

Seasonal Climate Forecast : A Decision Support Tool in Philippine Agriculture and Water Resources Management

**APEC Climate Symposium (APCS) 2012: “*Harnessing and Using Climate Information for Decision-making in Agriculture, Water Resource Management and Energy Efficiency*”, St. Petersburg, Russia
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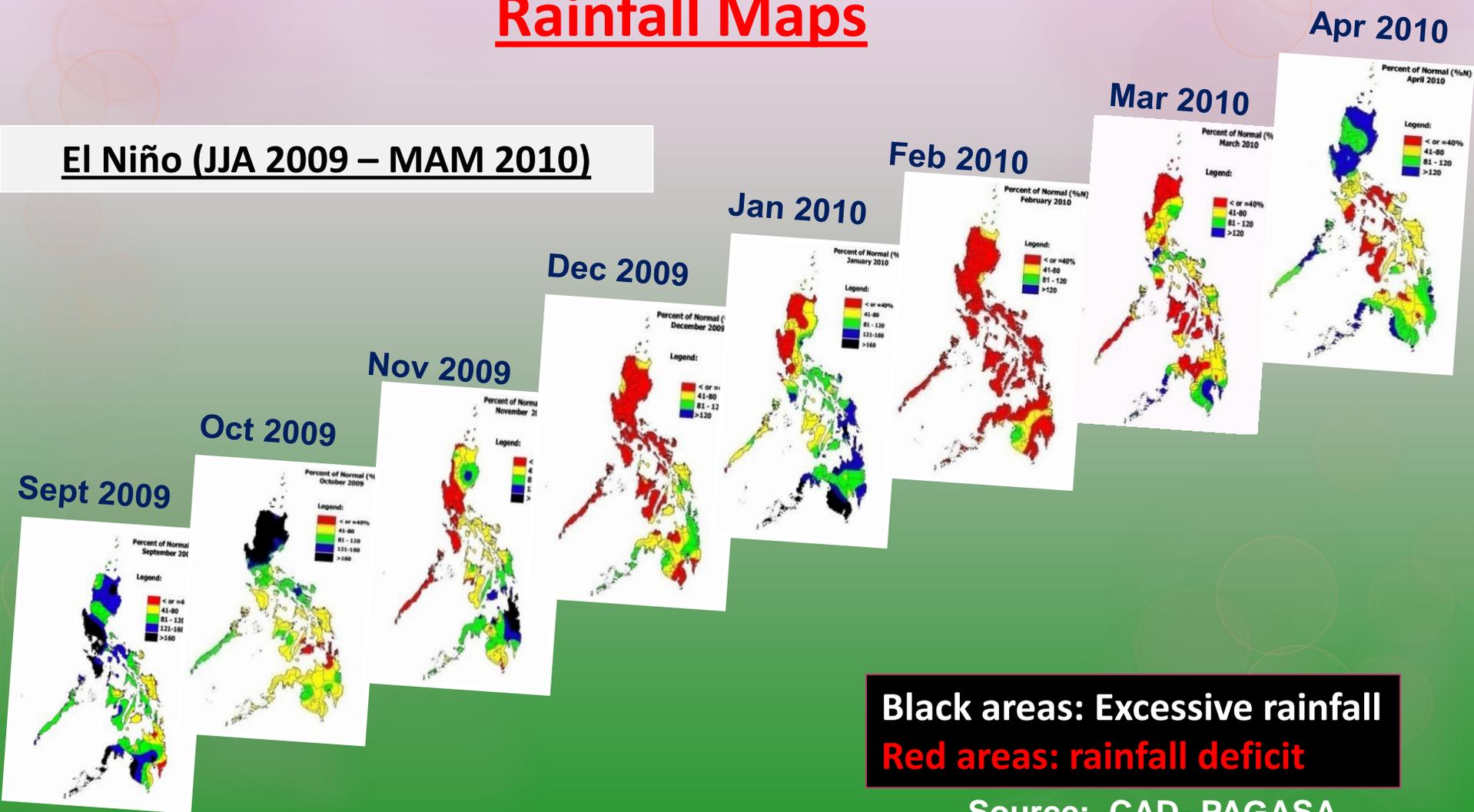
**Philippine Atmospheric Geophysical and Astronomical Services
Administration (PAGASA)
Department of Science and Technology (DOST)**



Recent Impact of Extreme Climate Variability (ENSO Episode) Philippine Setting

Rainfall Maps

El Niño (JJA 2009 – MAM 2010)



Black areas: Excessive rainfall
Red areas: rainfall deficit

Source: CAD- PAGASA

The Philippines has not been spared of the weather-related disturbances and disasters. The past typhoons have been unusually heavy and devastating to our country and our people



El Niño 2009-2010

Flooding in Metro Manila: Tropical Storm Ketsana "ONDOY" Sept. 24 - 27, 2009

Impacts.....

As El Niño causes droughts and power cuts, people turn to shamans and prayers



A young boy shows corn damaged by severe drought in the Southern Philippine town of Surallah, South Cotabato. Greenpeace/Enrique Soriano-Silverlens

02/23/2010 16:53
PHILIPPINES

About 2.5 million metric tons of rice and corn were lost since the start of the year (2010)



Report from: NDCC

 **REPUBLIC OF THE PHILIPPINES**
NATIONAL DISASTER COORDINATING COUNCIL
National Disaster Management Center, Camp Gen. Emilio Aguinaldo, Quezon City, Philippines

NDCC UPDATE
Update on Mindanao Power Crisis

Releasing Officer:

GLENN J. RABONZA
Administrator, OCD and
Executive Officer, NDCC

DATE : **March 23, 2010**
Sources: NGCP, NAPOCOR, OCDRCs IX, X and XII

I. SITUATION OVERVIEW

A. Power Situation Update

- ❖ Mindanao, which is highly dependent on hydro power, has been experiencing power shortfalls and rotating blackouts since 2009 when the dry spell caused water levels in reservoirs to go below normal levels
- ❖ Power supply curtailment has been imposed by NGCP in Southern Mindanao since August 2009 due to power generation deficiency, ranging from 20 MW to as high as 40 MW daily based on last report
- ❖ Per National Grid Corporation of the Philippines (NGCP)'s advice, water elevation of hydroelectric power plants reaches below critical level. Power crisis is expected to continue until rainy season arrives or until power generation deficiency is addressed
- ❖ The power shortage situation in southern Mindanao is caused by generation insufficiency brought about by shutdown/non-availability of generating units and due to the critical loading of Pulang-Kibawe transmission lines in Bukidnon

B. Areas Experiencing Power Outages (brown out)

Region IX

- ❖ The region continues to experience 6 hours rotational power interruption as electric cooperatives operating in the region schedule power curtailment

Region X

- ❖ Misamis Oriental
 - 5 hrs/day : Cagayan de Oro City, Jasaan, Tagoloan, Villanueva and Opol
 - 6 hrs/day : Magsaysay, Medina, Talisayan, Balingoan, Kinoguitan, Salay, Binoangan, Sugbongcogon, Binoangan,

