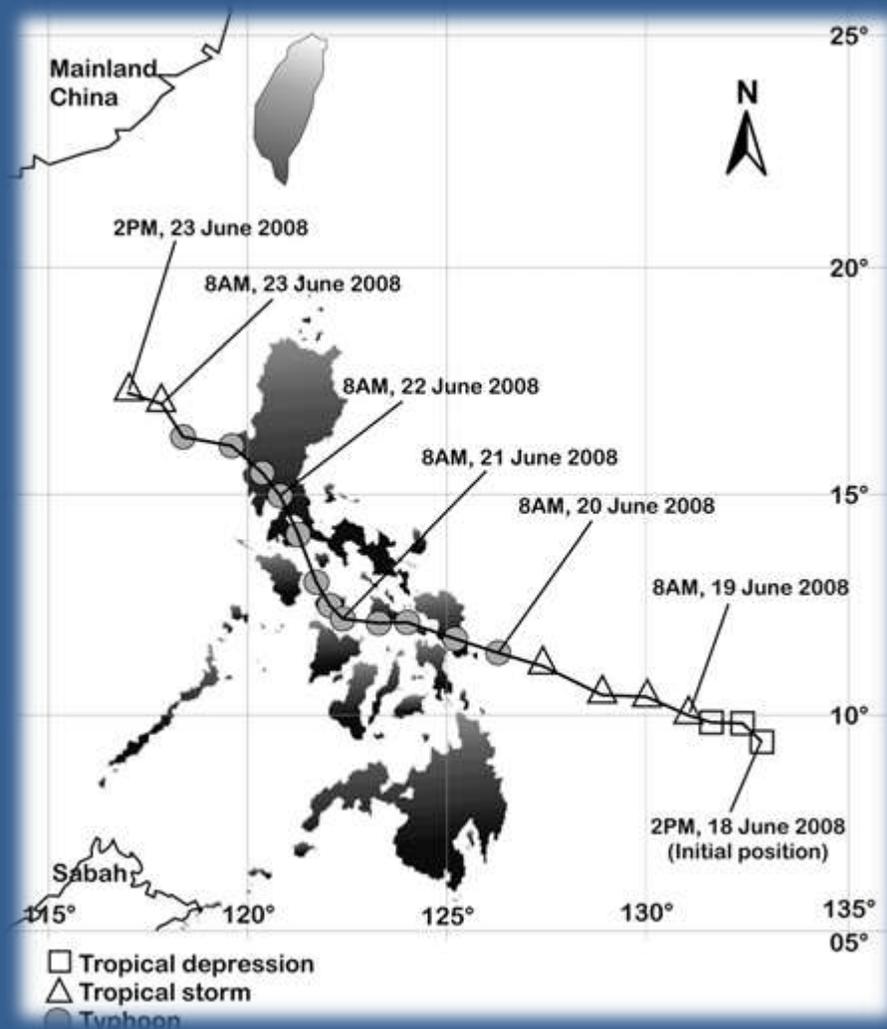


2014

Nature Begins Where Human Predication Ends

Typhoon Frank (Fengshen)

17th to 27th June, 2008

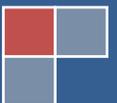


Credit: National Institute of Geological Sciences, University of the Philippines, 2012

Tashfeen Siddique – Research Fellow

AIM – Stephen Zuellig Graduate School of Development Management

8/15/2014



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Acronyms and Abbreviations:

ARMM	Autonomous Region in Muslim Mindanao
BDRRMC	Barangay Disaster Risk Reduction & Management Committee
DRRMO	Disaster Risk Reduction and Management Office
FB	Facebook
Kph	Kilometers per hour
LPA	Low Pressure Area
LGU	Local Government Unit
Mph	Miles per hour
MDRRMC	Municipal Disaster Risk Reduction and Management Council
NASA	National Aeronautics and Space Administration
NTC	National Telecommunications Commission
NDCC	National Disaster Coordinating Council
NFIs	Non Food Items
NDRRMC	National Disaster Risk Reduction and Management Council
OCD	Office of Civil Defense
PAR	Philippine Area of Responsibility
PDRRMC	Provincial Disaster Risk Reduction & Management Council
PSWS	Public Storm Warning Signal
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
STS	Severe Tropical Storm
TD	Tropical Depression
TS	Tropical Storm
TY	Typhoon
UTC	Coordinated Universal Time

Nature Begins Where Human Predication Ends

Typhoon Frank (Fengshen)

17-27th June, 2008

Brief History

The evidences of typhoons, tropical cyclones, hurricanes or bagyo on this land which is now known as Philippines were found in the history of 15th century and onward. Due to aforementioned historical background, the terms related with these catastrophes along-with their occurrence in various forms are not surprising factor at all for the people of this land and they have rich experience of dealing such type of natural hazards. According to a report titled "Typhoons in the Philippine Islands, 1566-1900"¹ the first record of hurricanes appeared under the earliest years of Spanish colonies. There is a little doubt that Christopher Columbus experienced at least two typhoons one in 1495 and the other is in 1502. Spanish used the term "Hurricane- means great wind with heavy and intense rainfall" first time in 16th Century. The original work made by the Spanish Jesuit, Miguel Selga in the beginning of 20th Century proved that there were 652 events out of them 533 are reported as typhoons and the rest being considered as tropical storms.

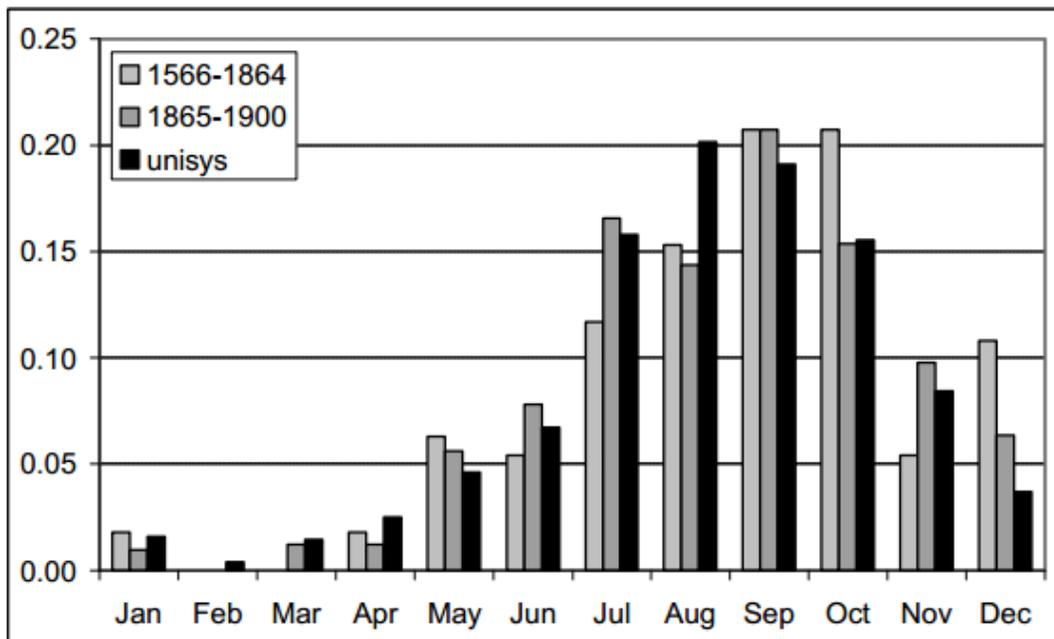


Figure 1 : Graph taken from the report titled 'Typhoons in the Philippine Islands, 1566-1900' showed the normalized monthly typhoons land falling in the Philippines for 1564-1864, 1865-1900 and 1945-2000 (Unisys)

A Tropical Cyclone (Typhoon or Bagyo in Philippines) usually referred to intense circulating weather system over tropical seas and oceans. It is accompanied by very

¹ (Ricardo Gracia-Herrera)

strong winds, heavy rains and large ocean waves or high tides. On average, 100 Tropical cyclones form in the world annually, where two-third becomes typhoons and hurricanes. Western North Pacific Ocean (includes the South China & Philippine Seas) hold the highest place of formation (30%), followed by the East Pacific Ocean (15%), Western Atlantic Ocean-South & North Indian Oceans-South Pacific Ocean(12%), Northern and western Australia (7%)², See Figure 2 below:

