Southern Africa 2015/16 El Niño-induced drought

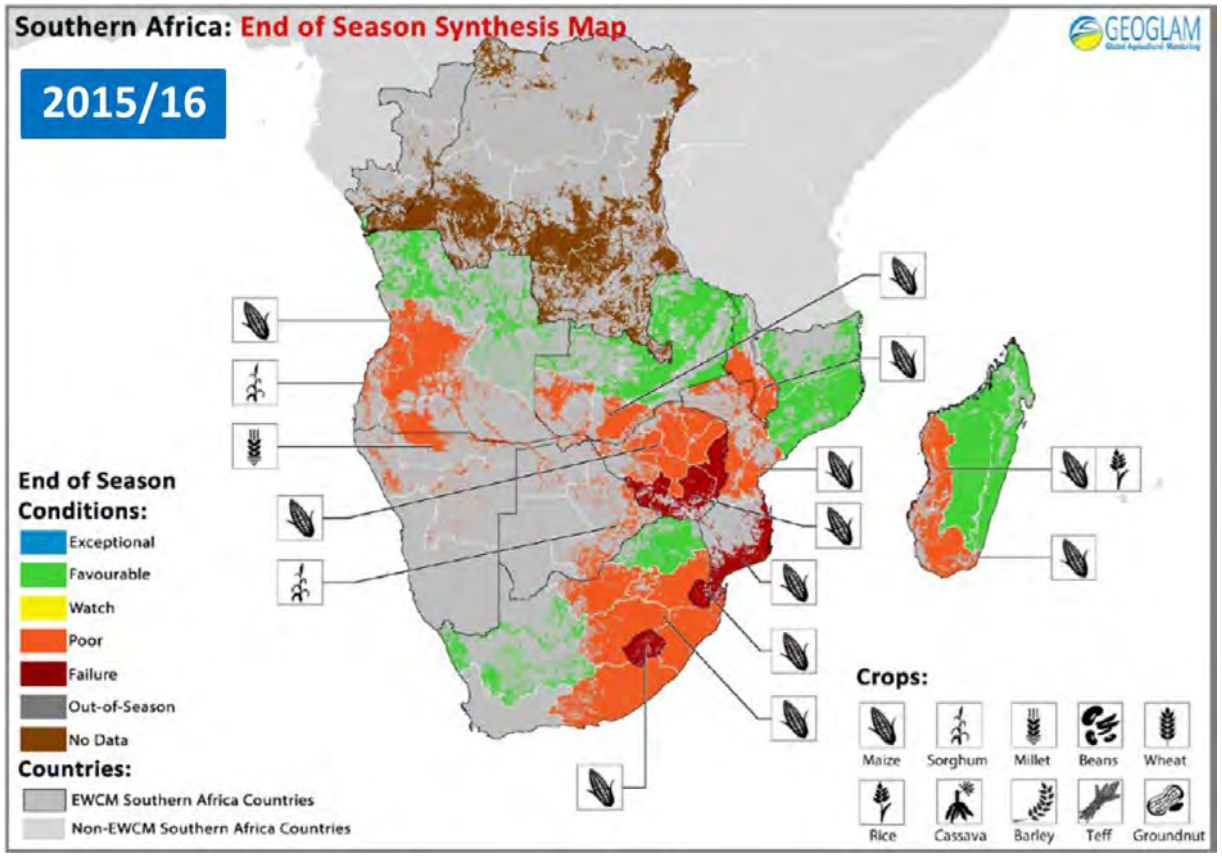
driest period in ≥
35 years

Percentage deviation from average cereal production
-10 %

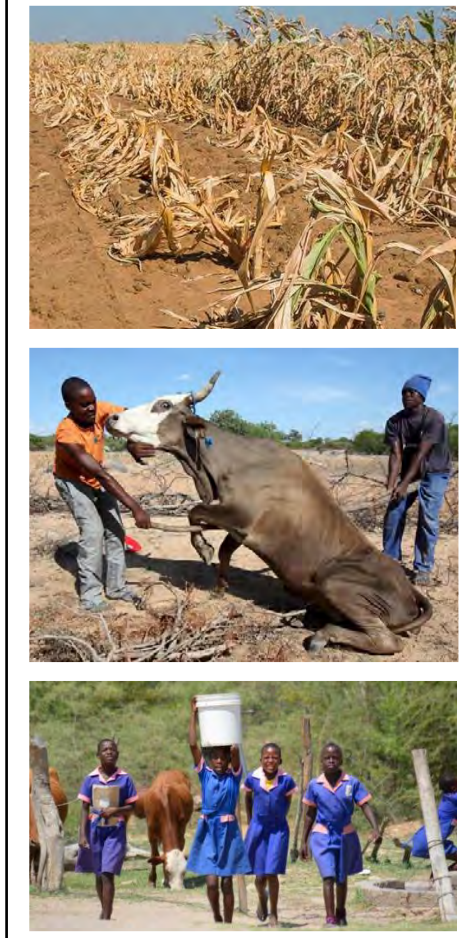
People in need of emergency assistance
23 M

Funding requirement (USD)
2.7 B

2015/16 End-of-season Crop Condition Map



Source: GEOGLAM CM4EW



Source: SADC Regional Humanitarian Appeal 2016

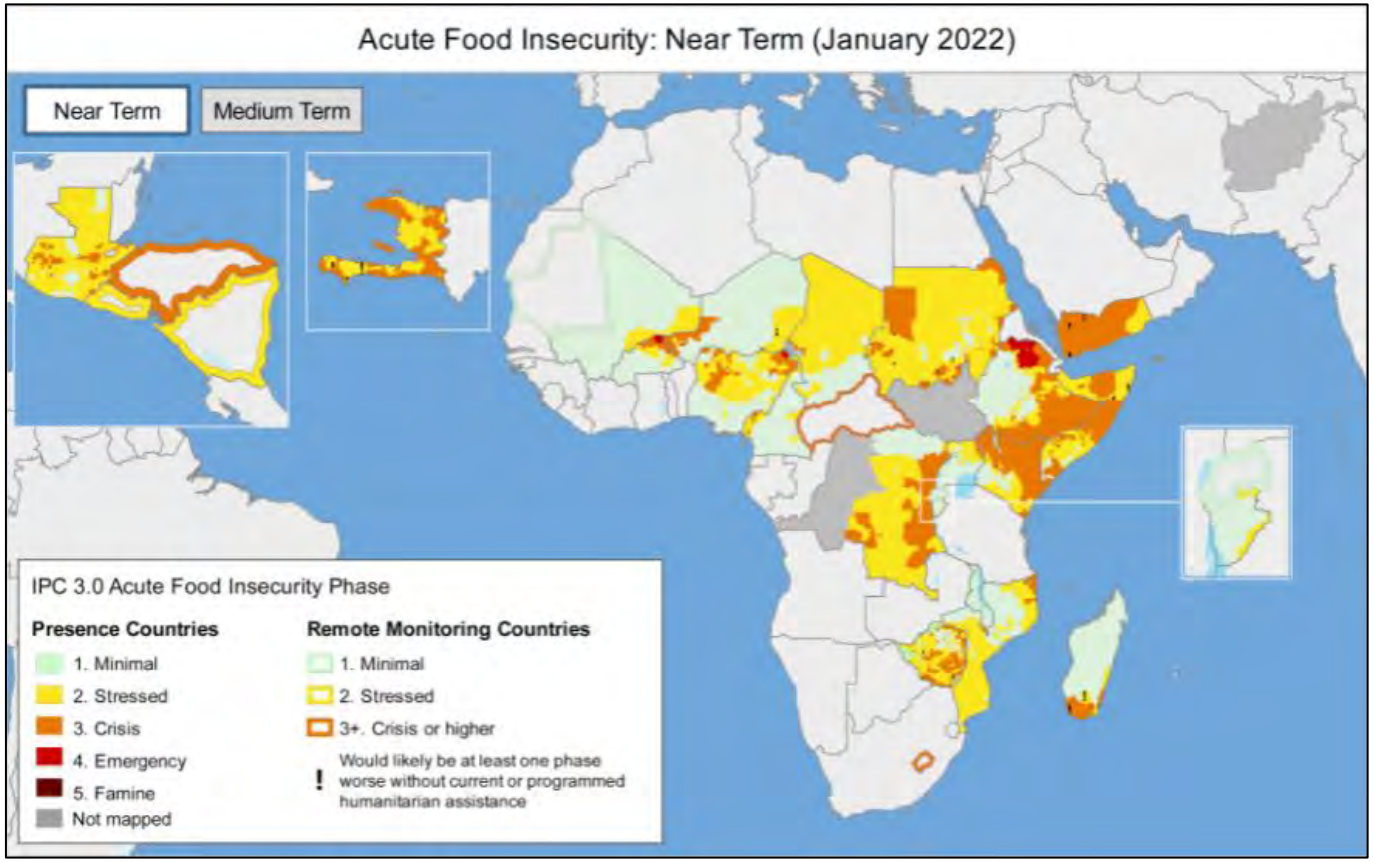
How multi-year prediction can aid planning for drought impacts on food security

Tamuka Magadzire[1] and James Verdin[2]

[1] FEWS NET, UCSB CHC
[2] USAID

Famine Early Warning Systems Network

- *Africa*
- *Central America & the Caribbean*
- *Central Asia*



- **Since 1985**
- **USAID-funded**

- Leading provider of early warning and analysis on acute food insecurity
- **Goal:** To provide: "Objective, evidence-based analysis to help government decision-makers and relief agencies **plan for** and respond to humanitarian crises."

