Regional Capacity Building in Climate Innovation and Market Readiness
Training Session 1: Disaster Risk Resilience and Climate Adaptation – From Technology to Resilient Solutions
16 October 2026| SMX Convention Center, Davao City



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DOST-PAGASA

CONTENTS:

- Hazard vs. disaster
- Definition and types of drought
- Historical Drought Occurrences
- Drought Monitoring and Forecast Products
- Opportunities for scaling solutions

IS DROUGHT A HAZARD OR A DISASTER?



https://www.sciencing.com/effects-drought-deserts-8027361/



https://ispweb.pcaarrd.dost.gov.ph/the-devastating-impact-of-el-nino-on-philippine-agriculture/

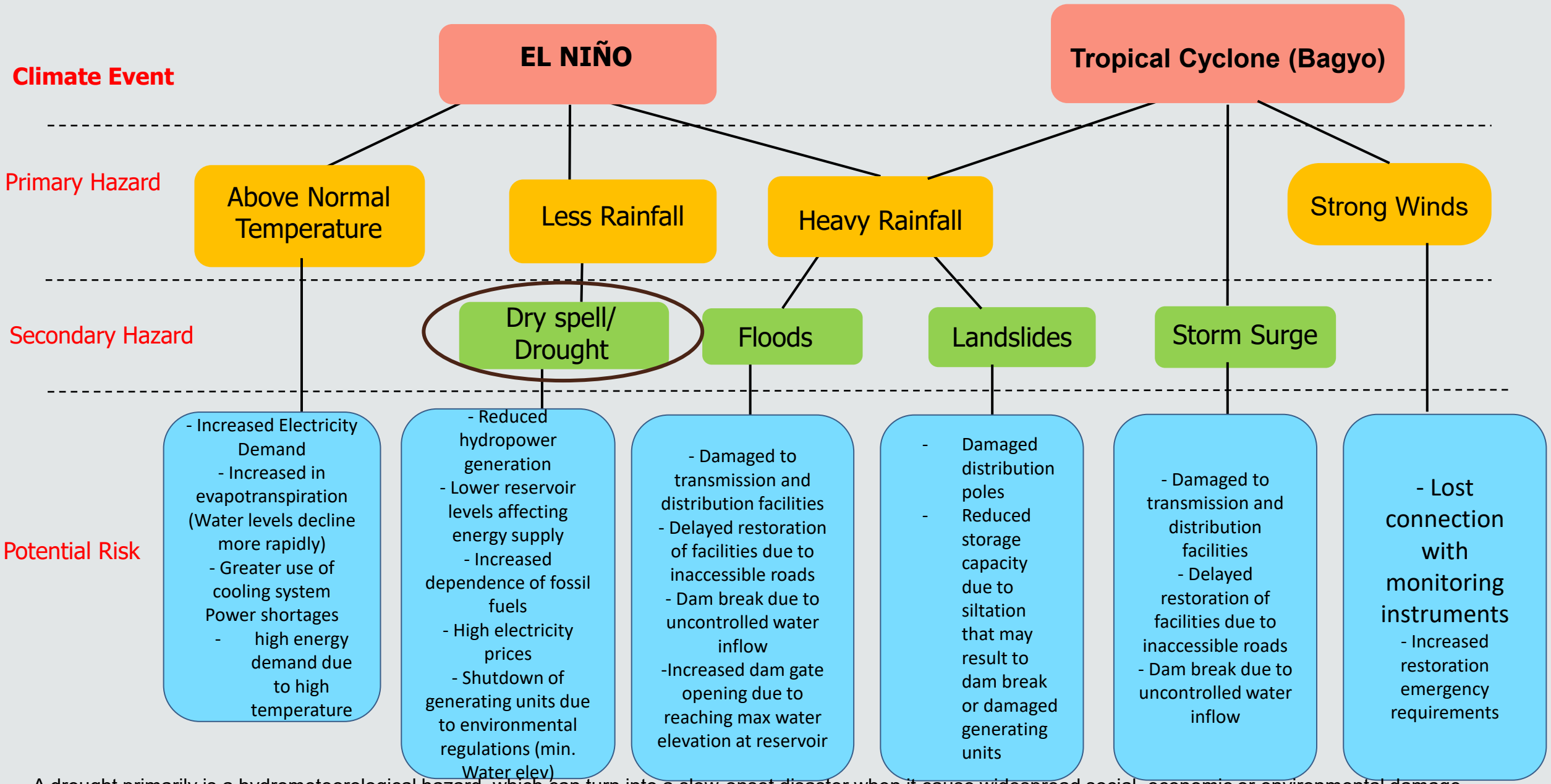
Scientifically and environmentally, a drought begins as a **natural hazard.** However, when that hazard intersects with human vulnerability and causes widespread socioeconomic, agricultural, or health crises, it escalates into a **disaster.**

IS DROUGHT A HAZARD OR A DISASTER?

Hazard – Physical event or natural process itself- specifically a prolonged period of abnormally low rainfall and water scarcity (such as meteo, agri, or hydro drought) *(UNL Digital Comm)*

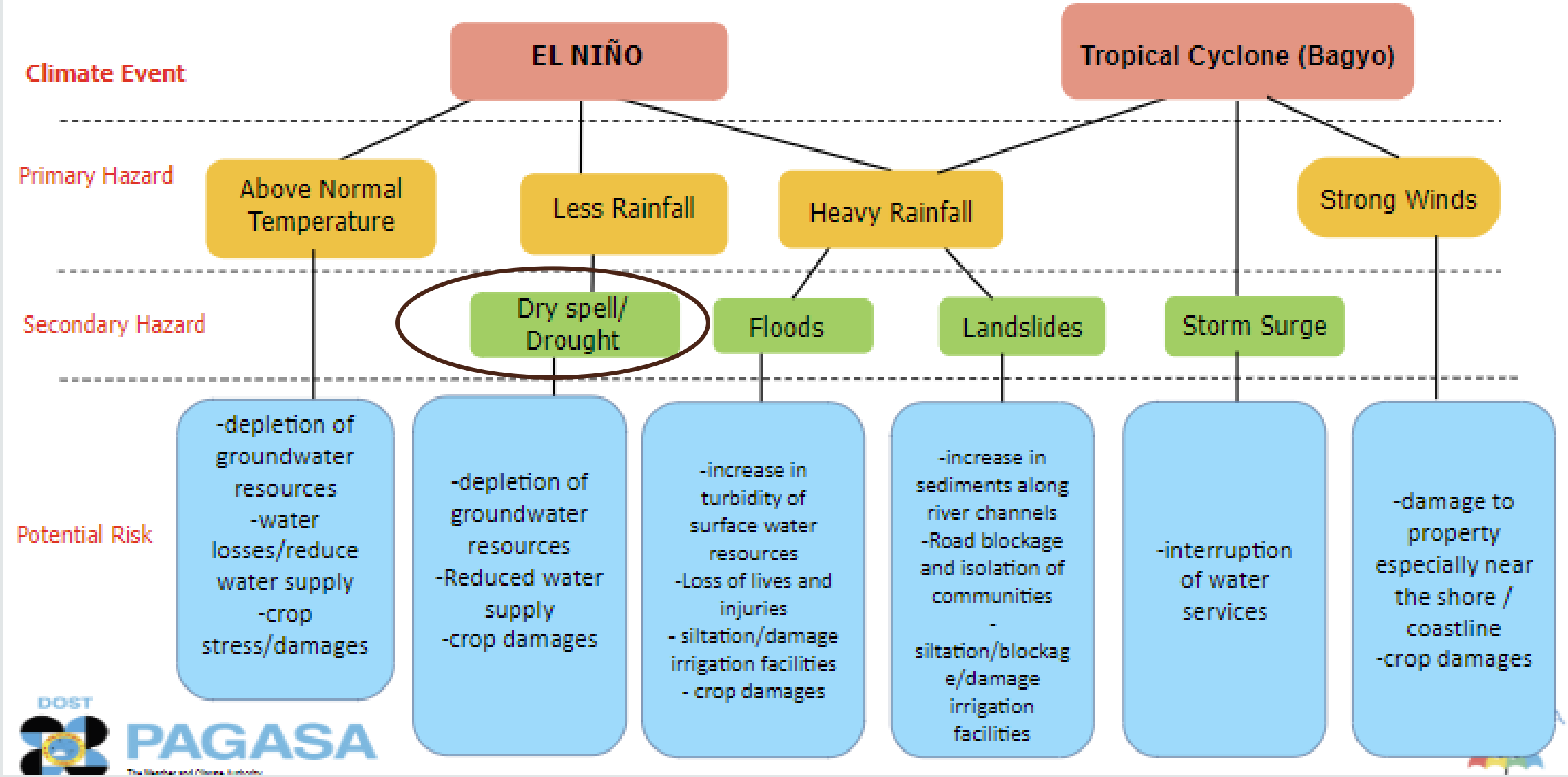
Disaster – the severe outcome that happens when hazard strikes a vulnerable population, leading to crop failures, livestock deaths, water shortages, economic losses or displacement. *(WHO definition)*

El Niño Hazard Domino Effect (ENERGY)



A drought primarily is a hydrometeorological hazard, which can turn into a slow-onset disaster when it cause widespread social, economic or environmental damage

El Niño Hazard Domino Effect (WATER)



A drought primarily is a hydrometeorological hazard, which can turn into a slow-onset disaster when it cause widespread social, economic or environmental damage

Conceptual vs. Operational Definitions

Drought is a relative water shortage caused by a lack of precipitation, acting as a slow-moving event with deep economic, environmental, and social effects.

Conceptual vs. Operational Definitions



Operational definitions



- **Conceptual definitions:** Explain the general boundaries of drought as a relative water deficit. They are general and hard to apply directly to policy.
- **Operational definitions:** Help people identify the exact beginning, severity, and end of a drought period. They use specific criteria or thresholds (like rainfall totals or soil moisture) to trigger relief or management plans. [1, 2, 3]

The Four Perspectives of Drought

Researchers divide drought types into four basic categories based on how they are measured and experienced:



Meteorological Drought

Defined by the degree of degree of dryness and the duration of the dry period compared to regional averages. Because “normal” weather varies by place, these definitions are strictly region-specific.



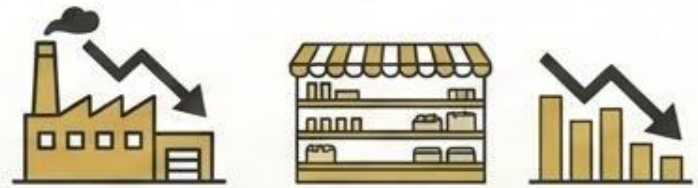
Agricultural Drought

Focuses on soil-plant water demands. It happens when low rainfall and poor soil moisture during the grouggags during the growing seaso creatoing crop stress and cut yields.



Hydrological Drought

Focuses on shortfalls in surface and subsurface water. It occurs when supplies in river basins, lakes, reservoirs, and aquifers drop below normal levels.



Socioeconomic Drought

Links the physical shortage of water to the supply and demand of economic goods. It tracks how a water deficit ripples through human activities and commercial sectors.

Designing for resilience and adaptation

Why Definitions Matter

Without Clear Definitions:



Poor Planning & Reactive Responses

Using a single, simplistic definition for drought leads operational to regional averages. Because "normal" weather varies by place, these definitions are strictly region-specific.