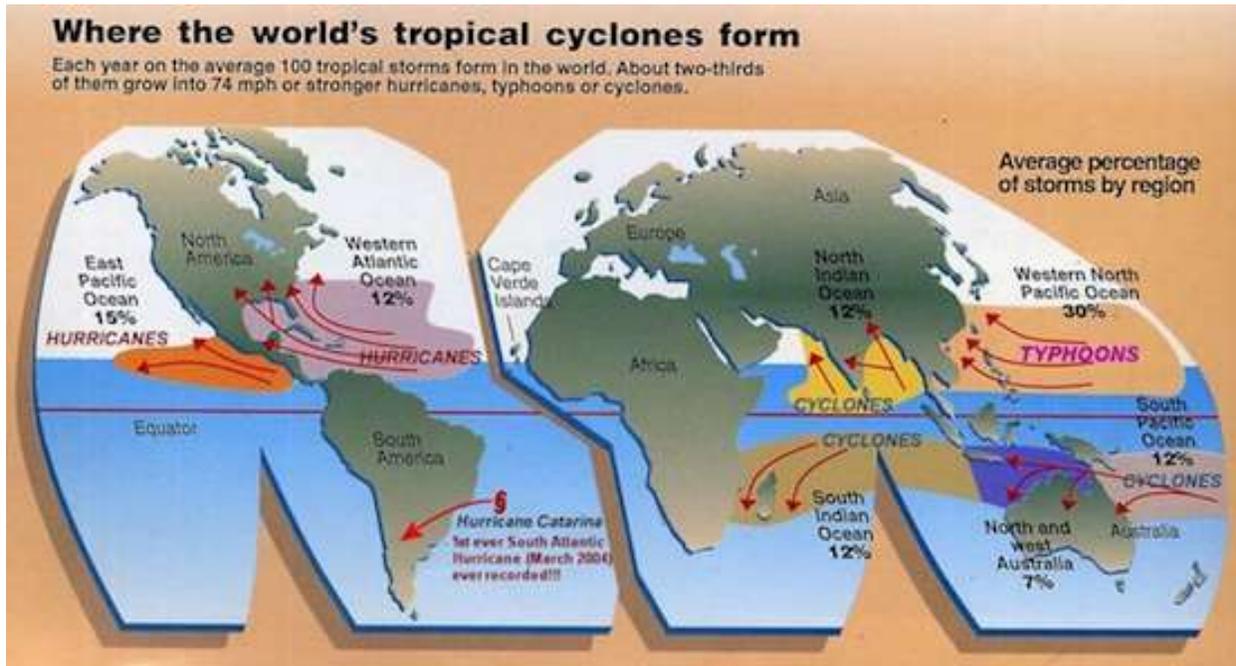


Figure 2 : Breeding grounds of Tropical Cyclones, where the highest percentage forms over the Philippine Sea & Western Pacific Ocean. Illustration Credit: Jack Williams, USA Today: The Weather Book (1992) (David Michael V. Padua, Typhoon Climatology, 2012).

Philippines Climate

The Climate of the Philippines is tropical and maritime and described by relatively high temperature, high humidity and abundant rainfall. On the basis of this, there are two major season in Philippines³:

1. The Rainy Season , from June to November and
2. The dry season, from December to May

The dry season may again be subdivided into

- i. The cool dry season from December to February
- ii. The hot dry season from March to May.

² (David Michael V. Padua, Typhoon Climatology, 2012)

³ (PAGASA)

According to Climate Page of PAGASA' website; Typhoons have a great influence on the climate and weather conditions of the country. A great portion of the rainfall, humidity and cloudness are due to the influence of typhoons. See Annex-I

Chronology of Typhoon Frank

Typhoon Frank (International name: Fengshen) brought an extra ordinary amount of rainfall with strong winds and flash floods. Fengshen is a Chinese word means "God of wind"⁴ but originally, during frank there were more rain then winds. The name Fengshen has been used for two tropical cyclones in the northwestern Pacific Ocean i.e. Category 5 storm of 2002 which brushed southern Japan and typhoon of June, 2008 i.e. Frank which hit Philippines and china caused substantial losses both to lives and properties.

Japan Meteorological Agency traced Tropical depression over the northwest sea of Palau Islands at 18 UTC (Coordinated Universal Time) on 17th June, 2008. Moving west-northwestward, it was upgraded as tropical storm (TS) intensity east of Mindanao Island on 19th June. Afterward it was upgraded to typhoon at 18 UTC on the same day before hitting the Samar Island early on the next day. Turning from west-northwest to the northwest, on 21st June it reached peak intensity with maximum sustained winds of 90 knots and hit Luzon island and then it moved towards the South China Sea. Fengshen again turned to the north-north west on 23rd June and hit Hong Kong on 25th June. After being downgraded to Tropical Depression intensity at

Date/Time (UTC)	Center position	Central pressure (hPa)	Max wind (kt)	CI num.	Grade
	Lat (N) Lon (E)				
FENGSHEN (0806)					
Jun. 17/18	8.4 134.2	1006	-	0.5	TD
18/00	8.6 133.4	1008	-	1.0	TD
18/06	9.0 132.7	1006	-	1.0	TD
18/12	9.3 132.1	1006	-	1.5	TD
18/18	9.5 131.4	1002	-	2.0	TD
19/00	9.7 130.9	1000	35	2.5	TS
19/06	10.0 130.1	994	45	3.0	TS
19/12	10.3 128.9	985	55	3.5	STS
19/18	10.7 127.7	980	65	4.0	TY
20/00	11.0 126.9	970	70	4.5	TY
20/06	11.5 125.4	965	75	5.0	TY
20/12	11.6 124.3	960	75	5.0	TY
20/18	11.7 123.5	955	80	5.5	TY
21/00	11.9 122.7	945	90	6.0	TY
21/06	12.2 122.3	955	85	5.5	TY
21/12	13.1 121.8	965	75	4.5	TY
21/18	14.0 121.6	970	75	5.0	TY
22/00	14.8 121.0	975	75	4.5	TY
22/06	15.4 120.5	980	65	4.0	TY
22/12	15.9 119.6	985	55	3.5	STS
22/18	16.5 118.4	985	50	3.5	STS
23/00	17.1 117.8	985	50	3.0	STS
23/06	17.6 117.1	985	50	3.0	STS
23/12	18.0 116.5	985	50	3.0	STS
23/18	18.6 116.1	985	50	3.0	STS
24/00	19.4 115.9	985	50	3.0	STS
24/06	20.5 115.4	985	50	3.0	STS
24/12	21.1 115.0	985	50	3.0	STS
24/18	22.0 114.6	990	45	3.0	TS
25/00	22.9 113.9	994	40	2.5	TS
25/06	23.6 113.6	998	-	2.5	TD
25/12	24.3 113.4	998	-	2.0	TD
25/18	24.5 113.5	1000	-	1.5	TD
26/00	24.9 113.7	1000	-	-	TD
26/06	25.3 114.3	1000	-	-	TD
26/12	25.8 114.7	1000	-	-	TD
26/18	26.2 115.0	1000	-	-	TD
27/00	27.0 115.4	1002	-	-	TD
27/06					Dissip.

