

The timing of El Niño impacts and drought in the Philippines

Preparing for extreme climate events

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Philippine Association of Government Budget
Administration
2015 3rd Quarterly Meeting
05 November 2015, Pasay City, Philippines

Preparing for El
Niño impacts and
drought

Wendy Clavano

Overview

Part 1: El Niño and
drought

Current conditions

Winds and rainfall

Drought

Part 2: Timing of
impacts

Climate vs weather

Forecasts

Timing

Part 3: Preparing
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Recovery

Surviving

Thriving

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Outline

- ▶ What happens during an El Niño? (Cause)
- ▶ Why are climate forecasts useful? (Impact)
- ▶ How can be adjusted to better prepare? (Policy)

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Objectives

- ▶ **Drought as hazard** risk with or without El Niño
- ▶ **Timing** of impacts, opportunity for localization
- ▶ Compounding effects, **recover** from past events

Part 1: El Niño and drought

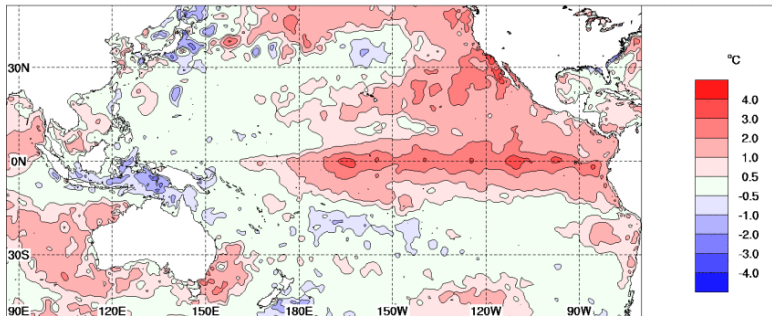
- ▶ What is an El Niño? Look at current conditions
- ▶ Why is it still raining now? Monsoon, ITCZ, tropical cyclone rainfall, convection
- ▶ What is drought? All rainfall sources combined

ENSO = El Niño Southern Oscillation

Current sea surface temperature anomalies

Preparing for El Niño impacts and drought

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Source: BOM (Australia); as of 25 Oct 2015, base period 1961–1990.

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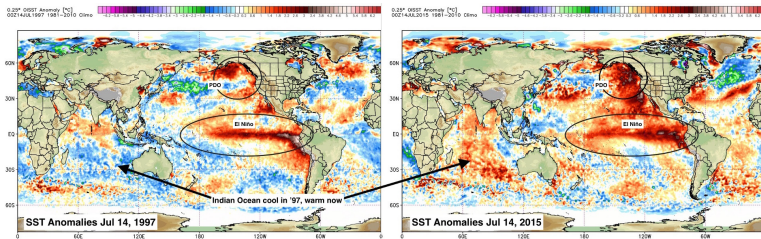
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Acknowledgments

Compare with 1997/1998 El Niño

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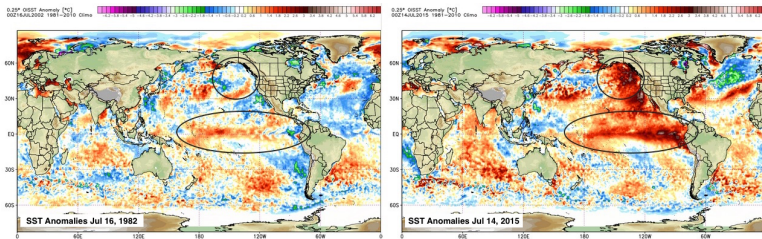
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Compare with 1982/1983 El Niño

