

MEMBER REPORT

ESCAP/WMO Typhoon Committee
9th Integrated Workshop

PAGASA, PHILIPPINES

20 – 24 October 2014

ESCAP – UN Conference Center, Bangkok, Thailand

CONTENTS

- I. Overview of tropical cyclones which have affected/impacted Member's area since the last Typhoon Committee Session
- II. Summary of progress in Key Result Areas

I. Overview of tropical cyclones which have affected/impacted Member's area in 2014

1. Meteorological Assessment (highlighting forecasting issues/impacts)

CY 2014 has been considered not a very active year in terms of tropical cyclone formation over the Northwest Pacific Region and a total of only 14 tropical cyclones entered and developed inside the Philippine Area of Responsibility (PAR), three (3) of which are Tropical Depression, six (6) are Tropical Storm and the remaining five (5) were typhoon intensity. From the 10 tropical cyclones shown in Figure 1, only four (4) made landfall and these were TS Basyang (Kajiki), Typhoon Glenda (Ramasun) Typhoon Luis (Kalmaegi) and Typhoon Mario (Fung-Wong). TD Agaton did not make a landfall but it brings moderate to heavy precipitation for several days in Mindanao causing severe floodings and landslides that cause many casualties and damage to agriculture and infrastructure.

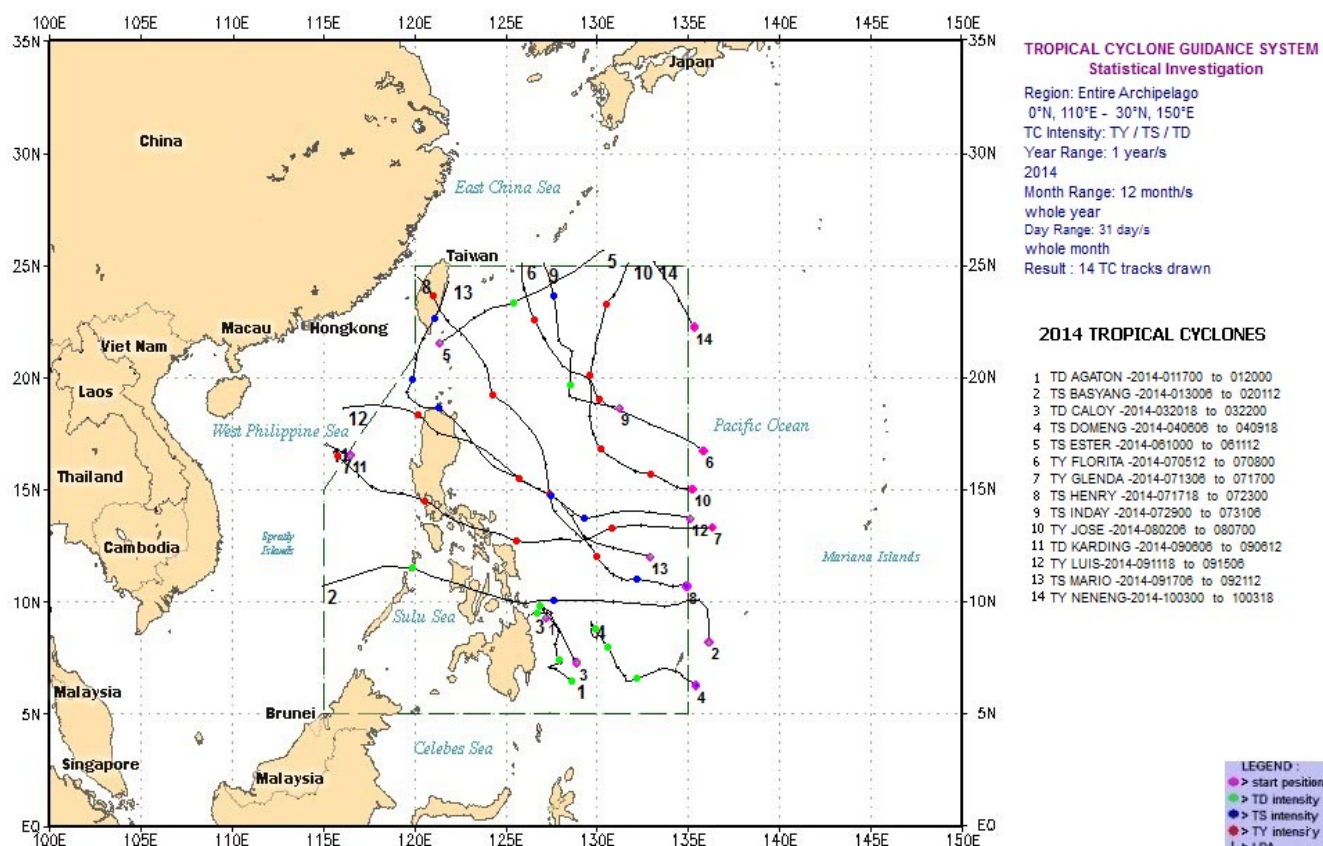


Figure 1.1 Tracks of Tropical cyclones that entered and developed the PAR in 2014

The descriptions of the fourteen(14) tropical cyclones that entered and developed within PAR are summarized below.

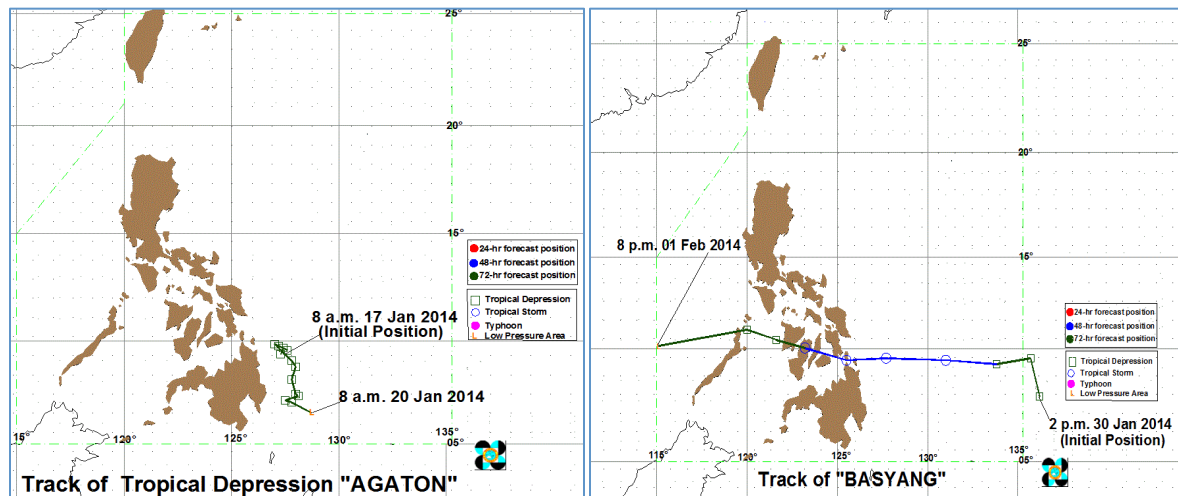
1) TD “AGATON”

Agaton was the 1st tropical cyclone that affected the country for the year 2014. It started from a low pressure area and developed into a Tropical Depression(TD)130 km northeast of Guiuan, eastern Samar in the morning of January 17 and **Public Storm Warning Signal (PSWS) #1** was hoisted over eastern Mindanao. It then moved westward slowly at 5 kph in the morning of January 18. Agaton continued moving in the same direction and speed closer to Surigao Provinces. It then drifted to the southeast then south while maintaining its TD intensity of 55 kph in the morning of Jan. 19. It then moved west southwest at the same speed in the evening of the same day and weakened into a Low Pressure Area (LPA) in the morning of Jan. 20 and the final bulletin was issued.

Weather Advisory Issued - 10

International Warning for Shipping – 13

Severe Weather Bulletin Issued -13
Casualties – 70 Persons
Damage –566 M PhP



Figures 1.2 and 1.3 Tracks of TD AGATON and TS BASYANG (KAJIKI)

2) TS BASYANG (KAJIKI-1402)

Basyang was already a TD with maximum sustained winds of 55 kph near the center when it entered the **PAR** in the afternoon of Jan. 30. It then moved west at 30 kph. Basyang maintained its direction and speed in the early morning of Jan. 31 and **Public Storm Warning Signal (PSWS)#1** were raised over Northern Mindanao and Southern Visayas. It intensified into a Storm with maximum winds of 65 kph near the center with gust of 80 kph as it continued moving in the same direction and speed in the late morning of the same day. Basyang intensified slightly at 80 kph with gust of 100 kph in the afternoon of the same day and **PSWS#2** were raised over Southern Visayas and Northern Mindanao as it approaches the area. It made landfall over Siargao Island in the evening of the same day. It weakened slightly at 65 kph after making a landfall and moved toward Cebu and Negros Provinces. TS Basyang crossed Cebu, Negros and Southern Iloilo Provinces in the morning of Feb. 1 and weakened into a **TD** and was over Sulu Sea. It then moved towards Northern Palawan in the afternoon of the same day and weakened into a Low Pressure Area (LPA). Basyang was over the West Philippine Sea in the evening of the same day and the final bulletin was issued.