Figure 3 : Table from Japan Meteorological Agency, Annual Report on the Activities of the RSMC Tokyo -Typhoon Center 2008

⁴ (Wikipedia, 2013)

06 UTC on 25th June, it turned to be northeast and dissipated over southern china at 06 UTC on 27th June⁵. See figure below:

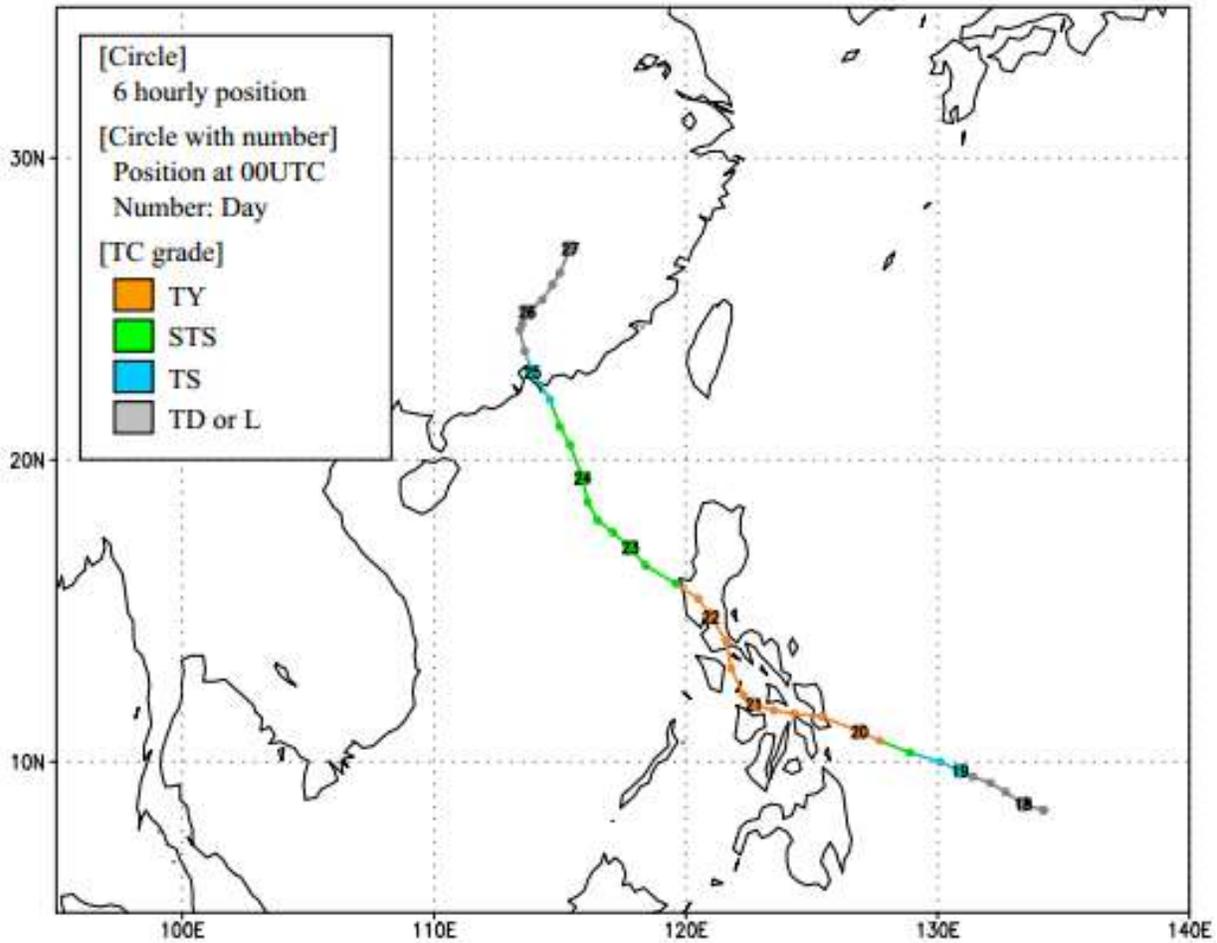


Figure 4 : Track of Typhoon Fengshen, Japan Meteorological Agency, Annual Report on the Activities of the RSMC Tokyo - Typhoon Center 2008

⁵ (Japan Meteorological Agency, 2008)

On the other hand Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) described the Chronology of typhoon Frank that it originated from a low pressure area (LPA) spotted to the East of Northern Mindanao (10.0N / 130.1E) on the afternoon of June 18. It then moved West Northwest at an average speed of 11 kph and intensified into a tropical storm 18

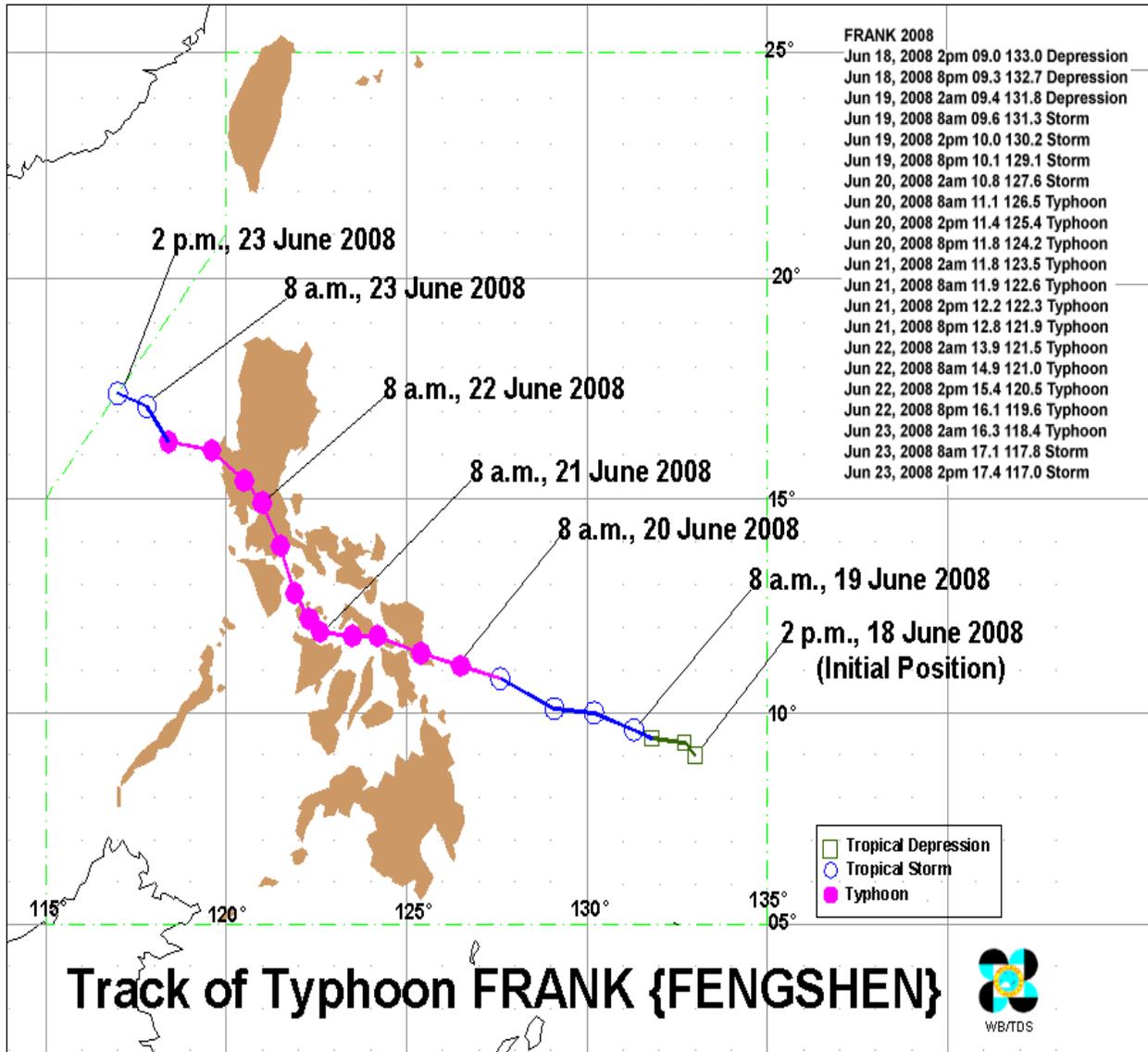


Figure 5 : Track of Typhoon Frank – Provided by PAGASA-DOST

hours later. It continues to consolidate and gained more strength reaching 110–140 kph the next morning. FRANK continues to move West Northwest towards Eastern Samar about 90 km Northeast of Guiuan wherein it was already under PSWS # 3. It made landfall over eastern Samar with packing winds of 140 kph in the afternoon of 20th June. Before midnight of the same day, it was already in the vicinity of Biliran Island traversing the Visayan Sea (southern coast of Masbate) towards Jintotolo Channel or Panay-Romblon area. Morning of June 21st, FRANK was located over the coastal area of Capiz and remained almost stationary for about 6 hours resulted in

capsizing the MV Princess of the Stars and other sea crafts over the inland waters of Visayas and southern Luzon area. Lots of fishermen were drowned and Panay Island was affected by floods and landslides due to heavy downpour. It gradually veered to the northwest crossing the Islands of Romblon then Marinduque towards Calabarzon and passed near Metro Manila in the morning of 22nd June. It crossed Central Luzon on its way out over Pangasinan towards the South China Sea and exits PAR afternoon of June 23.⁶

The Earth Observatory Mission has also disclosed the information about the track of typhoon Frank and the amount of rainfall.