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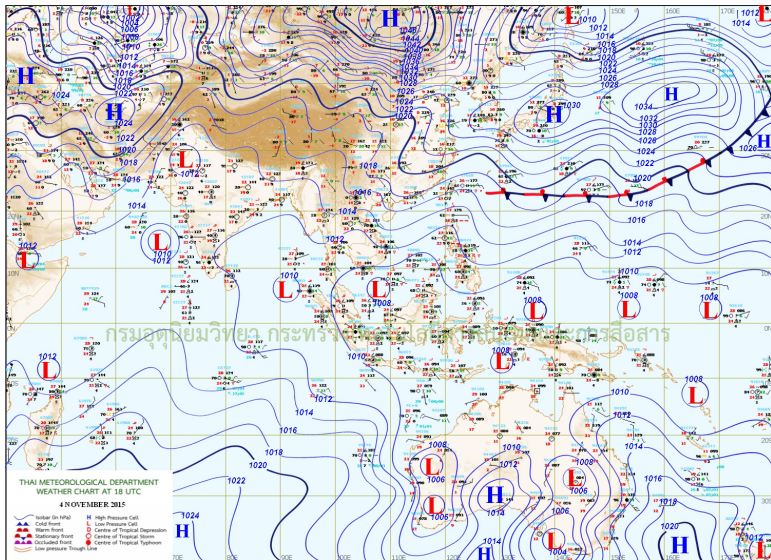
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Current atmospheric conditions

Preparing for El Niño impacts and drought

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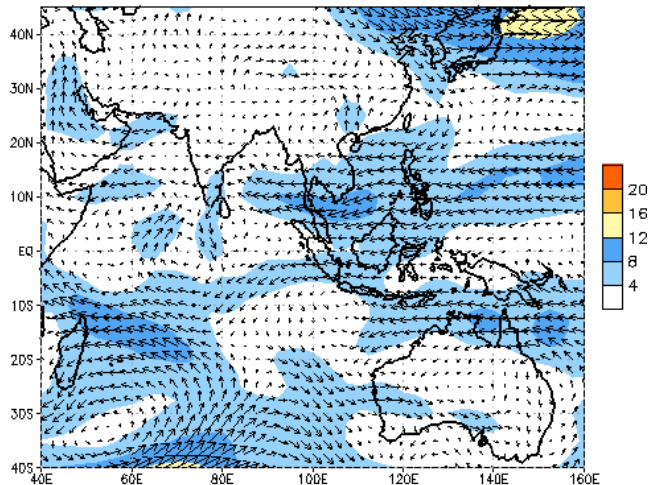
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850-hPa winds 7-day average

Preparing for El Niño impacts and drought

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850 hPa Vector Total Wind (ms^{-1}) 25 OCT 2015 – 31 OCT 2015



Data Source: NCEP/CDAS
(Wind speed $> 4 \text{ ms}^{-1}$ shaded)

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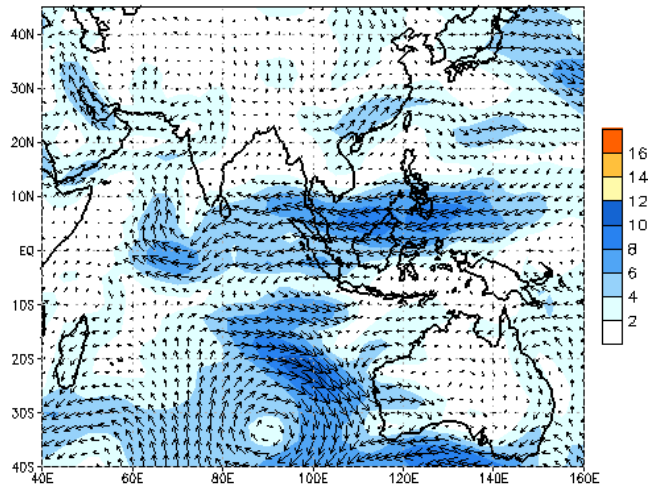
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850-hPa winds 7-day anomalies

Preparing for El Niño impacts and drought

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850 hPa Vector Wind Anomalies (ms^{-1}) 25 OCT 2015 – 31 OCT 2015



Data Source: NCEP/CDAS – Climatology (1981–2010)
(Wind speed $> 2 \text{ ms}^{-1}$ shaded)