Weather Advisory Issued – 1
International Warning for Shipping – 10
Severe Weather Bulletin Issued – 10

Casualties – 6 persons
Damage – 9.142 million Pesos

3) **TD CALOY**

Caloy was spotted as a **LPA** east of Mindanao and developed into a **TD** with maximum winds of 45 kph near the center, in the early morning of March 21 and was estimated at 360 km east of Davao City. It initially moved northwest at 11 kph and PSWS#1 were raised over Davao Provinces, SurigaoProvinces, Agusan Provinces, North Cotabato, Bukidnon and Misamis Oriental. Caloy changed course to west northwest at 15 kph in the evening of the same day. It then slowed down while moving west and made landfall in the vicinity of Tandag, Surigaodel Sur in the morning of March 22. Caloy weakened into a LPA after making a landfall in the afternoon of the same day and the final bulletin was issued.

Weather Advisory Issued – 2

International Warning for Shipping – 7

Severe Weather Bulletin Issued - 7

No damage reported.

4) **TS DOMENG(PEIPA-1404)**

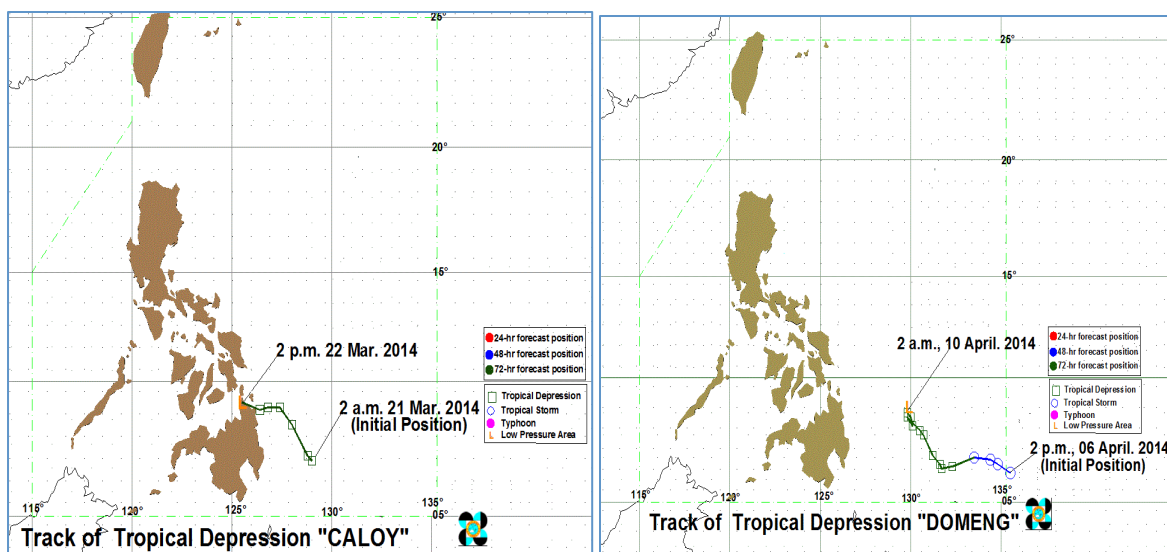
Domeng was already a tropical storm with maximum winds of 65 kph near the center with gust of 80 kph, when it entered the PAR and the tropical cyclone warning, alert level was issued in the afternoon of June 6. It then moved west northwest at 20 kph in the general direction of Eastern Mindanao and Leyte area. In the evening of June 7, it weakened into a TD as it slowed down at 15 kph while moving in a westerly direction. It then veered to the northwest as it moved slowly at 5 kph in the morning of April 8. It continued moving in the same direction and speed in the morning of April 9 while maintaining its strength while over the Philippine Sea. It weakened into a LPA in the morning of April 10 and the final bulletin, alert level was issued.

Weather Advisory Issued – 3

International Warning for Shipping – 15

Severe Weather Bulletin Issued - 13

No PSWS was hoisted.



Figures 1.4 and 1.5 Tracks of TD CALOY and TSDOMENG(PEIPA)

5) TS ESTER (MITAG-1406)

Ester was first detected as a Low Pressure Area near Basco, Batanes embedded along the monsoon trough north of Northern Luzon. It developed into a TD in the morning of June 10 with maximum winds of 55 kph near the center. It then moved northeast at 20 kph and PSWS#1 was raised over the Batanes group of islands. In the evening of the same day, it continued moving in the same direction and speed while maintaining its strength and PSWS#1 was lifted over the Batanes group of islands and the tropical cyclone warning was downgraded to tropical cyclone alert as it moved away from the area. Ester intensified into a storm with maximum winds of 65 kph near the center with gust of 80 kph in the afternoon of June 11 while continued moving in the same direction and speed. It accelerated at 33kph while moving northeasterly away from the country and the final bulletin was issued in the evening of the same day.

International Warning for Shipping – 7
Severe Weather Bulletin Issued – 7

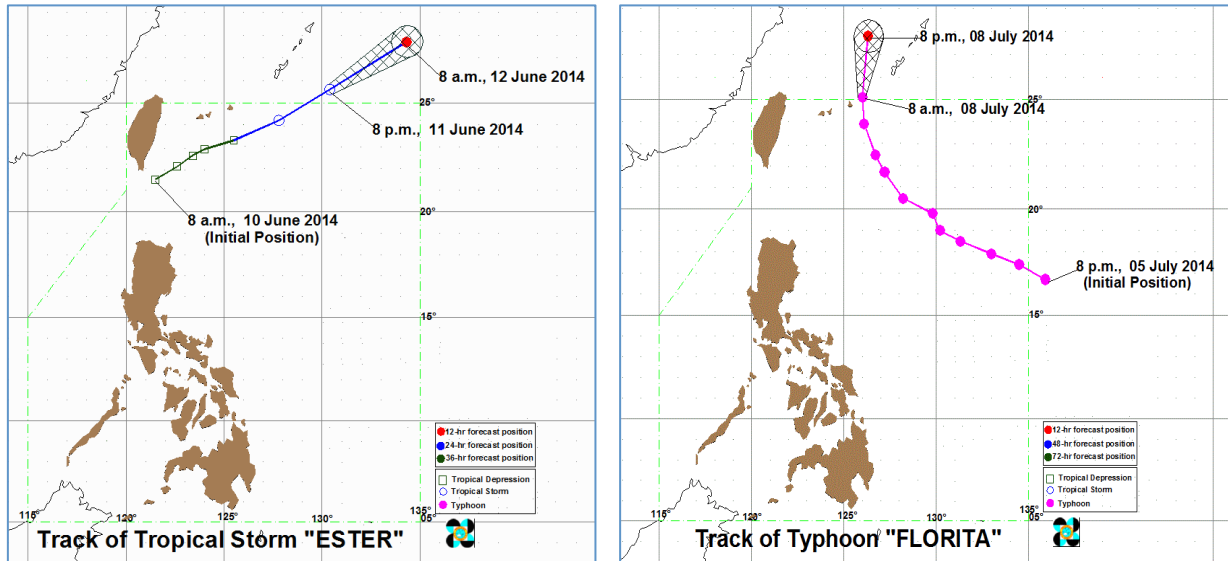
No damage reported.

6) TYPHOON FLORITA(NEOGURI-1408)

Florita was already a typhoon with maximum winds of 160 kph near the center with gust of 195 kph when it entered the PAR east of Northern Luzon. The initial bulletin, alert level was then issued in the afternoon of July 5. It then moved west northwest at 24 kph in the general direction of Southern Japan. Florita has intensified slightly at 175 kph with gust of 210 kph while maintaining its movement in the morning of July 6. It again gained strength at 185 kph with gust of 220 kph in the evening of the same day as it moved northwest at 24 kph. Florita veered to north northwest at a slower pace at 20 kph towards the southern islands of Japan in the morning of July 7. It again intensified and reached its peak intensity at 195 kph with gust of 230 kph as it moved in the same direction and speed in the evening of July 7. In the morning of July 8, typhoon Florita weakened slightly at 185 kph as it moved northward and exited PAR and the final bulletin, alert level was issued.

Weather Advisory issued – 1
International Warning for Shipping – 11
Severe Weather Bulletin issued – 6

No PSWS was raised.



Figures 1.6 and 1.7 Tracks of TS ESTER (MITAG) and TYPFLORITA(NEOGURI)

7) TYPHOON GLEND (RAMMASUN-1409)

Glenda was already a storm when it entered the PAR in the evening of July 13, with maximum winds of 65 kph near the center and gust of 80 kph while moving west at 30 kph. It intensified at 80 kph near the center with gust of 95 kph as it continued moving in the same direction and speed in the early morning of July 14 and **PSWS #1** was raised over Bicol Region. Glenda intensified into a Severe Storm at 95 kph near the center with gust of 120 kph in the morning of the same day and **PSWS#2** was raised over Bicol Region, **PSWS#1** was raised over Southern Luzon including Metro Manila and Northern Samar. In the evening of the same day, Glenda intensified into a typhoon with maximum sustained winds of 120 kph near the center with gust of 150kph as it moved west at 20 kph. **PSWS#3** were raised over Bicol Region and Northern Samar, **PSWS#2** over Camarines Provinces, Masbate, Marinduque, Southern Quezon and Rest of Samar Provinces, **PSWS#1** over Central and Southern Luzon, and Leyte Provinces. In the morning of July 15, Glenda intensified slightly at 130 kph with gust of 160 kph as it shifted in a west northwest direction at 19 kph. **PSWS#3** were hoisted over Bicol Region, Southern Luzon and Samar Provinces. Glenda made landfall over Rapurapisland in Bicol Region in the afternoon of the same day. It then crossed Sorsogon and Albay Provinces and was over Ragay Gulf in the evening of the same day and it intensified at 150 kph near the center with gust of 180 kph. It then moved west northwest at 21kph towards the National Capital Region and **PSWS#3** were raised over Central and Southern Luzon including Metro Manila. Glenda accelerated at 26 kph moving in the same direction and was over Nagcarlan, Laguna in the early morning of July 16. It weakened slightly at 140 kph and was over Bataan in the late morning of the same day after crossing CALABARZON Provinces and Manila Bay. Typhoon Glenda was over the West Philippine Sea after crossing Bataan Province and was moving towards Bajo de Masinlocisland. In the morning of July 17, Glenda was outside the PAR and the final bulletin was issued.