FEWS NET Approach

AGROCLIMATOLOGY »

LIVELIHOODS »

MARKETS & TRADE »

NUTRITION »

Knowledge Base

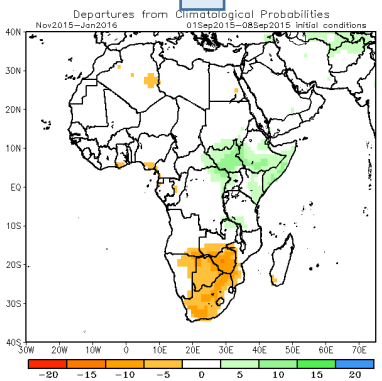
Efficient Monitoring

Scenario Development

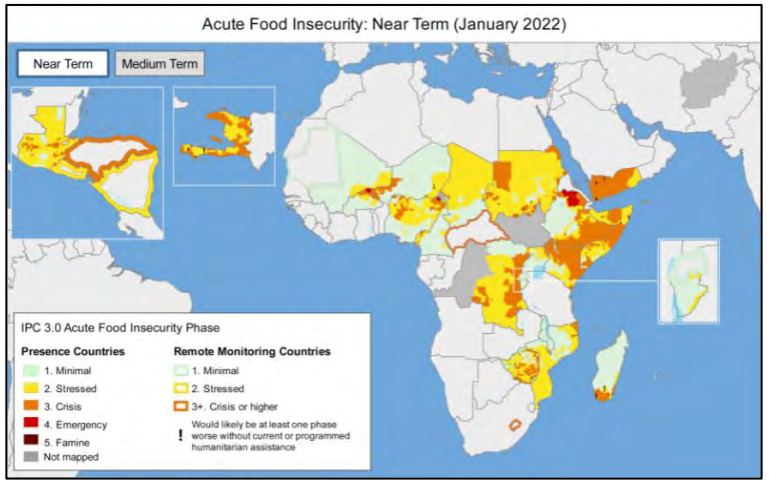
Comparable classification

Effective decision support

FEWS NET Early Warning Analysis

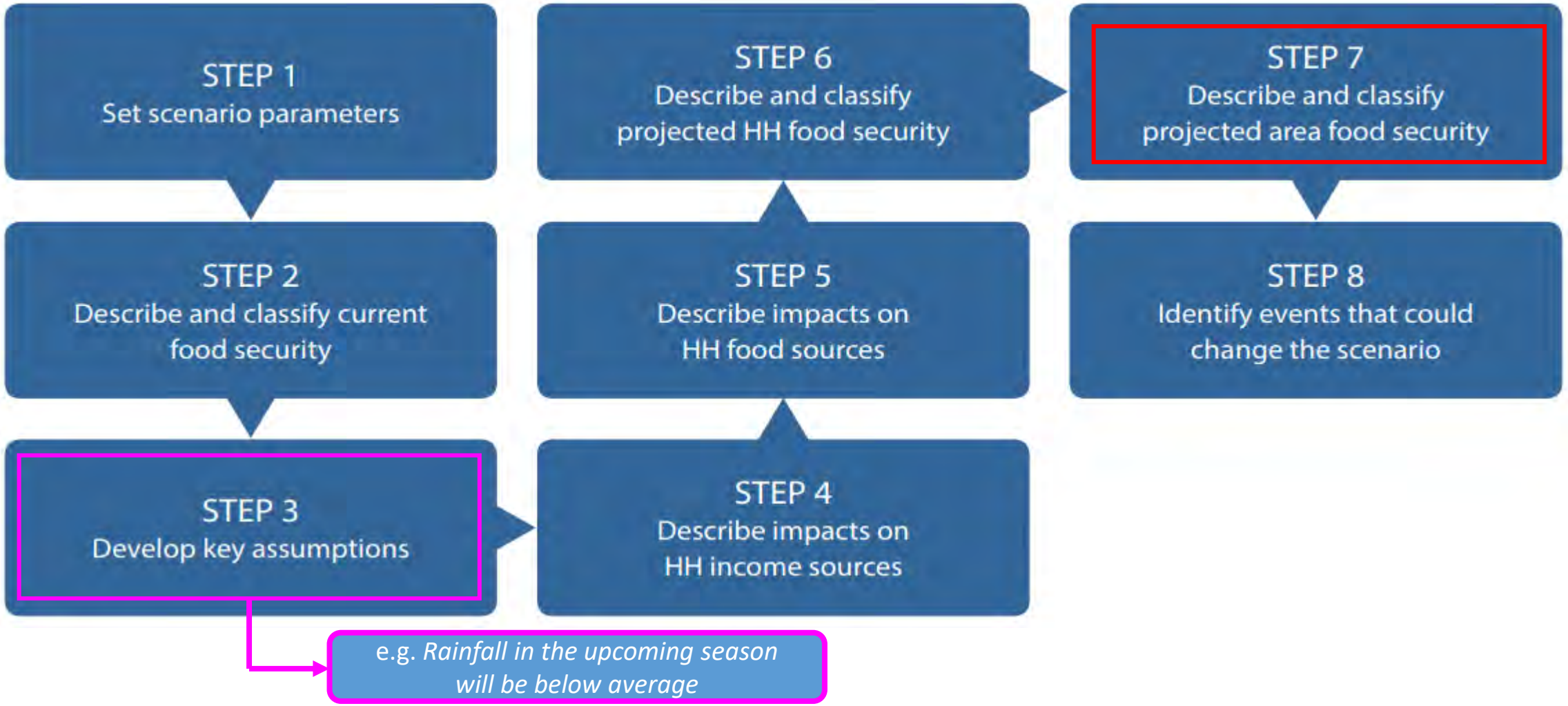


Rainfall forecasts…
and other parameters

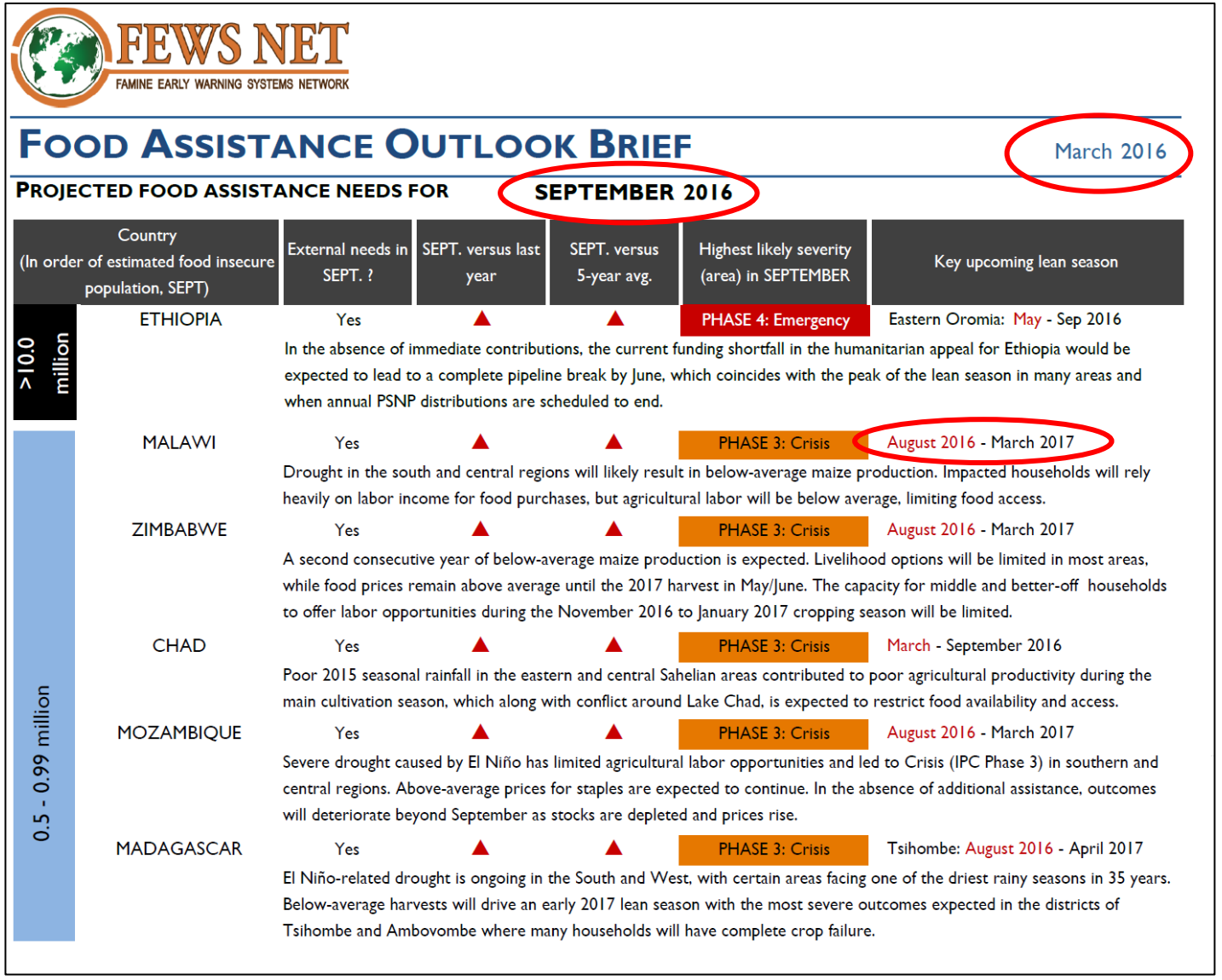


Short-to-Medium term
Food Security Projections

FEWS NET Scenario Development



Eight-month food security outlooks



FEWS NET
FAMINE EARLY WARNING SYSTEMS NETWORK

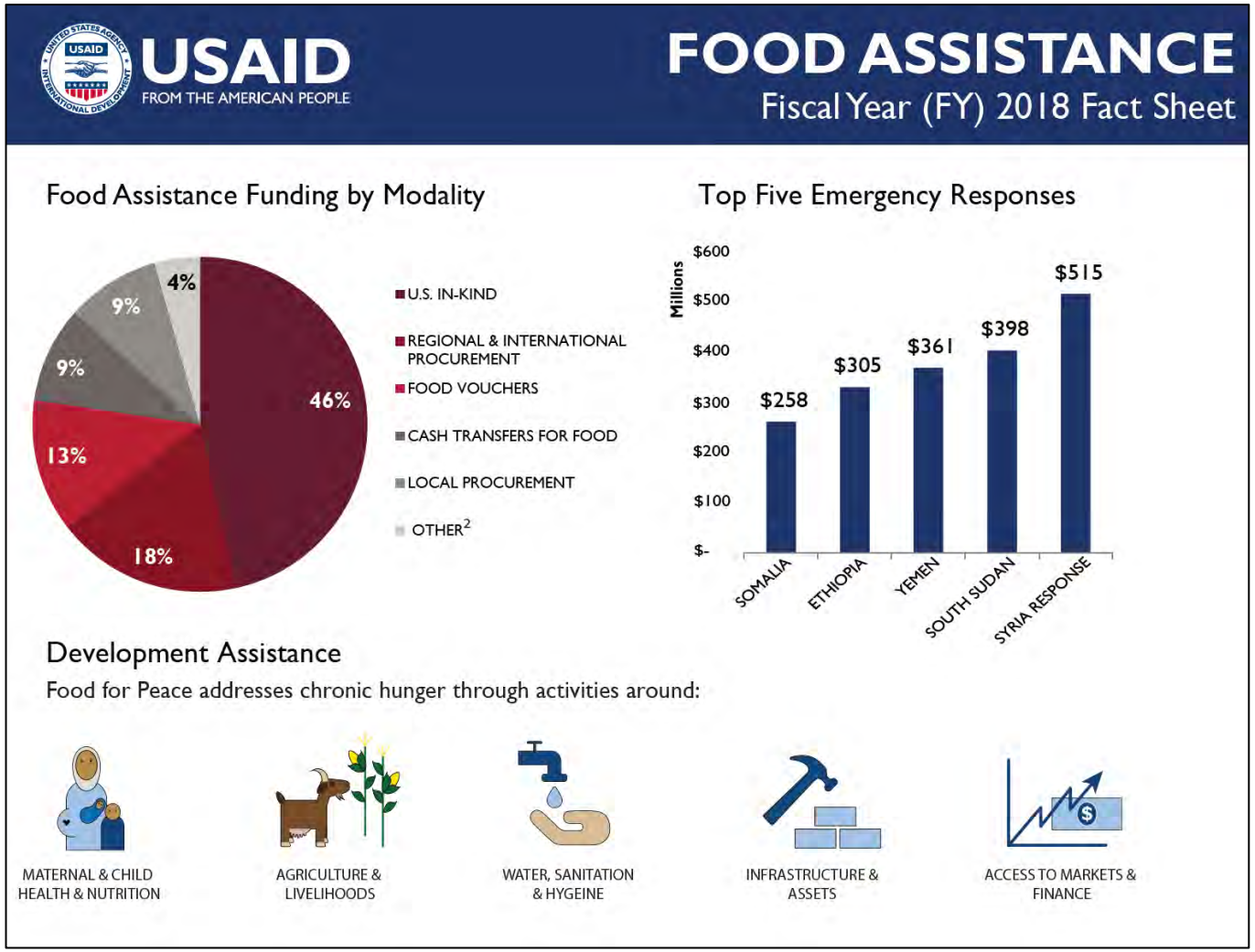
FOOD ASSISTANCE OUTLOOK BRIEF

March 2016

PROJECTED FOOD ASSISTANCE NEEDS FOR SEPTEMBER 2016

	Country (In order of estimated food insecure population, SEPT)	External needs in SEPT. ?	SEPT. versus last year	SEPT. versus 5-year avg.	Highest likely severity (area) in SEPTEMBER	Key upcoming lean season
>10.0 million	ETHIOPIA	Yes	▲	▲	PHASE 4: Emergency	Eastern Oromia: May - Sep 2016
	In the absence of immediate contributions, the current funding shortfall in the humanitarian appeal for Ethiopia would be expected to lead to a complete pipeline break by June, which coincides with the peak of the lean season in many areas and when annual PSNP distributions are scheduled to end.					
0.5 - 0.99 million	MALAWI	Yes	▲	▲	PHASE 3: Crisis	August 2016 - March 2017
	Drought in the south and central regions will likely result in below-average maize production. Impacted households will rely heavily on labor income for food purchases, but agricultural labor will be below average, limiting food access.					
