

The economic and social impacts of the 2015-2016 El Niño event

Sep 23 2016

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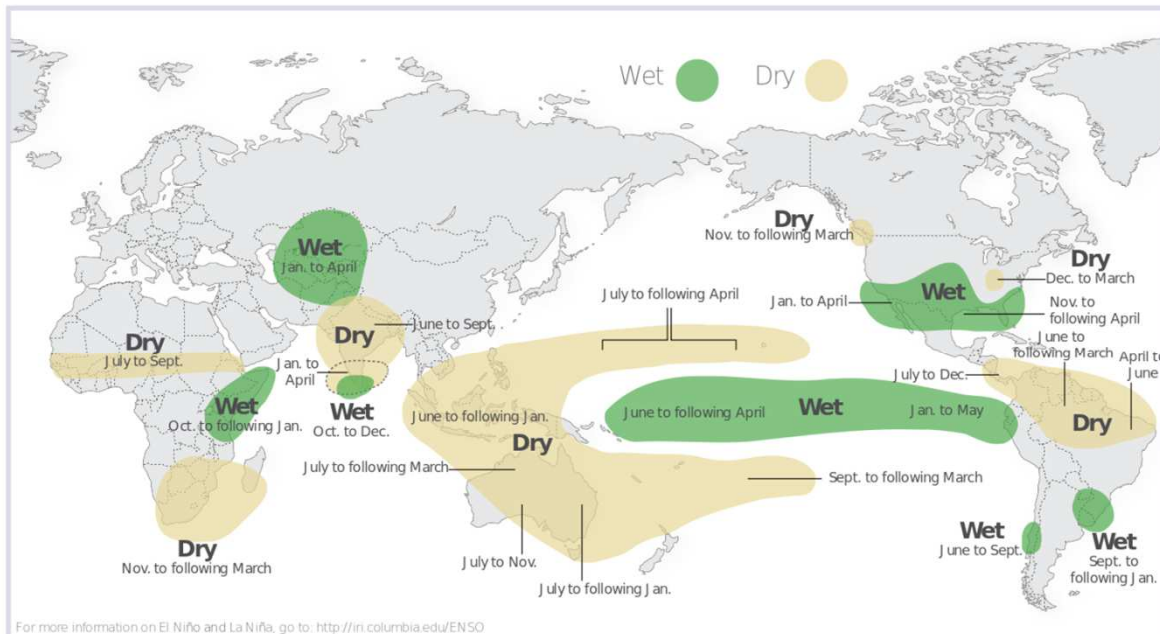
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Hawai'i
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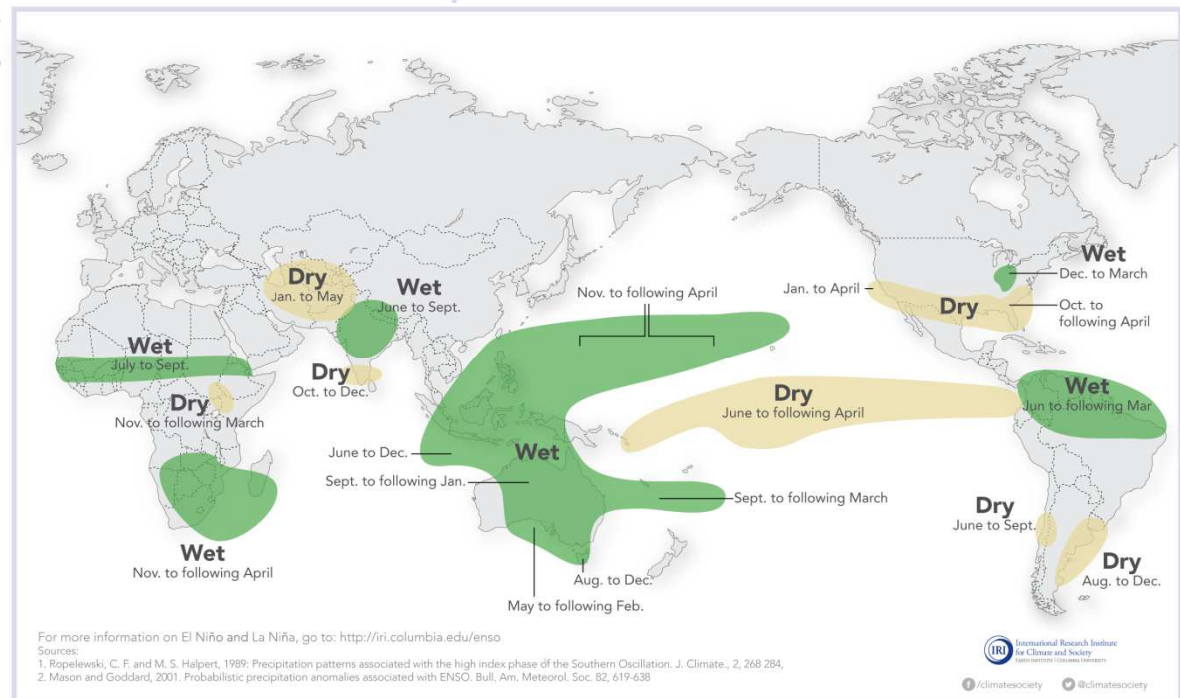


For more information on El Niño and La Niña, go to: <http://iri.columbia.edu/ENSO>

Sources: Ropelewski, C. F. and M. S. Halpert, 1989. Precipitation patterns associated with the high index phase of the Southern Oscillation. J. Clim., 2, 268-284.
 2. Mason and Goddard, 2001. Probabilistic precipitation anomalies associated with ENSO. Bull. Am. Meteorol. Soc. 82, 619-638

El Niño and Rainfall

La Niña and Rainfall



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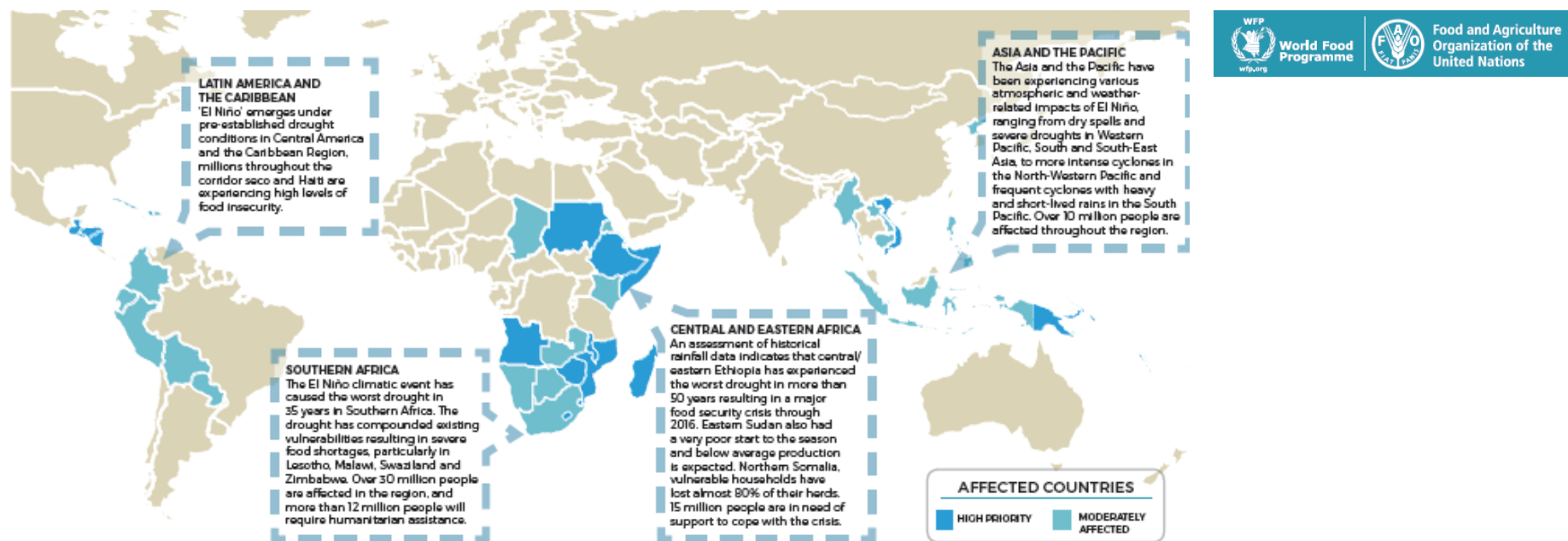
<http://www.climate.gov/news-features/departments/8443/all>