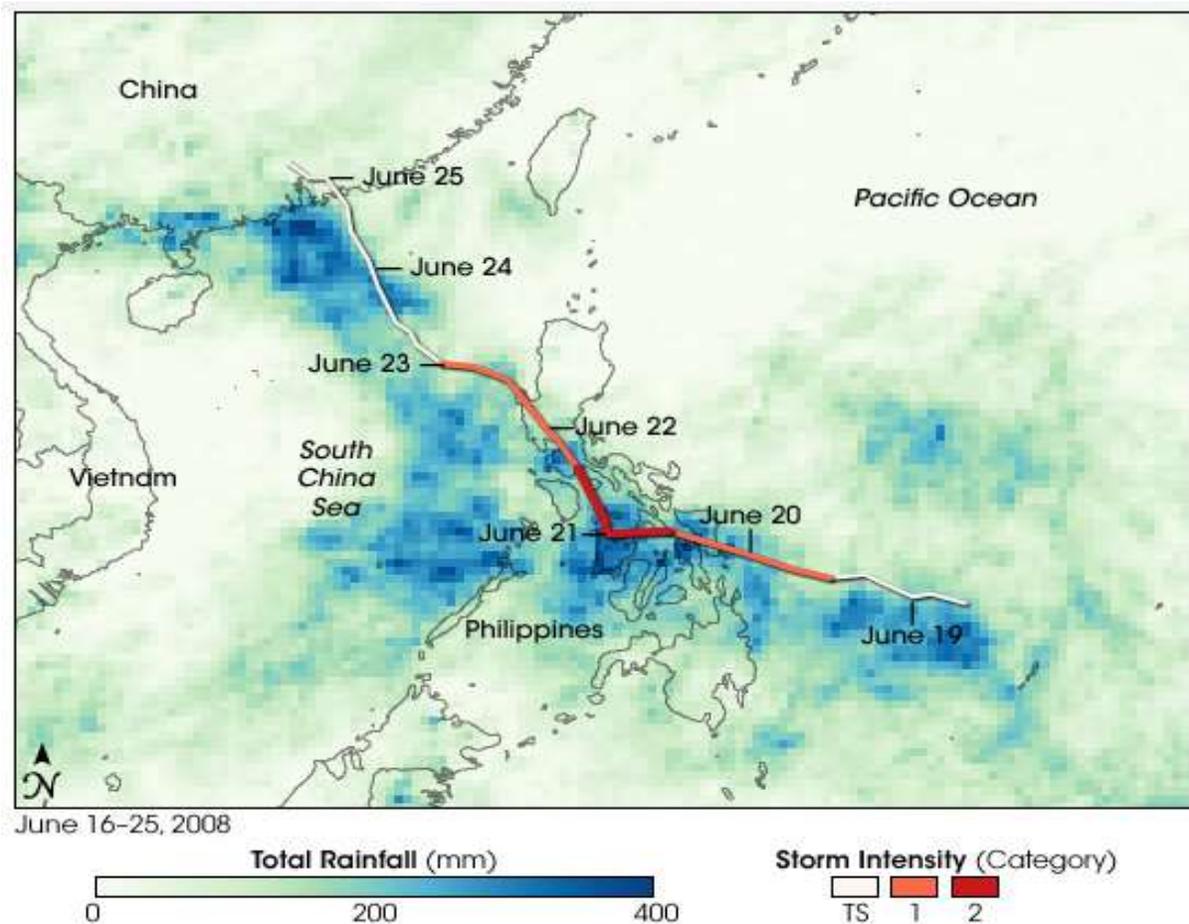


Figure 6 : Typhoon Frank Track with Rainfall details from Earth observatory Mission website <http://earthobservatory.nasa.gov/IOTD/view.php?id=8868>

This image shows the rainfall associated with typhoon Frank between 16 to 25 June, 2008. Dark blues shows rainfall totals around 400 millimeters (about 15.7 inches). Storm intensity is indicated by colored lines. The typhoon caused heavy

⁶ (PAGASA-DOST, 2008)

rains, flash floods and landslides over the central Philippines. Then it affects China by heavy rains and winds⁷.

Forecasting went wrong

The above mentioned details are taken from the reports or articles prepared after typhoon frank and almost all have presented the same kind of information with actual typhoon track but there are evidences that typhoon frank changed its directions and went beyond the predictions of Forecasters.

According to Ross Hayes Jr, CNN Weather Producer (Published in the edition of Friday, June 20, 2008, CNN.Com International)

"The storm has also gone against all computer guidance and tracked farther west rather than turn north." - Not much advance notice here, but Typhoon Fengshen made landfall in the central Philippines late Thursday afternoon⁸.

Like the same IRIN (a service of the UN Office for the Coordination of Humanitarian Affairs-Humanitarian news and analysis) published the following statement of NDCC official on 22nd June, 2008

*"We did not expect this at all because of the behavior of the typhoon track," the National Disaster Coordination Centre (NDCC) spokesman, Anthony Golez, told IRIN. "It changes direction from time to time"*⁹.

National Aeronautics and Space Administration (NASA) also noticed the Track changes and forecasting issues on 24th June, 2008.

"Storm Fengshen is keeping forecasters at the Joint Typhoon Warning Center on their toes. On June 23, the forecast track looked as if it would take Fengshen northeast toward Japan. Now, computer forecast models are calling for a landfall just to the north of Hong Kong late on June 24th.

*Why the change in track to the west? It's because of an "extension" of a steering ridge of high pressure to the northeast. High pressure once fixed in a location can block low pressure systems"*¹⁰.

Typhoon2000.com (The Philippines first website on Tropical cyclones) summaries the forecasting issues in the following words:

"FRANK was very destructive in many ways including forecasting blunders of monitoring agencies. Hundreds of marine vessels around the Visayas were

⁷ (Earth Observatory Mission, 2008)

⁸ (CNN.com International, 2008)

⁹ (IRIN Asia - Philippines, 2008)

¹⁰ (National Aeronautics and Space Administration (NASA), 2008)

*destroyed. Iloilo and Aklan province were the most devastated provinces with floods never seen before in history of the region. Rescue and relief efforts were delayed due to damaged roads and bridges, and the focus of rescuers on trapped people in the capsized ferry. The unpredictable behavior of FRANK traversed seven islands, directly affecting 16 provinces and spawned floods as far as Central and Western Mindanao*¹¹.

Philippine Daily Inquirer also reported about the track changes of typhoon frank in its news like:

*"Typhoon "Frank" (international codename: Fengshen) weakened slightly, and changed its track further northwest towards Manila Bay, the chief of the state weather bureau said late Saturday evening (June 21, 2008 23:43:00, Frank' changes course; Signal No. 3 up in Metro Manila)*¹².

There are several other articles, publications and reports addressed the forecasting issues. PAGASA and other weather monitoring agencies faced criticism and several considered losses due to their negligence. There is an incident attached with typhoon frank i.e. capsizing the MV Princess of the stars Ferry and due to that incident the death toll raised to double.

¹¹ (Typhoon2000.com, 2008)

¹² (Inquirer.net, 2008)

Philippines Daily Inquirer reported the incident in the following words released on June 22, 2008:

Ferry carrying over 800 sinking in storm--officials

June 22, 2008 08:25:00

Joel Guinto

Agence France-Presse INQUIRER.net

MANILA, Philippines-- (UPDATE 3) A ferry carrying over 800 passengers was sinking off the coast of the central Philippines after being battered by huge waves caused by a typhoon, reports and officials said Sunday.