	ZIMBABWE	Yes	▲	▲	PHASE 3: Crisis	August 2016 - March 2017
	A second consecutive year of below-average maize production is expected. Livelihood options will be limited in most areas, while food prices remain above average until the 2017 harvest in May/June. The capacity for middle and better-off households to offer labor opportunities during the November 2016 to January 2017 cropping season will be limited.					
	CHAD	Yes	▲	▲	PHASE 3: Crisis	March - September 2016
	Poor 2015 seasonal rainfall in the eastern and central Sahelian areas contributed to poor agricultural productivity during the main cultivation season, which along with conflict around Lake Chad, is expected to restrict food availability and access.					
	MOZAMBIQUE	Yes	▲	▲	PHASE 3: Crisis	August 2016 - March 2017
	Severe drought caused by El Niño has limited agricultural labor opportunities and led to Crisis (IPC Phase 3) in southern and central regions. Above-average prices for staples are expected to continue. In the absence of additional assistance, outcomes will deteriorate beyond September as stocks are depleted and prices rise.					
	MADAGASCAR	Yes	▲	▲	PHASE 3: Crisis	Tsihombe: August 2016 - April 2017
	El Niño-related drought is ongoing in the South and West, with certain areas facing one of the driest rainy seasons in 35 years. Below-average harvests will drive an early 2017 lean season with the most severe outcomes expected in the districts of Tsihombe and Ambovombe where many households will have complete crop failure.					