International Warning for Shipping – 16
Severe Weather Bulletin issued – 16

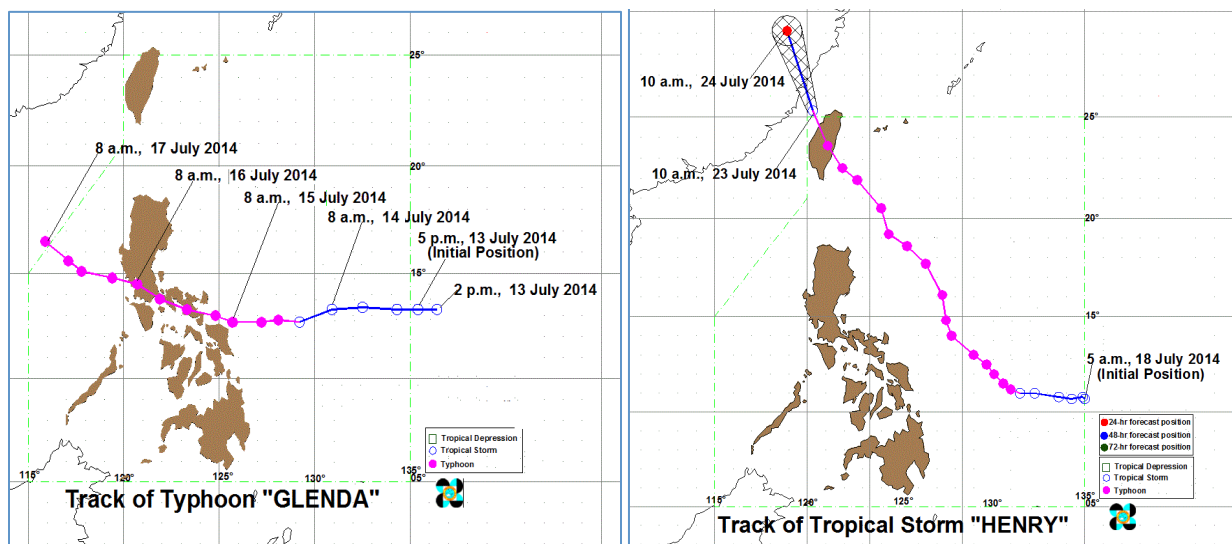
Casualty -106 persons
Cost of Damage – 38.6BillionPhP

8) TYPHOON HENRY (MATMO-1410)

Henry was the 3rd tropical cyclone in July and the 8th for the year 2014. It was already a storm when it entered the PAR in the morning of July 18 with maximum winds of 65 kph near the center with gust of 80 kph. It then moved north northwest slowly at 7 kph. Henry changed course to northwest and accelerated at 13 kph while maintaining its strength in the evening of the same day. In the morning of July 19, it intensified at 95 kph near the center with gust of 120 kph while moving in the same direction at 19 kph. Henry intensified into a typhoon at 120 kph with gust of 150 kph while moving in the same direction and speed in the evening of the same day. It slowed down at 13 kph while maintaining its course and intensity in the evening of July 20 and PWSW#1 was raised over extreme Northern Luzon. In the morning of July 21, it intensified slightly at 130 kph near the center with gust of 160 kph while moving towards Batanes-Taiwan area. PSWS#2 were raised over the Batanes group of islands while PSWS#1 were raised over the Cagayan including Calayan and Babuyan islands in the afternoon of the same day. Typhoon Henry intensified at 140 kph near the center with gust of 170 kph while traversing Balintang Channel in the morning of July 22. It weakened slightly at 130 kph near the center as it passed near Batanes group of islands in the afternoon of the same day, while moving closer to Taiwan. In the early morning of July 23, Henry made a landfall in Taiwan and all the PSWS's were lowered as it moved away from the country. It exited in the northwestern boundary of PAR late morning of the same day and the final bulletin was issued.

International Warning for Shipping – 22
Severe Weather Bulletin issued - 17

No casualty and damages reported.



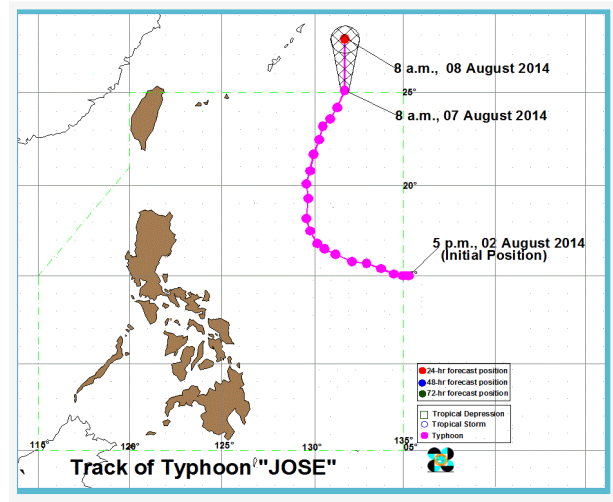
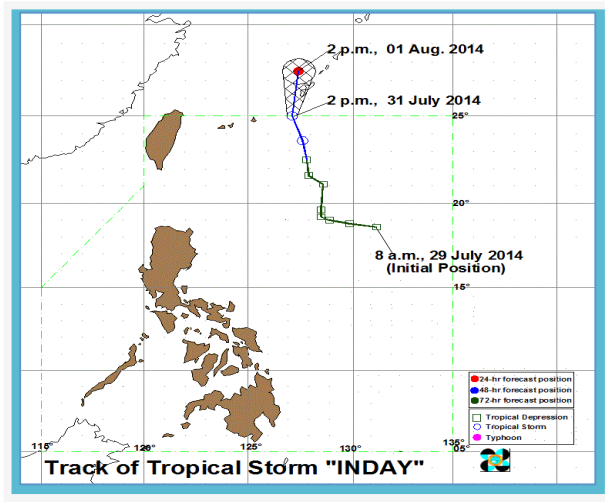
Figures 1.8 and 1.9 Tracks of TYPGLENDA(RAMMASUN) and TSHENRY(MATMO)

9) TS INDAY(*NAKRI-1412*)

Inday was a Low Pressure Area 865 km east of Virac, Catanduanes in the morning of July 27. It then moved northward and developed into a TD with maximum winds of 55 kph near the center, in the morning of July 29 and the initial Severe Weather Bulletin, Alert level was issued. Inday moved west northwest at 20 kph and was expected not to directly affect any part of the country. In the morning of July 30, Inday shifted to north northwest at the same speed. It intensified into a storm in the early morning of July 31 with maximum winds of 75 kph near the center with gust of 90 kph. It continued moving north northwest at 20 kph toward the southern islands of Japan in the late morning of the same day. Inday maintained strength and movement in the afternoon of the same day and was outside PAR and the final bulletin, alert level was issued.

International Warning for Shipping – 9
Severe Weather Bulletin issued - 9

No PSWS was raised.



Figures 1.10 and 1.11 Tracks of TS INDAY (NAKRI) and TYP JOSE (HALONG)

10) TYPHOON JOSE(*HALONG-1411*)

Jose was already a typhoon with maximum sustained winds of 160 kph near the center and gust of 195 kph, when it entered the PAR in the evening of Aug.2 and the initial Severe Weather Bulletin, Alert level was issued. It then moved west northwest at 11 kph over the Philippine Sea.

Typhoon Jose gained more strength at 185 kph with gust of 220 kph as it continued moving in the same direction and speed in the morning of Aug. 3. It again intensified at 195 kph with gust of 230 kph in the evening of the same day. Jose shifted direction to the northwest at 15 kph as it weakened slightly at 185 kph in the morning of Aug. 4. It veered to north northwest at 11 kph while weakening at 165 kph near the center with gust of 200 kph in the evening of the same day. In the morning of Aug. 5, typhoon Jose again changed direction to north northeast at 15 kph as it weakened at 150 kph with gust of 185 kph while moving towards Southern Japan. Jose maintained its strength as it moved north at the same speed in the morning of Aug. 6. It continued moving towards Southern Japan in the evening of the same day. Jose exited in the northern boundary of PAR in the morning of Aug. 7 and the final bulletin, alert level was issued.

Weather Advisory issued – 1

International Warning for Shipping – 20

Severe Weather Bulletin Issued - 11

No PSWS was raised.