Impacts

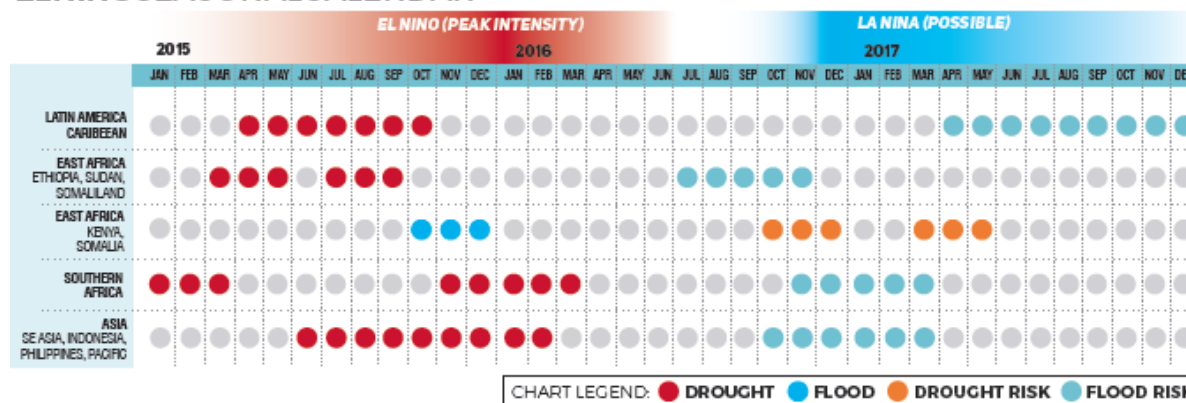
Rainfall, Tropical Cyclones and Societal
Impacts

Summary of the 2015-2016 El Niño impacts

(WFP/FAO 13 July 2016)