Example USAID Food Assistance

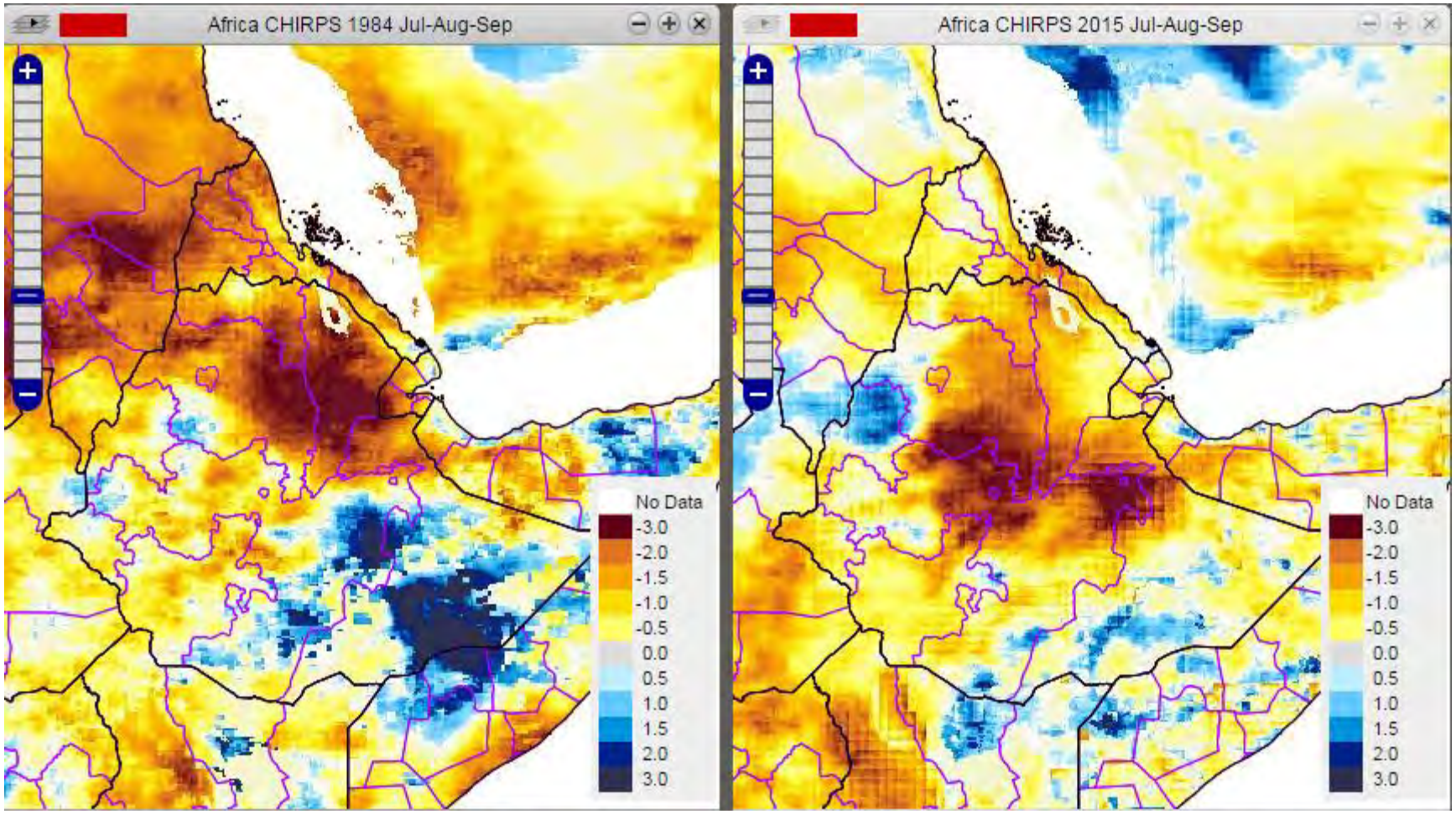


- Market-based Food Vouchers
- Flexible Market-based Food Assistance
- Cash Transfers for Food
- Local and Regional Procurement
- U.S. In-Kind Food Assistance

- Agriculture and Food Security
- Livelihoods
- Water Sanitation and Hygiene
- Logistics
- Economic Recovery and Market Systems
- Maternal and Child Nutrition

Source: USAID Fact Sheet

How Ethiopia Averted Widespread Famine



1984

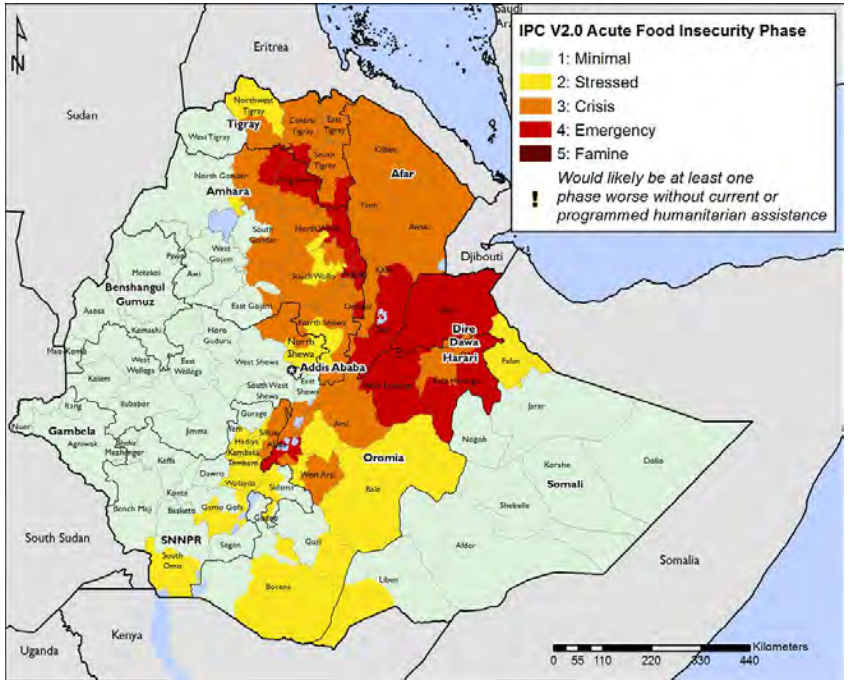
Standardized Precipitation Anomalies
Yellow to Brown: Increasingly Dry
Lt Blue to Dk Blue: Increasingly Wet

2015

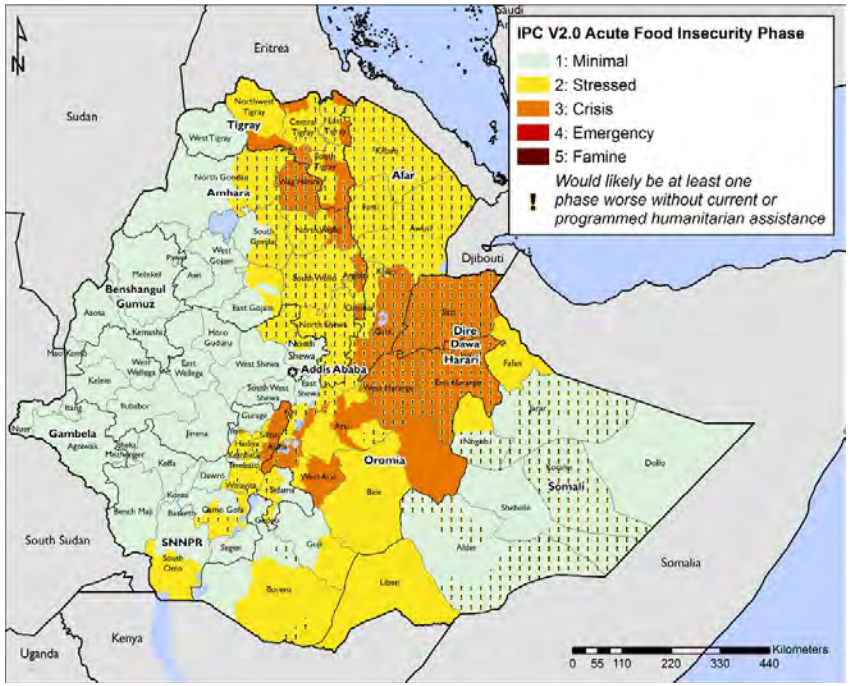
Ethiopia saw climatically similar droughts in 1984 and 2015

In1984, exceptional drought led to crop failure, livestock losses, and famine. Hundreds of thousands of people perished.

How Ethiopia Averted Widespread Famine



February 2016 projection of June-September 2016 acute food insecurity (no HA assumed)



June 2016 projection of June-September 2016 acute food insecurity (including planned, funded, and likely HA)

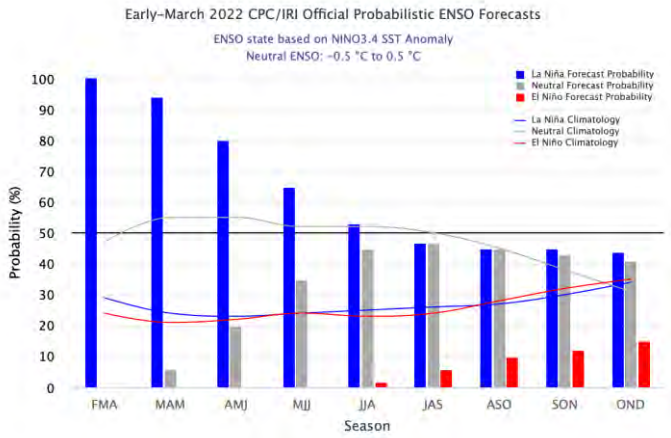
Early warning information signaled the need for an early and robust response **well before peak hunger needs**

PSNP covered 8 million people; USAID mobilized $800 million and 680,000 tons of food assistance for 4 million people