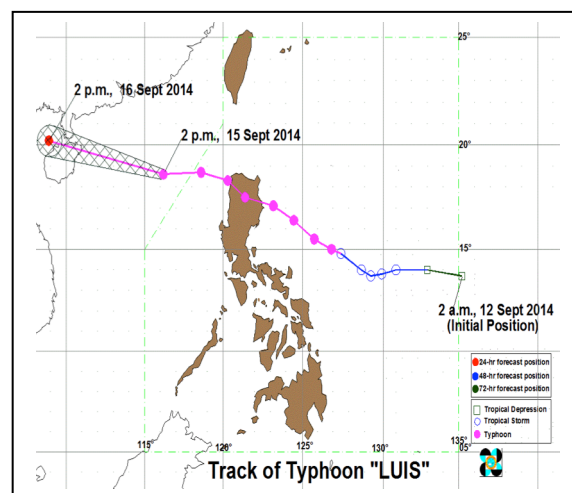
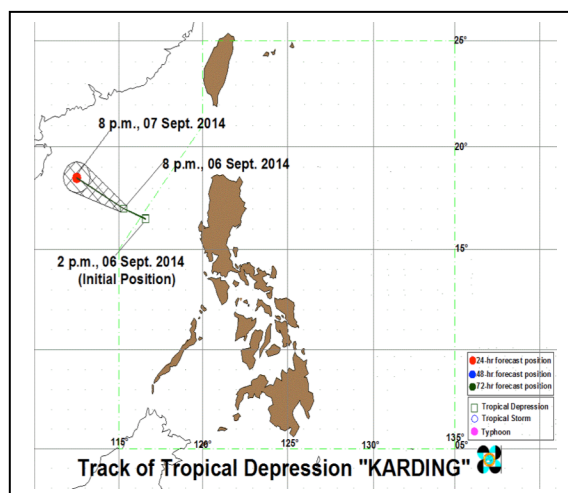
11) TD KARDING

Karding was a Low Pressure Area that crossed Central Luzon and developed into a Tropical Depression while over the West Philippine Sea. The initial Severe Weather Bulletin, Alert Level was issued in the afternoon of September 6. It has a center winds of 45 kph and was moving WNW slowly at 7 kph towards the western boundary of **PAR**. In the evening of the same day, the final bulletin (alert) was issued as Karding exit the **PAR**.

International Warning for Shipping – 2

Severe Weather Bulletin - 2

No PSWS was raised.



Figures 1.12 and 1.13 Tracks of TD KARDING and TYP LUIS (KALMAEGI)

12) TYPHOON LUIS (KALMAEGI-1415)

LUIS was already a TD when it entered the **PAR** in the early morning of Sept. 12. It then moved westward at 26 kph. It intensified into a Tropical Storm with center winds of 65 kph in the afternoon of the same day as it moved in the same course. Luis intensified slightly at 75 kph near the center in the morning of Sept. 13 and PSWS#1 were hoisted in the Provinces of Cagayan, Isabela, Northern Aurora and Catanduanes. It intensified into a Severe Storm at 110kph near the center in the afternoon of the same day and PSWS#2 were hoisted over Cagayan, Isabela and PSWS#1 over the rest of Northern Luzon. In the evening of the same day, Luis intensified into a typhoon with winds of 120 kph near the center as it moved towards Northern Luzon. **PSWS #3** were raised over Cagayan Region, Cordillera and Northern Ilocos Region. **PWSW#2** over the rest of Ilocos Region, Nueva Ecija, Aurora and Batanes. PSWS#1 over Central Luzon, Northern Quezon and Polilio island. Luis gained more strength at 130 kph with gust of 160 kph moving in the same direction and speed closer to Cagayan and Isabela area in the morning of Sept. 14. It made landfall in the boundary of Cagayan and Isabela area in the afternoon of the same day. It weakened slightly at 120 kph after crossing the rugged terrain of Northern Luzon in the evening of the same day. In the early morning of Sept 15, Luis was in the vicinity of Laoag City and then move WNW at 30 kph towards the Philippine Sea. It intensified slightly at 130 kph near the center with gust of 160 kph as it exited the **PAR** in the afternoon of the same day.

International Warning for Shipping – 15
Severe Weather Bulletin Issued - 15

Casualty – 4 Persons
Cost of Damage – 815 Million in PhP

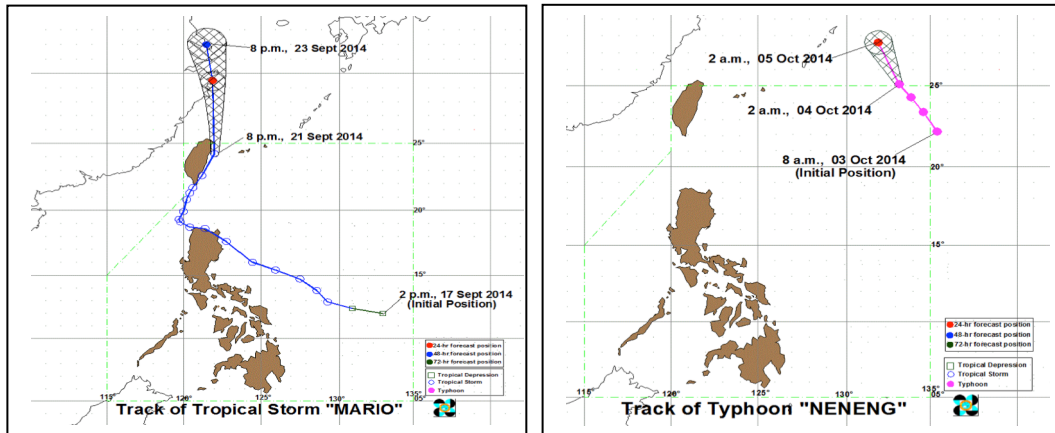
13) TY MARIO (*FUNG-WONG-1416*)

Typhoon **Mario** was the 3rd tropical cyclone in September and the 13th during the year. It was spotted as a **LPA** over the Caroline islands and entered **PAR** in the afternoon of Sept. 17 as it developed into a TD and the initial Severe Weather Bulletin, Alert Level was issued. It initially moved **WNW** at 24 kph and then accelerated at 28 kph in the same direction in the evening of the same day. In the morning of Sept. 18, Mario maintained its intensity as it continued moving in the same direction and speed towards Northern Luzon and PSWS#1 were raised over Catanduanes and Northern Luzon. It intensified into a Tropical Storm with maximum center winds of 65 kph with gust of 80 kph in the afternoon of the same day and PSWS#2 were raised over Isabela and Cagayan Provinces and PSWS#1 were raised over the rest of Northern Luzon. In the morning of Sept. 19, Mario intensified at 85 kph with gust of 100 kph as it slowed down and threatened Northern Luzon and PSWS#2 were raised over Extreme Northern Luzon and PSWS#1 were raised over the rest of Northern Luzon. Mario made landfall in the northeastern part of Cagayan in the late morning of the same day while maintaining its intensity. It enhanced the southwest monsoon bringing heavy to intense precipitation (20-40mm/hr) in National Capital Region in the early morning of Sept. 19 which resulted to flooding and landslides in Metro Manila and neighboring areas. It weakened slightly at 75 kph with gust of 90 kph while crossing the northern part of the Provinces of Cagayan, Apayao and Ilocos Norte. It slowed down in the evening of the same day and the same PSWS were raised over the area. In the morning of Sept. 20, it changed course to northerly while moving slowly and then accelerated at 17 kph in the same direction in the afternoon of the same day. Mario again intensified while over Luzon Strait and moving towards Taiwan in the evening of the same day. It made landfall in Southern Taiwan the morning of Sept. 21 and continued moving almost northerly at 20 kph, traversing the eastern

coast of Taiwan in the evening of the same day. It exited PAR at around midnight and the final Bulletin was issued.

International Warning for Shipping – 18
Severe Weather Bulletin issued – 17

Casualty – 18 persons
Cost of Damage –3.4 Billion PhP



Figures 1.14 and 1.15 Tracks of TS MARING (TRAMI) and TS NANDO (KONG-REY)

14) TYPHOON NENENG (PHANFONE -1418)

NENENG (Phanfone) was already a typhoon when it entered the PAR in the morning of October 3, with maximum winds of 175 kph near the center with gust of 210 kph. It then moved northwest at 20 kph. In the evening of the same day, it continued moving in the same direction and speed toward the southern islands of Japan. It exited PAR in the early morning of October 4 and the final Severe Weather Bulletin, Alert level was issued.

International Warning for Shipping – 4
Severe Weather Bulletin issued - 3

No PSWS was issued.

2. Hydrological Assessment (highlighting water-related issues/impact)

There were 74 flood bulletins and 13 flood advisories issued in the monitored river basins of Pampanga, Agno and Bicol while 1130 General Flood Advisories were issued in the various regions for the ungauged major and principal river basins in the country for the year 2014.

During typhoon Mario episode (Sept 17-21), the major reservoirs in Binga and Ambuklao operated their spillways when the water levels of the two dams exceeded its Flood Season High Water level (FSHWL) elevation, Fig.1, La Mesa dam exceeded its top weir elevation of 80.15 meters, Fig.2, thereby dumping its excess water to the already swollen Tullahan River, which runs towards Quezon, Caloocan, Malabon, Navotas and Valenzuela cities, all in Metro Manila and contributing to the flooding in these region. Although there were considerable inflows from the Binga and Ambuklao dams, the San Roque dam which is located downstream of Binga and Ambuklao was able to contain the discharge from two (2) tropical cyclones (TS Mario and Luis) that affected the watersheds of the upper Agno river. Angat Dam raised its elevation up to 199.79 meters (Sept.22) by 17.27 meter from 182.52 meters (Sept.1), thereby beefing its reserved volume of water for domestic water supply for Metro Manila.