Ad Hoc Government Responses

Focuses on shortfalls in surface and subsurface water. It occurs when supplies in river basins, lakes, reservoirs, and aquifers drop below normal levels.

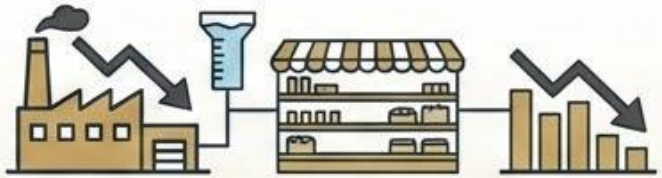
With Operational Definitions:



Proactive Management Strategies

- Inteactive management
- Sensor shovn low rainfall

and poor soil moisture during the grouggags: during the growing seaso creatoing crop stress and cut yields.

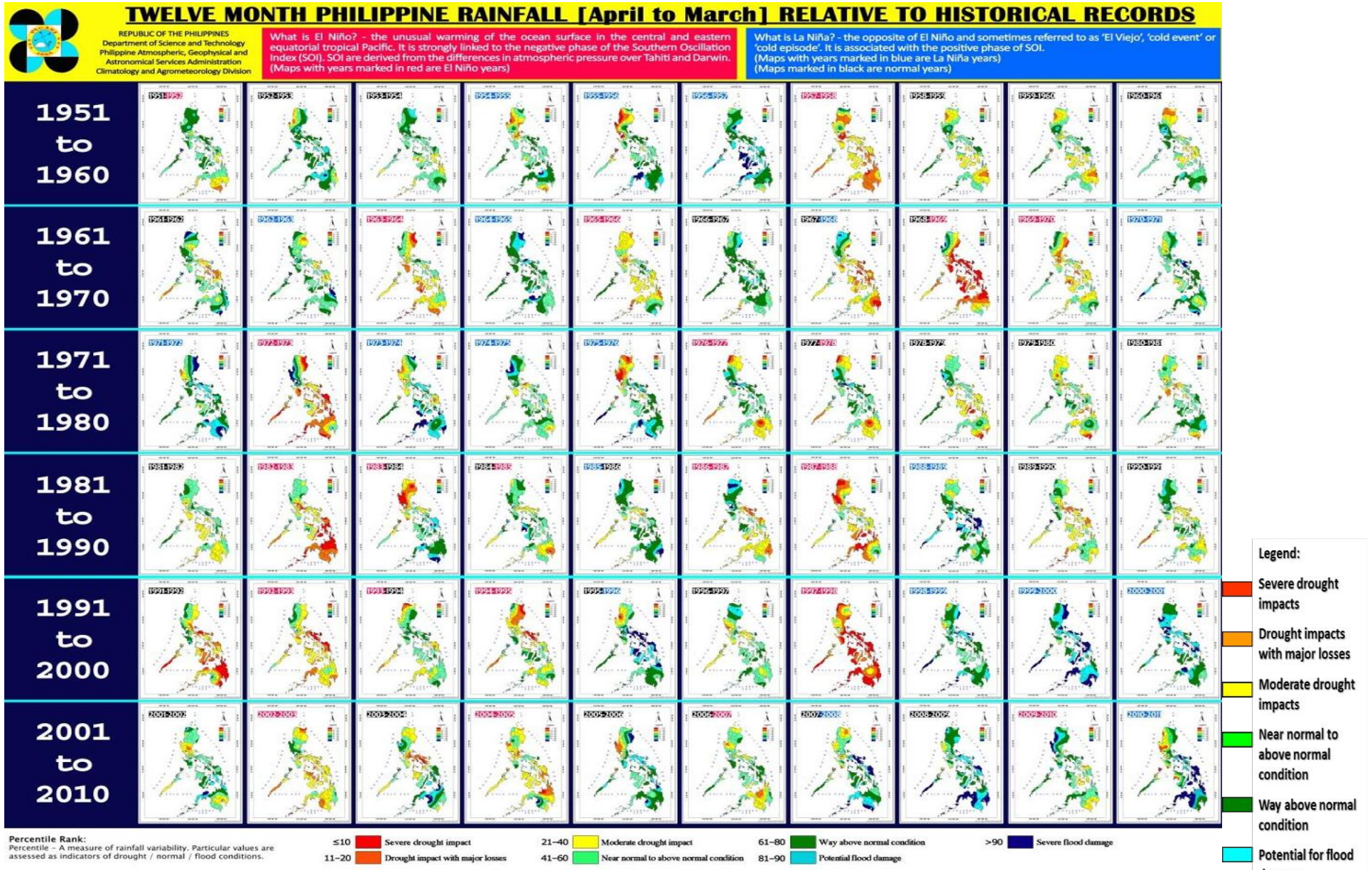


Linked Systems (Physical & Social)

- Links the physical shortage of water to the supply and demand of economic goods. It
- Tracks how a water deficit ripples through human activities and commercial sectors.

Historical Drought Occurrences

IMPACTS OF ENSO ON PHILIPPINE RAINFALL



RED colored years are **EL NINO** years, **BLUE** colored years are **LA NINA** years and **BLACK** colored years are **NON_ENSO** years

Impacts of Strong El Niño on Philippine Rainfall





LEGEND:

- Severe drought impacts
- Drought impacts with major losses
- Moderate drought impacts
- Near normal to above normal condition
- Way above normal condition
- Potential for flood damage
- Severe flood damage

During the 1982-83 and 1997-98 strong El Niño events, several areas of the country were affected by moderate to severe drought.

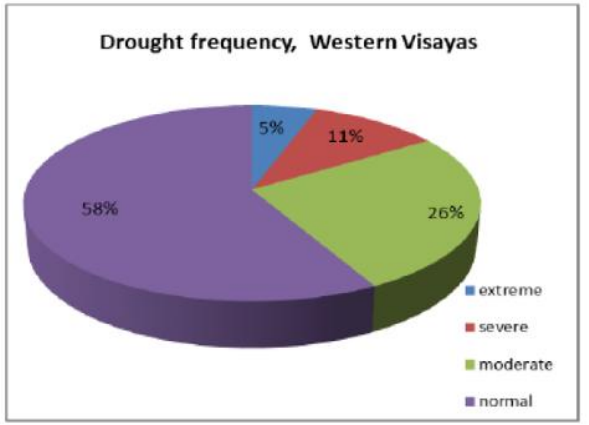
- **Drought occuurence using Reconnaissance Drought Index**

Table 5.1: Drought classification thresholds

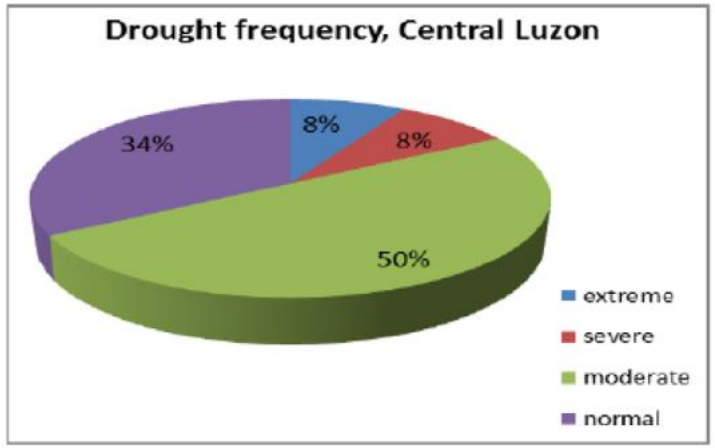
RDIst or SPI value	Category
2.00 or more	Extremely wet
1.50 to 1.99	Severely wet
1.00 to 1.49	Moderately wet
0.99 to -0.99	Near normal
-1.00 to -1.49	Moderately dry
-1.50 to -1.99	Severely sry
-2.00 or less	Extremely dry

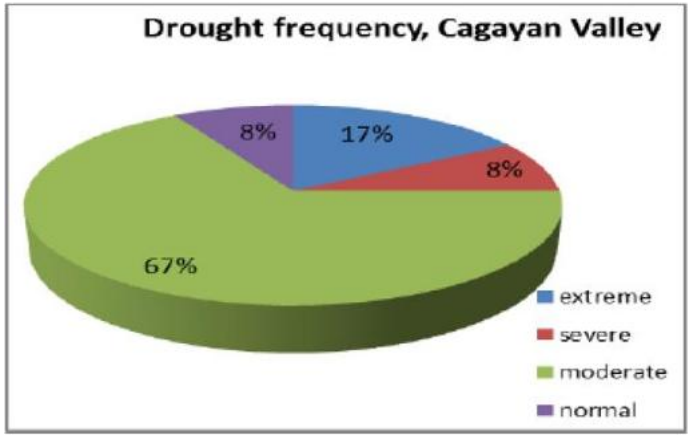
Source: Tsakiris *et al*, 2005



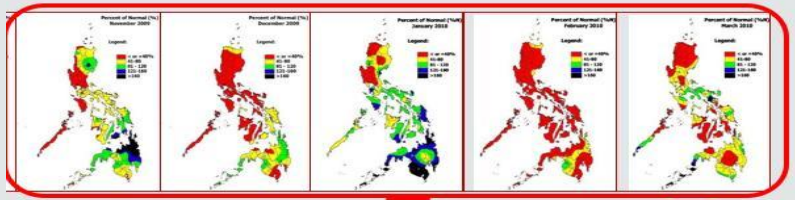


Drought frequency in top 3 major rice-producing regions in the Philippines during the 1971-2008 hydrological years.