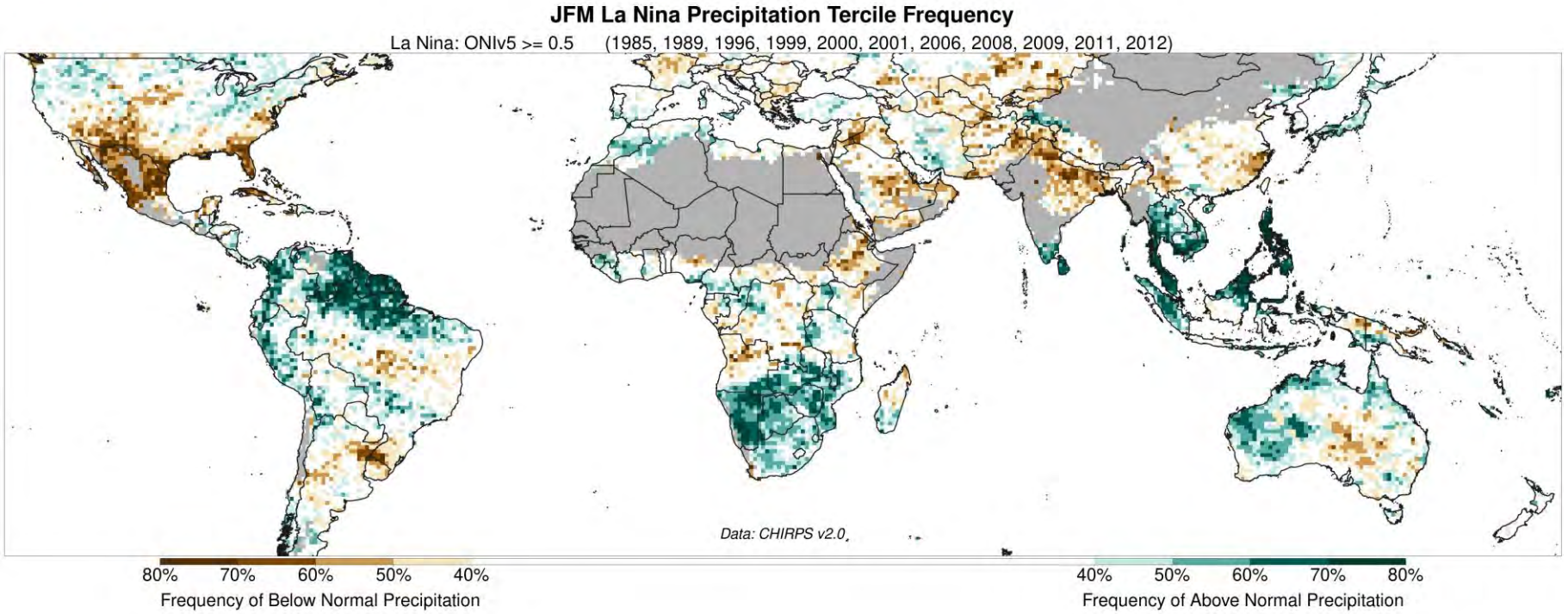
Emergency food insecurity and famine were prevented thanks to effective climate, early warning and decision support services which alerted social safety nets

Using climate prediction for food security outlooks

- ENSO gives us good long-lead predictability in many regions
- Helping to contribute to agroclimatology assumptions → food security projections



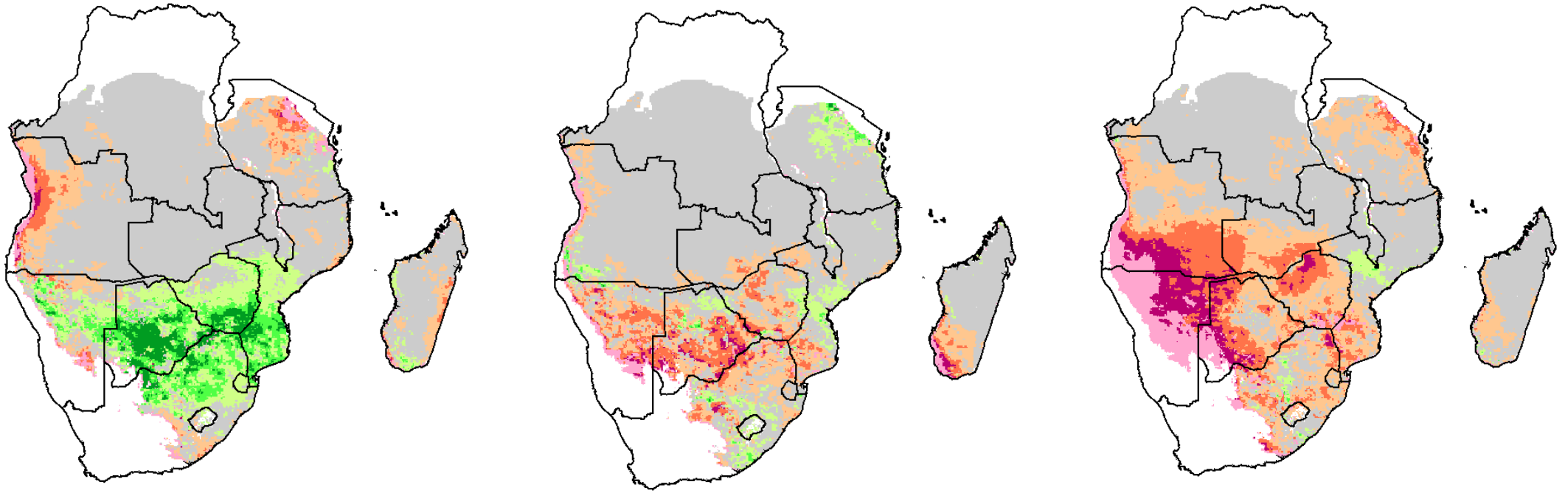
Source: NOAA CPC/IRI



Source: Laura Harrison and Andrew Hoell, unpublished data

Agroclimatic Indicators and Food Insecure Populations

Water Requirements Satisfaction Index (WRSI)

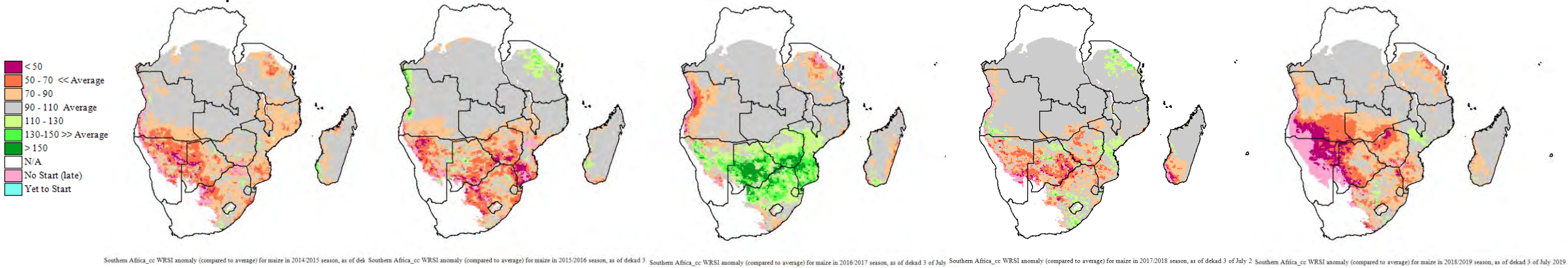


2016/17 2017/18 2018/19

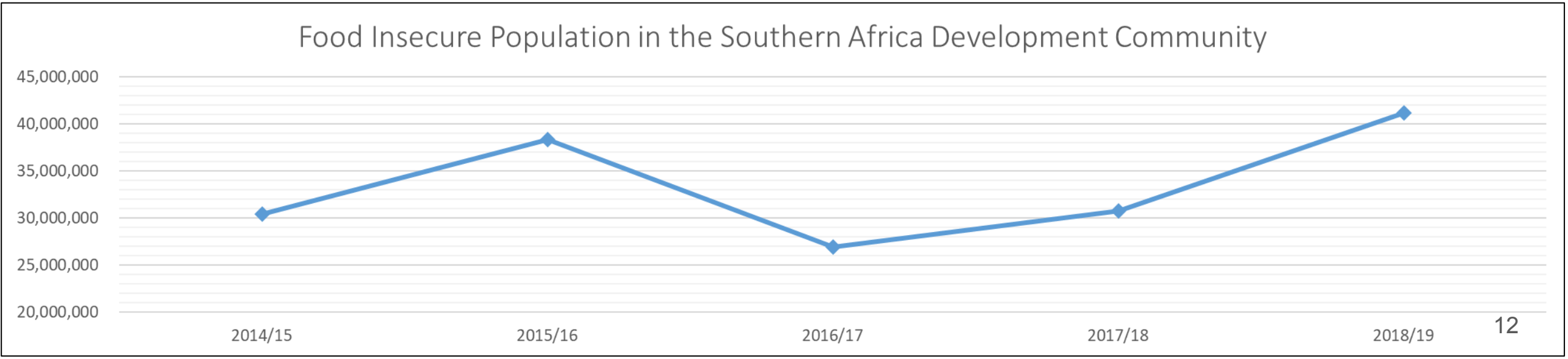
$$\text{WRSI} = \frac{\text{Actual Evapotranspiration}}{\text{Water Requirement}} \%$$