"This is already a confirmed report," Nanette Tansingco, mayor of the coastal town of San Fernando in Romblon province, said of the sinking.

The M/V Princess of the Star sent a distress signal late on Saturday from the area after becoming stranded when Typhoon Fengshen swept across the country.

"I sent a speed boat to check on the report, and they saw the boat submerged with a hole in the hull. They saw the name Princess of the Star and there were at least four bodies there," the mayor told dzMM radio.

The ship was reported to have capsized at around 6 p.m. Saturday off Sibuyan Island, Lieutenant Colonel Edgard Arevalo, spokesman of the Philippine Navy, told INQUIRER.net.

The vessel encountered engine trouble, lost power, and was "dead in the water," Office of Civil Defense Administrator Glenn Rabonza said in a phone interview.

Three Navy vessels have been readied to rescue the passengers and crew. The vessel nearest the area, the PG378 stationed in Masbate province, had to abort its rescue mission due to "gigantic waves, pounding rain, and gusty winds," Arevalo said.

"We are waiting until the weather is at least permissive [before resuming rescue efforts]," Arevalo said in a text message.

"We don't want to complicate the problem if our personnel will later be the ones needing rescue," he added.

According to the Coast Guard, the ferry's manifest recorded 702 passengers including 50 children as well as 100 crew. The civil defense office said the ship carried 626 passengers and 121 crew members.

The ferry capsized about three to four kilometers (1.8 to 2.4 miles) off San Fernando town, local radio reports said.

"I have not seen any survivors," resident Melanie Rotoni told dzMM radio.

"Life jackets and debris litter the shore. I saw a dead woman in her 40s along the shore but she was the only body I saw. There is no one else."

Critics again think that it's due to wrong forecast of PAGASA and others were asking a question who gave permission to that ferry during typhoon to move. There are several other articles and reports still debating on the issue but no conclusion till now only the blames on each other.

Mr. Jesse Ferrell published an article on AccuWeather.com on 25th June, 2008. In his article he has addressed the forecasting and actual tracks. As of Thursday (Shown in Figure 7) the storm was in its initial stage with the chances to become typhoon and hit Philippines and then moved towards Japan. Figure: 7 showed the initial forecast of the Monitoring agencies.



Figure 7: Initially forecasting Track; Image courtesy from the article written by Mr. Jesse Ferrell, Published on AccuWeather.com on 25th June, 2008

As of Friday, the typhoon changed its track and the predicted track was shown in Figure 8;



Figure 8: Track as of Friday; Image from the article written by Mr. Jesse Ferrell, Published on AccuWeather.com on 25th June, 2008



Figure 9: Actual Track; Image from the article written by Mr. Jesse Ferrell, Published on AccuWeather.com on 25th June, 2008

Mr. Ferrell then discussed the actual track with the help of Figure 9. According to him the actual track was off by about 4 degrees of longitude and the reason he mentioned is that the international Metrological agencies were not totally aware of the geographical location of the Philippines. He also argued that the forecast of Joint Typhoon Warning Center (JTWC) are mostly considered as reliable and there was no reason for not to believe but during frank there forecast was also went wrong.

U.S Naval Maritime Forecast Center/ Joint Typhoon Warning Center (JTWC) Pearl Harbor, Hawaii also accepted the errors in their forecast and addressed in their Annual Tropical Cyclone Report 2008 as follows:

“Typhoon (TY) 07W (Fengshen) formed southeast of Yap in mid-June, tracked westward across the Philippines and made landfall north of Hong Kong around 25/00Z. TY 07W was noteworthy for persistently erroneous track forecasts from all of the numerical models used to produce the JTWC consensus (CONW) forecast aid. All the dynamic aids used in the CONW determination predicted northward movement within 12 to 24 hours of any given initial forecast position with several of the numerical forecast tracks predicting very sharp poleward turns and recurvature.

The erroneous poleward bias of the CONW and all of the dynamic aids that are used to compute the consensus, negatively affected the JTWC forecasts issued for this cyclone¹³.

Warning and Precautionary Measures

There were several news clips which indicated that PAGASA issued warnings before typhoon frank and they also gave weather updates after every six hours. There were three different views regarding the timing of warnings; one group was of the view that PAGASA gave warnings only when the typhoon was on their head and when everyone got aware that typhoon reached in PAR means not well in time, second group was of the opinion that they were under warning # 1 when the typhoon reached and destroyed everything while the third group blamed PAGASA and other monitoring Agencies for issuing wrong forecast. Table 1 showed the details of Public Storm Warning Signals issued by PAGASA-DOST, presented in Tropical Cyclone Summary-2008 provided by Ms. Rose S. Barba (Senior Weather Specialist, Climatology and Agrometeorology Division (CADS)):

Public Storm Warning Signal (PSWS) # 3:	Samar Provinces, Leyte, Biliran Island, Capiz, Aklan, Northern Antique, Northern Iloilo, Masbate, Sorsogon, Albay, Catanduanes, Camarines Provinces, Burias Island Bondoc Peninsula, Marinduque, Romblon, Mindoro Provinces, Lubang Island, Calamian group of islands, Batangas, Laguna, Cavite, Rizal, Bataan, Northern Quezon, Polillo island, Southern Aurora, Nueva Ecija, Bulacan, Pampanga, Tarlac, Pangasinan, Zambales, Bataan, Benguet, La Union and Metro Manila.
Public Storm Warning Signal (PSWS) # 2:	Southern Leyte, Northern Cebu, Negros, Occidental, Rest of Antique, Rest of Iloilo, Guimaras, Sibuyan island, Dinagat island, Siargao island, Cuyo island, Calamian Group, Northern Palawan, Ticao Island, Rest of Aurora, Nueva Viscaya, Ifugao, Mt. Province, Ilocos Sur, Ilocos Norte, Abra, Ifugao and Quirino.
Public Storm Warning Signal (PSWS) # 1:	Bohol, Rest of Cebu, Negros Oriental, Sequijor island, Surigao del Norte, Surigao del Sur, Agusan del Norte, Camiguin, Rest of Palawan, Isabela, Cagayan, Kalinga, Apayao, Abra and Ilocos Norte.

Table 1: PSWS issued by PAGASA-DOST during typhoon Frank, Details from Tropical Cyclone Summary, 2008

During field interviews in region VI, most of the stakeholders criticize the poor performance of PAGASA during typhoon Frank but they appreciate the well time warnings issued by PAGASA and other agencies at the time of typhoon Yolanda. In most of the places during typhoon frank evacuation took place after the flash floods and heavy rains. Here are some evidences collected regarding warnings and pre-cautionary measures:

¹³ (G. A. Cooper(Captain & Robert J. Falvey (Director, 2008)

IRIN (a service of the UN Office for the Coordination of Humanitarian Affairs-Humanitarian news and analysis) printed the following statement on 22nd June, 2008

"The government's weather bureau, the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), only released the storm alert on 19 June.

"Initially, all the forecasts including those from meteorologists in the United States, Japan, and other countries, said the typhoon would not hit the Philippines. Around Thursday afternoon, we changed our forecast saying it's going to hit the Samar and Bicol region," Director Prisco Nilo of PAGASA told IRIN"¹⁴.

There are many other news clips and articles debated on the warning and forecasting system of PAGASA. Some Critics even blame PAGASA for the ferry incident by using the words ""gross negligence and incompetence"¹⁵.

¹⁴ (IRIN Asia - Philippines, 2008)

¹⁵ (Philippine Daily Inquirer, 2008)

Typhoon Climatology-Science

How Typhoon Formed?