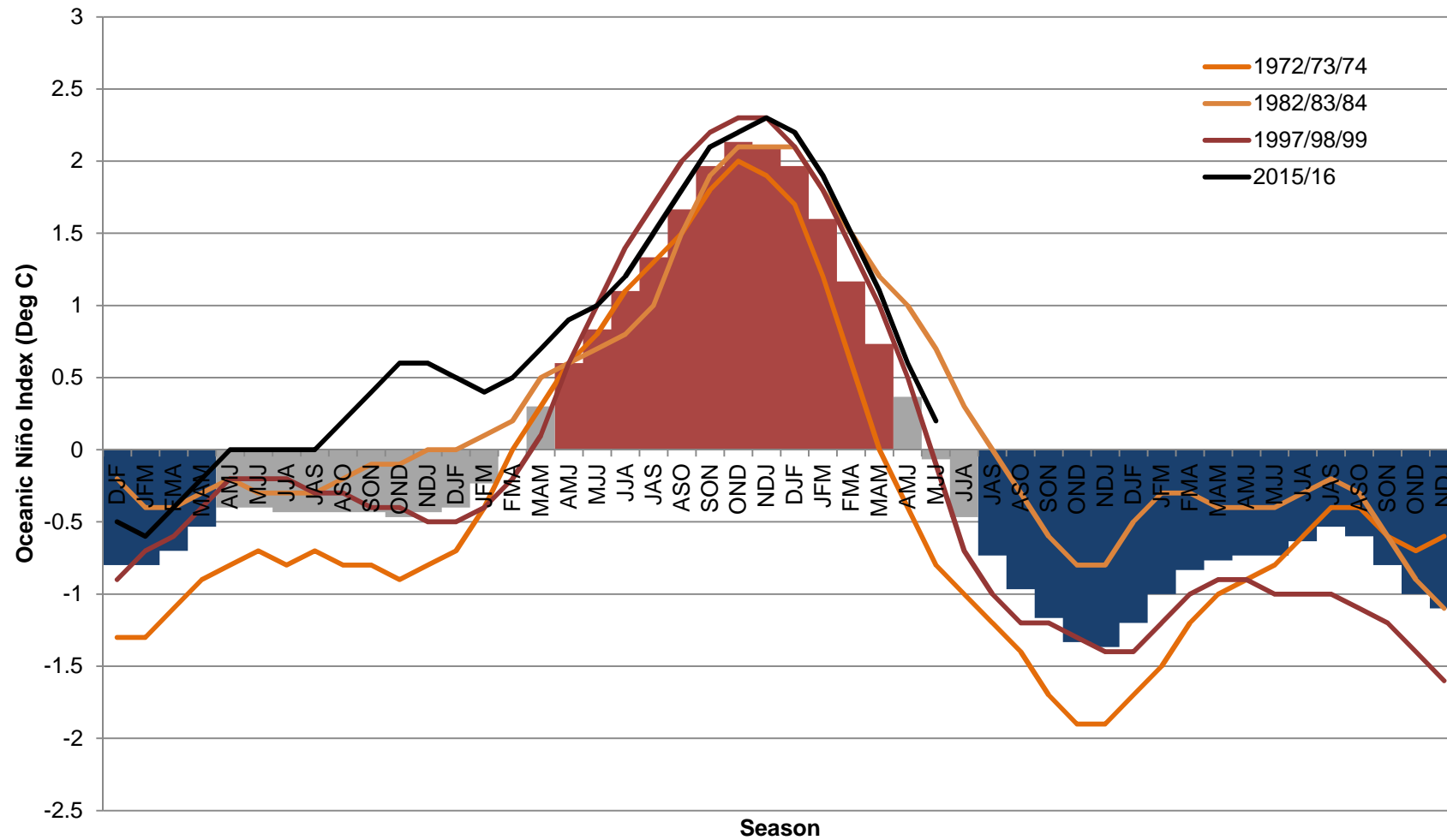


EL NIÑO SEASONAL CALENDAR**



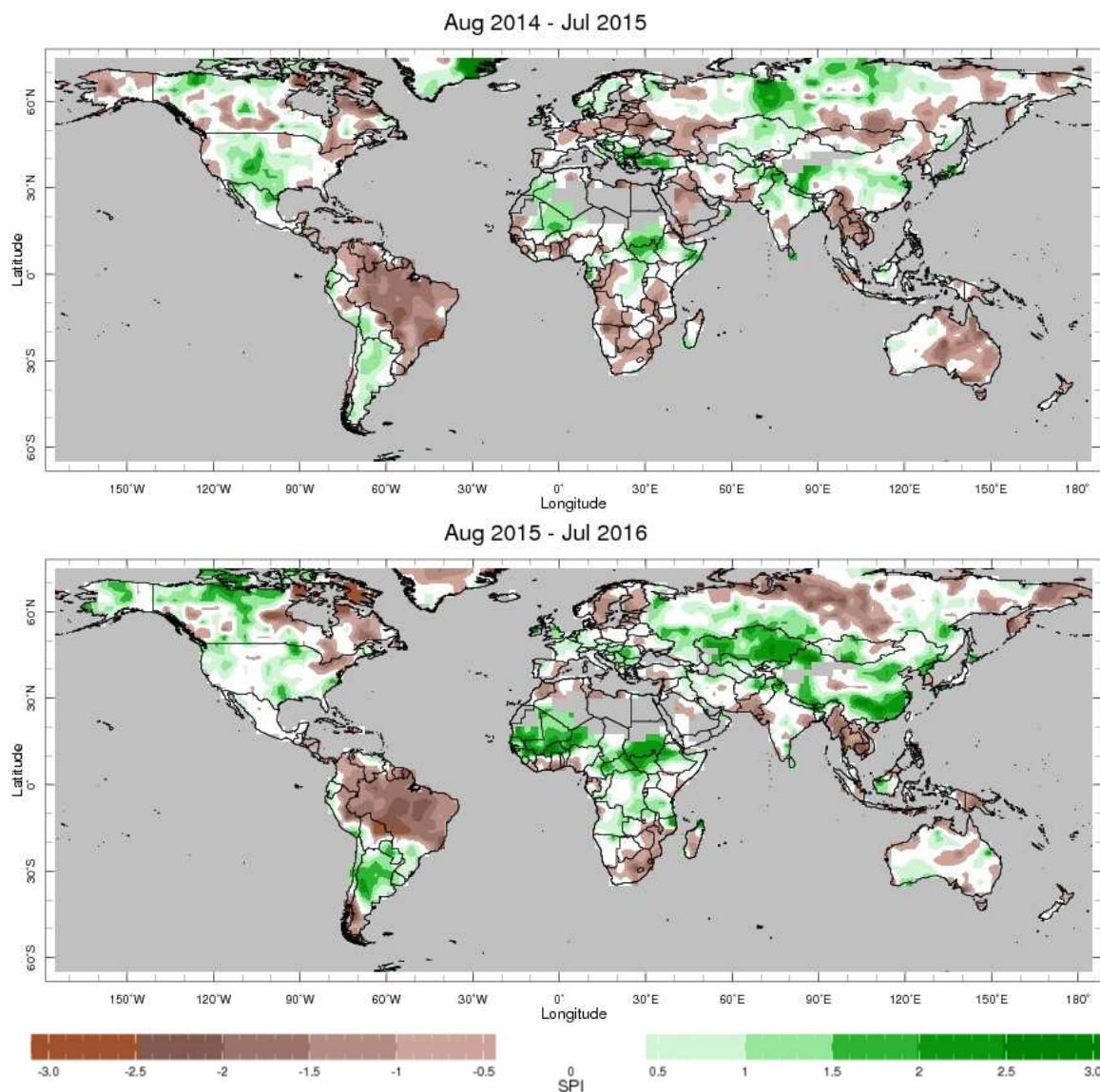
Retrieved from:
http://reliefweb.int/sites/reliefweb.int/files/resources/wfp_fao_el_nino_overview_by_fsc_1.pdf

El Niño “like” conditions during 2014



Rainfall impacts: Drought

- The impacts of the 2015/2016 El Niño where compounded with those from El Niño “like conditions during the year before
- Extremely dry conditions over two years (two growing seasons) were present in many areas of the globe
 - Northern South America
 - Africa
 - South East Asia
 - Pacific Islands
 - Australia

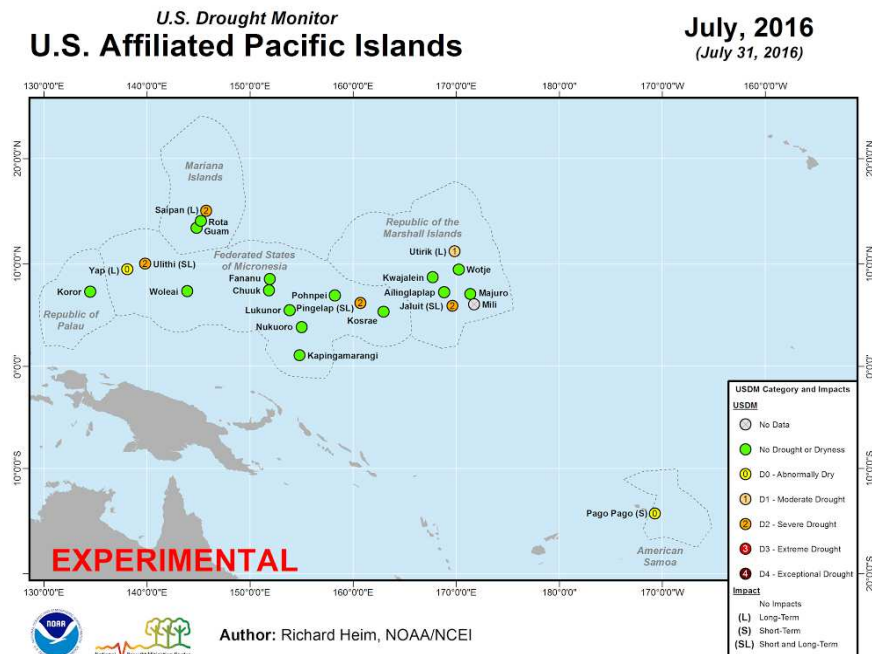
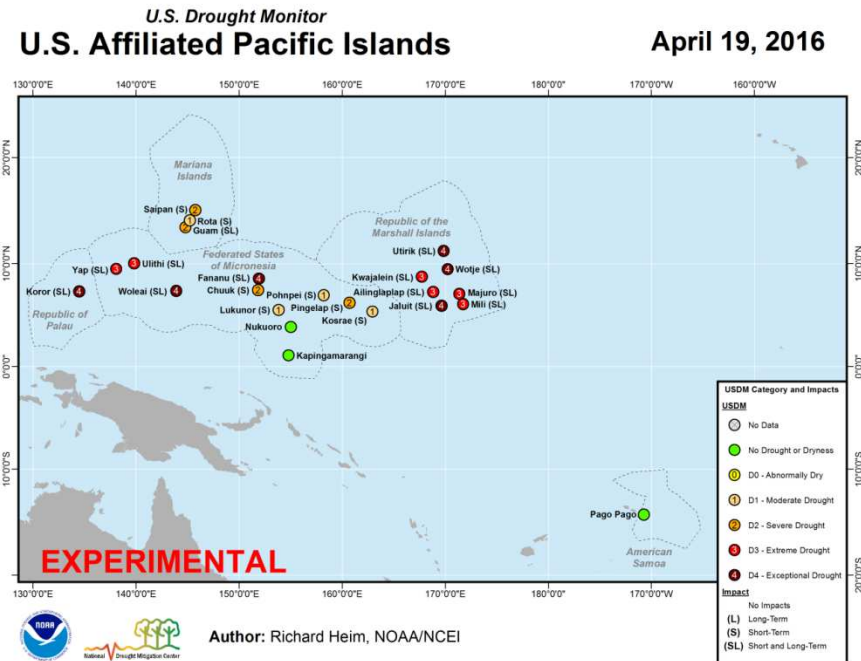