Agroclimatic Indicators and Food Insecure Populations

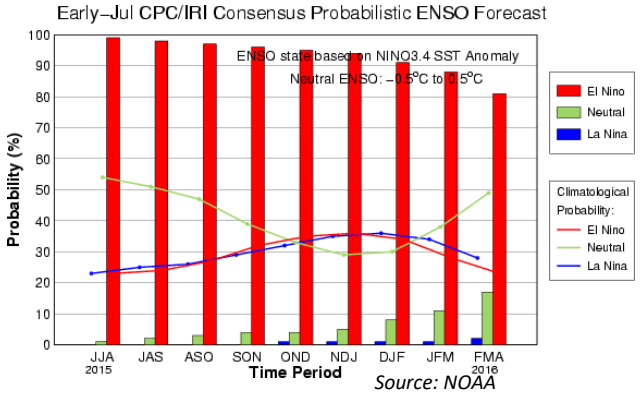
Water Requirements Satisfaction Index



2014/15 2015/16 2016/17 2017/18 2018/19

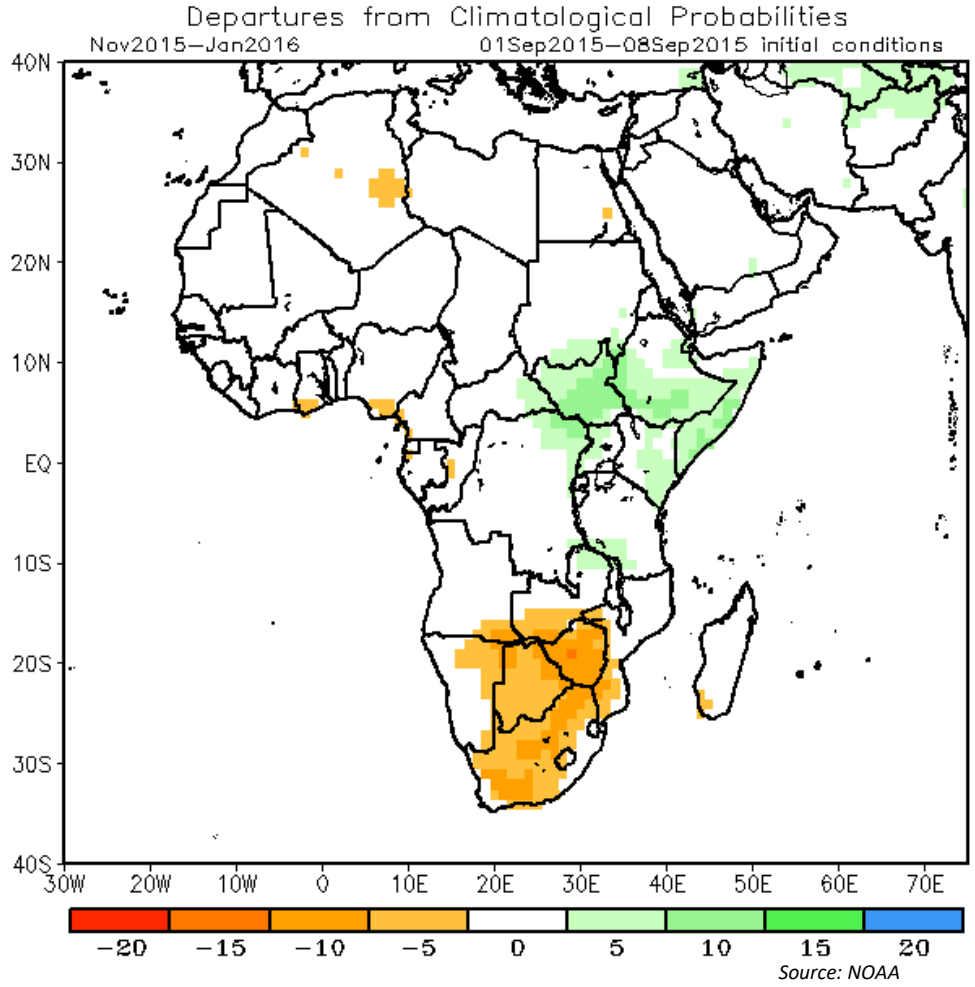


Forecasting the 2015/16 El Niño-induced drought



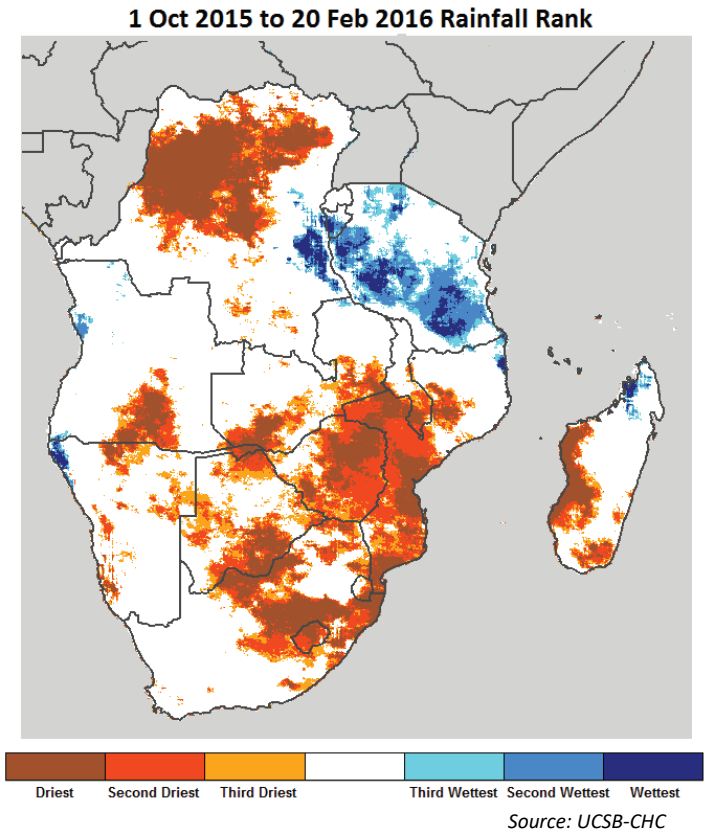
Source: NOAA

July IC ENSO Forecast



Source: NOAA

Sep IC Rainfall Forecast



Source: UCSB-CHC

What actually happened

Impacts and response: 2015/16 El Niño-induced drought

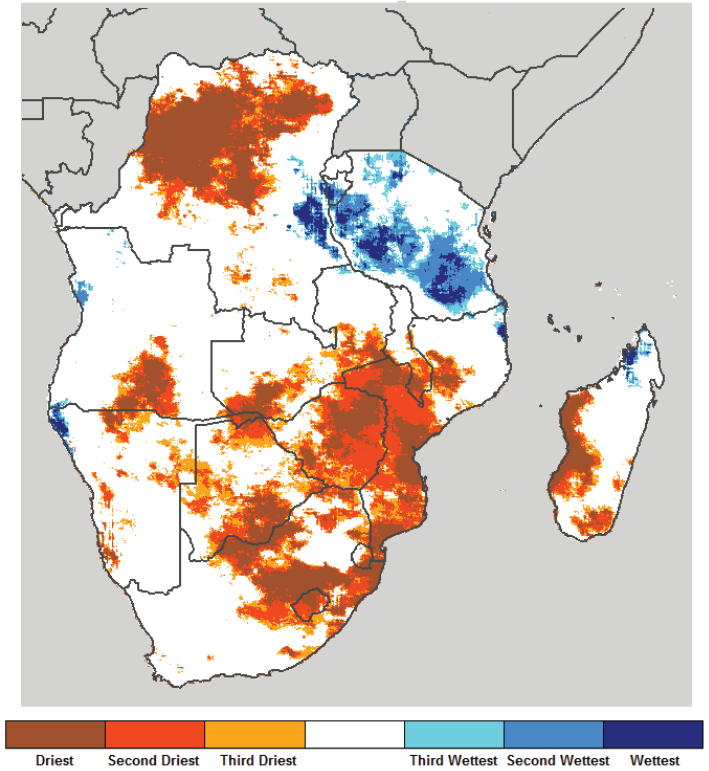
driest period in ≥
35 years

People in need of emergency assistance
23 M

Funding requirement (USD)
2.7 B

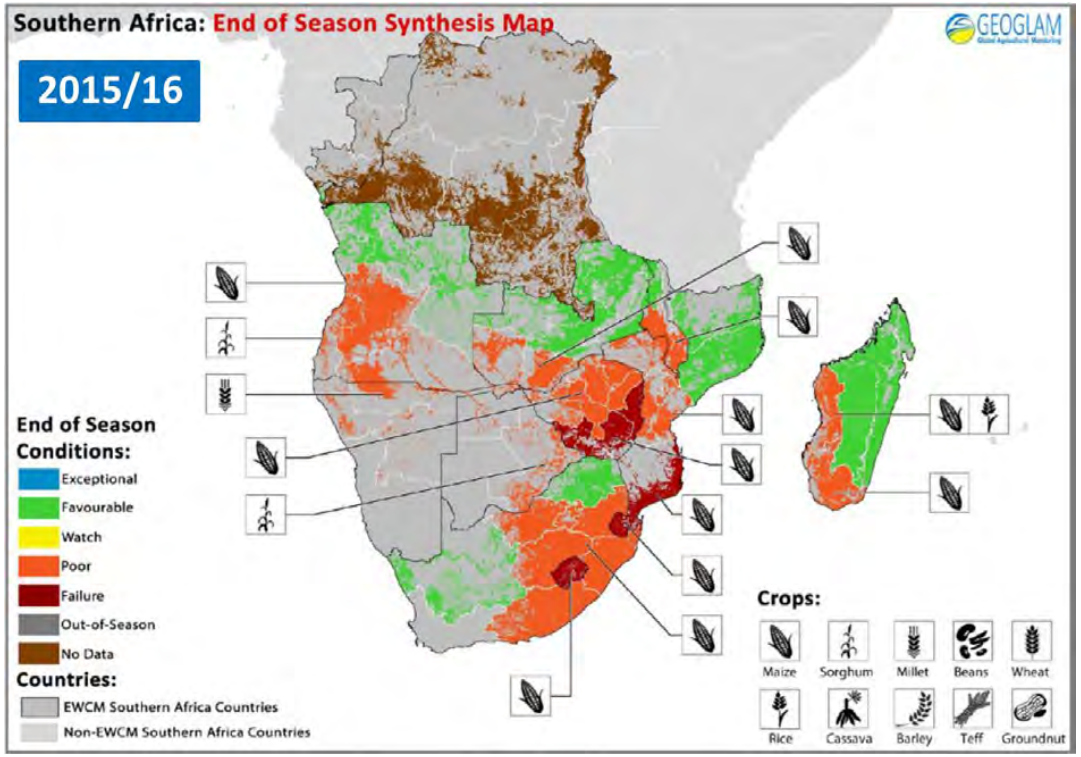
USAID response in FY 2015-2016
331 M

1 Oct 2015 to 20 Feb 2016 Rainfall Rank



Source: UCSB-CHC

2015/16 End-of-season Crop Condition Map



Source: GEOGLAM CM4EW

USAID response for 2015/16 SA drought

driest period in ≥ **35** years

People in need of emergency assistance **23** M

Funding requirement (USD) **2.7** B

USAID response in FY 2015-2016 **331** M

- **Local and Regional Procurement**
- **U.S. In-Kind Food Assistance**

} **82% of FY 2016 response (278 M)**

- Cash Transfers for Food
- Agriculture and Food Security

} **~15 % of FY 2016 response (278 M)**

- Nutrition
- Water Sanitation and Hygiene (WASH)
- Economic Recovery and Market Systems (ERMS)