NAME OF DAM	BASIN MEAN RAINFALL (MM)	Lowest Daily WL (Meters)	Highest Daily WL (Meters)	Rate of Increase (Meters)	Rule Curve FSHWL (Meters)	Deviation (Meters)
ANGAT	312	182.52 (Sept. 1)	199.79 (Sept.22)	+17.27	185.19	+14.53
					210.00	-10.28
PANTABANGAN	615	185.99 (Sept. 1)	195.37 (Sept. 22)	+9.38	209.45	-14.13
					216.00	-20.68
MAGAT	124	177.32 (Sept. 1)	190.93 (Sept. 22)	+13.61	185.07	+5.86
					190.00	+0.93
AMBUKLAO	446	747.91 (Sept. 8)	751.62 (Sept. 22)	+3.71	745.00	+6.62
					752.00	-0.38
BINGA	446	571.00 (Sept. 13)	573.53 (Sept. 22)	+2.53	565.00	+8.53
					575.00	-1.47
SAN ROQUE	607	252.45 (Sept. 1)	278.56 (Sept. 22)	+26.11	264.45	+14.11
					280.00	-1.44

Fig. 1. Status of Major Dams for the month of September.

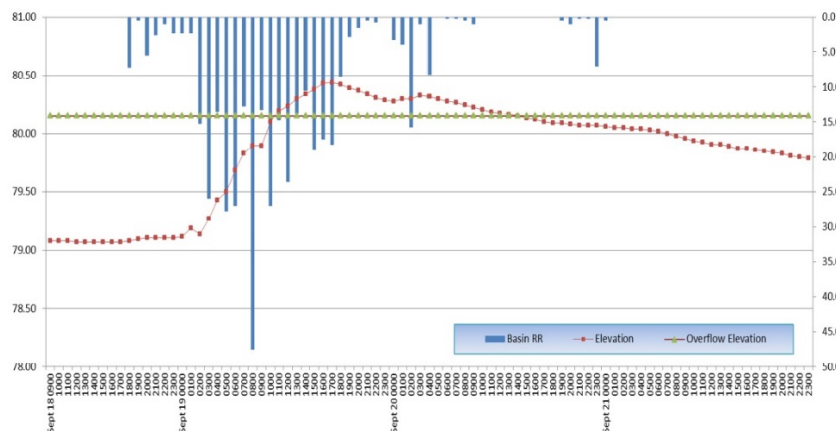


Fig.2. La mesa dam water level elevation and hyetograph during the passage of typhoon Mario.

However, Metro Manila (Fig.3) was inundated due to the heavy rainfall intensities recorded by the monitoring facilities of KOICA project (Fig. 4) and EFCOS. As early as 1:35 a.m. of September 19, the warning facility of Dela Costa subdivision was activated in an alert level (awareness for flood) when the water level of upstream Montalban water level station reached its alert level status. Subsequently, most of the warning stations were activated from alert level, to alarm level (preparation for flood) up to critical level (evacuation for flood), by sounding the sirens and the voice messages for the residents living nearby (Fig.5).



Fig.3. Flooding in Metro Manila due to the swelling of Pasig-Marikina River and its tributaries in the early morning hours of September 19, 2014 due to the enhancement of the southwest monsoon spawned by typhoon Mario.



Fig.4. Pasig Marikina River FFWS Monitoring Equipment

Station Name	Alert	Alarm	Critical	REMARKS
1. Eastwood Rodriguez	3:36 AM	4:04 AM	5:52 AM	
2. Rodriguez 2	3:36 AM	4:04 AM	5:52 AM	
3. Rodriguez 1	3:40 AM	4:04 AM	5:52 AM	
4. De la Costa Subdivision	1:35 AM	2:31 AM	4:19 AM	
5. Burgos Station	1:45 AM	2:37 AM	3:16 AM	
6. San Mateo 2	1:36 AM	2:31 AM	4:19 AM	
7. San Mateo 1	3:07 AM	4:01 AM	5:52 AM	
8. Nangka	3:10 AM	4:08 AM	5:52 AM	
9. Tumana Bridge	3:10 AM	4:08 AM	5:52 AM	
10. Sto. Niño	3:10 AM	4:09 AM	5:52 AM	
11. Marcos Highway	4:08 AM	5:56 AM	6:27 AM	
12. Rosario J.S.	2:11 AM		6:06 AM	
13. Rosario L.S.	6:29 AM		10:17 AM	
14. People's Park	2:41 AM	3:23 AM	6:02 AM	Failure of the Amplifier at the Station caused the unsuccessful sounding of the warning post during the actual operation.
15. San Juan (Pumping Station)	3:06 AM	3:23 AM	6:02 AM	

Fig. 5. Summary of Warning Post Activation of Pasig-Marikina River Basin FFWS

2. Socio-Economic Assessment (highlighting socio-economic and DRR issues/ impacts)

The Pre-Disaster Risk Assessment (PDRA) core group led by Executive Director USEC Pama of NDRRMC, ASEC Vilma Cabrera of DSWD, ASEC Raymund Liboro of DOST, Esperanza O. Cayana, Chief of Weather Division, PAGASA, Dir. Alan Tabel of DILG and other member of the agencies convened at the NDRRMC Operations Center for a meeting in anticipation to Typhoon Glenda (Rammasun) entry to the PAR. Subsequently, NDRRMC Operations Center sent a Memorandum to Chairpersons, OCD-Regional DRRMCs I, II, III, IVA, V and CAR instructing them to observe heightened alert in preparations for the entry of Typhoon Glenda.

PDRA will convene whenever a tropical cyclone will enter the **PAR** especially if it is a landfalling TC, so that early disaster preparedness and or pre-emptive evacuation can be done in areas to be affected. This is also to pre-position relief goods, medicines and equipment in anticipation of the relief and rescue operations before, during and after the passage of TC.

Name of TC	Casualties	Injured	Missing	Affected					
				Families	Persons	Province	Cities	Municipalities	Brgys
<i>TD AGATON</i>	70	86	9	236,499	1,092,398	16	11	128	985
<i>TYP. GLENDA</i>	106	1,250	5	1,024,251	4,653,716	27	40	345	5,378
<i>TYP. LUIS</i>	4	1	0	100,267	431,085	19	12	108	
<i>TYP. MARIO</i>	18	16	4	453,190	2,052,141	27	30	207	2,145

Name of TC	Damaged Houses		Cost of Damages			Assistance		SitRep	
	Totally	Partially	Agri	Infra	Total	Cost	From	No.	Date
<i>AGATON</i>	1,585	1,897	293M	273M	566M			FR	
<i>GLENDA</i>	112,067	521,613	33.8 B	4.8 B	38.6 B	69.2 M	NDRRMC, DSWD, DOH, LGU, NGOs	FR	July 17, 2014
<i>LUIS</i>	1,895	129	2.7 M	812.9 M	815 M	8.6 M	DSWD, LGU, NGOs	12	Sept. 19, 2014
<i>MARIO</i>	2,256	9,335	2.8 B	.585 B	3.4 B	41.5 M	DSWD, DOH, LGU, NGOs	17	Sept. 30, 2014

Effects of Tropical Cyclones Glenda, Luis and Mario

3. Regional Cooperation and Assessment (highlighting regional cooperation successes and challenges)

The Japan Meteorological Agency (JMA) allowed us to access their Numerical Typhoon Prediction Website by giving us the **user identification and the password**, which is very helpful in forecasting the tract of tropical cyclones. We can also get information on storm surges whenever a tropical cyclone will make a landfall in any part of the country.

II. Summary of Progress in Key Result Areas

- **KRA 1: Reduced Loss of Life from Typhoon related Disasters**

SG: To enhance cooperation among TC members to reduce the number of deaths by typhoon - related disasters by half in ten (10) years

- a) Technical Cooperation Project for Enhancing Capacity on Weather Observation, Forecasting and Warning in the Philippines. This Project is Between PAGASA, DOST and Japan International Cooperation Agency (JICA). This project is to be implemented in PAGASA, Head Office and Southern Luzon, PAGASA Regional Services Division (PRSD).

The purpose of the project are to improve the following:

1. Weather observation capacity
2. Meteorological data analysis and forecasting capacity
3. Warning criteria at the provincial level
4. Content and accessibility of meteorological capacity
5. Raising awareness on meteorological information activities in Southern Luzon PRSD.