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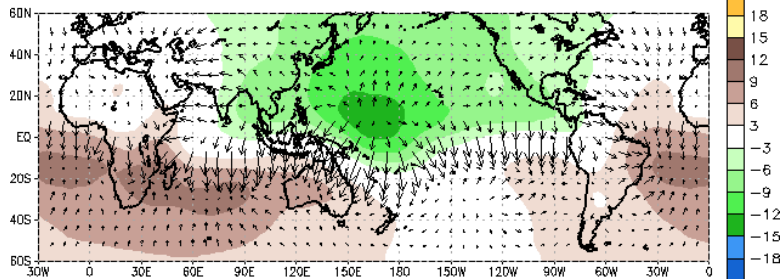
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200-hPa and divergent wind 7-day average

200-hPa Ave. Velocity Potential ($10^6 \text{m}^2 \text{s}^{-1}$) & Div. Wind 03AUG2015-31OCT2015



Data Source: NCEP CDAS

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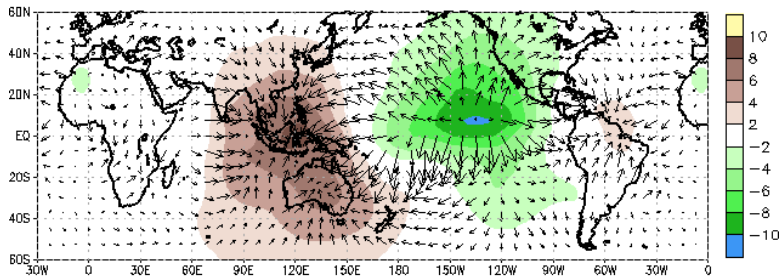
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200-hPa and divergent wind 7-day anomalies

Preparing for El Niño impacts and drought

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200-hPa Ave. Velocity Potential ($10^4 \text{m}^2 \text{s}^{-1}$) & Div. Wind Anomalies 03AUG2015–31OCT2015



Data Source: NCEP CDAS
Climatology (1981–2010)

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PAGASA drought monitor

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DRY SPELL / DROUGHT ASSESSMENT

As of 21 October 2015

DROUGHT/DRY SPELL ASSESSMENT

AS OF OCTOBER 21, 2015

LEGEND

- Drought
- Dry Spell
- Dry Condition

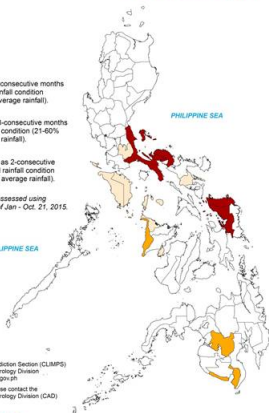
Drought is defined as 3-consecutive months of way below normal rainfall condition (>60% reduction from average rainfall).

Dry spell is defined as 3-consecutive months of below normal rainfall condition (21-60% reduction from average rainfall).

Dry condition is defined as 2-consecutive months of below normal rainfall condition (21-60% reduction from average rainfall).

Drought condition was assessed using observed rainfall (mm) of Jan - Oct. 21, 2015.

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434-7956 or 435-1675.



OVER DIFFERENT PROVINCES AS OF OCTOBER 21, 2015 AFTER THE PASSAGE OF 'TY LANDO'

PROVINCES THAT EXPERIENCED DRY CONDITION

LUZON	LAGUNA, OCCIDENTAL MINDORO, ORIENTAL MINDORO, ROMBLON, ALBAY
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VISAYAS	AKLAN, GUIMARAS
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MINDANAO	NONE
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PROVINCES THAT EXPERIENCED DRY SPELL

LUZON	
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VISAYAS	ANTIQUE
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MINDANAO	NORTH COTABATO, SARANGANI
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PROVINCES THAT EXPERIENCED DROUGHT