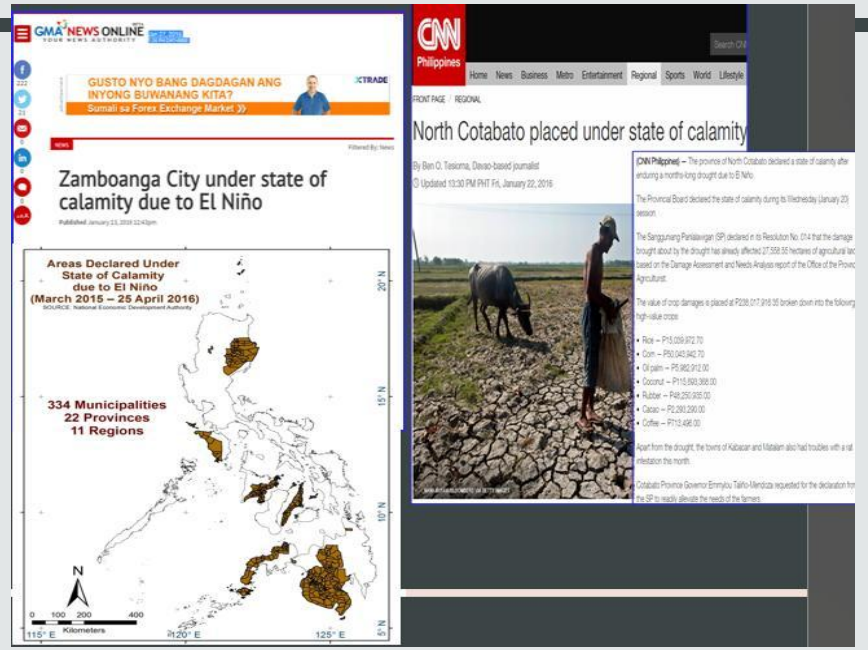


2009-2010 strong EL NINO

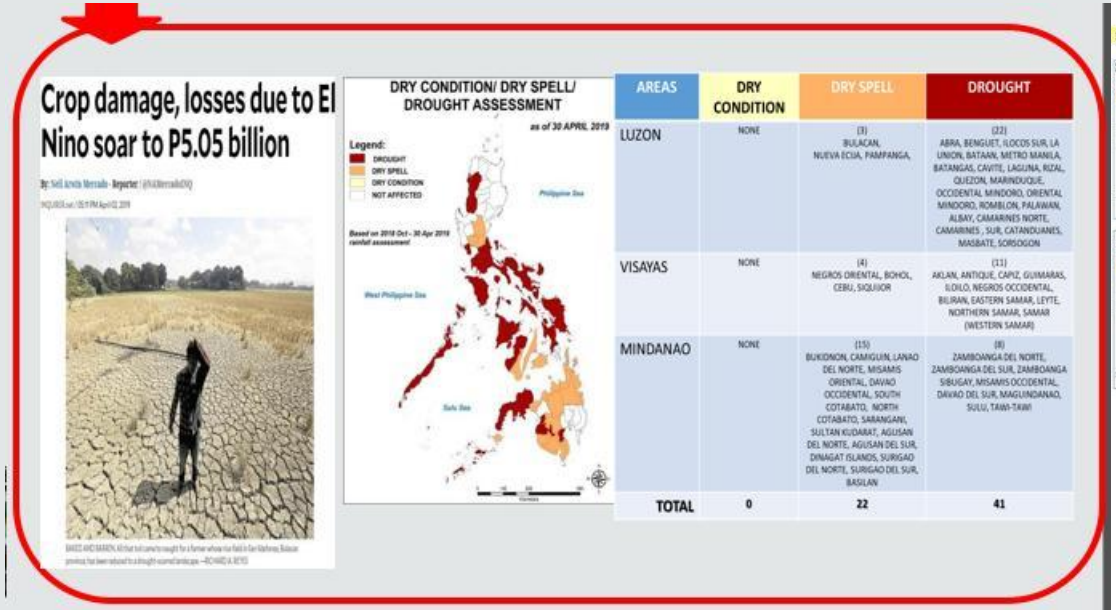


39 DROUGHT	CAR	REGION I	REGION II	REGION III (CENTRAL LUZON)	NATIONAL CAPITAL REGION
	ABRA BENGUET PROVINCE KALINGA APAYAO MOUNTAIN PROVINCE	ILOCOS NORTE ILOCOS SUR LA UNION PANGASINAN	BATANES CAGAYAN ISABELA NUEVA VIZCAYA QUIRINO	BATAAN BULACAN NUEVA ECIJA PAMPANGA TARLAC ZAMBALES AURORA	METROMANILA
	REGION IV-A (CALABARZON)	REGION IV-B (MIMAROPA)	REGION VI (WESTERN VISAYAS)	REGION VII (CENTRAL VISAYAS)	
	BATANGAS CAVITE LAGUNA RIZAL QUEZON	MARINDUQUE OCCIDENTAL MINDORO ORIENTAL MINDORO ROMBLON PALAWAN	AKLAN ANTIQUE CAPIZ GUIMARAS ILOILO NEGROS OCCIDENTAL	SIQUIJOR	
27 DRY SPELL	REGION V (BICOL)	REGION VII (CENTRAL VISAYAS)	REGION VIII (EASTERN VISAYAS)	REGION X (NORTHERN MINDANAO)	
	ALBAY CAMARINES NORTE CAMARINES SUR CATANDUANES MASBATE SORSOGON	BOHOL CEBU NEGROS ORIENTAL	BILIRAN EASTERN SAMAR LEYTE NORTHERN SAMAR SAMAR (WESTERN SAMAR) SOUTHERN LEYTE	BUKIDNON CAMIGUIN LANAO DEL NORTE MISAMIS OCCIDENTAL MISAMIS ORIENTAL	
	REGION XI (DAVAO REGION)	REGION XII (SOCCSKSARGEN)			
	DAVAO DAVAO DEL SUR DAVAO ORIENTAL	SOUTH COTABATO COTABATO SARANGANI SULTAN KUDARAT			
4 DRY CONDITION	REGION XIII- CARAGA				
	AGUSAN DEL NORTE AGUSAN DEL SUR SURIGAO DEL NORTE SURIGAO DEL SUR				

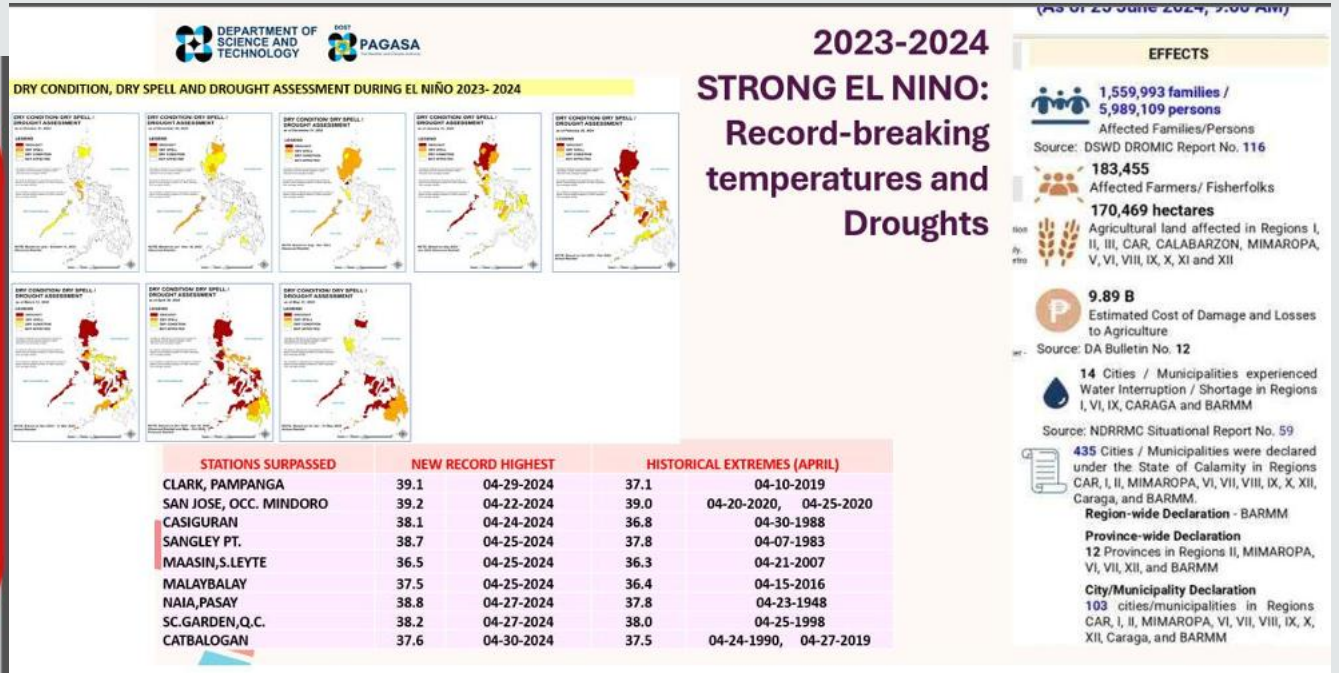
2015-2016 strong EL NINO



2018-2019 STRONG EL NINO



AREAS	DRY CONDITION	DRY SPELL	DROUGHT
LUZON	NONE	(3) BULACAN, NUEVA ECIJA, PAMPANGA,	(22) ABRA, BENGUET, ILOCOS SUR, LA UNION, BATAAN, METRO MANILA, BATANGAS, CAVITE, LAGUNA, RIZAL, QUEZON, MARINDUQUE, OCCIDENTAL MINDORO, ORIENTAL MINDORO, ROMBLON, PALAWAN, ALBAY, CAMARINES NORTE, CAMARINES , SUR, CATANDUANES, MASBATE, SORSOGON
VISAYAS	NONE	(4) NEGROS ORIENTAL, BOHOL, CEBU, SIQUIJOR	(11) AKLAN, ANTIQUE, CAPIZ, GUIMARAS, ILOILO, NEGROS OCCIDENTAL, BILIRAN, EASTERN SAMAR, LEYTE, NORTHERN SAMAR, SAMAR (WESTERN SAMAR)
MINDANAO	NONE	(15) BUKIDNON, CAMIGUIN, LANAO DEL NORTE, MISAMIS ORIENTAL, DAVAO OCCIDENTAL, SOUTH COTABATO, NORTH COTABATO, SARANGANI, SULTAN KUDARAT, AGUSAN DEL NORTE, AGUSAN DEL SUR, DINAGAT ISLANDS, SURIGAO DEL NORTE, SURIGAO DEL SUR, BASILAN	(8) ZAMBOANGA DEL NORTE, ZAMBOANGA DEL SUR, ZAMBOANGA SIBUGAY, MISAMIS OCCIDENTAL, DAVAO DEL SUR, MAGUINDANAO, SULU, TAWI-TAWI
TOTAL	0	22	41



STATIONS SURPASSED	NEW RECORD HIGHEST		HISTORICAL EXTREMES (APRIL)	
CLARK, PAMPANGA	39.1	04-29-2024	37.1	04-10-2019
SAN JOSE, OCC. MINDORO	39.2	04-22-2024	39.0	04-20-2020, 04-25-2020
CASIGURAN	38.1	04-24-2024	36.8	04-30-1988
SANGLEY PT.	38.7	04-25-2024	37.8	04-07-1983
MAASIN,S.LEYTE	36.5	04-25-2024	36.3	04-21-2007
MALAYBALAY	37.5	04-25-2024	36.4	04-15-2016
NAIA,PASAY	38.8	04-27-2024	37.8	04-23-1948
SC.GARDEN,Q.C.	38.2	04-27-2024	38.0	04-25-1998
CATBALOGAN	37.6	04-30-2024	37.5	04-24-1990, 04-27-2019

OVERVIEW OF DROUGHT INDICATORS

To effectively monitor, prepare for, and respond to droughts, scientists and policymakers rely on specialized drought indices. These tools simplify vast amounts of climate data—such as rainfall, temperature, and soil conditions—into a single metric or score. Specific indices are assigned to track each physical perspective

Drought Monitoring and Forecast Products

1. Meteorological Drought Indices (Atmospheric Water Shortage)

These indices track deficits in precipitation over time. They are highly effective for early warning signs.

- **Deciles**
- **Percent of Normal Index (PNI)**
- **Standardized Precipitation Index (SPI)**
- **Standardized Precipitation Evapotranspiration Index (SPEI)**

2. Agricultural Drought Indices - are numerical tools used to measure water shortages that affect crop growth and soil moisture.

- **Soil Moisture Indices:** Measure root-zone water deficits directly. Examples include the Soil Water Deficit Index (**SWDI**) and the Standardized Soil Moisture Index (**SSI**)
- **Evapotranspiration-Based Indices:** Track the balance between water supply and crop water demand. Examples include the Crop Moisture Index (**CMI**) and the Evapotranspiration Deficit Index (**ETDI**).
- **Remote-Sensing Indices:** Use satellite data to detect plant stress and green biomass. Examples include the Normalized Difference Vegetation Index (**NDVI**) and the Vegetation Health Index (**VHI**).