- Humanitarian Coordination and Information Management
- Logistics Support and Relief Commodities
- Humanitarian Studies, Analysis or Applications
- Urban Vulnerability Assessments
- Program Support Costs

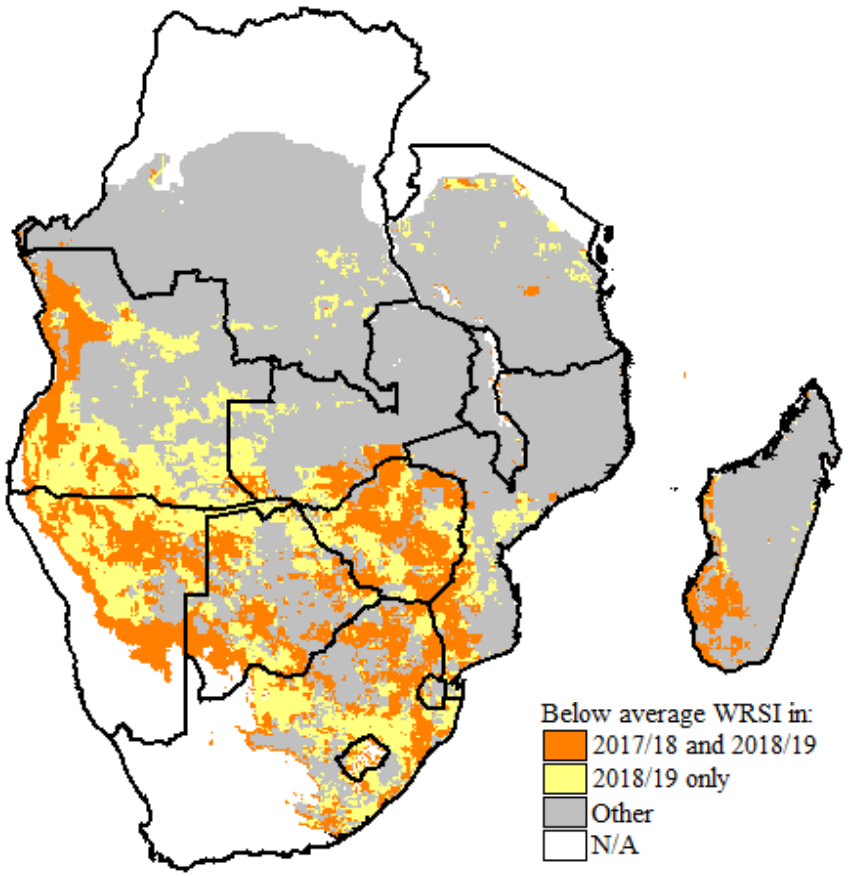
Source: USAID Southern Africa Drought Fact Sheet #1 - 10-31-2016

USAID's Agriculture and Food Security responses

- interventions that:
  - increase livelihood opportunities
  - address the basic food requirements of disaster-affected populations
  - strengthen local disaster response capacity
  - increase community resilience to shocks that could negatively affect livelihoods and food security
  - supports agricultural infrastructure rehabilitation and economic recovery
  - provide agriculture-based livelihood assistance

Source: USAID: https://www.usaid.gov/what-we-do/working-crises-and-conflict/responding-times-crisis/how-we-do-it/humanitarian-sectors/agriculture-and-food-security

2-year recurrent drought: forecast implications

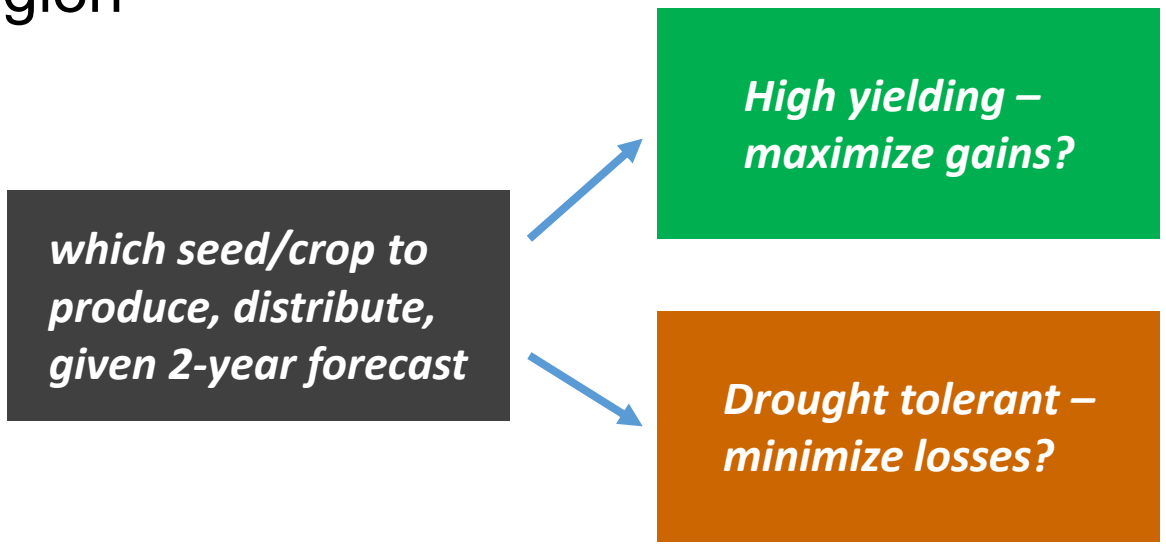


- WRSI was below average two years in a row
- What actions for food security planning knowing 2 bad years in a row are coming?
- Implications for humanitarian assistance: 1 year of drought versus 2 consecutive years
  - Prepositioning?
  - Improved logistics planning?

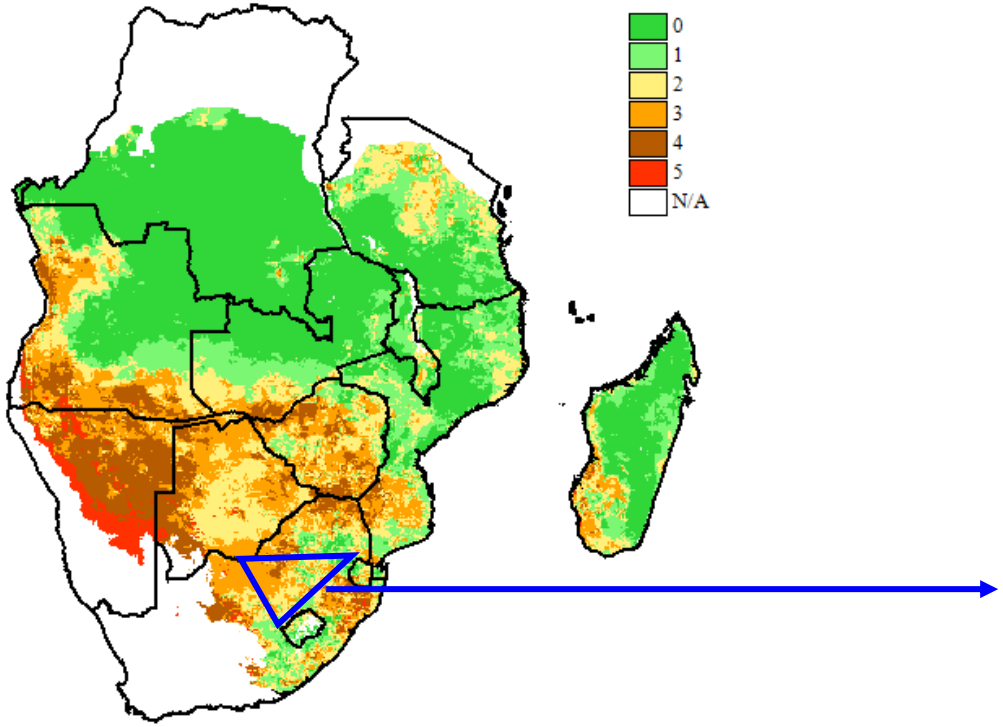
USAID Southern Africa Development Initiatives