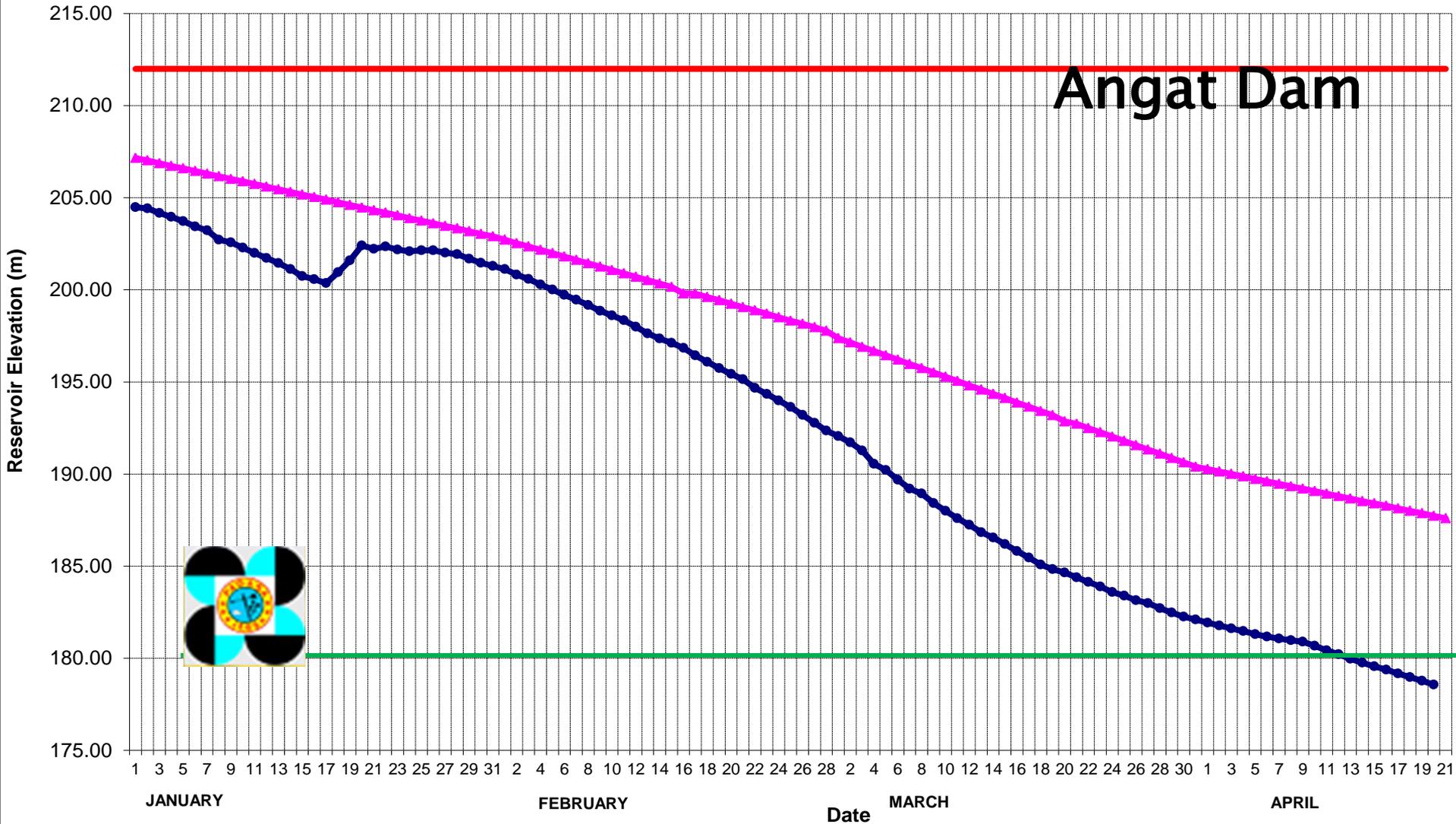
Telephone: (+632) 911-5061 to 64, 912-5668
FAX: 911-1406, 912-2424
Email: dopcen@ndcc.gov.ph Website: www.ndcc.gov.ph

Impact of 2009-2010 El Niño: Dry spell condition where Mindanao experienced the worst of the power shortage, since electricity is sourced from hydro-generated power plants.

During El Nino 2009-2010

ANGAT DAM (Norzagaray, Bulacan)
DAILY 6:00A.M. RWL, JANUARY-APRIL 2010

Spilling Level Rule Curve RWL
Low-level Condition



Background

- Most drought occurrences based on climatological studies in the Philippines are found to be El Niño Southern Oscillation (ENSO) -related. (Jose A.M., et. al. 1992)
- Crop production damages in various regions of the country are highest during ENSO-related drought events. (Jose A. M., et al, 1992)
- The annual water inflows in major reservoirs are significantly decreased during El Niño which induces widespread water shortages. (Jose, A.M., 1993)

List of Drought Events in the Philippines During the Period 1968 - 1992

Date of Occurrence	Areas Affected	Damages
1. 1968-1969	Moderate to severe drought over most of the Philippines with Bicol Region as most severely affected	Total of 5x10 ⁵ mt of rice and corn production
2. 1972-1973	Central Luzon, Palawan, Visayas and Mindanao	Total loss of 6.3x10 ⁵ mt of rice and corn production
3. 1977-1978	The whole of Mindanao except Davao	Total loss of 7.5x10 ⁵ mt of rice and corn production
4. 1982-1983 Oct. 1982- March 1983 Apr. 1983 - Sept. 1983	Western and Central Luzon, Southern Tagalog Provinces, Northern Visayas, Bohol and Western Mindanao Moderate to severe drought affected most of Luzon, Negros Occidental and Iloilo	Rice and corn production loss of 6.4x10 ⁵ mt; insurance claims amounted to P38 M; hydropower generation loss was P316 M
5. 1986-1987- Oct. 1986 – March 1987	Moderate to severe drought affected most of Luzon, Negros Occidental and Iloilo	Estimated agricultural damages of P47 M
Apr. 1987- Sept. 1987	Severe drought affected mainland of Luzon, Central Visayas and Western Mindanao	Estimated hydro energy generation loss was P671 M
6. 1989-1990 Oct. 1989 - March 1990	Drought affected Cagayan Valley, Panay Island, Guimaras, Palawan and Southern Mindanao; affected rice and corn area totalled 283,562 hectares; major multipurpose water reservoirs reduced inflow	Estimated 5x10 ⁵ mt of rice and corn production losses; hydropower generation loss of P348 M; 10% cutback in water production in Metro Manila
7. 1991-1992	Severe drought affected Mindanao, Central and Western Visayas and Cagayan Valley; affected agricultural areas of 461,800 hectares	P4.09 Billion agri-cultural losses ; 20% shortfall in Metro Manila water supply

Source: Jose,A.M, 1993.

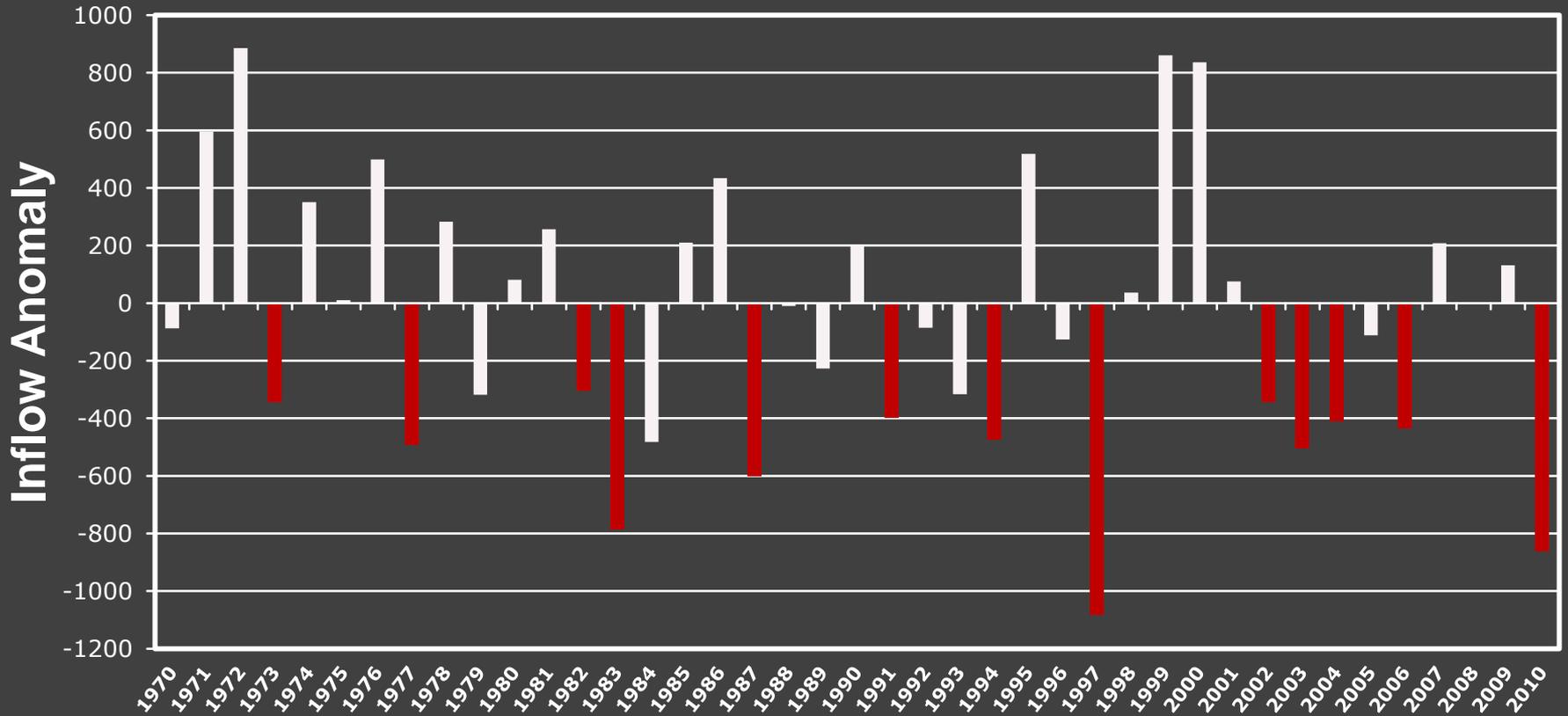
Summary of agricultural production damages at various regions caused by the 1991-1992 El Niño – related drought event