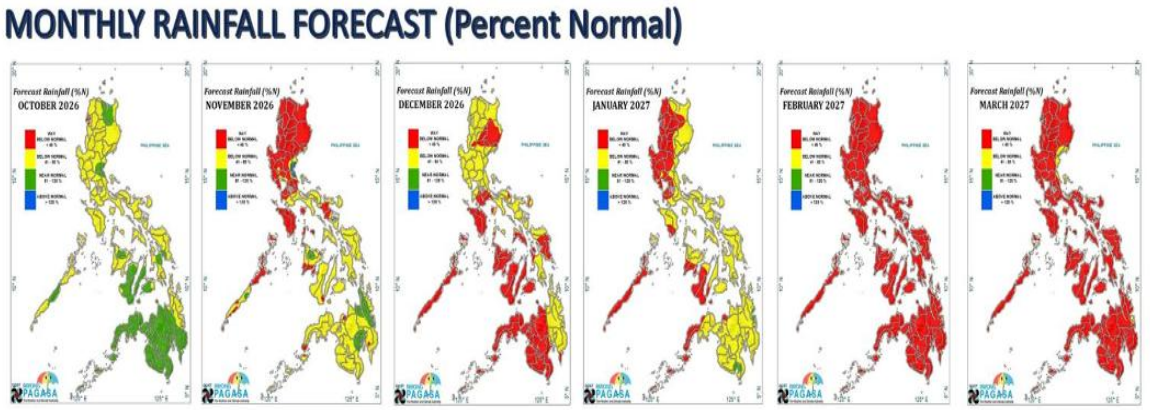
The **Percent of Normal Index (PNI)** measures how much rainfall occurred compared to the historical normal over a specific period

How PNI is Calculated

- Formula: Divide actual recorded precipitation by the long-term normal precipitation (typically a 30-year average), then multiply by 100.
- Scale: A value of 100% means rainfall is completely normal. Values below 100% indicate drier-than-normal conditions (potential drought), while values above 100% indicate wetter-than-normal conditions.
- Timeframes: Can be computed for daily, monthly, seasonal, or annual timescales

Strengths and Weaknesses

- **Pros**: It is very simple to calculate and intuitive to understand for a single region or single season.
- **Cons**: It assumes precipitation is normally distributed, which is rarely true. This makes it less reliable when comparing different climate zones or comparing a wet season directly to a dry season.



- **October**: Below-normal rainfall over Luzon, Visayas, Caraga. Near-normal over Northern Luzon & Southern Mindanao.
- **November**: Way-below-normal to below-normal rainfall conditions are expected across the country. Patches of near-normal rainfall are expected over some areas in Mindanao.
- **December**: Way-below-normal to below-normal rainfall conditions are expected across the country.
- **January**: Way-below-normal to below-normal rainfall conditions are expected across the country.
- **February**: Way-below-normal rainfall conditions are expected across the country.
- **March:** Way-below-normal rainfall conditions are expected across the country

Issued: 23 September 2026

Number of Provinces likely to receive the following rainfall conditions:

Month	way below normal	below normal	near normal	above normal
October 2026	0	52	35	0
November 2026	36	46	5	0
December 2026	48	39	0	0
January 2027	32	55	0	0
February 2027	87	0	0	0
March 2027	86	1	0	0

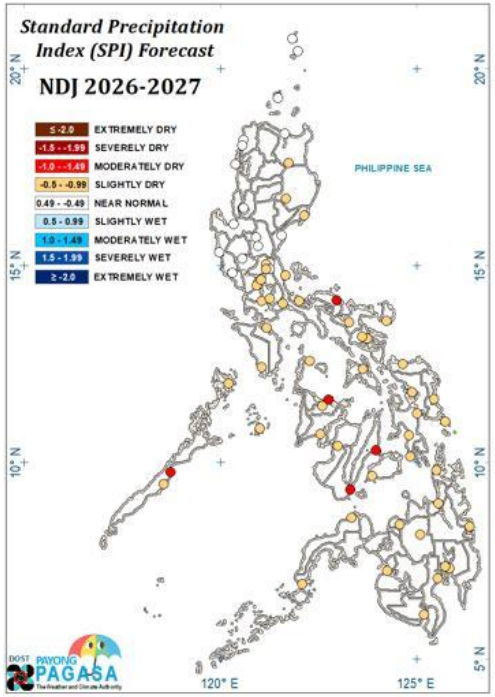
OVERVIEW OF DROUGHT INDICATORS

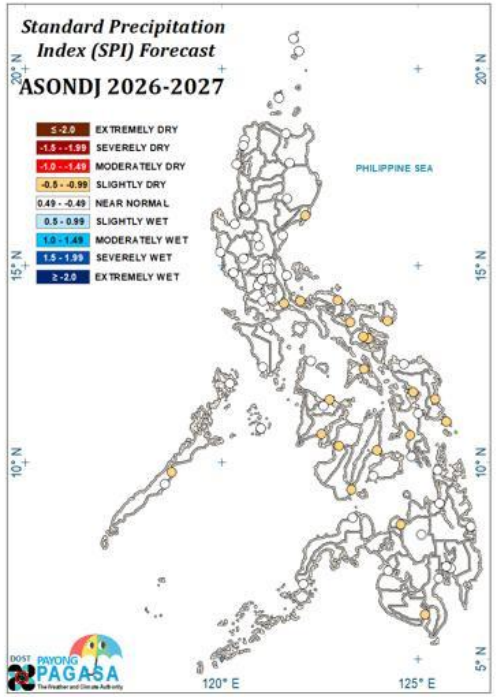
- **Standardized Precipitation Index (SPI): Recommended globally by the World Meteorological Organization,** the SPI measures only **precipitation deficits** across flexible timescales (e.g., 1, 3, or 12 months). This versatility allows it to catch sudden dry spells or analyze long-term climate trends. (Mc Kee et al., 1993)

Table 5.1: Drought classification thresholds

RDIst or SPI value	Category
2.00 or more	Extremely wet
1.50 to 1.99	Severely wet
1.00 to 1.49	Moderately wet
0.99 to -0.99	Near normal
-1.00 to -1.49	Moderately dry
-1.50 to -1.99	Severely sry
-2.00 or less	Extremely dry

Source: Tsakiris *et al*, 2005



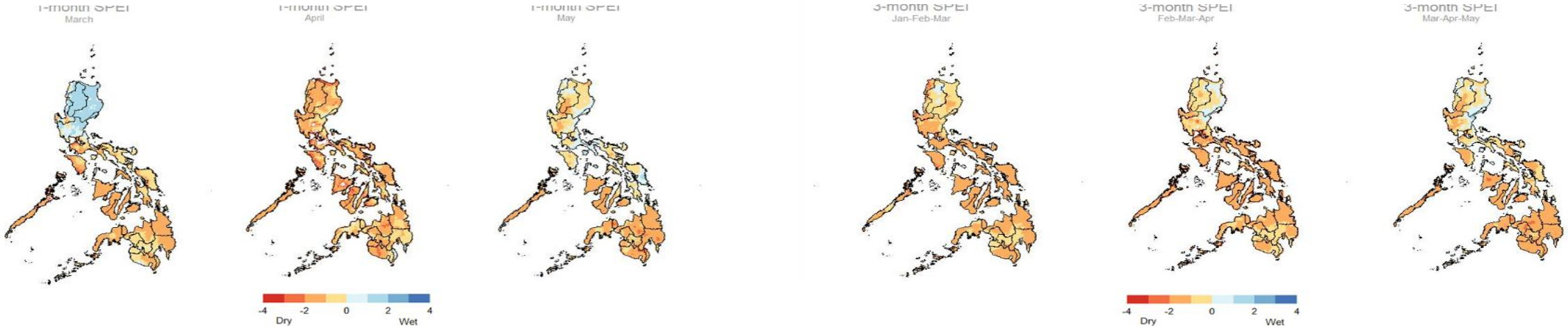


Deciles and SPI are based only on rainfall for describing the water deficit and do not consider other factors; in addition, the rainfal dataset needs to be updated whenever new data emerges (Hayes, 2004).

Drought Monitoring

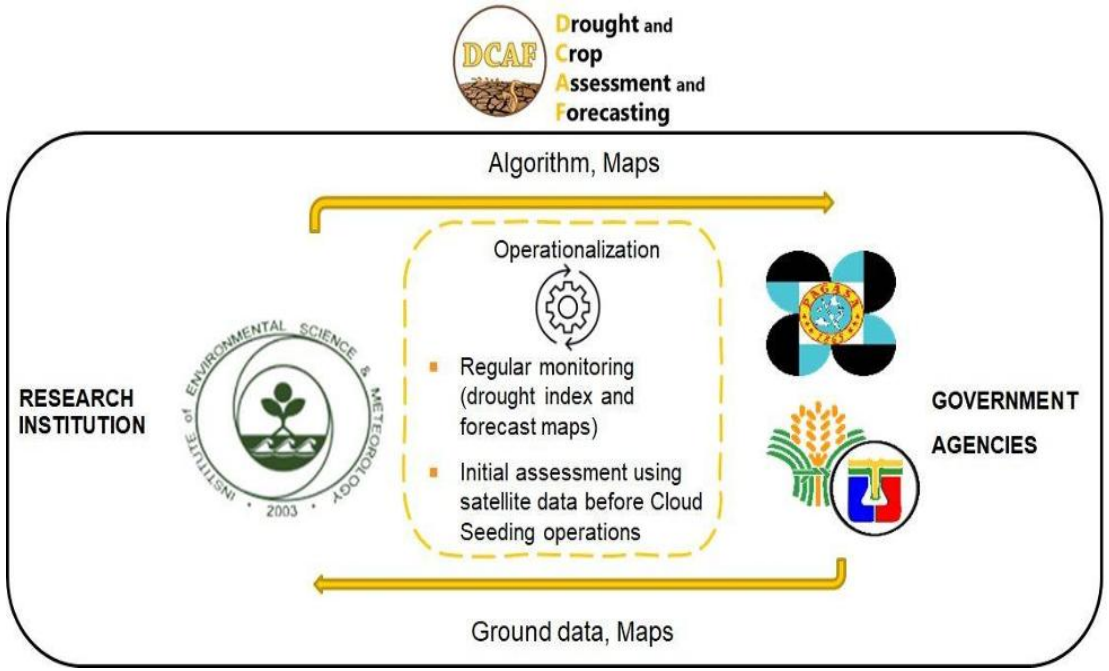
- **Meteorological Drought Indices (Atmospheric Water Shortage)**
  - **Standardized Precipitation Evapotranspiration Index (SPEI):** Building upon the SPI, the SPEI factors in both **precipitation and temperature**. By tracking potential evapotranspiration (how much water evaporates from soil and transpires from plants), it effectively captures how global warming increases drought intensity

1-month SPEI



3-month SPEI

Source: BSWM



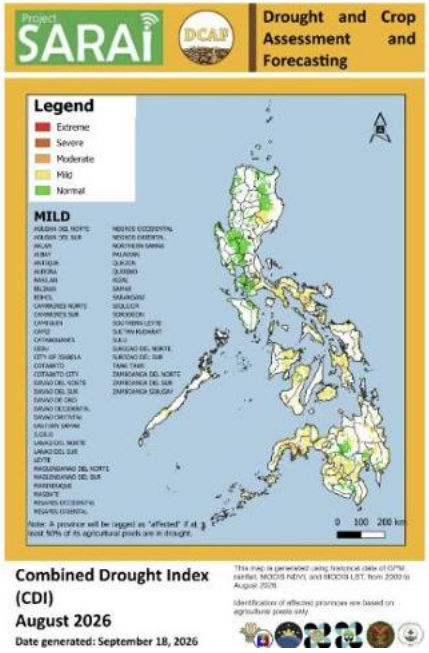
Drought and Crop Assessment and Forecasting (DCAF) Project (2014-2021)

Drought Monitoring

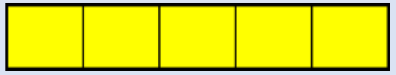
Monitoring Drought: Combined Drought Index (CDI)

CDI INPUTS			
Normal			
Mild	✓		
Moderate	✓	✓	
Severe	✓		✓
		✓	✓
Extreme	✓	✓	✓

Integrates **rainfall**, **temperature**, and **vegetation health** to monitor the transition from meteorological to agricultural drought.