- This project is implemented based on the following six (6) policies:
 1. Main streaming of disaster prevention (transfer JMA technical skills) – transfer of technical skills which have been developed mainly by JMA through their experiences, i.e observation, forecasting and data distribution/communication skills .
 2. Technical cooperation along WMO policies – JMA and PAGASA are both National Weather Services (NWS) of WMO and both support WMO World Weather Watch (WWW) policy through sharing of observation and forecast data for disaster prevention activities transnationally. As a Regional Specialized Meteorological Center (RSMC) of Region II, JMA issues/ provides tropical storm warnings for Northwest Pacific area and this information is also used by PAGASA and other NWS.
 3. Contribution for Northwest Pacific Countries – Enhancement of observation skills of PAGASA would greatly contribute for Northwest Pacific countries through the provision of accurate observation data under WWW framework. Accurate weather observation and quick distribution to Northwest Pacific countries help them monitor existing weather disturbance (TC), analyze weather environment and issue correct weather warnings.
 4. Technical transfer based on documents – Making documents will contribute for visualizing operational tasks and have a clear daily operation of the jobs. This will include documents for planning, implementing and evaluation of activities for future improvement.
 5. Ensuring technical skills through review and improvement – In order to ensure technical skills, technical training and improvement of documents for operations

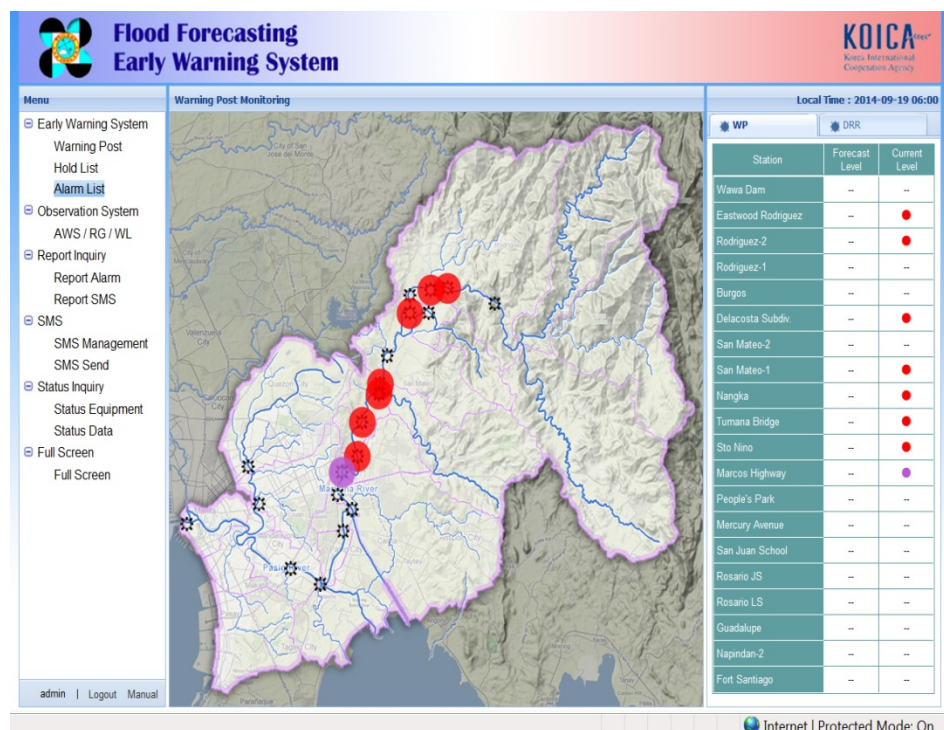
should be review. Daily operation based on the training will be implemented as daily tasks by PAGASA.

6. Useful materials based on communication with users –With sharing educational materials used in drills with Japan local communities or schools, we can develop educational materials for LGU's and schools together. This materials will be based on communication with other users in order to make it user friendly materials.

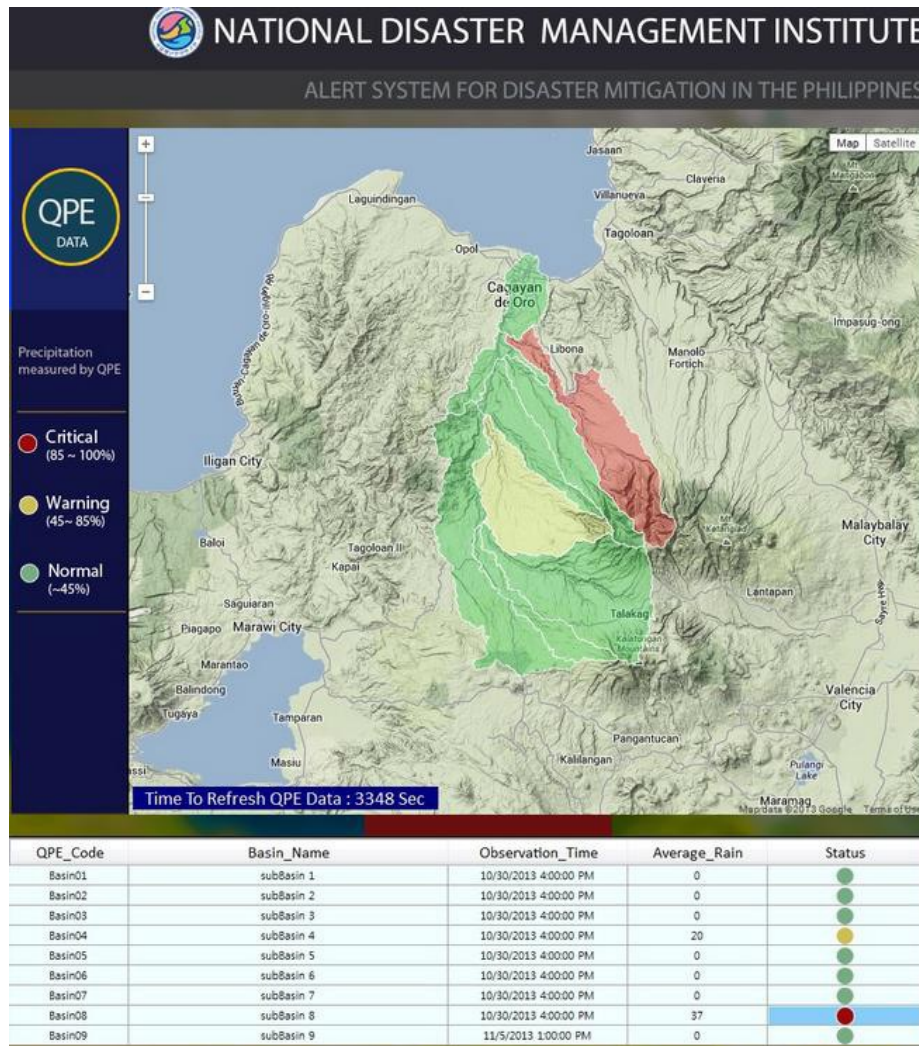
Title of Item: Improvement of Urban Flood Risk Management

a) Operation of Flood Forecasting and Warning in Metro Manila

The FFWS for the Pasig-Marikina river basin which include a large portion of the Metro Manila was enhance through the establishment of 10 rainfall stations, 10 water level gauging stations, 6 disaster reduction offices and 20 warning post stations under the project: Establishment of a Flood Warning and Monitoring System for Disaster Reduction in Metro Manila with funding from the Republic of Korea. Flood warnings in the form of pre-recorded sirens coupled with messages can now be heard from the warning stations which is strategically located along the Pasig-Marikina river. This is demonstrated in the recent flood event in Metro Manila last September 19, 2014.



- b) The Automatic Rainfall Warning System (ARWS) and Flash Flood Alert System (FFAS) developed by National Disaster Management Institute (NDMI) have provided an additional Warning Post and intelligent CCTV for the enhancement of the existing system. Moreover, development of hydrological model for Cagayan de Oro river Basin will be the next activity as an additional tool for the FFWS.



- c. The Integrated Flood Alerts System (IFAS) will be applies in the Cagayan and Pampanga River basins. The IFAS is a distributed rain-runoff model that employs remotely sensed data from microwave satellites to simulate flooding to improve river management. The project is jointly implemented by the Asian Development Bank (ADB) and the Japan Aerospace Exploration Agency (JAXA) in the Philippines, Bangladesh and Vietnam. Verification of Global Satellite Mapping of Precipitation (GSMaP) will be done based on existing rainfall station and the installation of 3 additional rainfall gauges within the Cagayan river basin.



Screenshot of the IFAS in the Cagayan river basin

IFAS will be made operational in the Cagayan, Pampanga and Agno river basins in 2014.

- **KRA 2: Minimized Typhoon – related Social and Economic Impacts**

SG: To reduce socio-economic impacts of typhoon – related disasters per GDP per capita by 20% in ten (10) years.

a) PAGASA gears up in Building Community Resilience to Natural Disasters.

To beef up its effort of protecting lives and properties against natural hazards, PAGASA participated in the “Building Community Resilience and Strengthening Local Government Capacities for Recovery and Disaster Risk Management or Resilience Project”. This is in line with the signing of the Memorandum of Agreement for the “Multi-stakeholder Collaboration on Disaster Risk Reduction and Management towards building Community Resilience” spearheaded by the National Disaster Risk Reduction and Management Council (NDRRMC) through the Office of the Civil Defense.

The main objective of the project is to sustain the operationalization of the disaster risk reduction and management which includes the integration of flood early warning system (EWS); sharing of response resources and harmonization of land use policies.

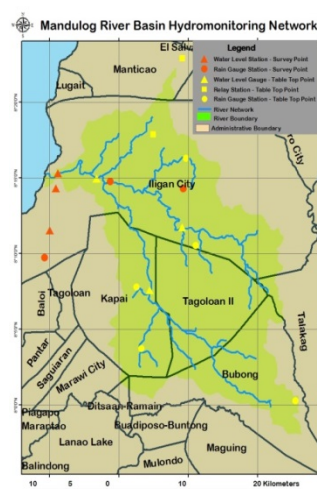
There was a great improvement with regards to the Disaster Preparedness in the Community Level as shown by the number of casualties during the passage of TS Basyang (Kajiki), Typhoon Glenda (Rammasun), Typhoon Luis (Kalmaegi) and Typhoon Mario (Fung-Wong).