LUZON	QUEZON, CAMARINES NORTE
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VISAYAS	NORTHERN SAMAR, SAMAR (WESTERN SAMAR)
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MINDANAO	NONE
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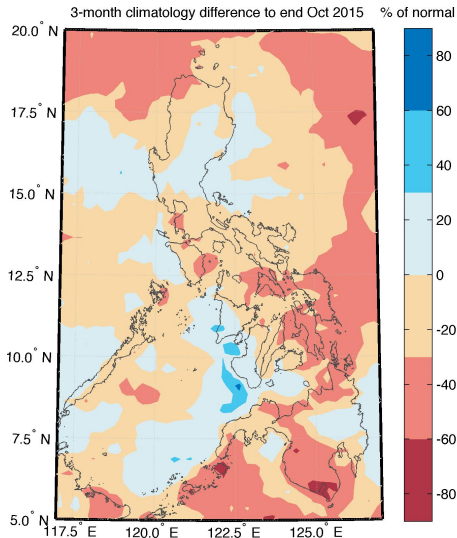
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Seasonal rainfall difference, Oct 2015



Preparing for El Niño impacts and drought

Wendy Clavano

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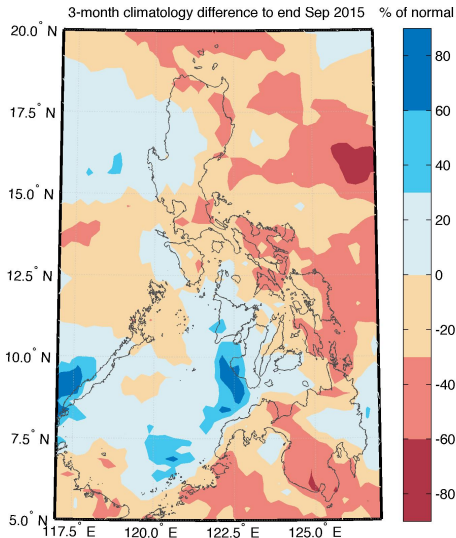
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Seasonal rainfall difference, Sep 2015

Preparing for El Niño impacts and drought

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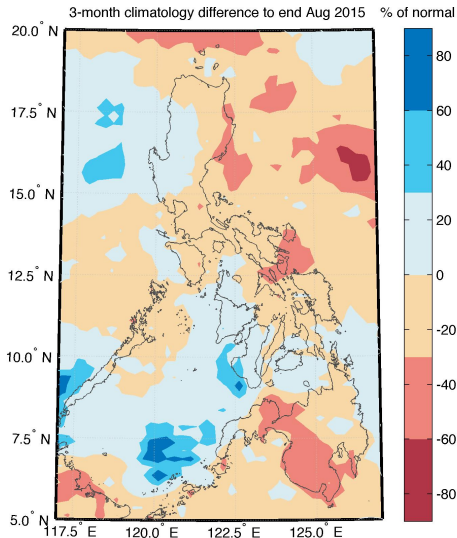
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Seasonal rainfall difference, Aug 2015

Preparing for El Niño impacts and drought

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Discussion: El Niño

About El Niño and rainfall—questions?

Preparing for El Niño impacts and drought

Wendy Clavano

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Preparing for El Niño impacts and drought

- └ Drought

- └ Discussion: El Niño

When someone's immune system is down, they are more susceptible to diseases. If they get sick, the cause is the disease not their weakness. It is the same with ENSO, an El Niño increases the likelihood of more intense storms, it did not cause Typhoon Lando.