Area Affected (hectares)							
REGION	RICE	CORN	VEGETABLES	FRUIT TREES	OTHER CROPS	TOTAL	ESTIMATED DAMAGE (P)
1	2,851	679	527	-	-	4,057	34,362,920
2	2,285	6,950	-	-	-	9,235	92,589,760
CAR	429	4,049	262	132	-	4,872	45,059,033
5	4,099	456	43	-	-	4,598	30,609,764
6	70,990	454	368	-	28	71,840	856,743,835
7	35	187	87	1,767	-	2,076	5,426,660
8	7,591	1,177	1,353	38	28	10,187	86,298,944
9	7,974	8,689	2,564	-	-	19,227	227,601,981
10	2,387	28,552	1,381	13,640	130	46,090	232,649,997
11	21,156	56,589	1,265	90,987	1,684	171,681	1,304,986,686
12	38,263	74,763	2,390	1,320	1,183	117,919	1,178,603,224
Grand Total	158,058	182,543	10,240	107,884	3,053	461,782	4,094,932,804

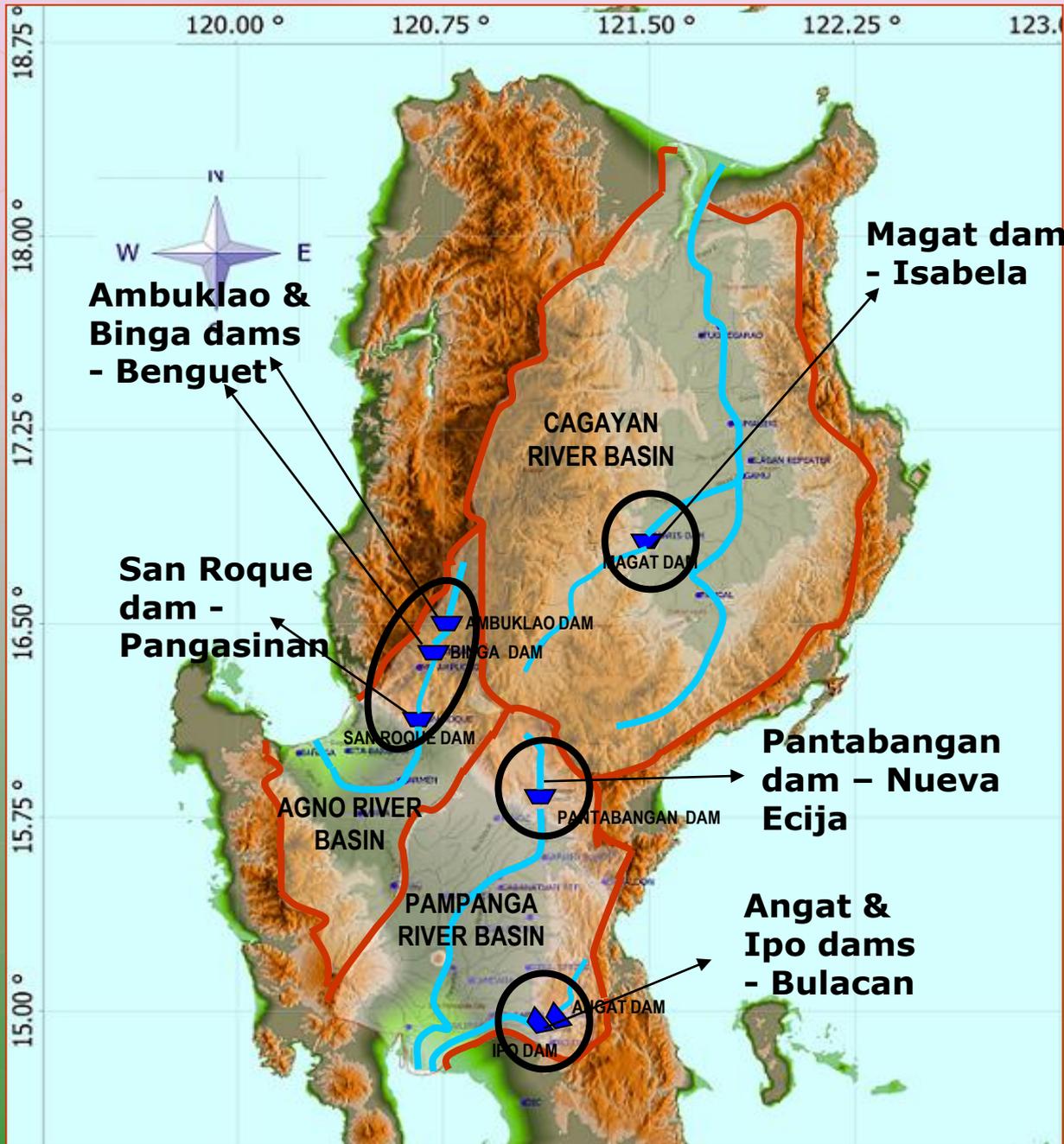
Source: Jose, A.M. et al (1993), A study on Impacts of Climate Variability /Change on Water Resources in the Philippines, PAGASA, Quezon City

Impact on Dam

Annual Inflow Anomaly , Angat Multipurpose Reservoir (1970-2010)



El Niño Year



Location of monitored dams in Luzon

**Actual monthly inflows compared with the normal values (1971- 2000)
for Angat reservoir in Luzon during selected El Niño years
(million cubic meters).**

Month	1991-92			1997-98		
	Actual	Normal	%N	Actual	Normal	%N
Oct	68	318	21	90	318	28
Nov	181	304	60	43	304	14
Dec	113	254	44	87	254	34
Jan	63	111	56	52	111	47
Feb	29	71	40	28	71	39
Mar	15	52	28	21	52	40

Average Annual Inflow : 1,924 mcm

Total Inflow in 1997 : 842 mcm (decreased)

Deficit is about 56 % of the average annual inflow of 1,924mcm

Status of Multi-purpose reservoirs during May 15, 1990

Hydro Plant	Rule Curve (Meters) (Desired Elevations)	Current Level (Meters)	Deviation From the Curve (Meters)	Inoperational Level (Meters) (Minimum)
Angat	192.42	181.66	-10.76	180.00
Magat	175.79	157.18	-18.61	160.00
Pantabangan	199.52	176.35	-23.17	172.00
Ambuklao	733.84	714.71	-19.13	715.00
Binga	571.29	568.30	-2.99	555.00

Source: Jose, Aida M. 2002

Background

- The 1997-98 El Niño had brought devastations on the different sectors of the Philippine society including its agriculture, environment, domestic food and water supply, health, and energy. (Jose, A.M., et. al. 1998)
- The urgency of mitigating the impending impacts of an ENSO episode in the country led to the operationalization of the National ENSO Early Warning and Monitoring System (NEEWMS) now called Climate Monitoring and Prediction Section (CLIMPS) , initiated by the Philippine Atmospheric Geophysical & Astronomical Services Administration (PAGASA).