Title of Item: Establishment of Flood Forecasting Warning System in Major River Basin

- a) Establishment of FFWS/ Center for major river basins ; River basin that have a catchment area of more than 1400 square meters is classified as a major river basin, otherwise river basin of less than 1400 square meters is classified as principal river basin. To date, 5 major river basins have FFW center with FFWS installed (Pampanga, Agno, Bicol, Cagayan and Pasig-Marikina). Three (3) FFW Centers currently constructed and 5 more to be bidded within the year, which is funded by Government of the Philippines .
- b) FFWS (Automatic Rain Gauges, Water Level Gauges, Automatic Weather Station, R/F Communication, Main Data Center) currently being put-up in Cagayan de Oro , Mandulog and Tagum-Libuganon River



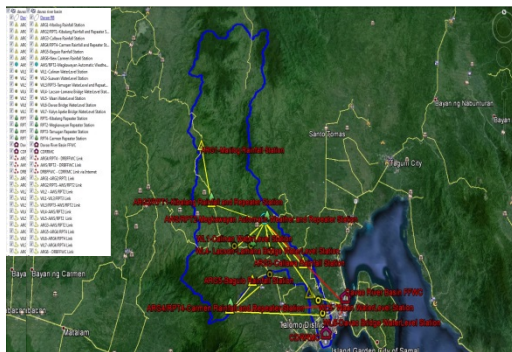
**Cagayan de Oro
River Basin**



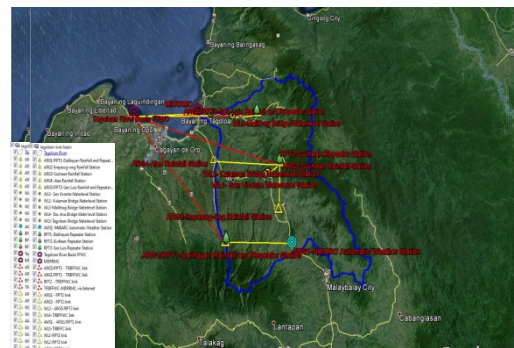
**Mandulog
River basin**

- c) The Japan Non-Grant Aid Project -JICS provide FFWS for Davao, Tagoloan and Buayan-Malungon River Basin which is currently undertaking. GoP will provide the

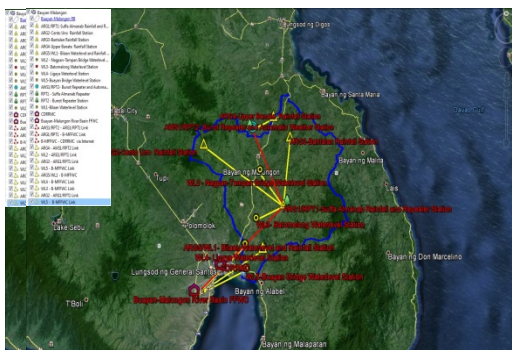
infrastructure to house these equipment. To date, site location determination, MOAs signing with the local governments and soon to be bid for implementation. GoP will finance the implementation of the FFWS for Ilog-Hilabangan river basin



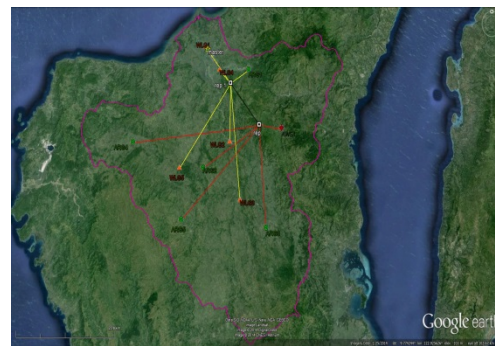
Davao River Basin



Tagoloan River Basin



Bauyan-Malungon River Basin



Ilog-Hilabangan River Basin

KRA 4: Improved Typhoon-related Disaster Risk Management in Various Sectors

a) WMO/ESCAP/Typhoon Committee Post-Typhoon Haiyan Expert Mission to the Philippines

The Mission is being organized to obtain valuable insights from hazards monitoring and early warning system (policies, intuitional coordination and operational aspects before, during and after the event), processes and products in the context of Typhoon Haiyan in the Philippines. Since the typhoon was well forecasted several days in advance, in addition to the monitoring of the hazards, the Mission should look very closely at gaps in understanding the impacts of the hazards, its communication to all hazards partners and to the public in order to prepare the adequate and proper response. It will seek to provide recommendations to PAGASA and the relevant Philippine authorities as well as their partners on how to further improve hazard monitoring, early warning and understanding the impact of such typhoon on the population in order to reduce death, injury, damage losses from future natural disasters. The information collected is also expected to help

consolidate the lessons that can be learnt at the regional level by members of the TC and the WMO/ESCAP/Panel of Tropical Cyclones (PTC).

b) In order to provide reliable typhoon-related disaster information for effective decision making in risk management in various sectors, PAGASA issue Weather Advisory and Severe weather Bulletin .

Weather Advisory is issued when a tropical cyclone outside the Philippine Area of Responsibility (PAR) is expected to enter PAR in the next 2- 3 days. This means that the tropical cyclone has no impending threat yet to any part of the country. This is to inform the general public and the disaster managers, the presence of a weather disturbance outside the PAR.

Severe Weather Bulletin Alert Status is issued when a tropical cyclone has entered or developed inside the PAR, the Weather Advisory shall be upgraded to Severe Weather Bulletin either Alert or Warning status. No Public Storm Warning Signal hoisted in any part of the country.

Severe Weather Bulletin Warning is issued if the formation of the tropical cyclone is very near to any landmass of the country which may create a real threat or if it will affect the area in at least 36 hours, a Severe Weather Bulletin Warning shall be issued instead of the Alert status and Public Storm Warning Signals are already hoisted in some areas. The initial issuance of the Severe Weather Bulletin will be anytime depends on the available data gathered which may warrant the formation of a tropical cyclone or if it will affect the area in at least 36 hours.

The bulletin should include a general advisory to communities in critical areas to take precautionary measures due to the expected inclement weather that can result to flash floods and landslides due to the approaching tropical cyclone and associated weather systems such as enhanced southwest monsoon.

It also includes the diameter of forecast rainfall associated with the tropical cyclone in descriptive form i.e. moderate, heavy, intense and torrential with the numerical equivalent based on available data. Information about the expected impacts of the wind to areas to be affected based on forecast track of the typhoon and all the hazards associated with the TC.

Title of Item: Development of Comprehensive countermeasure for Extraordinary Flood Disaster

- Discussion with government officials in charge of FFWS for dam operation activities those from Pantabangan, Angat and San Roque dams;

- Active Participation in the capacity building of the DRR Managers and LGU especially in development and improvement of their Comprehensive Land Use Plan (CLUP);
-

KRA 5: Strengthened Resilience of Communities to Typhoon-related Disaster

SG: To promote and enhance culture of community-based disaster risk management among the members; to promote education, training and public awareness of typhoon-related disasters among Members.

a) In line with the observance of the “Typhoon and Flood Awareness Week”, PAGASA conducted a media seminar Workshop.

“As a media practitioner, I really appreciate (the seminar) and I am so thankful to the PAGASA-DOST team who exerted efforts for this media seminar-workshop. It is very informative and I gained more knowledge about the weather”. Those were the kind words that one participant shared after attending the media seminar-workshop which aimed to create stronger ties with the media and strengthen their basic knowledge in Meteorology and other PAGASA Products and Services, held in Alfonso, Cavite at the Sunrise Holiday Mansion on August 15-17, 2014. The media seminar-workshop was part of the Typhoon and Flood Awareness week organize yearly by PAGASA.

b) Regional Training Workshop on Severe Weather Forecasting and Warning Services

The WMO in collaboration with PAGASA in line with the Severe Weather Forecasting Demonstration Project (SWFDP) of WMO, conducted a regional training workshop in PAGASA Central Office in Quezon City, Metro Manila, Philippines from 2 to 13 June 2014.

The main goals of then training workshop are the following:

- 1) Improve Severe Weather Forecasting
- 2) Improve lead-time of Warning
- 3) Improve interaction of NMHSs with users: media, disaster management, civil protection authorities.

Main Objectives

1. The NMHSs of participating countries are able to use the latest NWP and EPS Products in improving severe weather forecasting and lead-time of warnings.
2. To make better use of the satellite and radar information in nowcasting and very short range forecasting of severe weather.
3. To prepare country as well as site-specific forecast.
4. To develop capacity of forecasters through Exercise Sessions on developing Regional Guidance Product and making use of the guidance in severe weather forecasting.
5. Training of Trainers

6. To prepare the NMHSs for the next phase of the SWFDP-SeA i.e. demonstration phase which is likely to start later this year 2014.

The mission will utilize the concept of end-to-end hazard monitoring, early warning and identifying the impact of the detected hazard and make reference to the provisions of Hyogo Framework for Action 2005-2015, particularly Priority Action 2: Identify, assess and monitor disaster risks and enhance early warning.

Number of participants from the different country:

Lao PDR - 2
Cambodia -1
Thailand – 2
Vietnam – 2
Philippines -20
Tri-media – 10
NDRRMC -1

Lecturers:

Japan – 2
Vietnam – 2
Hongkong – 2
United Kingdom -1
WMO – 4

c) Broadcasters train up for responsible weather reporting

The “Seminar-Workshop on Responsible Weather Reporting” held last September 3, 2014 at Hotel Carmelita in Tuguegarao City trained Luzon-based radio and TV broadcasters for better understanding of weather-related information. The event, the first leg of a three-part series, aims to enhance the role of media as government partner in providing better weather reporting for disaster preparedness. Organized by the Department of Science and Technology-Science and Technology Information Institute and PAGASA in cooperation with the Kapisanan ng mga Brodkaster ng Pilipinas. The workshop will have its next legs in the cities of Cebu in Visayas and Davao in Mindanao in October and November respectively.