Part 2: Timing of impacts

- ▶ Climate vs weather
- ▶ Past observations (no El Niño), climatology, and model results
- ▶ Timing and risk

Climate vs weather

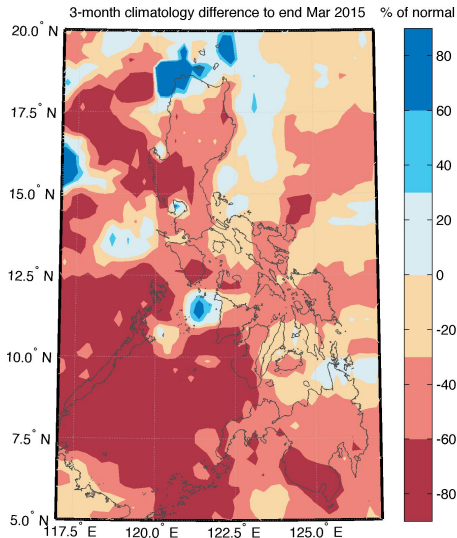
- ▶ Extreme climate (primary hazard) vs extreme weather (secondary hazard)
- ▶ Dry vs no rain
- ▶ Seasonal or year vs day-to-day

Following: examples of drought with no El Niño

Seasonal rainfall difference, Mar 2015

Preparing for El Niño impacts and drought

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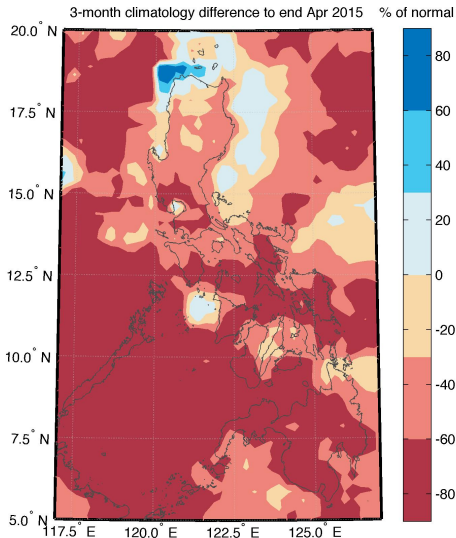
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Seasonal rainfall difference, Apr 2015

Preparing for El Niño impacts and drought

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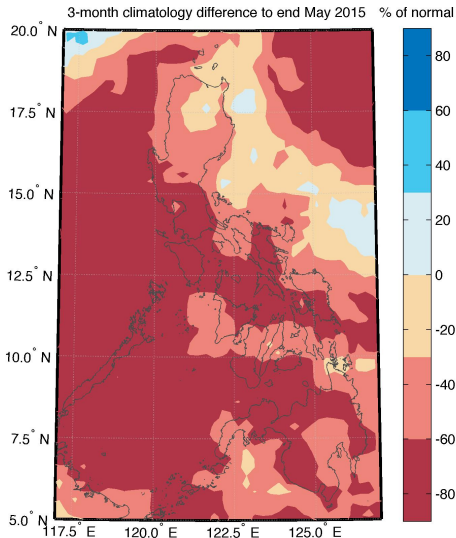
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Seasonal rainfall difference, May 2015

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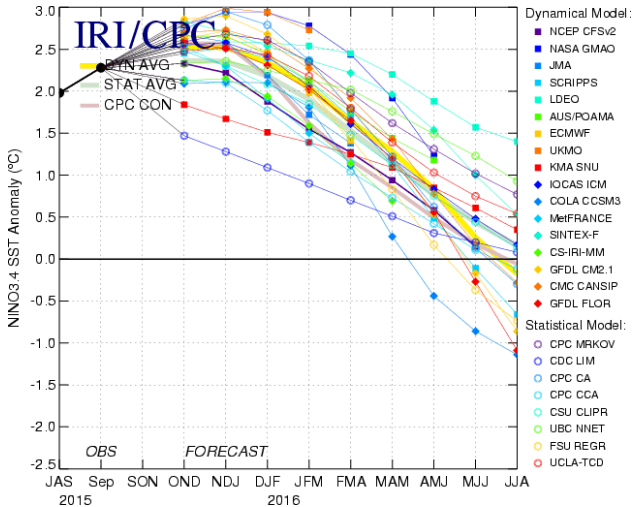
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ENSO model predictions

Mid-Oct 2015 Plume of Model ENSO Predictions



Forecast as of 15 Oct 2015; Source: IRI Columbia University

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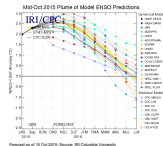
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Preparing for El Niño impacts and drought

└ Forecasts

└ ENSO model predictions



‘Unpredictable seasons produce unreliable harvests.’