Figures made using the IRI Map Room
<https://iridl.ldeo.columbia.edu/maproom/>

Drought impacts to the USAPIs

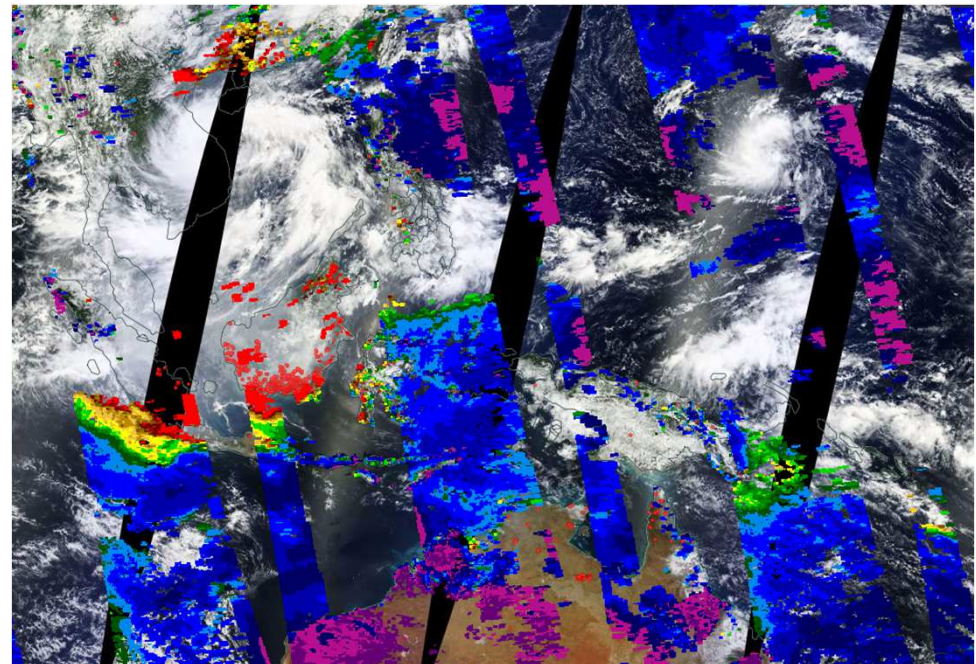
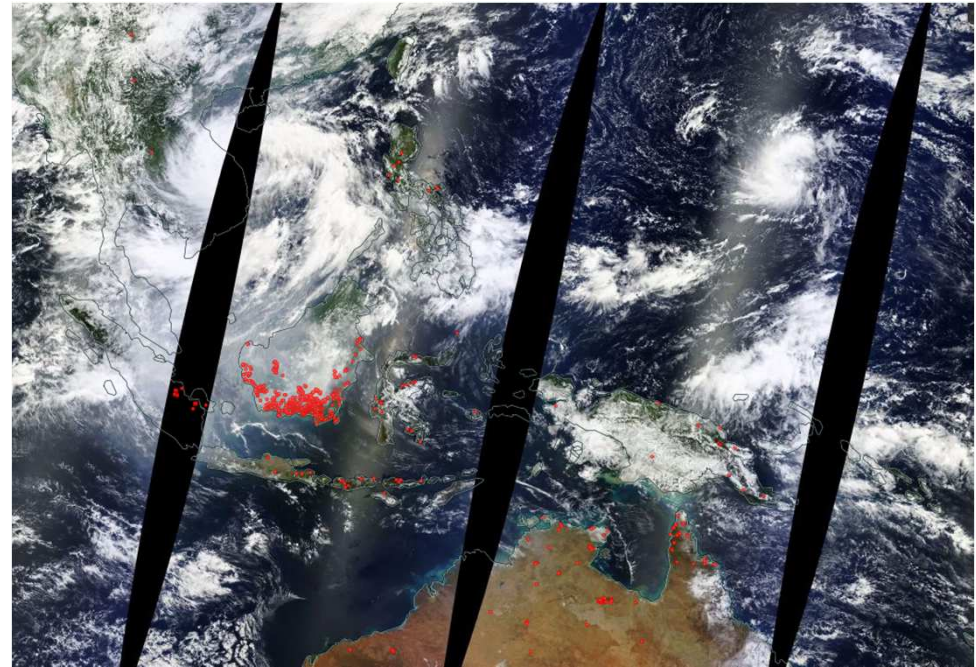
- State of Emergency due to drought declared for
 - Republic of Palau
 - Federated States of Micronesia
 - Federal and State levels
 - Republic of the Marshall Islands
- Water Rationing Implemented on bigger islands
- Drinking water became a serious issues for smaller islands
- Damage to food crops in smaller islands
- Drought conditions have eased in the last month
 - Water supply is less of a concern
 - Food security will take more time to recuperate

Special acknowledgement to
Richard Heim NOAA/NCEI
Chip Guard NWS WFO Guam
WSO personnel throughout the USAPI



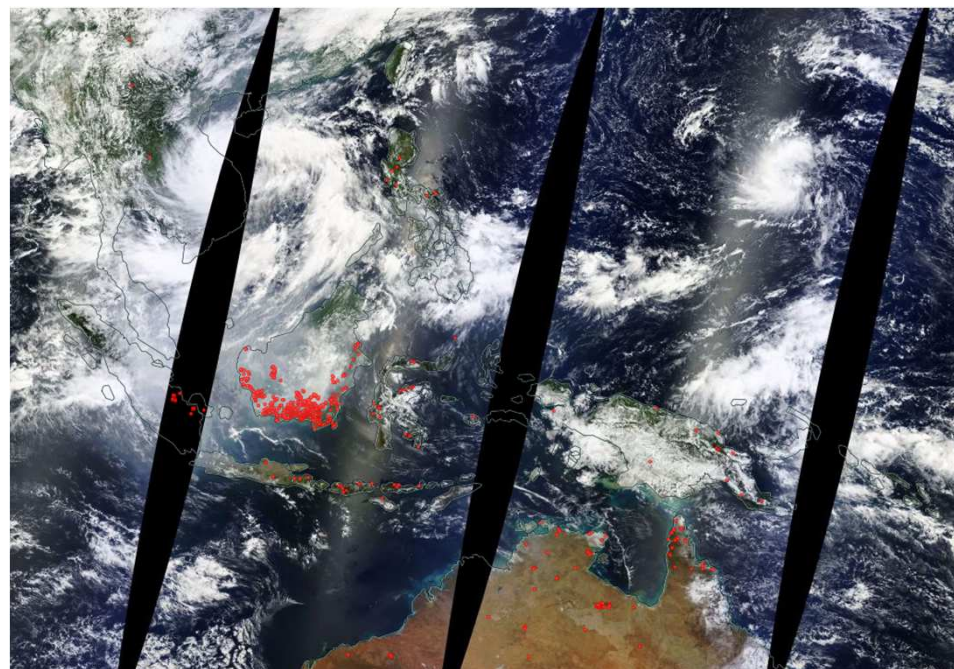
Borneo fires

- Sep 14 2015
- Top MODIS Terra true color and thermal anomalies
- Bottom MODIS Terra Aerosol Optical Depth
- This type of widespread fires was also seen during 1997



Borneo fires

- Costliest singular event of 2015
 - Estimated 16 billion in economic cost
 - 1.9% of Indonesia's GDP
- Estimated 100000 excess deaths across Indonesia, Malaysia and Singapore (Koplitz et al. ERL 19 Sep 2016)