In tropical oceans, the water in the oceans' surface layer heated by the direct solar radiation. As a result, the air above the tropical oceans is characterized by high temperature and humidity, resulting in air inflation that easily leads to low density per unit volume of air. Weak wind near the equator causes the lighter air to soar and incur convection that further attracts inflow of surrounding cooler air. The intake air then warms up and soars again,

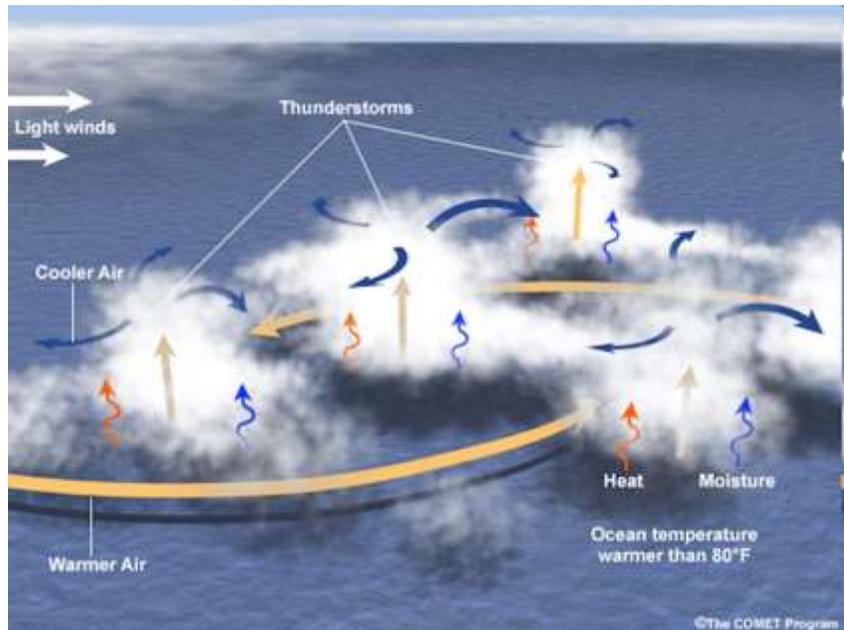


Figure 10 : ingredients needed for the development of Typhoons, Image courtesy of image taken from COMET Program, The Weather Philippines Foundation

creating a positive feedback cycle that eventually forms an air column with high temperature, light weight and low density. This is how the tropical depression forms¹⁶. Typhoons are normally associated with heavy rain falls and strong winds.

Typhoon Structure¹⁷

A typhoon's structure composed of four parts namely: Outer Rainbands, Inner Rainbands, Eyewall, and the Eye.

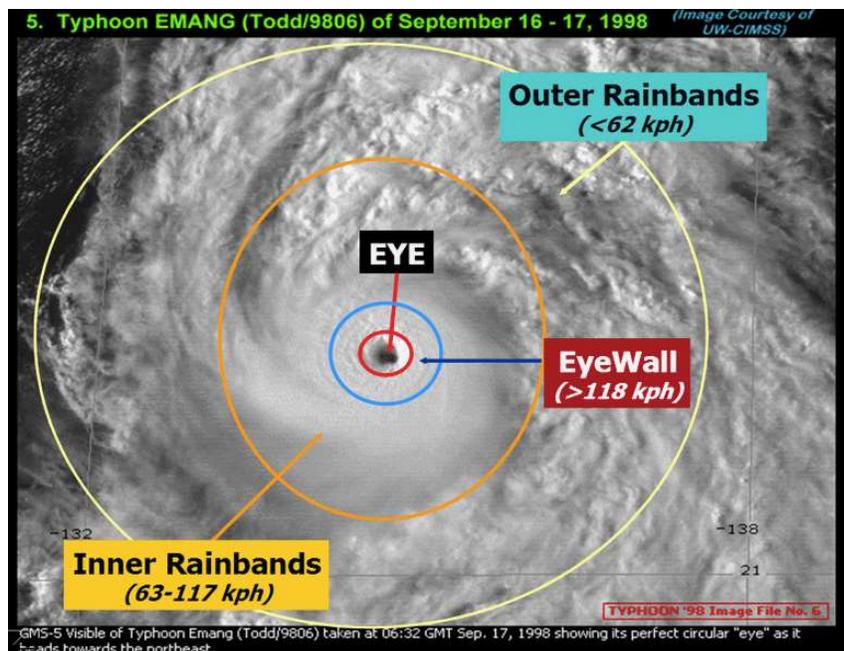


Figure 11 : Image Courtesy of the Weather Philippines Foundation, A graphical illustration & satellite view of a Typhoon showing its parts. Image Credit by: University of Wisconsin-CIMSS. Illustration by: David Michael V. Padua

■ OUTER RAINBANDS

¹⁶ (Central Weather Bureau, Taiwan)

¹⁷ (David Michael V. Padua, Typhoon Climatology, 2012)

defined as the outer spiral bands of a typhoon which are scattered but moving inward. It is characterized by occasional light to moderate rainfall with winds of up to 62 kph. Heavy gusts of up to 5-minutes occurring every 3 to 6 hours can be expected. Sunlight may still penetrate at these bands (50% cloud cover).

- **INNER RAINBANDS** – defined as the inner or main spiral bands of a typhoon which are now organized & not scattered as it moves inward towards the center. It is characterized by moderate intermittent rains with Tropical Storm Force Winds of 63 to 117 kph. Heavy gusts of up to 5-minutes occurring every hour can be expected. 90% of the sky covered with high to mid-level clouds.
- **EYEWALL** – an organized band of clouds immediately surrounding the center or “eye” of a typhoon. It is the area of most violent winds, heaviest rainfall & greatest release of heat energy. This “ring” of violent winds & torrential rains is usually 8 to 40 km from the storm’s center or “eye.” Typhoon Force Winds of greater than 118 kph can be expected within this wall.
- **EYE** – where the lowest pressure can be found. The relatively calm part of the typhoon with sometimes light winds (of up to 20 kph) blowing. The sky may be just partly cloudy with intermittent burst of blue sky through the thin clouds. Average “eye” diameter is about 30 km across.

Size of a Typhoon¹⁸

- **Vertical Extent:** a typhoon’s vertical size can reach a height of 40,000 to 50,000 feet above sea level.
- **Horizontal Extent:** a typhoon’s horizontal size can reach a maximum of 1,500 km in diameter & a minimum of

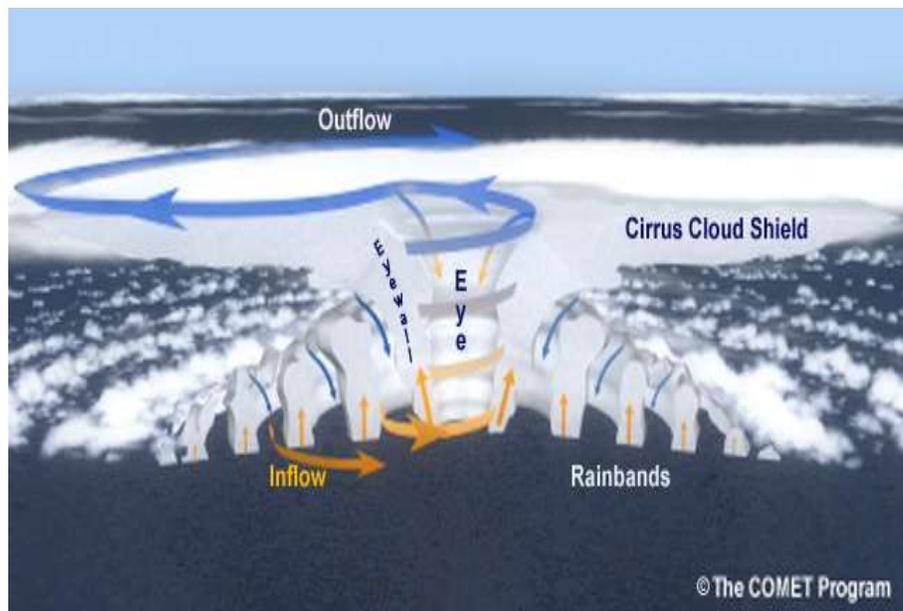


Figure 12: A schematic diagram that shows the horizontal view of a well-developed Typhoon reaching a vertical height of 40,000 to 50,000 feet above sea level. Image Credit: The COMET Program, The Weather Philippines Foundation

¹⁸ (David Michael V. Padua, Typhoon Climatology, 2012)

150 km. Its average size is about 600 km.