PAGASA Meteorological Dry condition / Dry spell / Drought Criteria

Dry condition	two (2) consecutive months of below normal (21%-60% reduction from average) rainfall conditions;	
Dry spell	three (3) consecutive months of below normal (21%-60% reduction from average) rainfall conditions; or	
	two (2) consecutive months of way below normal (more than 60% reduction from average) rainfall conditions.	
Drought	three (3) consecutive months of way below normal (>60% reduction from average); or	
	five (5) consecutive months of below normal (21%-60% reduction from average) rainfall condition.	

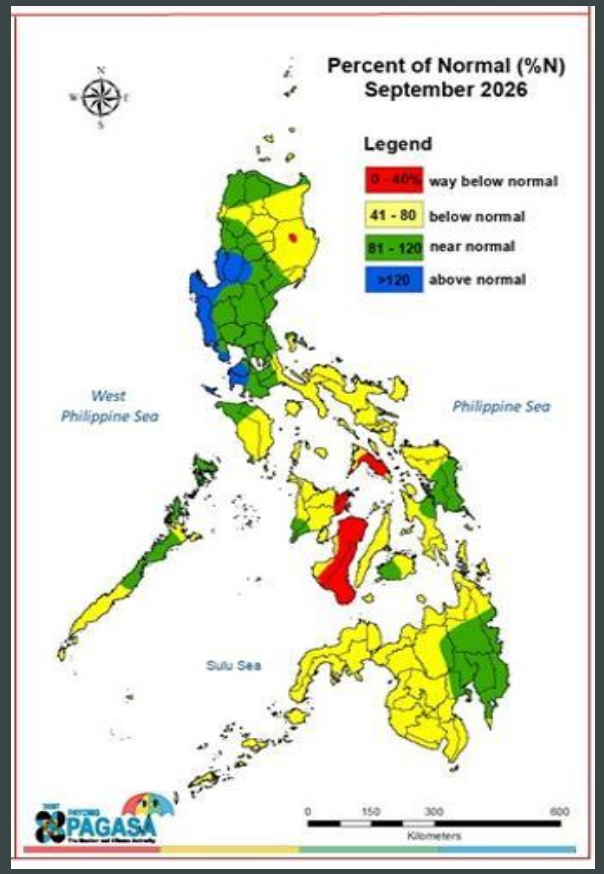
DOST
PAGASA
The Weather and Climate Authority

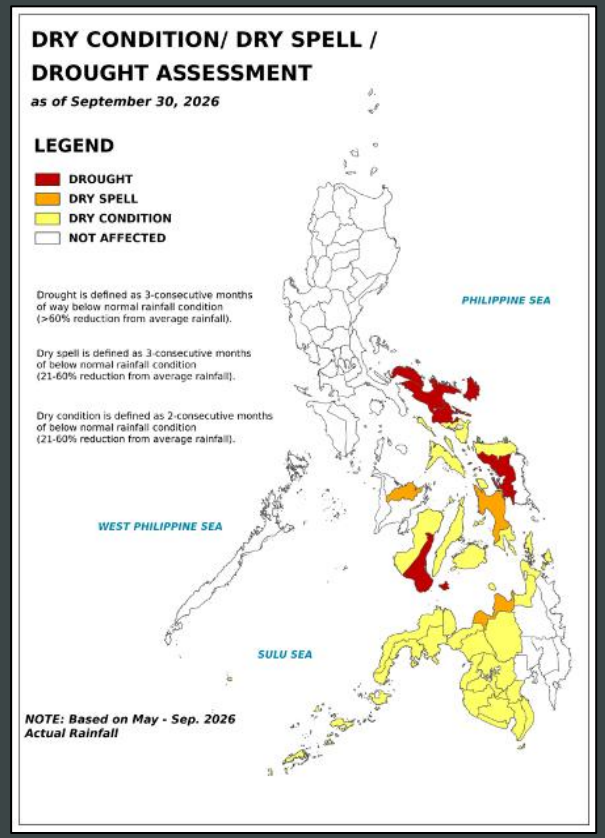
What exactly is happening in the Philippines with this El Niño?

RECENT CONDITIONS IN THE COUNTRY

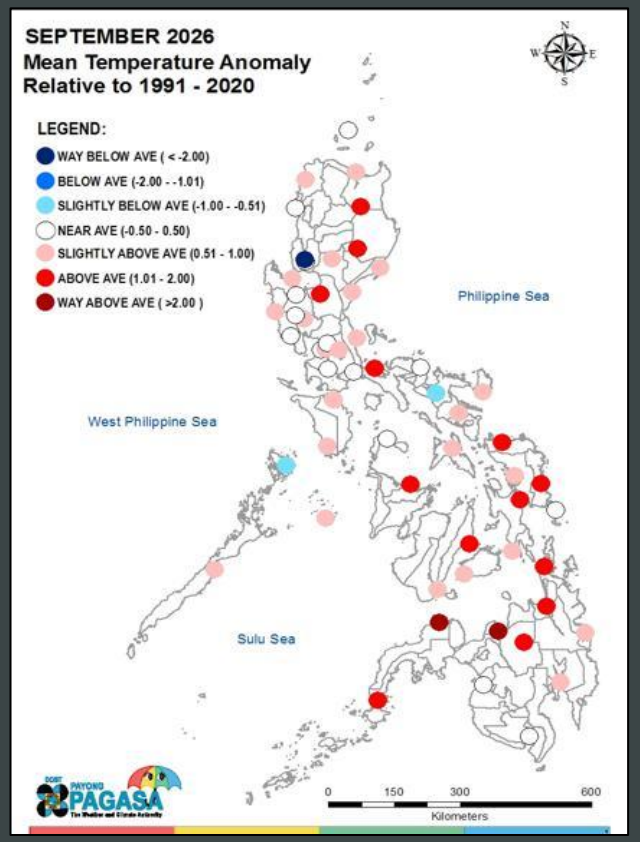
SEPTEMBER 2026

OBSERVED RAINFALL





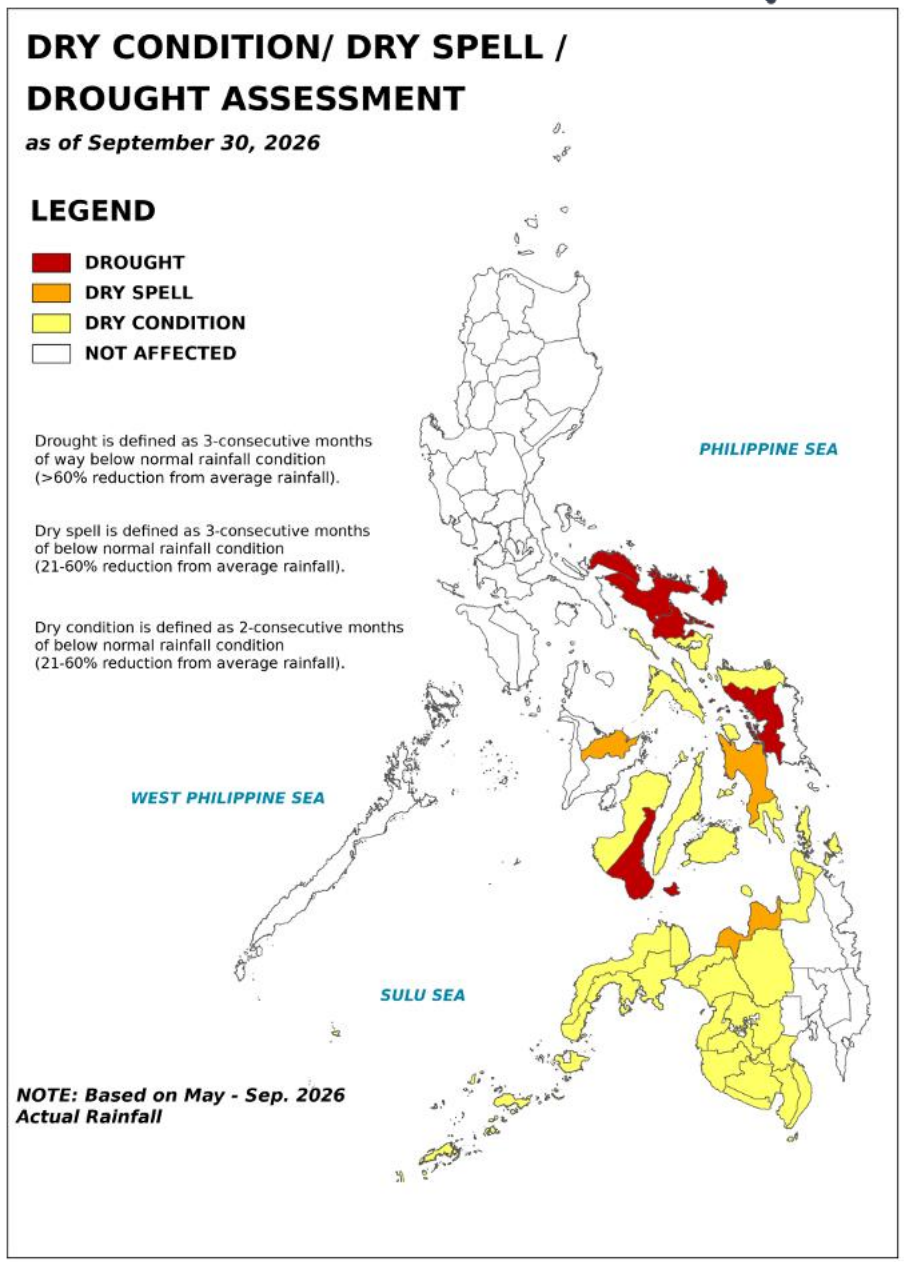
OBSERVED TEMPERATURE



Rainfall surplus was recorded in some areas of Western Luzon, while most of Southern Luzon, Visayas, and Mindanao experienced a deficit of rainfall in September.

- Warmer-than-usual conditions were experienced in most of the country.