PAGASA drought forecasts

Preparing for El Niño impacts and drought

Wendy Clavano

DRY SPELL / DROUGHT OUTLOOK BY END OF DECEMBER 2015

As of 21 October 2015

DROUGHT/DRY SPELL OUTLOOK

END OF DECEMBER 2015

LEGEND

- Drought
- Dry Spell
- Dry Condition

Drought is defined as 3-consecutive months of way below normal rainfall condition (>60% reduction from average rainfall).

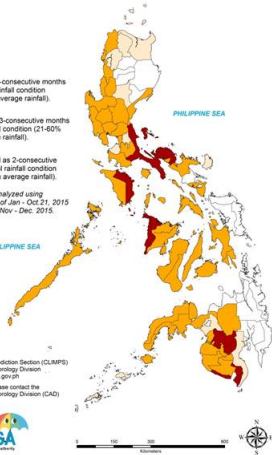
Dry spell is defined as 2-consecutive months of below normal rainfall condition (21-60% reduction from average rainfall).

Dry condition is defined as 2-consecutive months of below normal rainfall condition (21-60% reduction from average rainfall).

Drought outlook was analyzed using observed rainfall (mm) of Jan - Oct 21, 2015 and forecast rainfall of Nov - Dec 2015.

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OVER DIFFERENT PROVINCES END OF DECEMBER 2015

PROVINCES THAT WILL LIKELY EXPERIENCE **DRY CONDITION**

LUZON (7)	ABRA, APAYAO, CAGAYAN, NUEVA VIZCAYA, CAVITE RIZAL, CATANDUANES
VISAYAS	NONE
MINDANAO (3)	DAVAO DEL SUR, LANA O DEL SUR, SULU, TAWI-TAWI

PROVINCES THAT WILL LIKELY EXPERIENCE **DRY SPELL**

LUZON	BENGUET, ILOCOS NORTE, ILOCOS SUR, LA UNION PANGASINAN, BATAAN, BULACAN, NUEVA ECIJA, PAMPANGA, TARLAC, ZAMBALES, AURORA, METRO MANILA, BATANGAS, LAGUNA, MARINDUQUE, OCCIDENTAL MINDORO, ROMBLON, PALAWAN CAMARINES SUR,, MASBATE, SORSOGON
VISAYAS	CAPIZ, GUIMARAS, ILOILO, NEGROS OCCIDENTAL, BOHOL, CEBU, NEGROS ORIENTAL, SIKUJOUR BILIRAN, LEYTE, SOUTHERN LEYTE
MINDANAO	ZAMBOANGA DEL NORTE, ZAMBOANGA DEL SUR, ZAMBOANGA SIBUGAY, BUKIDNON. LANA O DEL NORTE, MISAMIS OCCIDENTAL, SOUTH COTABATO, SULTAN KUDARAT, BASILAN, MAGUINDANAO