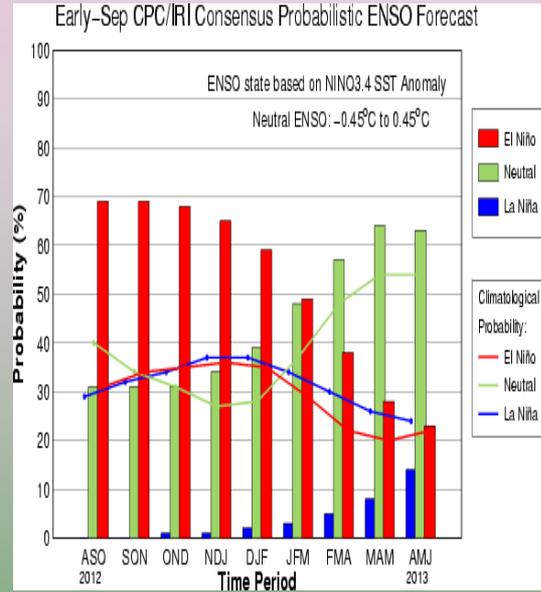
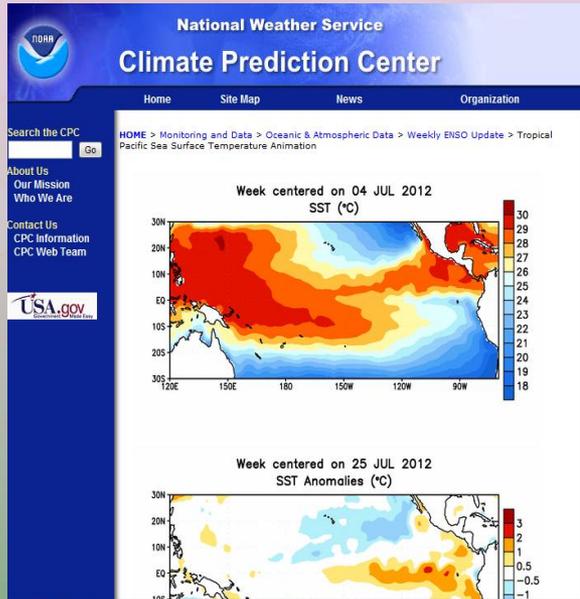
Background

- Its objective is to provide early assessments of weather conditions and other information including SCF, needed by various end-users particularly policy decision makers, economic planners and others concerned with crisis management regarding food security, and water and energy resources .
- However, despite of the high degree of preparation, impacts had been tremendous and substantial. These range from environmental to social, and ultimately economic. (Jose, A.M., et. al. 1998)

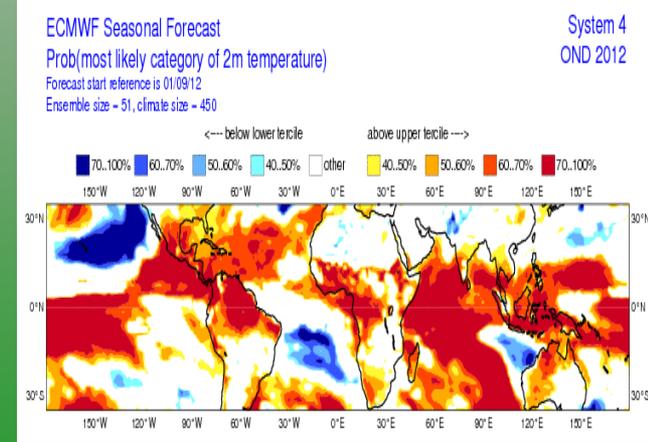
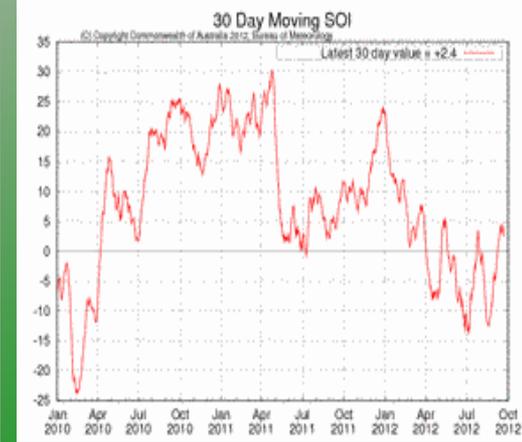
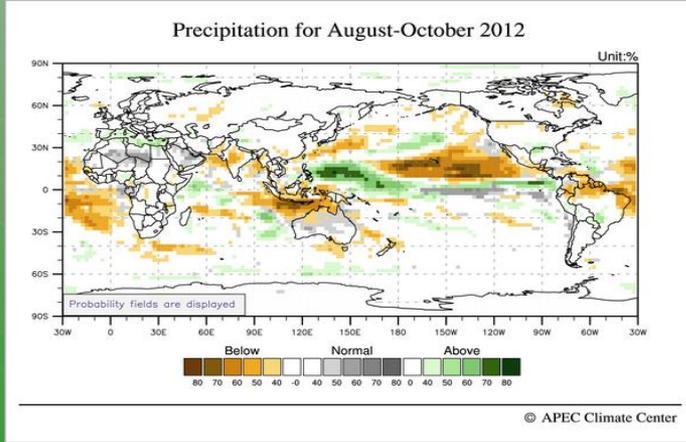
Background

- Early detection of an impending extreme event and issuance of advisories and information to the public, to the technical working groups of the agriculture sector and Inter-Agency Committee on Water Crisis Management (created by the national government) is made possible through the climate products of model-derived prediction of ENSO condition by (CPC/ENCEP, Aus Met Gov. BOM, ECMWF, APCC).
- SCF issued by PAGASA is based on translating global climate forecast on indicators into local climate forecasts.

Access to Climate Forecast Products of the Following Institutional Networks and used as References and Technical input to local SCF :



- **CPC-NCEP**
- **IRI**
- **ECMWF**
- **Aus Met BOM**
- **APCC**



Approaches to Seasonal Climate Forecast (SCF) in the Philippines (Categorical)