Global Economic Losses

Exhibit 1: Top 10 Global Economic Loss Events

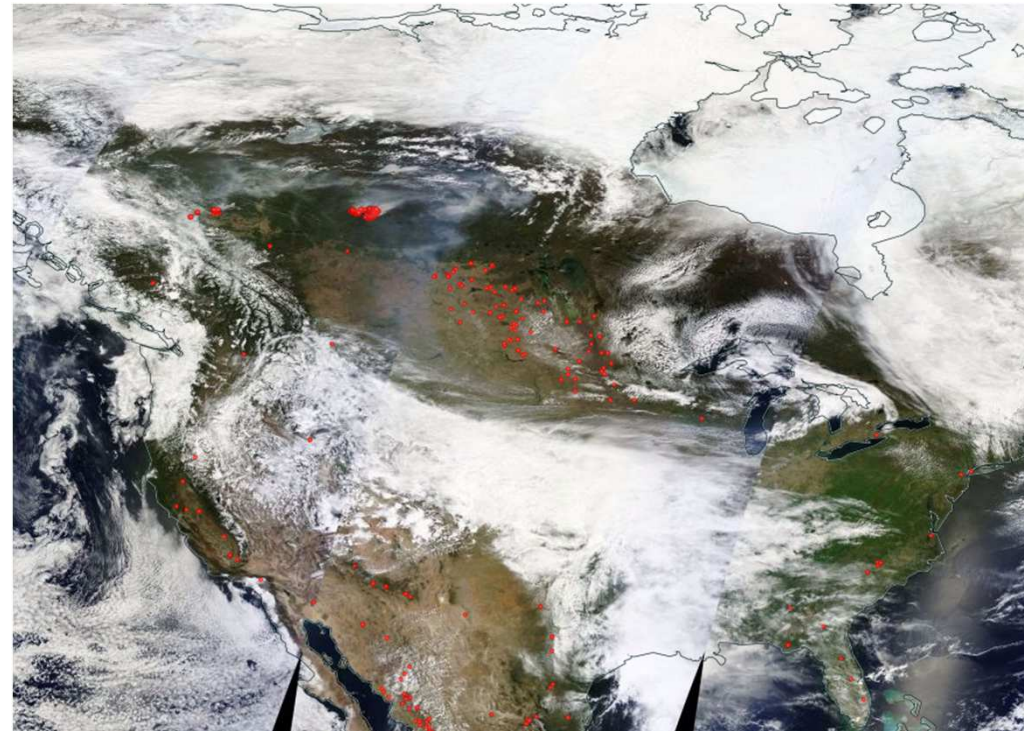
Date(s)	Event	Location	Deaths	Economic Loss (USD)	Insured Loss (USD)
Yearlong	Forest Fire	Indonesia	19	16.1 billion	250 million
April 25 & May 12	Earthquake(s)	Nepal	9,120	8.0 billion	200 million
October 1 – 11	Flooding	United States	21	5.0 billion	700 million
October 2 – 4	Tropical Cyclone	China, Philippines	22	4.2 billion	100 million
Nov. – Dec.	Flooding	India, Sri Lanka	386	4.0 billion	650 million
May 23 – 28	Severe Weather	United States	32	3.8 billion	1.4 billion
February 16 – 22	Winter Weather	United States	30	3.3 billion	2.1 billion
August 2 – 9	Tropical Cyclone	China, Taiwan	34	3.2 billion	100 million
December 26 – 30	Severe Weather	United States	46	3.0 billion	1.4 billion
December 22 – 31	Flooding	United Kingdom	N/A	2.5 billion	1.3 billion
		All Other Events		70 billion	27 billion
		Totals		123 billion¹	35 billion^{1,2}

Source:
AON Benfield
2015 Annual Global Climate
and Catastrophe Report

Fort McMurray Fires

- El Nino in the Pacific disrupted weather patterns to bring northern Alberta a dry fall and very little snow throughout the winter
- Similar conditions were observed in 1998

According to Daniel Thompson from Natural Resources Canada in Edmonton to Bloomberg News



MODIS True Color Image from May 16th 2016

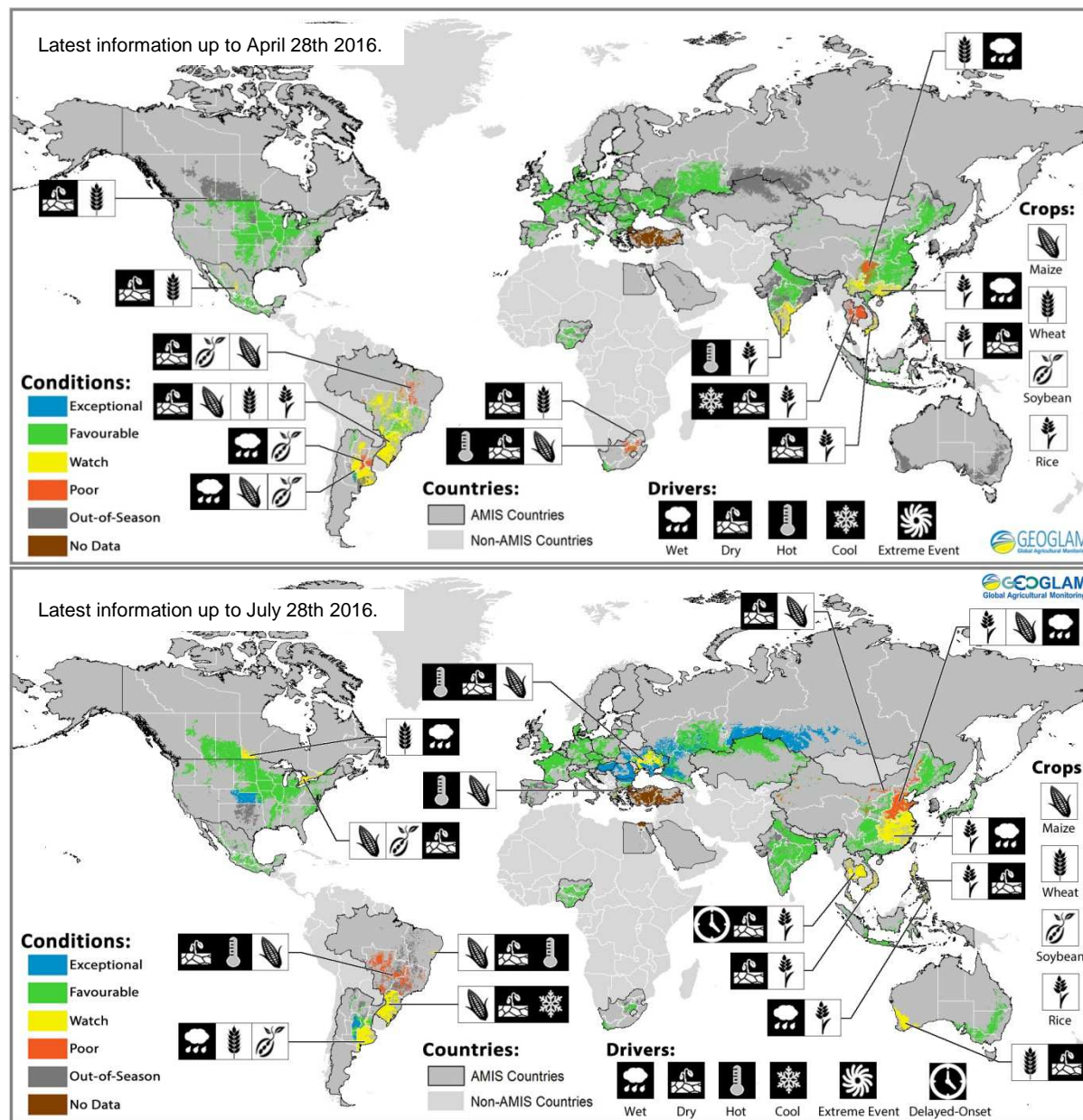
Source:
AON Benfield
2016 Global Catastrophe
Recap: First Half of 2016