ACTUAL DRY CONDITION/DRY SPELL/DROUGHT as of 30 September 2026

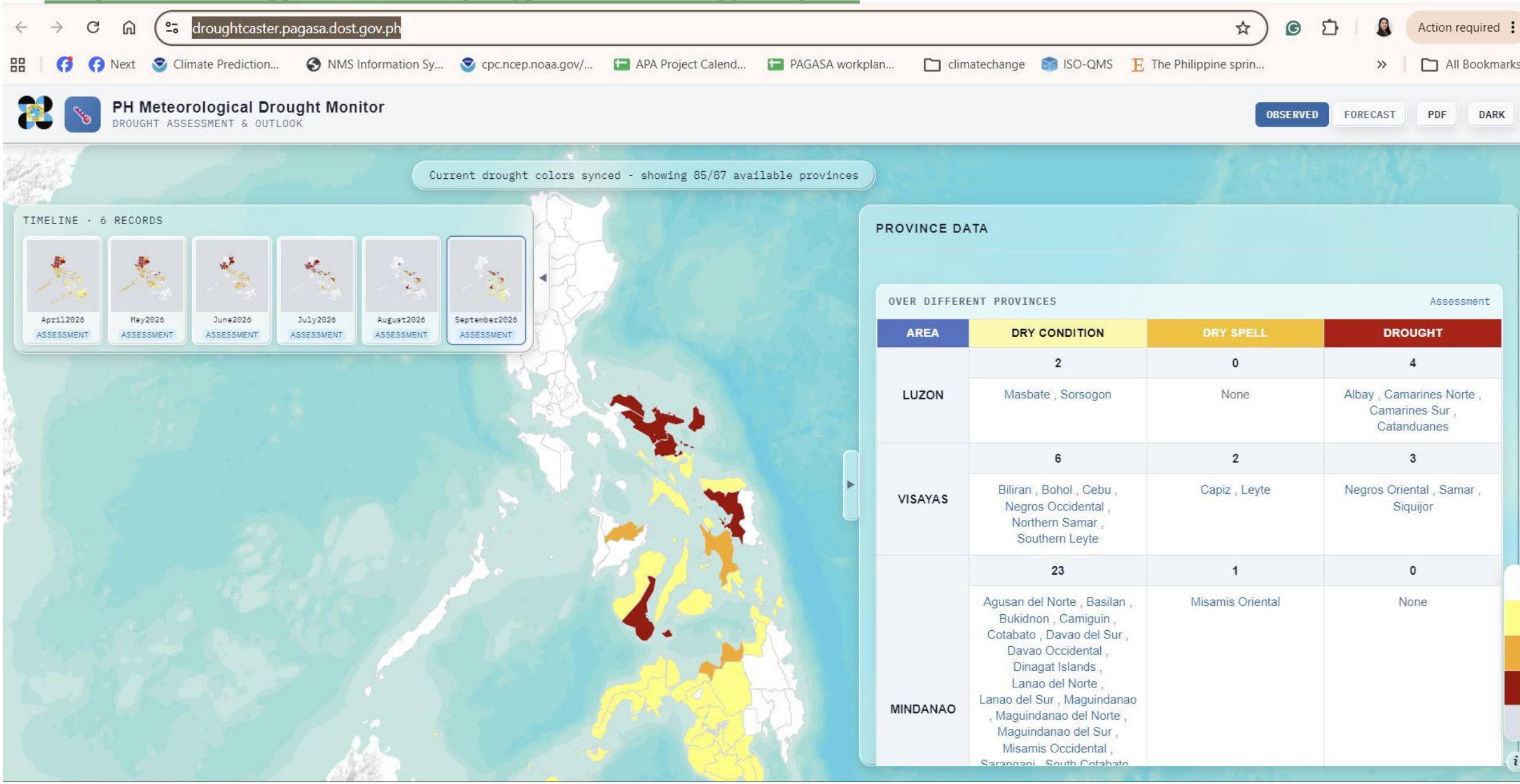


OVER DIFFERENT PROVINCES
As of Sep 30, 2026 (ACTUAL)

AREA	DRY CONDITION	DRY SPELL	DROUGHT
LUZON	2	0	4
	Masbate, Sorsogon	None	Albay, Camarines Norte, Camarines Sur, Catanduanes
VISAYAS	6	2	3
	Biliran, Bohol, Cebu, Negros Occidental, Northern Samar, Southern Leyte	Capiz, Leyte	Negros Oriental, Samar (Western Samar), Siquijor
MINDANAO	22	1	0
	Agusan del Norte, Basilan, Bukidnon, Camiguin, Cotabato (North Cotabato), Davao del Sur, Davao Occidental, Dinagat Islands, Lanao del Norte, Lanao del Sur, Maguindanao del Norte, Maguindanao del Sur, Misamis Occidental, Sarangani, South Cotabato, Sultan Kudarat, Sulu, Surigao del Norte, Tawi-Tawi, Zamboanga del Norte, Zamboanga del Sur, Zamboanga Sibugay	Misamis Oriental	None
TOTAL	**30**	**3**	**7**

Issued: 02 October 2026

https://droughtcaster.pagasa.dost.gov.ph/



AREA	DRY CONDITION	DRY SPELL	DROUGHT
LUZON	2 Masbate , Sorsogon	0 None	4 Albay , Camarines Norte , Camarines Sur , Catanduanes
VISAYAS	6 Biliran , Bohol , Cebu , Negros Occidental , Northern Samar , Southern Leyte	2 Capiz , Leyte	3 Negros Oriental , Samar , Siquijor
MINDANAO	23 Agusan del Norte , Basilan , Bukidnon , Camiguin , Cotabato , Davao del Sur , Davao Occidental , Dinagat Islands , Lanao del Norte , Lanao del Sur , Maguindanao , Maguindanao del Norte , Maguindanao del Sur , Misamis Occidental , Sarangani , South Cotabato	1 Misamis Oriental	0 None

Opportunities for scaling Drought resilience solutions

Opportunities for scaling DROUGHT resilience solutions

LIVE 33

FRAMEWORK FOR THE EL NIÑO ACTION PLAN

SOCIETAL GOAL: INCREASE RESILIENCY OF COMMUNITIES

GOAL FOR THE NAP: MITIGATE AND ADDRESS THE IMPACTS OF 2026-2027 EL NIÑO

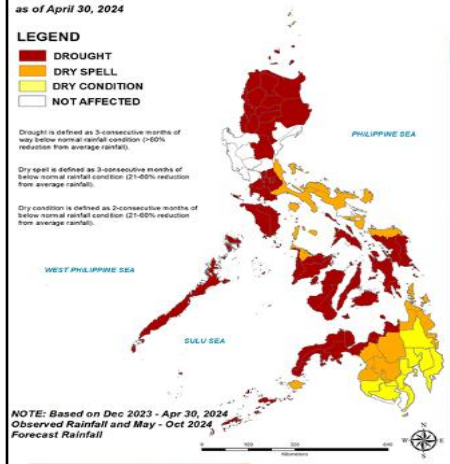
SECTORS	WATER SECURITY	FOOD SECURITY	ENERGY SECURITY	HEALTH	PUBLIC SAFETY
OUTCOMES	• Sufficient water supply	• Adequate and stable supply of key food commodities ensured • Income losses of affected farmers and fisherfolk minimized • Access of consumers to affordable food commodities expanded.	• Power interruptions minimized. • Ensure continuity and adequacy of fuel supply	• Outbreak of diseases managed.	• Fire incidents due to El Niño are reduced. • Safe, peaceful and orderly communities are maintained.
OBJECTIVES	• Efficiently allocate water supply during El Niño • Develop alternative water sources • Intensify water conservation efforts • Enhance water governance	• Provide support services to for food production. • Provide social protection to affected farmers and fisherfolk, including livelihood support and financial assistance. • Stabilize prices of basic necessities and prime commodities • Facilitate efficient and unhampered transportation and distribution of food.	• Ensure adequate energy supply • Efficiently manage power distribution & secure energy facilities. • Promote energy efficiency & conservation. • Ensure adequate fuel inventory & strategic reserves • Strengthen supply chain resiliency and logistics coordination • Secure oil & gas facilities against fire and climate-related risks	• Ensure adequate supply in hospitals/facilities • Provide timely advisories and support to hospitals/facilities.	• Prevent fire incidents and reduce hazards • Strengthen partnership with LGUs and NGAs • Ensure public safety and order conditions • Contribute to the government initiatives in mitigating the effects of El Niño

S-CUTTING CONCERNS: Information dissemination, management of watersheds and coastal/marine resources, monitoring of hazards, diseases and market conditions

Drought Advisories

DRY CONDITION/ DRY SPELL / DROUGHT ASSESSMENT

as of April 30, 2024



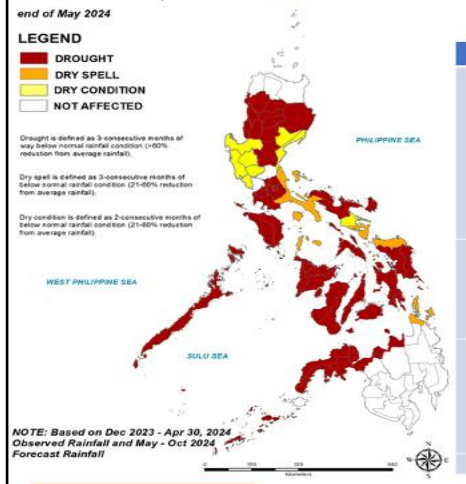
Issuance: 2024-05-06

OVER DIFFERENT PROVINCES
As of Apr 2024 (ACTUAL)

AREA	DRY CONDITION	DRY SPELL	DROUGHT
LUZON	0 None	8 Batanes, Camarines Norte, Camarines Sur, Catanduanes, Marinduque, Quezon, Romblon, Sorsogon	23 Spratly Islands, Abra, Apayao, Batangas, Benguet, Cagayan, Cavite, Ifugao, Ilocos Norte, Ilocos Sur, Isabela, Kalinga, La Union, Laguna, Masbate, Metropolitan Manila, Mountain Province, Nueva Ecija, Nueva Vizcaya, Occidental Mindoro, Oriental Mindoro, Palawan, Rizal
VISAYAS	0 None	2 Aklan, Northern Samar	14 Antique, Biliran, Bohol, Capiz, Cebu, Eastern Samar, Guimaras, Iloilo, Leyte, Negros Occidental, Negros Oriental, Samar, Siquijor, Southern Leyte
MINDANAO	9 Agusan del Sur, Compostela Valley, Davao del Norte, Davao del Sur, Davao Oriental, South Cotabato, Sultan Kudarat, Davao City, Davao Occidental	9 Agusan del Norte, Basilan, Bukidnon, Dinagat Islands, Lanao del Sur, North Cotabato, Sulu, Surigao del Norte, Surigao del Sur, Maguindanao	9 Camiguin, Lanao del Norte, Misamis Occidental, Misamis Oriental, Sulu, Tawi-Tawi, Zamboanga del Norte, Zamboanga del Sur, Zamboanga Sibugay
TOTAL	9	19	46