PROVINCES THAT WILL LIKELY EXPERIENCE **DROUGHT**

LUZON (3)	QUEZON, ORIENTAL MINDORO, CAMARINES NORTE
VISAYAS (2)	AKLAN, ANTIQUE
MINDANAO (2)	NORTH COTABATO, SARANGANI

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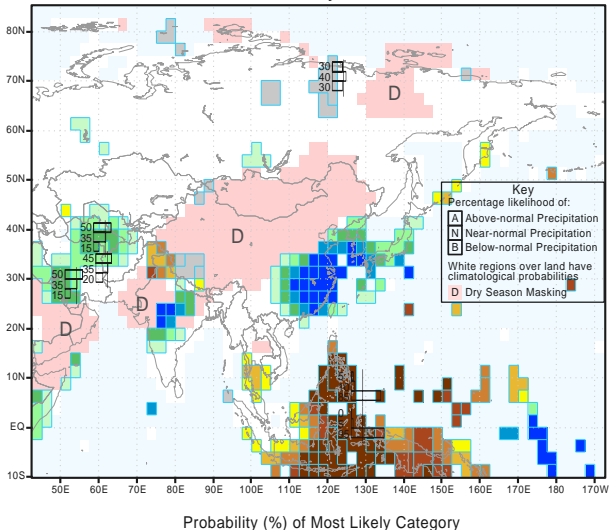
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Rainfall deficit in Nov-Dec-Jan 2016

Preparing for El Niño impacts and drought

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IRI Multi-Model Probability Forecast for Precipitation for November-December-January 2016, Issued October 2015



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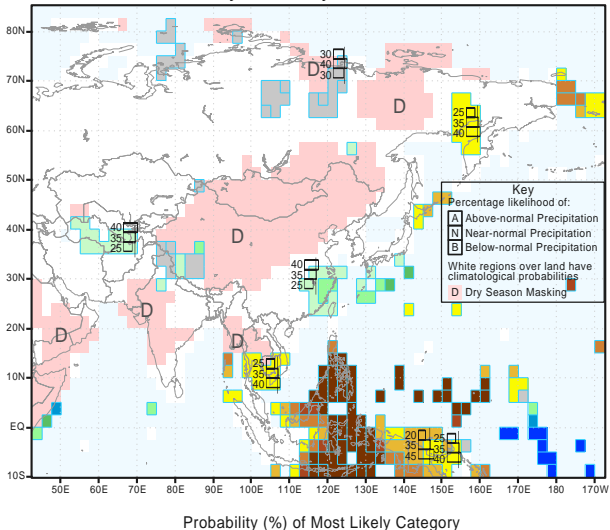
Acknowledgments

Rainfall deficit in Dec-Jan-Feb 2016

Preparing for El Niño impacts and drought

Wendy Clavano

IRI Multi-Model Probability Forecast for Precipitation
for December-January-February 2016, Issued October 2015



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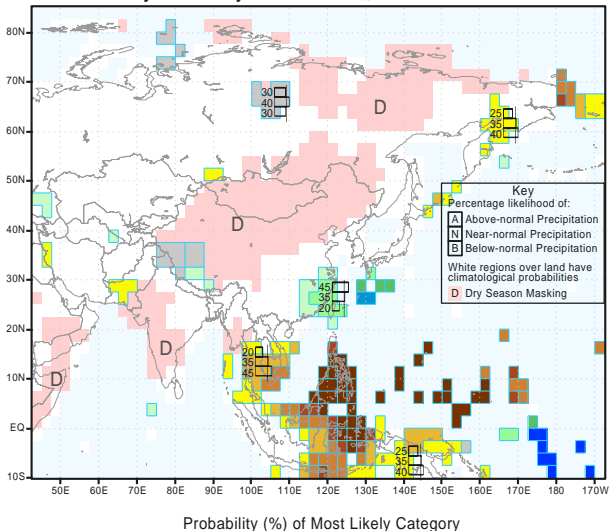
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Rainfall deficit in Jan-Feb-Mar 2016

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IRI Multi-Model Probability Forecast for Precipitation for January-February-March 2016, Issued October 2015



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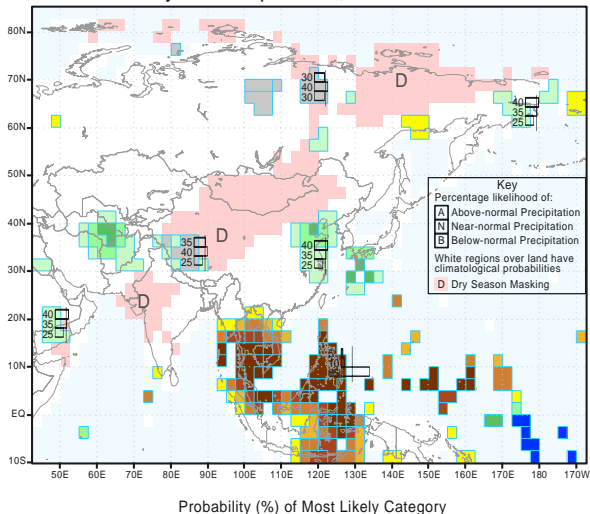
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Rainfall deficit in Jan-Feb-Mar 2016