- USAID Feed the Future (FTF) Southern Africa Seed Trade Project
  - improve availability + access to high-quality seed in Southern Africa
  - facilitate seed trade across the region

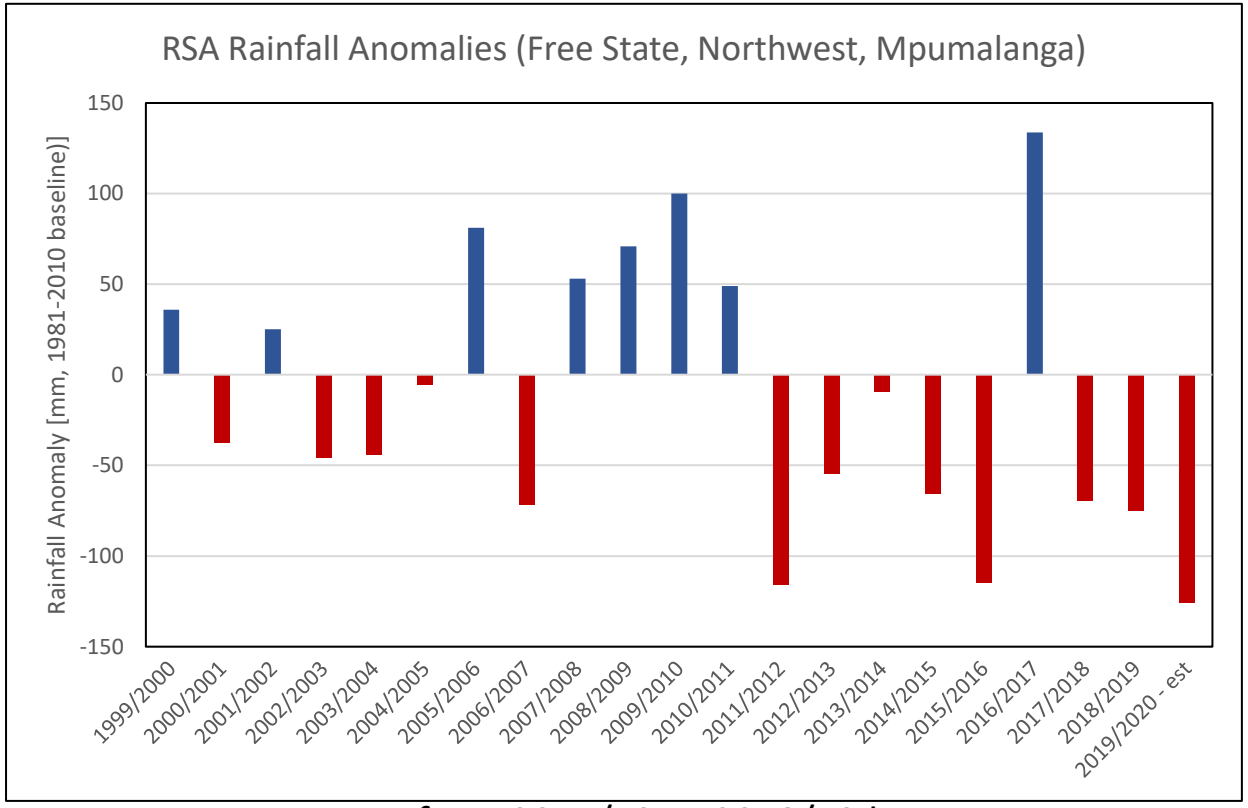
- ***Multi-year prediction impact →***



Several years of recurrent droughts



Number of seasons between 2014/15 and 2018/19 with below median WRSI (< 90% of median)



Most years from 2011/12 to 2018/19 have had poor South Africa maize triangle rainfall

Source: Chris Funk, CHIRPS

What food-insecurity mitigation measures could be taken knowing a cluster of poor rainfall seasons is impending?

Potential actions

- ***Multi-year prediction impact →***

which seed/crop to produce, distribute, given multi-year dry forecast

High yielding – maximize gains?

Drought tolerant – minimize losses?

Promote alternative livelihoods?

Drought mitigation measures

- Advance warning of severe drought can instigate various measures including (e.g. Garcia-Leon et al, 2021)
  - development of preparedness plans
  - increased water supply
  - water conservation programs
  - crop insurance
  - increasing percentage of drought tolerant crops, varieties and livelihoods
  - enhancing water recycling and reuse.

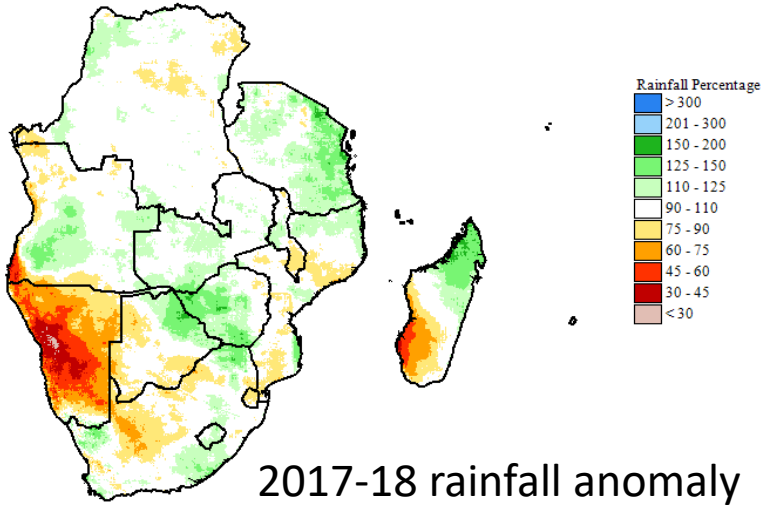
Opportunities & Challenges in using forecasts to improve production-side Food Security

- Study: farmers have a tendency to increase use of drought tolerant varieties when presented with low rainfall seasonal forecasts
- Small scale farmers use their expectations of the upcoming season to decide which varieties to plant

- Limited access to forecasts in some areas
- Typically forecasted climate variables do not always directly translate to decision-support… “Will there be a drought”?
- Reliability of the forecasts is an important factor for confidence and continued use
- Tendency to emphasize climate extremes risks compared to opportunities in decision-making (Muita et al, 2021)

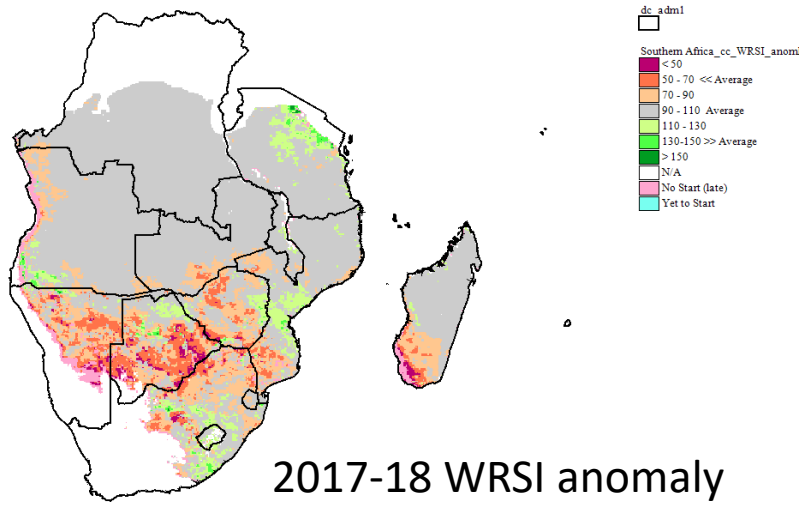
Additional Food security needs in multi-year prediction

- Sub-seasonal rainfall distribution characteristics in forecasts would increase their utility for food security outlooks.
  - Dry spells
  - Onset of rains
  - Cessation of rains



2017-18 rainfall anomaly

Percent of Mean Rainfall for 1 October 2017 to 31 March 2018



2017-18 WRSI anomaly

Southern Africa_cc WRSI anomaly (compared to average) for maize in 2017/2018 season, as of dekad 3 of July 2018

Some concluding remarks

- The ability to accurately project food security outcomes over a year out can help improve drought response
- Interventions that improve resilience, maximize gains in good seasons, and minimize losses from drought years can be more effectively targeted using accurate multi-year predictions
- Sub-seasonal rainfall distribution characteristics in long-lead and multi-year forecasts would increase the utility of forecasts for food security outlooks

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USAID
FROM THE AMERICAN PEOPLE

Thank you