- Below Normal - 
- Way-below Normal - 
- Near Normal - 
- Above Normal - 

Graphical Representation of Of Seasonal Climate Forecast



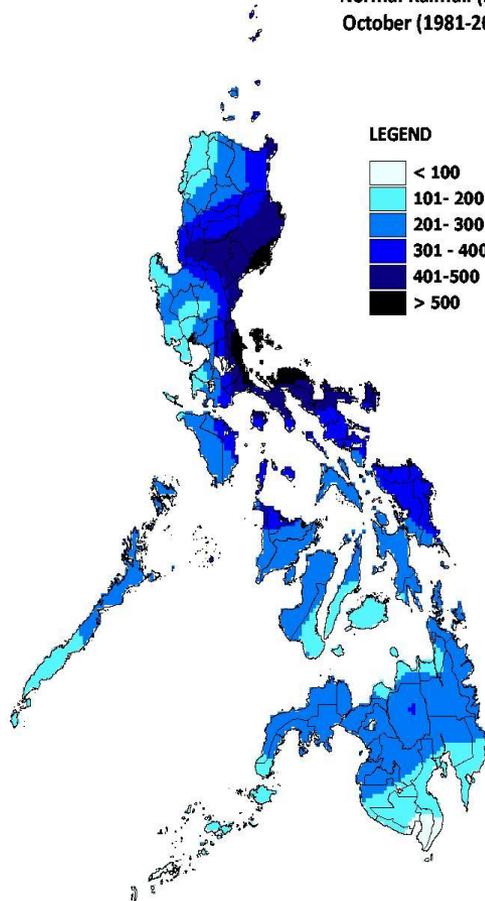
**Normal (mm)
(1981-2010)**

October 2012

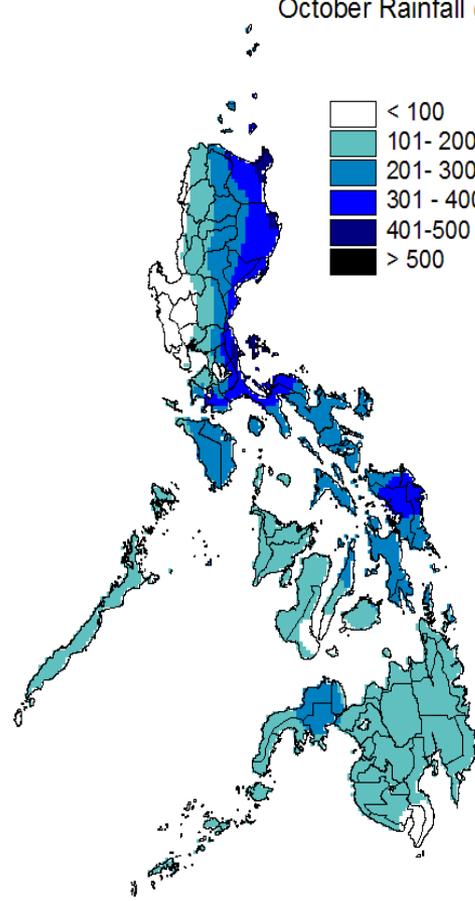
Forecast (mm)

% Normal

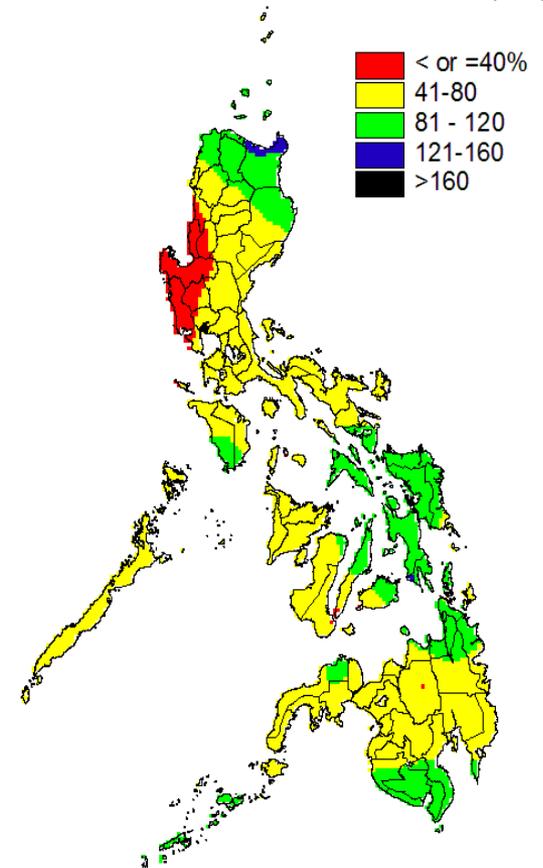
Normal Rainfall (mm)
October (1981-2010)



October Rainfall (mm)

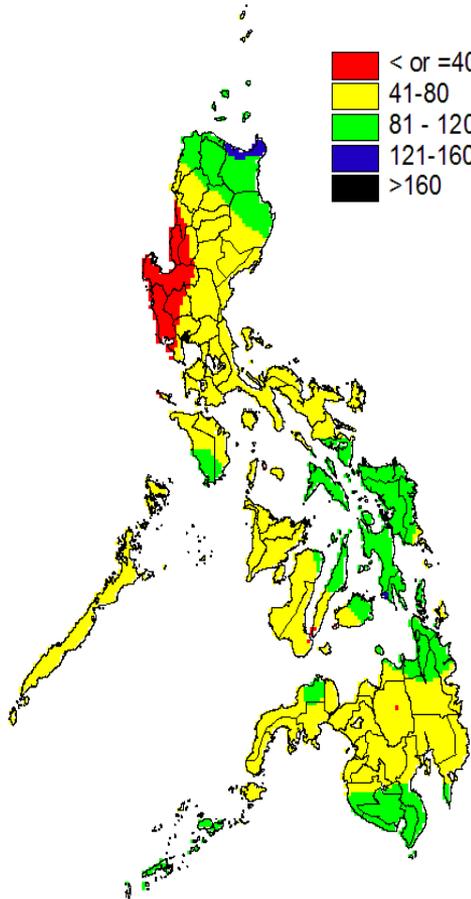
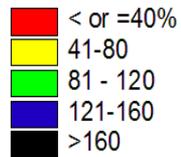


October RR (%N)



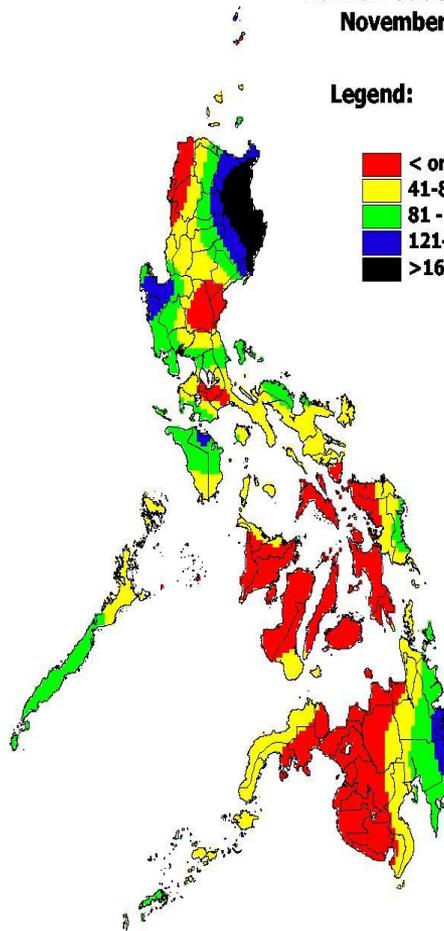
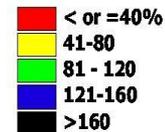
Monthly rainfall Forecast October – December 2012

October RR (%N)



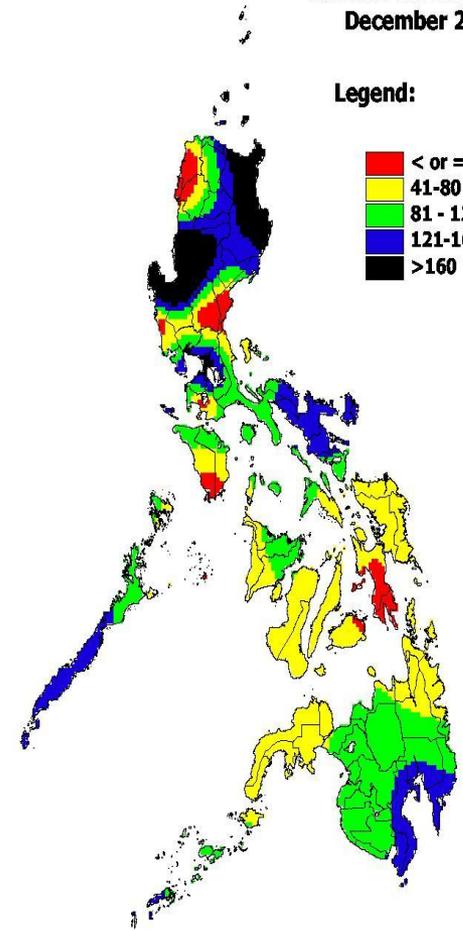
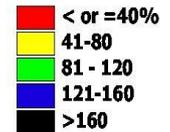
Rainfall Outlook (%N)
November 2012

Legend:



Rainfall Outlook (%N)
December 2012

Legend:



Forecast Rainfall Analysis in Percent of Normal (September-December 2012) as of Sept 07, 2012