Date	Event	Location	Deaths	Insured Loss ¹ (USD)
April 14 & 16, 2016	Earthquake(s)	Japan	75	5.0 billion
May/June 2016	Flooding	France, Germany, Belgium, Austria	17	3.4 billion
May 2016	Wildfire	Canada	0	3.2 billion
April 10-15, 2016	Severe Weather	United States	1	3.2 billion
March 22-25, 2016	Severe Weather	United States	0	1.5 billion
April 15-19, 2016	SCS/Flood	United States	9	1.0 billion

¹Totals subject to change

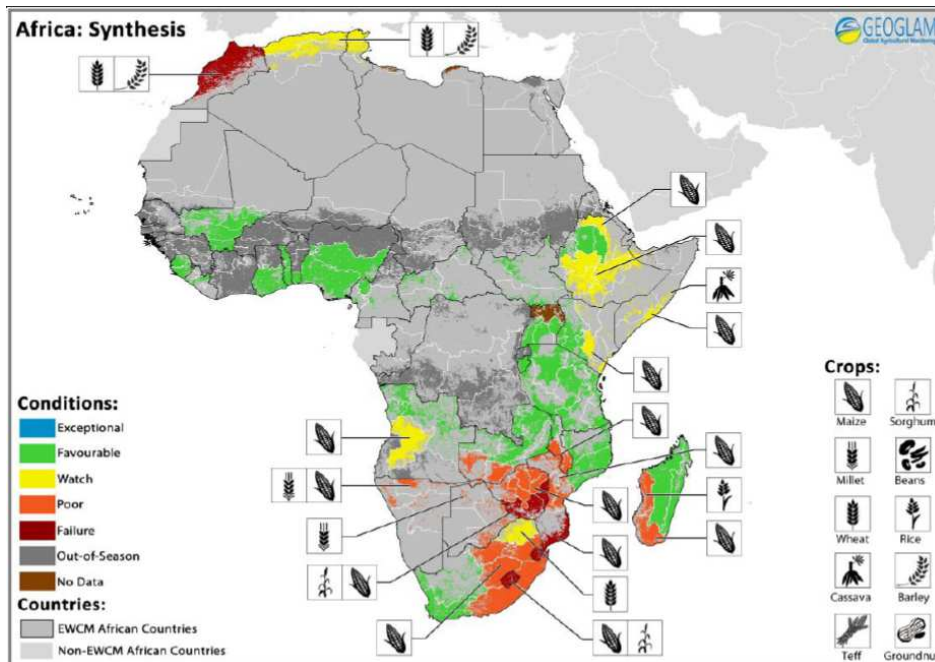
Global crops

- Conditions have improved for many places across the globe
 - Europe
 - South America
 - Australia
- Deteriorated over Western China

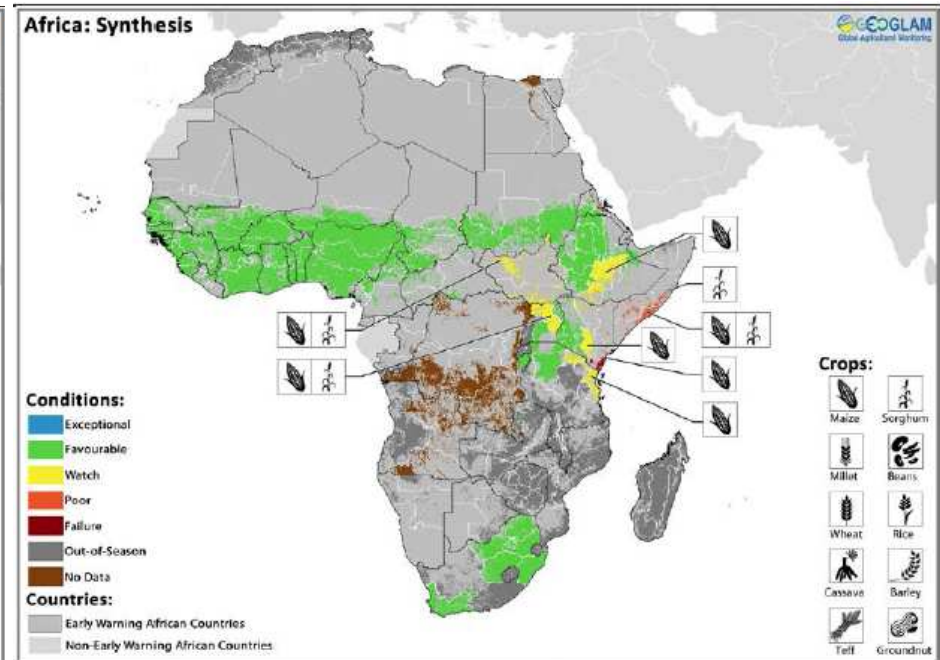


Crops in Africa

Latest information up to April 28th 2016.



Latest information up to July 28th 2016.



From GEOGLAM Early Warning Crop Monitor
<http://www.geoglam-crop-monitor.org/>

- Severe drought over the southern portion of the continent has been ameliorated
- Watch conditions over Ethiopia have improved

How ENSO affects global health

THE LANCET • Published online May 20, 2003 • <http://image.thelancet.com/extras/02art5336web.pdf>

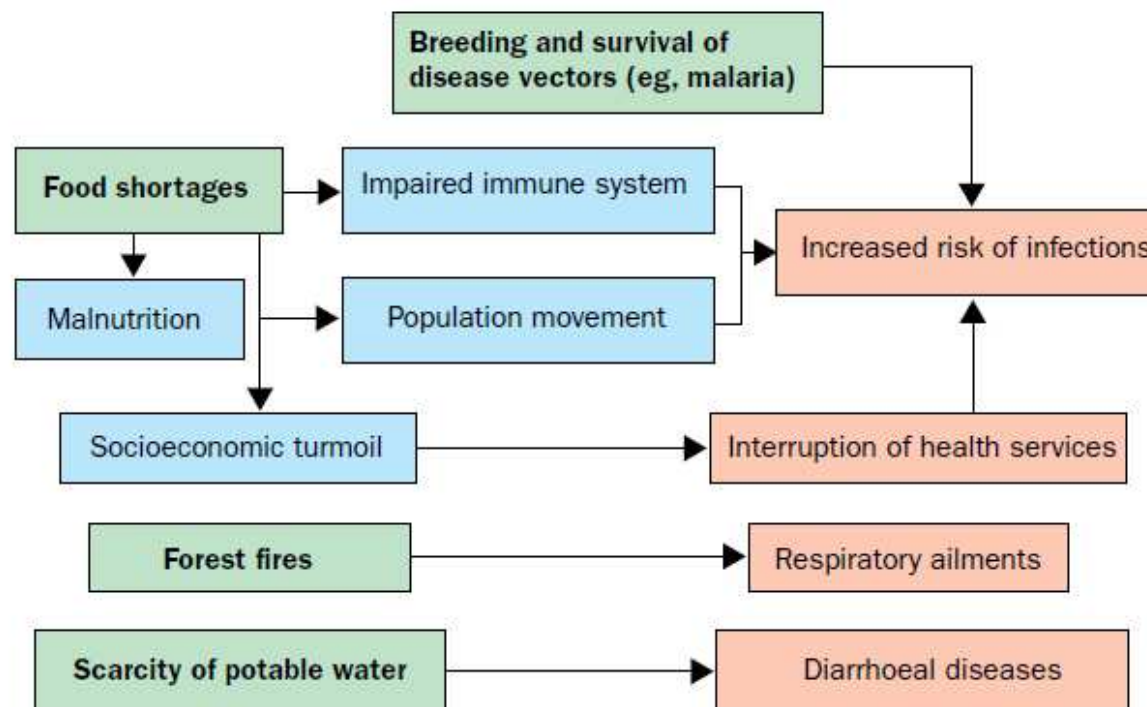
REVIEW

Review

El Niño and health

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El Niño Southern
consequences of
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Figure 2: Potential health effects of drought in developing countries