Title of Item: Establishment of Community Based Early Warning system

- Provide a technical support on the DRR Managers/LGU for the establishment of community early warning system particularly in Laguna, Bulacan and Laguna under the GMMS-Ready Project which is funded from Australia Agency for international Development (AusAID)

- Conduct a field survey for the installation of monitoring equipment such as warning posts, automatic rain gauge and water level flood prone areas.

Title of Item: Establishment of Urban Flood Inundation, hazard mapping and Risk Map

- a) Derivation of Flood Hazard, Vulnerability and Risk Map for Tullahan and Upper San Juan River Basin as an additional undertaken for flood disaster management with the assistance from Australia Agency for international Development (AusAID) under the Risk Analysis Project.
- b) Flood Hazard and Exposure Mapping in Olongapo City, Zambales. The project aims to use available high resolution remote sensing data (e.g. satellite data) to provide flood exposure map in Olongapo City, Zambales, and to provide rapid assessment tool to the disaster responder and warning agency regarding the risk of hydro-meteorological hazards to the concerned community through comprehensive elements at risk database

KRA 6: Improved capacity to generate and provide accurate, timely and understandable information on typhoon-related threats.

SG: To facilitate RSMC capability to respond to the needs of the Members in forecasting and capability building ; to improve capacity of Members to provide timely and accurate user-oriented and friendly TC products and information; to enhance capacity of Members' typhoon-related observation, monitoring, forecasting and warning.

a) Technical Cooperation Project for Enhancing Capacity on Weather Observation, Forecasting and Warning in the Philippines.

This Project is between PAGASA, DOST and Japan International Cooperation Agency (JICA). This is to be implemented in PAGASA, Head Office and Southern Luzon, PAGASA Regional Services Division (PRSD).

- The purpose of the project are to improve the following:
 1. Weather observation capacity
 2. Meteorological data analysis and forecasting capacity
 3. Warning criteria at the provincial level
 4. Content and accessibility of meteorological capacity
 5. Raising awareness on meteorological information activities in Southern Luzon PRSD.
- This project is implemented based on the following six (6) policies:
 1. Main streaming of disaster prevention (transfer JMA technical skills) – transfer of technical skills which have been developed mainly by JMA trough

their experiences, i.e observation, forecasting and data distribution/communication skills .

2. Technical cooperation along WMO policies – JMA and PAGASA are both National Weather Services (NWS) of WMO and both support WMO World Weather Watch (WWW) policy through sharing of observation and forecast data for disaster prevention activities transnationally. As a Regional Specialized Meteorological Center (RSMC) of Region II, JMA issues/ provides tropical storm warnings for Northwest Pacific area and these information is also used by PAGASA and other NWS.
3. Contribution for Northwest Pacific Countries – Enhancement of observation skills of PAGASA would greatly contribute for Northwest Pacific countries through the provision of accurate observation data under WWW framework. Accurate weather observation and quick distribution to Northwest Pacific countries help them monitor existing weather disturbance (TC), analyze weather environment and issue correct weather warnings.
4. Technical transfer based on documents – Making documents will contribute for visualizing operational tasks and have a clear daily operation of the jobs. This will include documents for planning, implementing and evaluation of activities for future improvement.
5. Ensuring technical skills through review and improvement – In order to ensure technical skills, technical training and improvement of documents for operations should be review. Daily operation based on the training will be implemented as daily tasks by PAGASA.
6. Useful materials based on communication with users – With sharing educational materials used in drills with Japan local communities or schools, we can develop educational materials will be developed for LGU's and schools. These materials will be based on communication with other users in order to make it user friendly materials.

b) JMA/WMO Workshop on Effective Tropical Cyclone Warnings in Southeast Asia (11-14 March 2014)

The JMA/WMO Workshop on Effective Tropical Cyclone Warning in Southeast Asia was held in collaboration with the World Meteorological Organization (WMO) from 11 to 14 March 2014 at the Headquarters of the Japan Meteorological Agency (JMA) in Tokyo.

The workshop was intended to promote understanding among participating countries regarding the latest tropical cyclone (TC) analysis/forecasting techniques and products, to identify challenges faced by these countries in improving their operational forecasting and warning services, and to discuss ways to address the challenges including external assistance. The session was attended by 51 people, including representatives of WMO and the Japan International Cooperation Agency (JICA), distinguished lecturers from the National Hurricane Center (NHC), the Central Pacific Hurricane Center (CPHC) of the US National Oceanic and Atmospheric Administration's National Weather Service and the Joint Typhoon Warning Center (JTWC), and TC experts from JMA and nine National Meteorological and Hydrological Services (NMHSs) in

South and Southeast Asia (Bangladesh, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Thailand, the Philippines and Viet Nam).

The representatives of the nine NMHSs provided Country Reports highlighting their current tropical cyclone operational service capacities as well as challenges and needs relating to the further enhancement of warning capacity. Attendees from NHC, CPHC, JTWC and JMA gave a series of lectures on tropical cyclone operational techniques, including storm surge forecasting techniques. The event further addressed the importance of warning development based on effective communication with emergency managers. In this regard, JMA reviewed recent efforts to improve its warning services in accordance with past tropical cyclone disasters; the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) shared information on its response to Typhoon Haiyan and lessons learned from the experience; and NHC detailed its improvement plan for storm surge forecasts and warnings based on lessons learned from Hurricane Sandy.

The workshop's discussions centered on the need for more effective regional cooperation initiatives such as training on satellite and weather radar-based monitoring/analysis techniques and further enhancement of real-time forecast supporting products including NWP guidance products from RSMCs. It also highlighted the importance of providing easy-to-understand warnings in text and/or graphical formats based on coordination with emergency managers, as well as continued efforts to increase public awareness in order to ensure the effectiveness of warnings. The event further encouraged ongoing enhancement of technical cooperation activities on storm surge forecasting, including the technical transfer of JMA's storm surge modeling methods.

Number of participants from the different country

1. Bangladesh – 2
2. Cambodia – 2
3. Indonesia – 2
4. Lao PDR – 2
5. Malaysia – 2
6. Philippines – 2
7. Thailand – 2
8. Vietnam – 2

c) In order to have a very good monitoring capability, PAGASA will install additional five (5) Doppler Radars for the next two (2) years and will acquire two (2) Mobile Radars.

These radars are located in the following areas:

1. **Basco, Batanes** – completed and already operational since June, 2014. This radar will track tropical cyclone that will pass in extreme Northern Luzon. This can also be used by Taiwan in monitoring movement of TC because it is very near to Basco, Batanes.

2. **Busuanga, Palawan** – Plans and Designs of the building and tower are still undergoing evaluation at the Department of Public Works and Highways – Bureau of Design. Bidding for the equipment was already done and ready for delivery.
3. **Quezon, Palawan** – construction of the building and tower as of August 2014 was 71%, equipment is for delivery awaiting for the completion of the construction of the building and tower.
4. **Jaro, Iloilo**- construction of the building and tower is 92.5% complete as of July 2014, equipment ready for delivery awaiting the completion of the construction of the building and tower.
5. **Zamboanga**– construction of the building and tower undergoing, started June 2014.

Mobile radars are from Japan Radio Corporation and one unit will be delivered by October 2014 and the other one will be delivered next year. These mobile radars will be used as back-up whenever one or two of the fixed radars will not be operational due to some problems. The STRIDE Team (Storm Chaser) will also use one of the radar whenever a tropical cyclone will make landfall. Radar is also one of the tools that we use in the issuance of Rainfall and Thunderstorm Advisory and Warning.

Title of Item: Deployment of Early Warning System (DEWS) in Disaster Prone Areas Project

- a) This project is implemented by the Department of Science and Technology-Advanced Science and Technology Institute in cooperation with DOST-Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and the DOST–Regional Offices, aimed at deploying hydrometeorological devices (hydromets) to improve local weather and flood monitoring capabilities and warning stations (1,000 devices) for the 65 principal river basins and the remaining ungauged major river basins.

KRA 7: Enhanced Typhoon Committee's Effectiveness, Efficiency and International collaboration.

SG: To strengthen the capacity of Typhoon Committee to effectively discharge its responsibilities and functions described in this Strategic Plan and completed its stated mission in accordance with the Typhoon Committee's Statute; To mobilize available resources and engage collaborators for the implementation of the strategic goals.

- a) The Typhoon Committee is conducting a yearly Roving Seminar-workshop to enhance and capacitate the meteorologist and hydrologist in performing their duties as Operational Meteorologist and Hydrologist in their respective country with the help of the other Member countries and from WMO/UNESCAP.
- b) The Typhoon Committee is also conducting and yearly Integrated Workshops wherein the member countries are requested to prepare a Member's Reports and this will also be presented during the Workshop. There will be discussions related the reports of the member. There will also be relevant topics to be presented during the workshop which

will help the operational Meteorologist, Hydrologist and the Disaster Management Group, in their work.

- c) The Typhoon Committee is also helping Member Country severely affected by the hazards of tropical cyclone, with the help of other Members, WMO and ESCAP.

Summary Table of relevant KRS's and components (please tick boxes, can be more than one, as appropriate):

KRA =	1	2	3	4	5	6	7
Meteorology	x	x	x	x	x	x	x
Hydrology	x	x	x	x	x	x	
DDR							
Training and research							
Resource mobilization or regional collaboration							

Member : Philippines Name of contact : Renito Paciente & Maximo Peralta
 Telephone: For this item: renito.paciente@yahoo.com
pmaximo64@yahoo.com