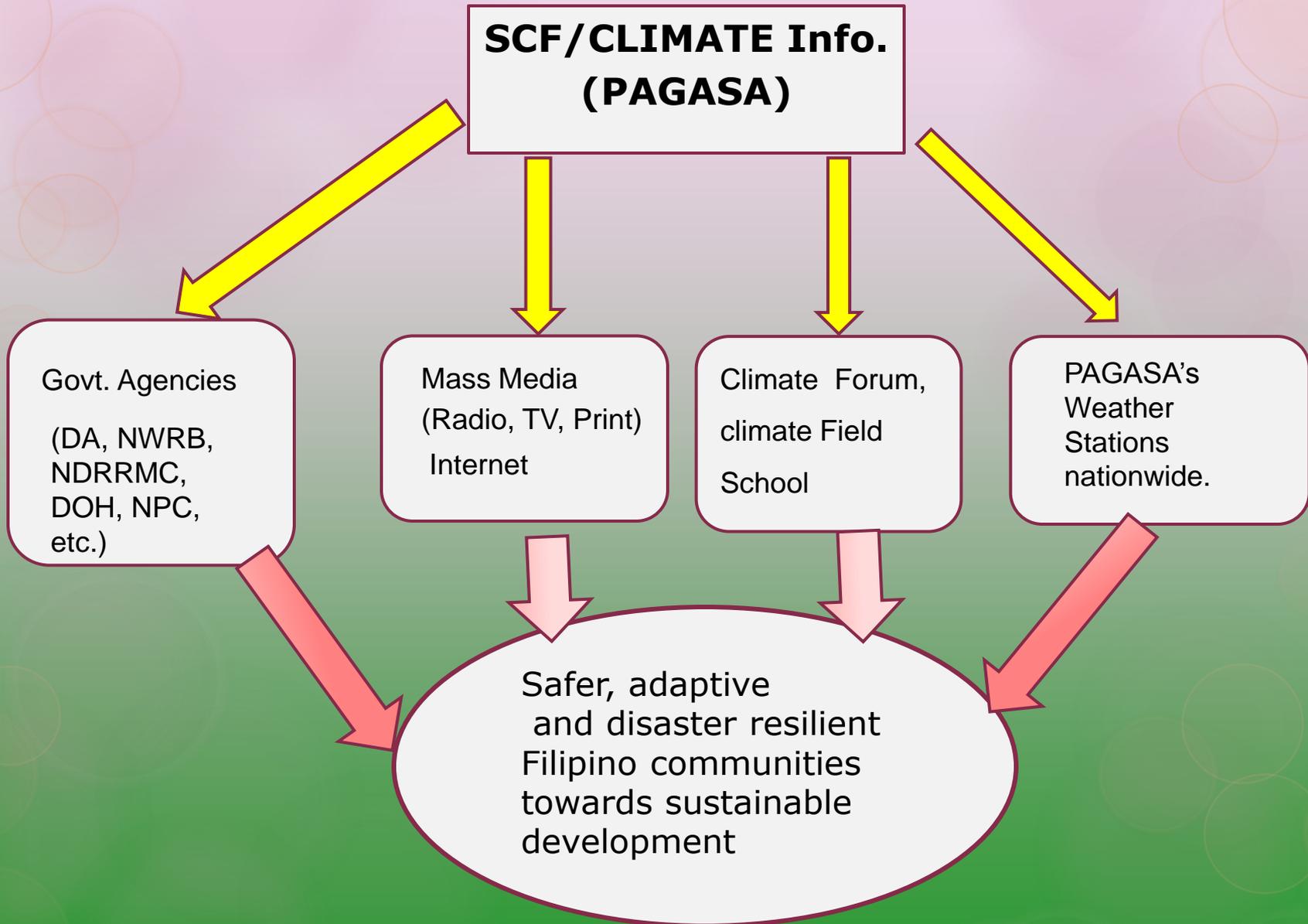
PROVINCE	%N SEP12	%N OCT12	%N NOV12	%N DEC12	PROVINCE	%N SEP12	%N OCT12	%N NOV12	%N DEC12
CORDILLERA ADMINISTRATIVE REGION (CAR)					REGION VI (WESTERN VISAYAS)				
ABRA	120.0	65.8	49.9	63.4	AKLAN	100.7	56.9	41.4	77.2
BENGUET	112.9	38.0	62.2	247.6	ANTIQUE	96.1	56.8	19.4	63.3
IFUGAO	87.4	59.9	93.1	166.8	CAPIZ	92.3	58.5	35.8	92.0
KALINGA	81.5	77.0	122.6	130.7	GUIMARAS	95.5	53.7	4.2	74.9
APAYAO	71.6	102.1	90.3	106.1	ILOILO	95.8	57.9	16.3	80.3
MOUNTAIN PROVINCE	97.6	60.8	95.8	147.9	NEGROS OCCIDENTAL	66.4	62.1	17.6	70.2
REGION I					REGION VII (CENTRAL VISAYAS)				
ILOCOS NORTE	83.4	88.2	23.1	35.7	BOHOL	101.2	79.3	12.6	50.2
ILOCOS SUR	145.3	44.1	35.9	104.9	CEBU	54.9	83.5	12.8	58.6
LA UNION	142.3	25.6	71.0	255.1	NEGROS ORIENTAL	50.3	50.7	38.5	69.3
PANGASINAN	157.7	13.9	115.3	234.5	SIQUIJOR	64.7	48.9	45.7	71.7
REGION II					REGION VIII (EASTERN VISAYAS)				
BATANES	88.8	71.9	67.7	463.9	BILIRAN	108.5	107.6	12.5	50.5
CAGAYAN	50.0	111.3	154.8	169.6	EASTERN SAMAR	207.5	85.8	79.1	55.0
ISABELA	46.4	82.8	166.4	164.3	LEYTE	105.7	104.1	21.5	39.8
NUEVA VIZCAYA	87.1	55.8	56.7	152.5	NORTHERN SAMAR	150.0	88.6	41.8	66.7
QUIRINO	69.3	65.0	85.4	117.9	SAMAR (WESTERN SAMAR)	167.1	96.6	44.5	52.0
REGION III (CENTRAL LUZON)					REGION IX (ZAMBOANGA PENINSULA)				
BATAAN	172.1	42.0	89.8	122.0	SOUTHERN LEYTE	133.3	109.8	26.5	31.0
BULACAN	130.9	65.1	70.5	100.6	ZAMBOANGA DEL NORTE	75.2	76.5	47.4	56.1
NUEVA ECIJA	85.3	61.6	28.6	63.8	ZAMBOANGA DEL SUR	83.1	75.7	38.8	64.7
PAMPANGA	136.3	49.4	77.8	90.2	ZAMBOANGA SIBUGAY	80.3	74.2	41.3	60.9
TARLAC	115.3	34.3	88.9	102.5	REGION X (NORTHERN MINDANAO)				
ZAMBALES	116.7	19.8	113.9	82.8	BUKIDNON	103.2	53.9	34.0	109.4
AURORA	63.8	69.9	65.5	65.7	CAMIGUIN	123.3	82.3	17.9	67.3
NATIONAL CAPITAL REGION					REGION XI (DAVAO REGION)				
METRO MANILA	212.7	61.9	87.8	180.6	LANAO DEL NORTE	88.4	70.1	15.9	91.6
REGION IV-A (CALABARZON)					REGION XII (SOCCSKSARGEN)				
BATANGAS	162.9	65.9	76.2	70.2	MISAMIS OCCIDENTAL	73.5	77.3	32.8	69.8
CAVITE	199.7	57.1	61.2	127.2	MISAMIS ORIENTAL	115.2	74.3	15.8	92.1
LAGUNA	148.8	68.4	42.1	119.4	REGION XIII- CARAGA				
RIZAL	138.2	68.6	85.1	138.0	AGUSAN DEL NORTE	106.4	92.1	48.2	59.3
QUEZON	99.6	69.1	70.3	99.7	AGUSAN DEL SUR	78.1	72.0	82.7	82.5
REGION IV-B (MIMAROPA)					REGION XIV (DARAVAO)				
MARINDUQUE	135.3	61.6	78.0	104.9	DAVAO	151.0	61.6	98.1	118.9
OCIDENTAL MINDORO	136.7	76.0	89.0	63.1	DAVAO DEL SUR	157.2	80.7	54.6	126.3
ORIENTAL MINDORO	136.7	71.9	101.5	72.6	DAVAO ORIENTAL	154.5	72.7	117.9	123.6
ROMBLON	119.1	51.5	64.9	86.8	REGION XV (ARMM)				
PALAWAN	33.2	63.5	78.9	124.3	SOUTH COTABATO	128.6	92.9	25.8	115.8
REGION V (BICOL)					REGION XVI (COTABATO)				
ALBAY	78.1	74.1	65.9	133.9	COTABATO	116.4	63.8	29.1	114.5
CAMARINES NORTE	98.4	60.6	83.7	126.6	SARANGANI	141.5	101.5	37.1	123.2
CAMARINES SUR	99.3	61.2	75.8	139.3	SULTAN KUDARAT	112.6	81.6	19.7	109.1
CATANDUANES	135.0	57.2	64.1	149.5	REGION XVII (BASILAN)				
MASBATE	87.0	102.5	17.7	81.0	AGUSAN DEL NORTE	106.4	92.1	48.2	59.3
SORSOGON	83.1	87.8	43.6	109.9	AGUSAN DEL SUR	78.1	72.0	82.7	82.5
					REGION XVIII (SURIGAO)				
					SURIGAO DEL NORTE				
					SURIGAO DEL SUR				
					SULU				
					BASILAN				
					MAGUINDANAO				
					LANAO DEL SUR				
					SULU				