OUTLOOK FOR AREAS POTENTIAL FOR DRY CONDITION, DRY SPELL AND DROUGHT

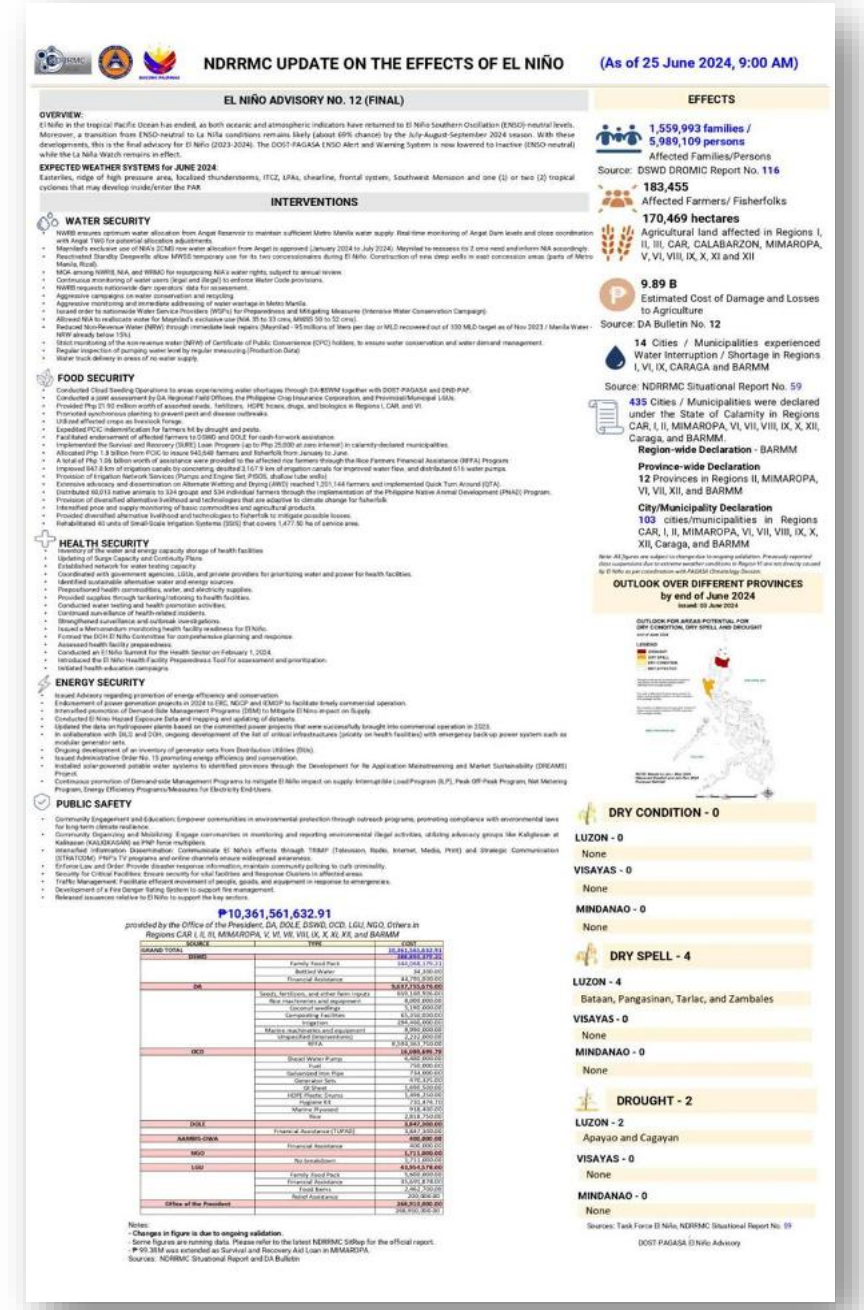
end of May 2024



Issuance: 2024-05-06

OUTLOOK OVER DIFFERENT PROVINCES
by end of May 2024

AREA	DRY CONDITION	DRY SPELL	DROUGHT
LUZON	8 Albay, Aurora, Bataan, Pampanga, Pangasinan, Quirino, Tarlac, Zambales	4 Marinduque, Quezon, Romblon, Sorsogon	23 Spratly Islands, Abra, Batangas, Benguet, Camarines Norte, Camarines Sur, Catanduanes, Cavite, Ifugao, Ilocos Sur, Isabela, Kalinga, La Union, Laguna, Masbate, Metropolitan Manila, Mountain Province, Nueva Ecija, Nueva Vizcaya, Occidental Mindoro, Oriental Mindoro, Palawan, Rizal
VISAYAS	0 None	1 Northern Samar	15 Aklan, Antique, Biliran, Bohol, Capiz, Cebu, Eastern Samar, Guimaras, Iloilo, Leyte, Negros Occidental, Negros Oriental, Samar, Siquijor, Southern Leyte
MINDANAO	0 None	2 Dinagat Islands, Surigao del Norte	9 Camiguin, Lanao del Norte, Misamis Occidental, Misamis Oriental, Sulu, Tawi-Tawi, Zamboanga del Norte, Zamboanga del Sur, Zamboanga Sibugay
TOTAL	8	7	47



NDRRMC UPDATE ON THE EFFECTS OF EL NIÑO (As of 25 June 2024, 9:00 AM)

EL NIÑO ADVISORY NO. 12 (FINAL)

OVERVIEW:
El Niño in the tropical Pacific Ocean has ended, as both oceanic and atmospheric indicators have returned to El Niño Southern Oscillation (ENSO)-neutral levels. Moreover, a transition from ENSO-neutral to La Niña conditions remains likely (about 69% chance) by the July-August-September 2024 season. With these developments, this is the final advisory for El Niño (2023-2024). The DOST-PAGASA ENSO Alert and Warning System is now lowered to Inactive (ENSO-neutral) while the La Niña Watch remains in effect.

EXPECTED WEATHER SYSTEMS for JUNE 2024:
Easterlies, ridge of high pressure area, localized thunderstorms, ITCZ, LPAs, shearline, frontal system, Southwest Monsoon and one (1) or two (2) tropical cyclones that may develop inside/enter the PAR

INTERVENTIONS

WATER SECURITY
- NWRB ensures optimum water allocation from Angat Reservoir to maintain sufficient Metro Manila water supply. Real-time monitoring of Angat Dam levels and close coordination with Angat TWG for potential allocation adjustments.
- Maynilad's exclusive use of NIA's (CNR) raw water allocation from Angat is approved (January 2024 to July 2024). Maynilad to reassess its 2 one-need-and-inform NIA accordingly.
- Reactivated Standby Deepwells allow MWSS temporary use for its two concessionaires during El Niño. Construction of new deep wells in east concession areas (parts of Metro Manila, Rizal).
- MOA among NWRB, NIA, and WRMC for repurposing NIA's water rights, subject to annual review.
- Continuous monitoring of water users (legal and illegal) to enforce Water Code provisions.
- NWRB requests nationwide dam operators' data for assessment.
- Aggressive campaigns on water conservation and recycling.
- Aggressive monitoring and immediate addressing of water wastage in Metro Manila.
- Issued order to nationwide Water Service Providers (WSPs) for Preparedness and Mitigating Measures (Intensive Water Conservation Campaign).
- Allowed NIA to reallocate water for Maynilad's exclusive use (NIA 35 to 33 cms, MWSS 50 to 52 cms).
- Reduced Non-Revenue Water (NRW) through immediate leak repairs (Maynilad - 95 millions of liters per day or MLD recovered out of 100 MLD target as of Nov 2023 / Manila Water - NRW already below 15%).
- Strict monitoring of the non-revenue water (NRW) of Certificate of Public Convenience (CPC) holders, to ensure water conservation and water demand management.
- Regular inspection of pumping water level by regular measuring (Production Data).
- Water truck delivery in areas of no water supply.

FOOD SECURITY
- Conducted Cloud Seeding Operations to areas experiencing water shortages through DA-BPI/PM together with DOST-PAGASA and DND-PAF.
- Conducted a joint assessment by DA Regional Field Offices, the Philippine Crop Insurance Corporation, and Provincial/Municipal LGUs.
- Provided Php 21.93 million worth of assorted seeds, fertilizers, HDPE boxes, drugs, and biologics in Regions I, CAR, and VI.
- Promoted synchronous planting to prevent pest and disease outbreaks.
- Utilized affected crops as livestock forage.
- Expedited PCIC indemnification for farmers hit by drought and pests.
- Facilitated endorsement of affected farmers to DSWD and DOLE for cash-for-work assistance.
- Implemented the Survival and Recovery (SURE) Loan Program (up to Php 25,000 at zero interest) in calamity-declared municipalities.
- Allocated Php 1.8 billion from PCIC to insure 540,648 farmers and fisherfolk from January to June.
- A total of Php 1.08 billion worth of assistance were provided to the affected rice farmers through the Rice Farmers Financial Assistance (RFFA) Program.
- Improved 847.8 km of irrigation canals by concreting, desilted 3,167.9 km of irrigation canals for improved water flow, and distributed 616 water pumps.
- Provision of Irrigation Network Services (Pumps and Engine Set, PISOS, shallow tube wells).
- Extensive advocacy and dissemination on Alternate Wetting and Drying (AWD) reached 1,201,144 farmers and implemented Quick Turn Around (QTA).
- Distributed 60,013 native animals to 324 groups and 534 individual farmers through the implementation of the Philippine Native Animal Development (PNAD) Program.
- Provision of diversified alternative livelihood and technologies that are adaptive to climate change for fisherfolk.
- Intensified price and supply monitoring of basic commodities and agricultural products.
- Provided alternative livelihood and technologies to fisherfolk to mitigate possible losses.
- Rehabilitated 40 units of Small-Scale Irrigation Systems (SSIS) that covers 1,477.50 ha of service area.

HEALTH SECURITY
- Inventory of the water and energy capacity storage of health facilities.
- Updating of Surge Capacity and Continuity Plans.
- Established network for water testing capacity.
- Coordinated with government agencies, LGUs, and private providers for prioritizing water and power for health facilities.
- Identified sustainable alternative water and energy sources.
- Prepositioned health commodities, water, and electricity supplies.
- Provided supplies through tankering/rationing to health facilities.
- Conducted water testing and health promotion activities.
- Continued surveillance of health-related incidents.
- Strengthened surveillance and outbreak investigations.
- Issued a Memorandum monitoring health facility readiness for El Niño.
- Formed the DOH El Niño Committee for comprehensive planning and response.
- Assessed health facility preparedness.
- Conducted an El Niño Summit for the Health Sector on February 1, 2024.
- Introduced the El Niño Health Facility Preparedness Tool for assessment and prioritization.
- Initiated health education campaigns.

ENERGY SECURITY
- Issued Advisory regarding promotion of energy efficiency and conservation.
- Endorsement of power generation projects in 2024 to ERC, NGCP and IEMOP to facilitate timely commercial operation.
- Intensified promotion of Demand-Side Management Programs (DSM) to Mitigate El Niño Impact on Supply.
- Conducted El Nino Hazard Exposure Data and mapping and updating of datasets.
- Updated the data on hydropower plants based on the committed power projects that were successfully brought into commercial operation in 2023.
- In collaboration with DILG and DOH, ongoing development of the list of critical infrastructures (priority on health facilities) with emergency back-up power system such as modular generator sets.
- Ongoing development of an inventory of generator sets from Distribution Utilities (DUs).
- Issued Administrative Order No. 15 promoting energy efficiency and conservation.
- Installed solar-powered potable water systems to identified provinces through the Development for Re Application Mainstreaming and Market Sustainability (DREAMS) Project.
- Continuous promotion of Demand-side Management Programs to mitigate El Niño impact on supply: Interruptible Load Program (ILP), Peak Off-Peak Program, Net Metering Program, Energy Efficiency Programs/Measures for Electricity End-Users.

PUBLIC SAFETY
- Community Engagement and Education: Empower communities in environmental protection through outreach programs, promoting compliance with environmental laws for long-term climate resilience.
- Community Organizing and Mobilizing: Engage communities in monitoring and reporting environmental illegal activities, utilizing advocacy groups like Kalipunan ng Kalikasan (KALIKASAN) as PNP force multipliers.
- Intensified Information Dissemination: Communicate El Niño's effects through TRIMP (Television, Radio, Internet, Media, Print) and Strategic Communication (STRATCOM). PNP's TV programs and online channels ensure widespread awareness.
- Enforce Law and Order: Provide disaster response information, maintain community policing to curb criminality.
- Security for Critical Facilities: Ensure security for vital facilities and Response Clusters in affected areas.
- Traffic Management: Facilitate efficient movement of people, goods, and equipment in response to emergencies.
- Development of a Fire Danger Rating System to support fire management.
- Released issuances relative to El Niño to support the key sectors.