Effects and Damages

The data presented in different reports, articles, news clips and in other relevant materials were mostly based on the data or information provided by National Disaster Risk Reduction and Management Council (NDRRMC), Office of the Civil Defense and PAGASA. The data is more or less the same and there are some silent variations which are mostly due to time. The Following data is based on the "Final Report on the aftermath of Typhoon" Frank" (Fengshen)"¹⁹ prepared by National Disaster Coordinating Council –National Disaster Management Center.

According to that report; the provinces of Iloilo, Capiz, Aklan and Antique in Region VI and Leyte, Eastern Samar in region VIII were severely affected both in terms of damage to infrastructure and the number of directly affected persons. In addition to this the provinces of Maguindanao and sheriff Kabunsuan in ARMM; and Cotabato city, North Cotabato in region XII were also affected by flooding due to moderate and heavy rains brought by the enhanced southwest monsoon. The maximum rain recorded by PAGASA was 354 mm rain in Iloilo city on 20th June and 300 mm rain in Roxas city on the same day²⁰.

Affected population and Areas²¹

There were 958,515 families / 4,776,778 persons directly affected by typhoon Frank in 6,642 barangays of 469 municipalities and 57 cities in 50 provinces of 15 Regions.

A total of 100,426 families or 512,118 persons stayed inside evacuation centers while 784, 129 families / 3,717,661 persons opted to stay outside evacuation centers.

¹⁹ (NDCC- National Disaster Management Center, 2008)

²⁰ (PAGASA-DOST, 2008)

²¹ (NDCC- National Disaster Management Center, 2008)

Casualties

There were 557 reported deaths (excluding the casualties of the MV Princess of the Stars); 87 missing and 826 injured²².

Damage details:

Table 1 showed the details of damages caused by typhoon Frank. The total amount of damage to Infrastructure and agriculture was Php 13.52 Billion (Php 7.54 Billion to livestock and agriculture and Php 5.98 Billion to Infrastructure).

The total number of damaged houses are 428,209 (out of total; 82,734 were totally destroyed and the rest have partial damages). Region VI has the most number of damaged houses with 53,219 totally and 152,369 partially, the damages mostly incurred in Iloilo and Aklan provinces.

Details		Frank (Fengshen)
Deaths		557
Injuries		826
Missing Persons (IDP's)		87
Totally Damaged	Houses	82,734
Partially		345,475
Total		428,209
Families	Affected	958,515
Persons		4,776,778
Barangays		6,642
Municipalities		469
Cities		57
Provinces		50
Evacuation Centers	Evacuated	1,650
Families		884,444
Persons		4,229,218
Roads /Bridges	Damages cost	4,239,486,057
Schools		1,092,986,632
Other Infrastructure		650,790,520
Infrastructure		5,983,263,209.00
Crops	Damages cost	1,876,613,694
Livestocks		93,776,790
Fisheries		2,654,435,000
Agri Infra/irrigation		2,916,951,000
Agriculture		7,541,776,484
Total (Infra & Agri)		13,525,039,693

Table 2: The table is based on the data provided by NDCC-NDMC and PAGASA- Damage details

²² (NDCC- National Disaster Management Center, 2008)

Region VI

Region VI is always vulnerable to natural calamities and tropical cyclones. The worse typhoon in recent years affected to region VI was typhoon Frank and almost everyone in the region were more or less the victims of that typhoon.

According to NDCC Final report on Typhoon Frank; the most affected provinces in region VI were Aklan, Iloilo, Capiz and Antique. For the research purpose, two provinces from region VI were selected i.e. Iloilo and Aklan with some most affected municipalities. The selection was made on the basis of data provided by NDRRMC and PAGASA showed in the below table²³:

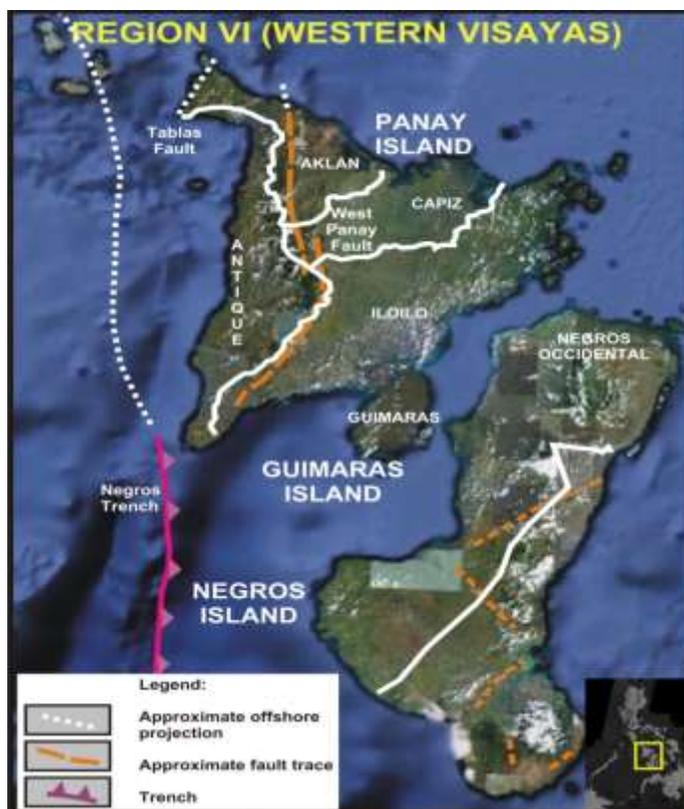


Figure 13: View of Region VI with trenches and fault traces, Credit to Mr. Mae Y. Magarzo, OIC, Chief Geologist, Geo Sciences Division, Mines and Geo-Sciences Bureau, Regional office No. VI

Affected and Displaced Population

Province /Municipality	No. of Affected			Inside Evac. Centers		No. of Evacuatio n centers Estab.	outside Evac Center		Total Served	
	Brgys	Families	Persons	Families	Persons		Families	Persons	Families	Persons
Aklan	239	78,564	373,272	8,492	48,886	312	63,365	288,904	71,857	337,790
Banga	17	7,929	30,454				7,929	30,454	7,929	30,454
Kalibo	16	17,425	50,125	1,647	7,078	46	15,778	43,047	17,425	50,125
Libacao	24	4,352	51,503	1,500	12,000	28	2,852	39,503	4,352	51,503
Makato	18	5,103	23,425	962	4,834	4	4,141	18,591	5,103	23,425
Numancia	17	7,386	31,230	3,093	15,465	58	4,293	15,765	7,386	31,230
Iloilo	1,413	177,847	917,529	17,095	85,916	375	158,375	812,979	175,470	898,895
Iloilo City	152	52,271	261,355	1,128	5,640	57	50,447	252,235	51,575	257,875
Pototan	50	10,228	54,410	3,028	15,410	4	7,146	39,000	10,174	54,410
Dumangas	45	7,732	37,352	779	3,545	45	6,953	33,807	7,732	37,352
Sta Barbara	60	3,441	17,274	3,159	15,864	22	282	1,410	3,441	17,274
Zarraga	24	4,200	22,740	24	120	14	4,176	22,620	4,200	22,740

Table 3 : Affected and Displaced population in Aklan and Iliolo Provinces, Table was created on the basis of data presented in NDCC Final report on typhoon Frank

²³ (NDCC- National Disaster Management Center, 2008)

The preceding table displayed the situation of selected municipalities along with overall situation in Aklan and Iloilo Provinces but there were many other municipalities of the above mentioned provinces which also got affected by Frank.

Table 3 exposed the details of damaged houses in Aklan and Iloilo Provinces along with the details in selected municipalities. The selected municipalities had both the highest number of damaged houses and affected population. Total number of damaged houses in Aklan was 58,792 and 84,129 in Iloilo Province. Additionally, 65 schools were damaged in Aklan and 428 in Iloilo Province. 16 bridges and various road networks were also damaged in Iloilo and the city experienced heavy rains with strong winds which caused power Interruption in the entire city²⁴.