Preparing for El Niño impacts and drought

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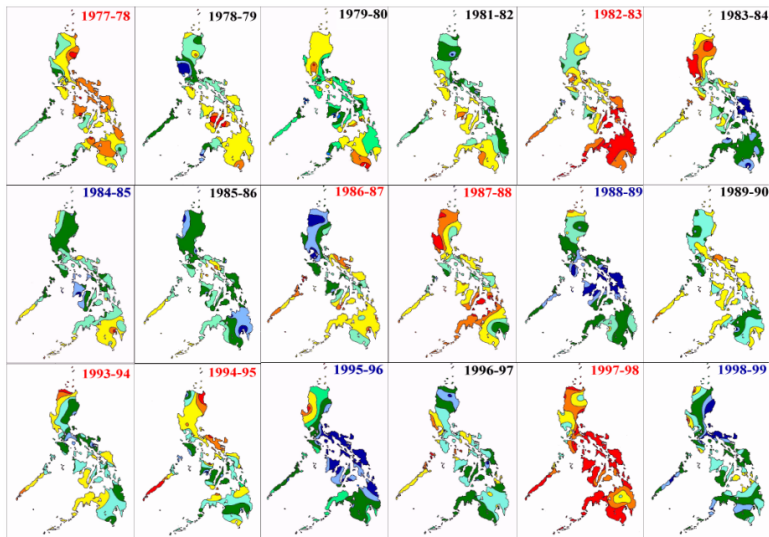
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Spatial and temporal distribution of “risk”

Preparing for El Niño impacts and drought

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Source: Hilario (2009)

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About seasonal climate forecasts and impacts—questions?

Preparing for El Niño impacts and drought

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Part 3: Preparing for extremes

- ▶ Coming from “recovery”, prior condition
- ▶ Seeing it through, during an event
- ▶ Development out of poverty, get out of *risk*

Start from recovery mindframe

An estimated 7 pesos is saved for every peso spent for preparation.

- ▶ Economic or investment risk
- ▶ Build back better
- ▶ Other more pressing needs

Drought hazard after Yolanda in Samar and Leyte.

Immediate action: respond

Drought is a creeping hazard.

- ▶ Water, conservation in practice
- ▶ Food, change a culture
- ▶ Health, clean water

Dengue as an example.

Disaster risk reduction as development tool

Preparing for El Niño impacts and drought

Wendy Clavano

Economic sense: Get people out of the risk of poverty.

- ▶ Livelihood
- ▶ Education
- ▶ Infrastructure
- ▶ Socioeconomic inclusion

Shift timing: buffer seeds for drought.

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Summary: cause, impact, policy

- ▶ Impacts of ENSO, we know it is going to happen
- ▶ Climate forecasts and the timing of drought, we know when
- ▶ The timing of preparations, we know what we might save

Discussion: Preparations

Thoughts on preparations—suggestions?

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Thanks

- ▶ NASA's Global Precipitation Measurement
- ▶ US NOAA (NCEP)
- ▶ DOST
- ▶ NOAA
- ▶ Thailand Meteorological Department
- ▶ Institute of Environmental Science for Social Change
- ▶ The Manila Observatory
- ▶ International Research Institute for Climate and Society (Columbia University)
- ▶ Australian Bureau of Meteorology
- ▶ WeatherBell Analytics
- ▶ W Coventry, University of New England

The timing of El Niño impacts and drought in the Philippines

Preparing for extreme climate events

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