Forecast Rainfall Analysis in millimeter(September-December 2012) as of Sept 07, 2012

PROVINCE	SEP2012	ÓCT2012	NOV2012	DEC2012	PROVINCE	SEP2012	ÓCT2012	NOV2012	DEC2012
CORDILLERA ADMINISTRATIVE REGION (CAR)					REGION VI (WESTERN VISAYAS)				
ABRA	466.5	142.4	143.5	139.9	AKLAN	274.4	169.1	100.5	145.2
BENGUET	568.8	153.3	120.0	114.5	ANTIQUE	283.6	168.1	54.1	108.0
IFUGAO	378.6	221.6	349.3	240.4	CAPIZ	228.4	170.8	83.8	145.2
KALINGA	298.4	222.1	332.9	202.6	GUIMARAS	277.6	145.5	6.0	78.9
APAYAO	238.4	239.6	255.3	226.0	ILOILO	263.8	164.0	37.3	108.0
MOUNTAIN PROVINCE	407.9	198.2	296.6	203.0	NEGROS OCCIDENTAL	166.2	145.0	24.9	79.7
REGION I					REGION VII (CENTRAL VISAYAS)				
ILOCOS NORTE	324.3	130.7	105.6	179.1	BOHOL	159.5	149.0	20.7	75.0
ILOCOS SUR	611.7	103.5	61.5	102.1	CEBU	105.7	170.2	12.6	75.8
LA UNION	666.7	93.8	36.2	68.1	NEGROS ORIENTAL	103.8	107.4	61.6	78.7
PANGASINAN	636.4	41.7	99.1	61.0	SIQUIJOR	92.9	100.8	86.1	94.7
REGION II					REGION VIII (EASTERN VISAYAS)				
BATANES	299.5	264.4	338.4	722.4	BILIRAN	270.3	281.6	17.1	131.7
CAGAYAN	115.7	342.4	438.8	307.3	EASTERN SAMAR	413.5	280.6	380.4	304.4
ISABELA	128.4	334.3	668.0	449.5	LEYTE	215.1	236.3	53.2	113.9
NUEVA VIZCAYA	377.4	232.1	383.6	269.9	NORTHERN SAMAR	329.2	298.3	212.6	386.0
QUIRINO	252.7	305.5	633.8	450.1	SAMAR (WESTERN SAMAR)	379.3	300.3	200.0	245.3
REGION III (CENTRAL LUZON)					REGION IX (ZAMBOANGA PENINSULA)				
BATAAN	644.4	88.4	113.6	83.9	SOUTHERN LEYTE	263.3	232.3	95.0	120.1
BULACAN	555.5	204.5	294.6	199.9	ZAMBOANGA DEL NORTE	138.8	199.6	140.3	90.6
NUEVA ECIJA	317.7	177.3	350.3	229.6	ZAMBOANGA DEL SUR	155.2	191.3	112.9	91.8
PAMPANGA	552.9	105.1	178.3	117.6	ZAMBOANGA SIBUGAY	149.6	189.4	116.6	86.8
TARLAC	465.2	63.4	166.5	96.2	REGION X (NORTHERN MINDANAO)				
ZAMBALES	511.2	34.6	90.2	41.9	BUKIDNON	258.8	134.2	62.1	139.4
AURORA	208.0	330.2	687.8	493.1	CAMIGUIN	216.1	153.3	43.1	106.2
NATIONAL CAPITAL REGION					LANAO DEL NORTE				
METRO MANILA	842.2	172.6	145.6	154.6	MISAMIS OCCIDENTAL	155.0	209.6	128.4	117.9
REGION IV-A (CALABARZON)					MISAMIS ORIENTAL				
BATANGAS	432.8	273.1	286.1	181.0	236.1	145.7	32.8	124.0	
CAVITE	616.0	160.2	126.6	102.4	REGION XI (DAVAO REGION)				
LAGUNA	436.6	296.1	173.4	284.5	DAVAO	273.9	127.7	224.9	208.0
RIZAL	568.1	282.5	295.0	238.5	DAVAO DEL SUR	228.0	109.6	71.6	117.8
QUEZON	279.5	350.9	388.9	486.2	DAVAO ORIENTAL	234.9	126.1	319.8	261.2
REGION IV-B (MIMAROPA)					REGION XII (SOCCSKSARGEN)				
MARINDUQUE	346.9	253.9	277.1	412.2	SOUTH COTABATO	147.7	114.1	21.4	84.4
OCCIDENTAL MINDORO	437.8	216.5	201.6	146.2	COTABATO	237.2	140.7	45.8	123.9
ORIENTAL MINDORO	393.2	215.9	260.4	195.2	SARANGANI	136.4	102.5	39.3	89.5
ROMBLON	318.7	153.2	170.2	203.6	SULTAN KUDARAT	167.8	136.8	26.4	96.9
PALAWAN	98.1	132.1	137.0	159.2	REGION XIII- CARAGA				
REGION V (BICOL)					AGUSAN DEL NORTE				
ALBAY	207.6	249.3	311.2	669.7	158.5	177.5	136.9	163.5	
CAMARINES NORTE	248.1	315.9	466.8	744.1	AGUSAN DEL SUR	149.0	163.8	266.4	237.1
CAMARINES SUR	255.6	256.1	377.0	730.4	SURIGAO DEL NORTE	198.8	192.4	316.0	279.1
CATANDUANES	315.0	245.2	308.9	720.2	SURIGAO DEL SUR	98.8	186.1	430.9	334.6
MASBATE	195.9	255.0	53.0	227.2	ARMM				
SORSOGON	203.2	263.3	206.4	529.6	BASILAN	173.1	121.6	47.2	41.0
					MAGUINDANAO	186.9	151.0	30.4	114.0
					LANAO DEL SUR	227.9	165.0	47.9	131.0
					SULU	64.1	113.1	89.5	65.2

Forecast information in the Philippines is integrated into decision-making at the national level for reduction risk management of vulnerable areas.