₱10,361,561,632.91
provided by the Office of the President, DA, DOLE, DSWD, DCD, LGU, NGO, Others in Regions CAR I, II, III, MIMAROPA, V, VI, VII, VIII, IX, X, XI, XII, and BARMM

SOURCE	TYPE	COST
GRAND TOTAL		10,361,561,632.91
DSWD		186,855,179.21
	Family Food Pack	146,048,179.21
	Bottled Water	34,100.00
	Financial Assistance	40,795,000.00
DA		5,637,755,676.00
	Seeds, fertilizers, and other farm inputs	839,140,976.00
	Rice machineries and equipment	8,000,000.00
	Livestock dewormings	1,197,000.00
	Composting Facilities	61,250,000.00
	Irrigation	294,468,000.00
	Maize machineries and equipment	8,090,000.00
	Unspecified (Improvements)	2,217,000.00
	RFFA	4,183,383,700.00
OCD		16,085,699.79
	Diesel Water Pump	8,400,000.00
	Fuel	750,000.00
	Galvanized Iron Pipe	734,400.00
	Generator Sets	470,325.00
	GI Sheet	1,692,520.00
	HDPE Plastic Drums	1,404,354.00
	Hygiene Kit	720,474.79
	Marine Plywood	918,830.00
	Rice	1,814,750.00
DOLE		1,847,300.00
	Financial Assistance (TUPAD)	1,847,300.00
AANMIS-DWA		400,000.00
	Financial Assistance	400,000.00
NGO		1,711,000.00
	No breakdown	1,711,000.00
LGU		43,954,578.00
	Family Food Pack	5,900,400.00
	Financial Assistance	15,699,878.00
	Food Items	2,862,700.00
	Relief Assistance	200,000.00
Office of the President		250,912,000.00

Notes:
- **Changes in figure is due to ongoing validation.**
- Some figures are running data. Please refer to the latest NDRRMC SitRep for the official report.
- ₱ 99.38M was extended as Survival and Recovery Aid Loan in MIMAROPA.

Sources: NDRRMC Situational Report and DA Bulletin

EFFECTS

1,559,993 families / 5,989,109 persons
Affected Families/Persons
Source: DSWD DROMIC Report No. 116

183,455
Affected Farmers/ Fisherfolks

170,469 hectares
Agricultural land affected in Regions I, II, III, CAR, CALABARZON, MIMAROPA, V, VI, VIII, IX, X, XI and XII

9.89 B
Estimated Cost of Damage and Losses to Agriculture
Source: DA Bulletin No. 12

14 Cities / Municipalities experienced Water Interruption / Shortage in Regions I, VI, IX, CARAGA and BARMM
Source: NDRRMC Situational Report No. 59

435 Cities / Municipalities were declared under the State of Calamity in Regions CAR, I, II, MIMAROPA, VI, VII, VIII, IX, X, XII, Caraga, and BARMM.
Region-wide Declaration - BARMM
Province-wide Declaration
12 Provinces in Regions II, MIMAROPA, VI, VII, XII, and BARMM
City/Municipality Declaration
103 cities/municipalities in Regions CAR, I, II, MIMAROPA, VI, VII, VIII, IX, X, XII, Caraga, and BARMM

Note: All figures are subject to change due to ongoing validation. Previously reported data suspensions due to extreme weather conditions in Region VI are not directly caused by El Niño as per coordination with PAGASA Climatology Division.

OUTLOOK OVER DIFFERENT PROVINCES
by end of June 2024
Issued: 03 June 2024

DRY CONDITION - 0
LUZON - 0
None
VISAYAS - 0
None
MINDANAO - 0
None

DRY SPELL - 4
LUZON - 4
Bataan, Pangasinan, Tarlac, and Zambales
VISAYAS - 0
None
MINDANAO - 0
None

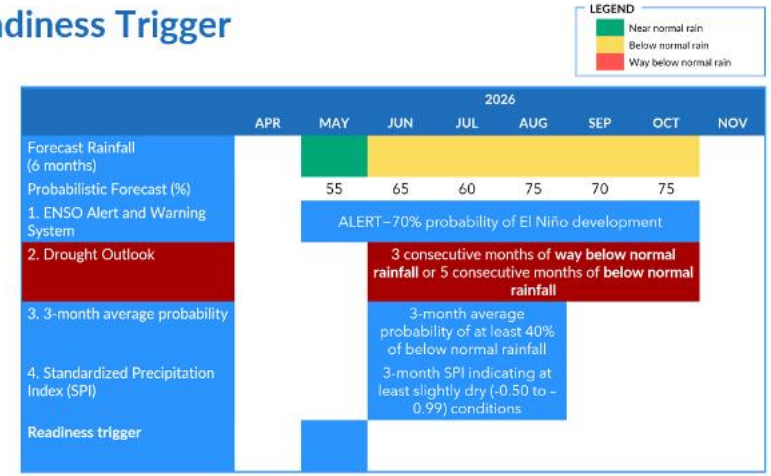
DROUGHT - 2
LUZON - 2
Apayao and Cagayan
VISAYAS - 0
None
MINDANAO - 0
None

Sources: Task Force El Niño, NDRRMC Situational Report No. 59
DOST-PAGASA El Niño Advisory

RA 12287 – State of Imminent Disaster

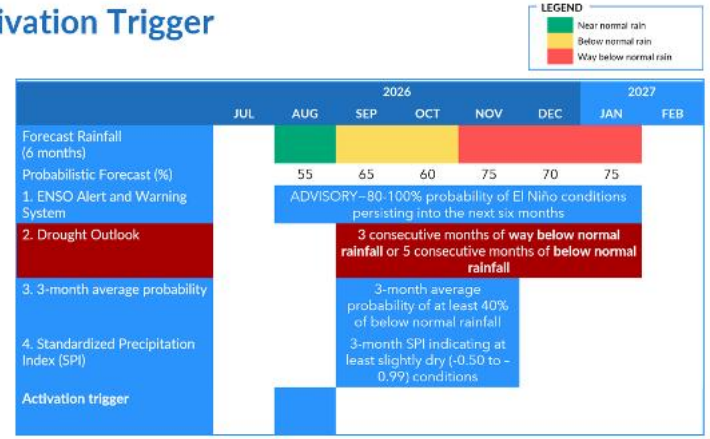
- **Development of triggers and thresholds for Drought**
- **Development of Anticipatory Action (AA) for Drought Guidance Framework**

Readiness Trigger



*illustrative example

Activation Trigger

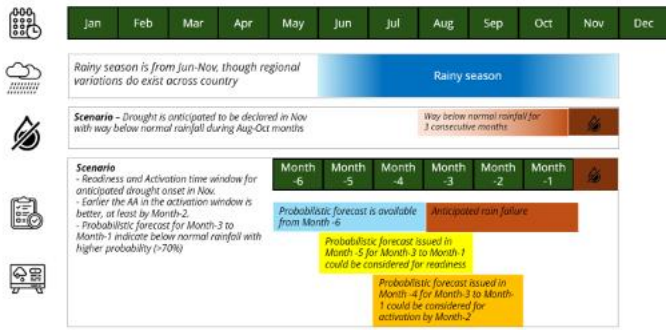


*illustrative example

Thresholds and Triggers Considerations

Use of multiple indicators	Increases confidence that drought conditions are real and persistent
Addition of ENSO Alert and Warning System	A single dry spell could trigger alarms even if ENSO outlooks show ENSO Neutral
	Covers the causal signal which indicates the presence of climate drivers that often precede localized low rainfall
Addition of SPI	Allows the comparison of rainfall deficits across different climates
Probability threshold of 40%	Ensures that anticipatory measures are activated sooner, reducing the risk of being caught unprepared if drought develops

Example – Anticipated drought onset in November



Deactivation



- DEACTIVATION: PAGASA confirms that El Niño conditions have fully dissipated.
- Considers the possibility of fluctuating ENSO events such as temporary improvement in rainfall
- Using PAGASA's final advisory ensures that all agencies and stakeholders are aligned with the same official climate status.

www.panahon.gov.ph
www.pagasa.dost.gov.ph

DOST-PAGASA

PAGASA-DOST

DOST-PAGASA Weather Report

TRUNKLINE: (02) 8284- 0800

EXTENSIONS

TYPHOON/WEATHER: 4801

FLOOD: 4855

CLIMATE: 4920 or 4921

MEDIA: 4865

Thank you for listening!

cadclimps@pagasa.dost.gov.ph

DOST PAGASA
The Weather and Climate Authority

1968-1969

Moderate to severe drought severely affected the Bicol region and caused millions of tons of losses in rice and corn production (Hilario, F., 2009).

1972-1973

Drought hit the area of Central Luzon, Palawan, Visayas, and Mindanao. As a result of this impact, a total loss of 8.3 million metric tons of rice and corn production were reported (Hilario, F., 2009). The Great Philippine Floods of 1972 coincided with this strong El Niño event.

1982-1983

The El Niño event from 1982 to 1983 caused an estimated US$ 450 million of damages in the Philippines. Western and Central Luzon, Southern Tagalog provinces, Northern Visayas, Bohol, and Western Mindanao were affected by drought from October of 1982 to March of 1983. Most of Luzon, Negros Occidental, and Iloilo were affected by moderate to severe drought from April to September of 1983. This resulted in the loss of 6.4x105 metric tons of rice, corn insurance claims amounting to PhP 38 million, and hydropower generation loss valued at PhP 316 million (Hilario, F., 2009). These events, including prolonged wet and dry seasons, caused a large drop in agricultural production and contributed to one of the sharpest falls in gross domestic product (Rincón, M., and Virtucio, F., 2008).

1989-1990

From October of 1989 to March of 1990, drought affected Cagayan Valley, Panay Island, Guimaras, Palawan, and Southern Mindanao. There were estimated losses of 5 million metric tons of rice and corn production, hydropower generation of PhP 348 million, as well as 10% cutback in water production in Metro Manila (Hilario, F., 2009).

1991-1993

During the El Niño in 1991 to 1992, the severe drought affected most areas of Central Luzon, Southern Luzon, Visayas, and Mindanao. It resulted in impacts to agricultural areas covering 461,800 hectares with agricultural losses amounting to PhP 4.09 billion, and to a 20% shortfall in Metro Manila's water supply (Hilario, F., 2009).

1997-1998

The drought episode from 1997 to 1998 was one of the strongest, affecting over 70% of the Philippines. The impacts of this drought resulted in damages to about 292,000 hectares of agricultural areas (such as rice, corn, and coconut) equivalent to PhP 3 billion, water shortages, forest fires, and human health impacts (Hilario, F., 2009 & WFP, 2016).

2015-2016

The 2015 to 2016 El Niño episode is considered to be among the strongest since the 1950s. It was officially declared in March of 2015, peaked during the November-December-January season with an Oceanic Niño Index (ONI) of 2.6°C and ended by June of 2016. According to the 2016 NDRRMC Final Damage Report, the 2015 to 2016 El Niño episode impacted around 396,000 hectares of agricultural areas, leading to rice and corn production losses amounting to almost PhP 10 billion.