Observed Health impacts during 2015-16

• Tanzania

- Cholera epidemic of more than 12 000 reported is likely to spread to other countries
- This Tanzanian cholera outbreak is the largest since 1997-1998, which had over 40 000 reported cases

• In Ethiopia

- Number of people in need of emergency health interventions nearly doubled in three months

• In southern Africa

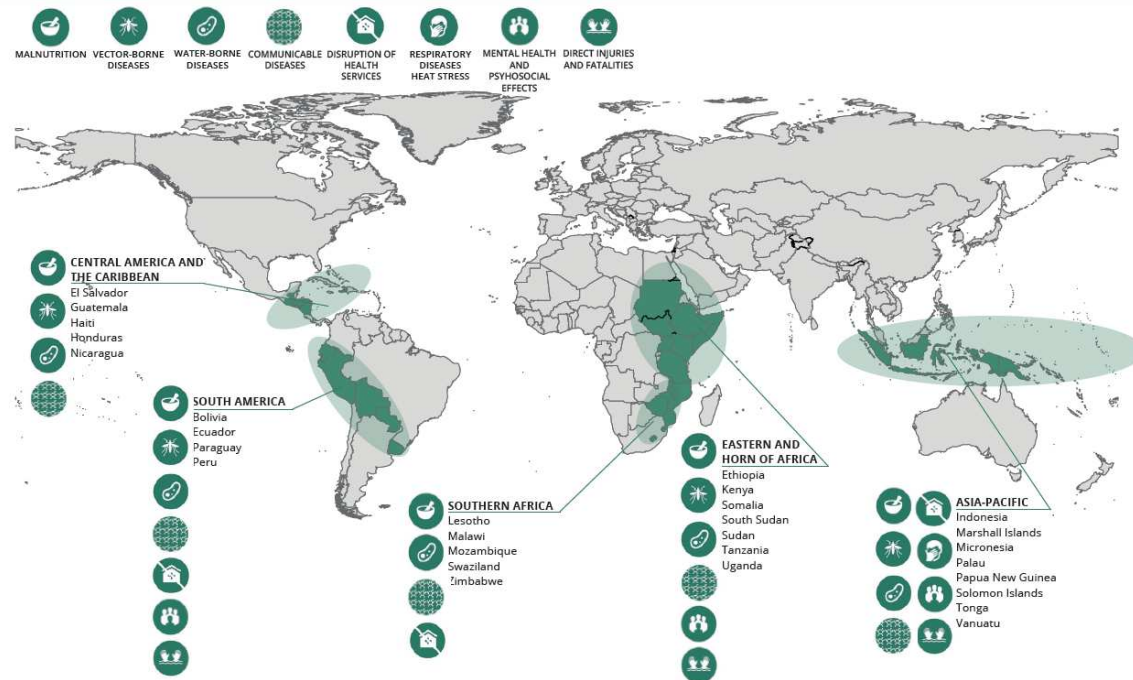
- Increasing malnutrition and disease risks
- Growing concerns about the interruption to anti-retroviral therapy

• South America

- Above-average rainfall
- Floods and increased diseases spread by mosquitoes

• In Guatemala and Honduras,

- 2 years of drought and El Niño
- 2.8 million people in need of humanitarian assistance
- 1-5 households will face critical food consumption gaps and acute malnutrition



http://www.who.int/hac/crises/el-nino/who_el_nino_and_health_global_report_21jan2016.pdf

• Papua New Guinea

- Drought
- Major immediate public health threats include the interruption of critical infrastructure

• Vanuatu, Fiji, Solomon Islands

- Water shortages
- Increased incidence of diarrheal diseases

• Indonesia

- Fires
- Likely cause respiratory disease, food insecurity

A GLOBAL CALL FOR SUPPORT & ACTION: **RESPONDING TO EL NIÑO**



- It is expected that there will be
 - 52 million food-insecure people in Southern and Eastern Africa
 - 4.7 million people at risk from adverse weather in the South Pacific
 - 4.2 million people affected by drought in Central America and
 - Millions affected by drought and extreme weather conditions across Asia
- Governments and the international community did prepare for this El Niño event and employed preparedness and response actions, but funding has been limited.
- Islands across the Pacific have been coping with the impacts of changed El Niño weather patterns. Many countries were able to mitigate the most serious impacts before most situations reached crisis point.
- The current funding gap stands at over **\$2.2 billion**, of which approximately one third is for Ethiopia.

From the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)
<http://www.unocha.org/el-nino> Apr 26 2016

El Niño – Current Funding Status¹ (in million US\$)

Government Plans

	Requirements \$ M	% Funding needs met	Funding available	Funding Gap
Lesotho	36	28	10	26
Malawi	146	49	71	75
Marshall Islands	8.9	50	4.5 ²	4.4
Mozambique	265	7	18.1	246.9
Palau	3.2	0	0	3.2
Swaziland ³	45	21	9.7	35.3
Zimbabwe ⁴	600	33	200	400
	1104.1		313.3	790.8

Joint Government and HCT Plans

	Requirements \$ M	% Funding needs met	Funding available	Funding Gap
El Salvador	44.6	9	4.2	40.4
Ethiopia ⁶	1400	54	798	602
Sudan	82	0	25.3	56.7
Timor Leste	25	0	0	25
Madagascar ⁸	69.9	12.5	8.8	61
Vietnam	48.5	16	7.8	40.7
	1670		844.1	825.8

HCT Plans

	Requirements \$ M	% Funding needs met	Funding available	Funding Gap
Guatemala	57	23	13.2	43.8
Haiti	105.5	10	10.1	95.4
Honduras	44.2	25	10.9	33.3
Lesotho	59	20	11.8	47.2
Papua New Guinea	37.57	23	8.75	28.81
Mongolia	14.3	43	6.36	7.94
Mozambique	60	0	0	60
Somalia	127	29	23	104
Zimbabwe	359	33.4	120	239
	863.6		204.2	659.4
GLOBAL TOTAL	\$ 3638 M		\$ 1362 M	\$ 2276 M

Global Response

- The 2015–16 El Niño has now dissipated, but its devastating impacts will be felt well into 2017
- As a result of droughts caused or exacerbated by El Niño, 60 million people across four continents, require immediate assistance
- This was a well forecast event.
- Both governments and international stakeholders have responded, but not at the scale and speed to preserve livelihoods, hope and dignity.
- This El Niño was a broadly preventable crisis, and as such, is a modern day tragedy.