SCF & Climate Information Dissemination Chart

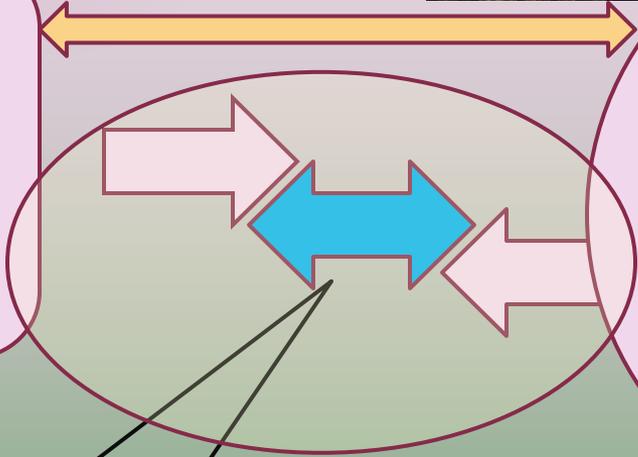


For a usable SCF



SCF
Climate science
behind and
how to use it

Decision makers in
Philippine
Agriculture and
Water Resources
Management &
Various end users



Bridging the gap for a
responsive decision
making to climate
related risks

“forecasts are only useful if the
recipients can actually use it to
improve their production”
..... Chipindu 2002

Strategies Undertaken to Bridge the Gap Between the End User and SCF

- Collaborative project with the Asian Disaster Preparedness Center (ADPC), focussing on capacitating agriculturists and extension workers as trainers through “Climate Field School Training of Trainers”. It is one of the component of the disaster risk management program.
- Replicated this activity, “Climate field school” to other areas capacitating farmers for them to identify available options, understand weather/climate information, SCF and interpret these for agriculture needs.

The Climate Field School (CFS) for Farmers



The Need for Climate Forecast Applications on Agriculture

Dumangas, due to its geographic location, is exposed to recurring climate risks, namely floods from August to December and drought from March to May. These climate risks have caused significant agriculture production losses, as well as infrastructure damage and displacement of households. Extreme climatic events like La Niña and El Niño exacerbate these climate risks, which in turn periodically subject food security and poverty to further pressure. The negative impacts prompted the municipal government of Dumangas to implement mitigation measures and integrate climate risk management into agriculture.

In the past, farmers observed an indigenous practice called “*tubong-tubong*” wherein weather is observed for the first 12 days of the year, each day was believed to represent the weather for each month of the coming year. Despite the lack of scientific evidence on the usefulness and reliability of this practice, it was evident that some form of seasonal climate information was needed to guide farmers in agricultural decisions. To respond to the need for localized weather and climate data, the Municipality of Dumangas has established a local Agro-Meteorological station that assists the weather bureau PAGASA to issue forecasts that advise farmers on crop and farming issues. *Grometeorology is the study of the effects of changing climate and weather patterns on agriculture*)



*From topmost left, counter-clockwise:
CFS Participants viewing different weather instruments at the Agro-Met station; During the CFS training; Participants taking Notes during the training; the Dumangas Agro-Met Station; Facilities of the community based flood and drought forecasting & warning system in Dumangas*

Strategies.....

- A funded project with the Australian government through Australian Centre for International Agricultural Research (ACIAR), “Bridging the Gap Between SCF and Decision Makers in Agriculture”, a framework that helps end-user, to build confidence into using and integrating SCF in decision-making was another channel of capacity building to link SCF and the science behind it.
- The aim of the project was to provide information how farmers and decision makers use SCF to make real decisions and done through training and workshops.



Bridging the Gap Between Seasonal Climate Forecasts (SCFs) and Decisionmakers in Agriculture

Strategies.....

- As one of the components of climate change adaptation program of the national government through early warning system to address climate risk reduction , collaboration of the Non Government Organizations through projects with PAGASA replicating the Climate Field school to empower small farmers from other communities to use climate information and SCF for sustainable agriculture is another channel of communication.
- Through information education campaign (IEC) on the line agencies of the Department of Agriculture (DA) as requested, incorporated in their projects with the LGUs.
- Through Climate Forum conducted by PAGASA in quarterly basis or monthly when there is an ENSO event.
- .

Program Objectives

Climate Field School

The Climate Field School (CFS) was designed in Year 2002 and implemented in Indonesia in Year 2003, eventually the concept was introduced in the Philippines with significant success. It basically facilitate the communication of climate information to end users more effectively and proved to be useful. The program now tries to replicate these technology to the municipalities of Gerona and Irosin with the following objectives:

1. Enhance Farmer's knowledge on climate variability and ability to anticipate extreme climate events and modify farming decisions.
2. Assist farmer's in interpreting climate information from PAGASA and facilitate adoption of contingency crop plans.
3. Assist farmer's in observing climate parameters to support farm operations and practices (e.g. land preparation, pest management)
4. Provide forecast information generation community with farmers' experiences to assess relevance of information and need to re-design/refine climate information.

Information & Education Campaign





National Climate Outlook Forum



Regional Climate Outlook Forum



Media Interviews

Sample Case Application: The 2009-2010 El Niño Event

Chronology of Coping Strategies:

- As early as June 2009 PAGASA issued a Press release on the ENSO alert system of “El Niño Watch”, a possibility of a warm condition to develop for the next few months. This is based on the seasonal climate forecast products from the institutional linkages with NOAA-CPC/ENCEP, Aus- BOM, APCC, IRI. July- Dec 2009 SCF was likewise issued.
- As early as August 2009, the Philippine government through the initiative of PAGASA-DOST, announced that the country must prepare for the possibility of an El Niño development.

Coping Strategies.....

- On September 17, 2009 - PAGASA conducted a PRESS Conference on El Niño condition developed in the equatorial Pacific giving warning of the possible impacts of dry condition on the likely affected areas as shown in the SCF
- SCF for the next 5 months was issued.
- Reactivation of El Niño Task Force was ordered by no less than the President of the Philippines and the release funds for emergency measures to mitigate the detrimental effects of the dry spell on the fisheries and agriculture sectors.

Coping Strategies...

- Members of the Task Force, chaired by the Sec. of the Department of Agriculture (DA), initiated the integrated and comprehensive action plan to address the impending threat of El Niño.
- These include mitigation program for rice, corn and high value crops.
- Based on the SCF, the likely vulnerable areas were identified and the government launched a massive water conservation program that includes information campaigns and asked the public to support it.
- Possible water rationing or management of dams under the control of the National Irrigation Administration was also hinted.

Coping Strategies...

- PAGASA as provider of the SCF and weather/climate information, are actively participating in various technical working group, established in response to weather/climate related risks brought by extreme events. These include various stakeholders.
- Activated collaborative efforts of the Inter-Agency Committee on Water Crisis Management (IACWCM) , established by the government to address impacts of ENSO on water resources, with the activities of Climate Monitoring and Prediction Section (CLIMPS) of PAGASA.

Coping Strategies...

Lessons learned....

The case study on Impacts and Responses to the 1997-98 El Niño (Jose A.M. et.al. 1998) identified three important lessons learned on the 1997-98 El Niño:

1. Political will and policy articulation
2. Creation of Task Force El Niño
3. Extensive information dissemination

Challenges to forecast use and dissemination

On the meteorologist point of view:

1. Spatial limitation

Spatial scale is not good if the forecast is to be used on a local scale, for example on a community level. One or two weather stations of PAGASA usually gives weather records that represents the whole province, not representative of the local climate variation.

2. Temporal scale

SCF gives predictions for the total rainfall for three months and does not tell which month the significant below normal or above normal rainfall condition likely to occur.

3. Lack of data for long time series of observation particularly in local areas. This is needed to develop weather statistic within the season for a good model output.

- There are some areas (local scale) where users have no means to access or use the information.
- On the relevant side of the SCF, some users especially the farmers claimed the SCF does not matches their needs.
- A more specific dates of onset and termination of rain are what they needed.

- The SCF is too general for some end users for application to their needs.
- On the language attribute of usable SCF, some users had gained gradual understanding through constant briefing, but to others specially the farmers SCF is not clearly understood.

Over-all assessment and Observation

- The SCF and climate information have gained attention recently, as impacts of extreme climate events had increased frequency, and brought changes in local climate pattern, thus users are guided by past experiences.
- In spite of the development and promotion of SCF application in disaster risk management in agriculture and water resource, the country continue to suffer the impacts of climate variability and extreme climate events.

Assessment.....

- Government support through policy development and planning to address risk reduction of impacts of extreme climate event to agriculture and water resources had encouraged the end users of climate information and SCF to develop gradual interest to its application. Although the learning process takes time.
- More observed data is needed to enhance the skill of the climate model in a smaller, specific area considering that recent trend in rainfall pattern is a short duration maximum rainfall in small spatial scale.



THANK YOU

“tracking the sky..... Helping the country”