OXFAM BRIEFING NOTE

18 JULY 2016

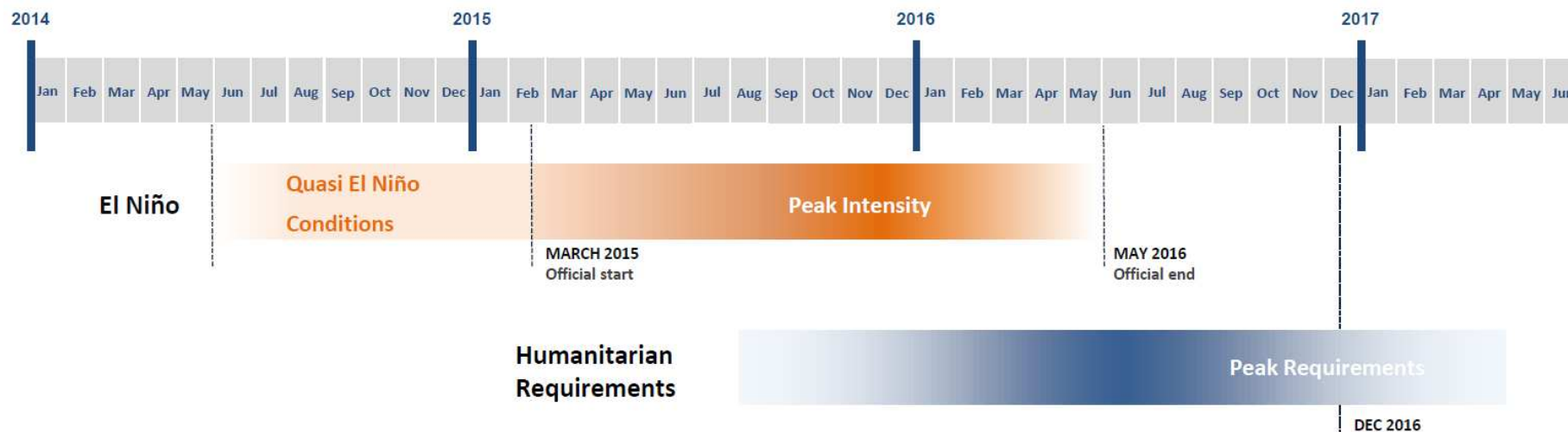


Nalukul, from Nalwei, Western Province, Zambia, only harvested 10kg of maize after El Niño-induced drought destroyed her crops. Her children have dropped out of school for the first time and they now weed other people's farms or sell charcoal. Photo: Misozi Tembor/Oxfam

A PREVENTABLE CRISIS

El Niño and La Niña events need earlier responses and a renewed focus on prevention

Even with El Niño ending, the challenges remain:



- Effects on food security and nutrition from this El Niño event are time delayed
 - Harvest and national stocks will supply populations for a period of time, food insecurity tends to happen later
 - Levels of humanitarian assistance are expected to peak by late 2016 early 2017

Figure and information from the WFP, VAM Food Security Analysis report “ENSO: Humanitarian Implications and Scenarios”

Global impacts of La Niña

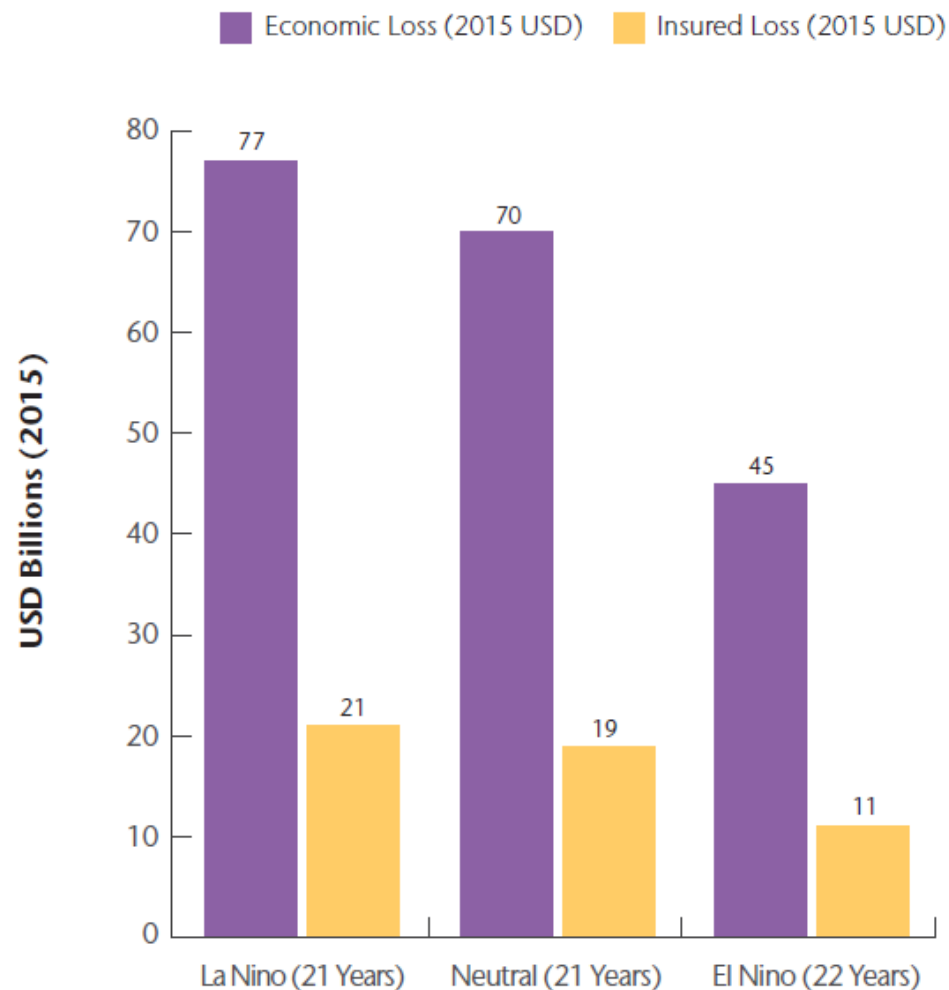
La Niña years have clearly shown greater average annual losses in comparison to El Niño and Neutral phases.

- La Niña USD77 billion
- El Niño USD45 billion

Much of the increase in losses during a La Niña year surrounds

- Increased frequency of costly landfalling tropical cyclone events in the Atlantic Ocean basin
- Increased flooding events across Asia Pacific

Exhibit 13: Global Weather Catastrophe Losses (Annual Average)



Source: Aon Benfield 2015 Annual Climate and Catastrophe report.

Web Resources

- Humanitarian Relief
 - <http://reliefweb.int/> . Archive of White Papers, Infographics and reports from various aid organizations
 - USAID. <https://www.usaid.gov>
 - UN Office for the Coordination of humanitarian affairs <http://www.unocha.org/>
 - UN Food and Agriculture Organization
 - Global Information and Early Warning System <http://www.fao.org/giews/english/index.htm>
 - Market Monitor Reports <https://www.wfp.org/content/market-monitor>
 - OXFAM <https://www.oxfam.org/>
- Insurance White Papers
 - <http://www.insurancehound.co.uk/>
- Crop Conditions
 - <http://www.geoglam-crop-monitor.org/>
 - USDA Foreign Agricultural Service
 - <http://www.fas.usda.gov/>
 - <http://www.pecad.fas.usda.gov/>
- Global Disaster Monitoring
 - <http://www.gdacs.org/> Global Disaster Alert and Coordination System
 - <http://www.pdc.org/> Pacific Disaster Center
- ERL Paper
 - <http://iopscience.iop.org/article/10.1088/1748-9326/11/9/094023>



The PEAC Center

The Pacific ENSO Applications Climate
Center

Photo courtesy of
Lt. Charlene Felkley