Province /Municipal	Damaged Houses		
	Totally	Partially	Total
Aklan	14,199	44,593	58,792
Banga	627	3,016	3,643
Kalibo	4,405	6,927	11,332
Libacao	457	2,296	2,753
Makato	737	2,901	3,638
Numancia	3,614	3,771	7,385
Iloilo	27,063	57,156	84,219
Iloilo City	1,478	4,978	6,456
Pototan	544	2,338	2,882
Dumangas	175	490	665
Sta Barbara	2,609	954	3,563
Zarraga	5,300	964	6,264

Table 4: Details of Damages Houses in Aklan and Iloilo provinces with the selected municipalities, Table was created on the basis of data presented in NDCC final report on Frank

Field Interviews: Iloilo Province

Municipality of Dumangas

- Engr. Saul D. Deasis
Municipal Planning & Development
Coordinator,
Executive officer MDRRMC
Municipality of Dumangas
Cell # 0912-2319-136
Fax # (033) 3612-884
Email: Sauldeasis@yahoo.com
dumangasmpdo@yahoo.com
- Mr. Arande D. Detablan
Local Revenue Collection officer I
Alternate MDRRMO
Municipality of Dumangas
Cell # 0947-5939-916
Email: arande_detablan@yahoo.com

²⁴ (NDCC- National Disaster Management Center, 2008)

Municipality of Dumangas was selected for study on the basis of data provided by NDRRMC. According to one of the reports of NDRRMC, in dumangas 665 houses (175 totally and 490 partially) were damaged due to typhoon Frank. Further, 24 barangays with 4200 families and 22, 740 persons were affected due to typhoon Frank.

Engr. Deasis discussed that the National Government had always conducted disaster preparedness workshops and drills even before the typhoon frank and Dumangas as the first class municipality established the Municipal Disaster Coordination Council (MDCC) in 1998. The objective of the MDCC is to formulate policies, set guidelines, and

encourage people participation for Disaster Risk Reduction and management. Moreover it also acts as a guide for LGU's. 5% Calamity fund is reserved for DRRM in all the municipalities throughout the Philippines. As a first class municipality, the Internal Revenue Allotment (IRA) for the municipality is Php 102 Million and they earn 12 Million from local income. 5 % of total 114 Million Pesos is used as a climate fund. 70% of the 5% calamity fund is used for preparedness, relief and rehabilitation and the rest 30% is reserved as quick response fund which can only be used in case of disasters. Engr. Deasis said that before typhoon frank, it was not allowed to

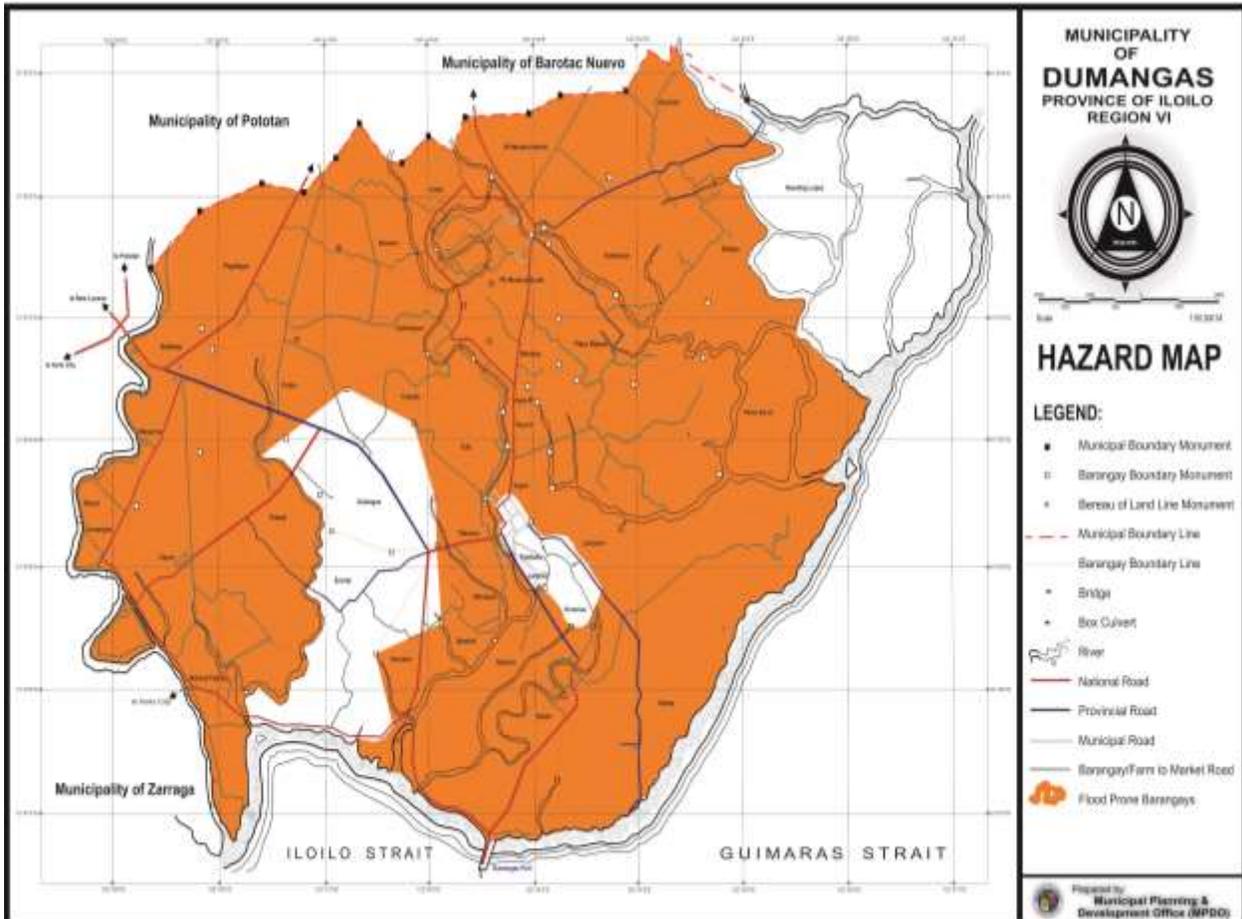


Figure 14: Hazard map of Dumangas Municipality provided by MDRRM Office during field visit

use calamity fund without disasters or natural hazards but now 70% is allowed to be used for preparedness. The MDCC is also changed to MDRRMC and now all the barangays also have BDRRMC with the group of volunteers. The job of MDRRMC and BDRRMC is on 24/7 basis.

Engr. Deasis while recalling his memories about Typhoon Frank expressed that it was Saturday 21st June, 2008 and the warning signal # 3 was already issued by PAGASA. On Saturday Morning the volunteers assembled in the municipal building and did planning to deal with the typhoon. At that time the municipality had more than 50 trained volunteers and the municipality had already declared the state of calamity. The Municipal Mayor was in USA for vacations and the Vice Mayor took responsibility to deal with the situation. The wind was very strong and many trees fell due to it. The neighboring municipality Mena called their help as they were flooded and they sent volunteers with rubber boats and dump trucks to help them, at that time there were no flood in the Dumangas Municipality but it was raining. Additionally congressmen also asked their help for Iloilo city but they were unable to help them. The flood came at once and within ten minutes almost 95% of the municipality was under water. The water near to river banks was 3 to 4 meters high.

Describing about his house, Engr. Deasis said that his house was 4 feet elevated from the ground but it was also flooded and so much mud and snakes entered to his house. It took months to clean the mud. The mud level was mostly above one ft. and very thick. He also added that mud made some fields very fertile while others became acidic and salty. According to Engr. Deasis and Mr. Detablan, typhoon frank was the worst typhoon came to their area and it brought so many strong rains. They added that typhoon Yolanda also brought flood in their municipality but it was not so much as compared to typhoon frank. At that time the flood came very fast and within ten minutes the height of the flood water was more than 2 to 3 meters.

They discussed that MDRRMC office continuously impart trainings and drills about disaster preparedness and response to local communities and they think that now they are more prepared as compared to the time of typhoon frank. Regarding the future plans they identify the need of a resilient evacuation center and they are thinking to get help from any International NGO or Donor for building it. Further, the municipality needs state of the art relief and rescue equipment's as the municipality falls in flood prone zone and it is surrounded by seven rivers.

Interview: 22nd April, 2014, 8:45 to 10:30 AM

Municipality of Pototan

- Ms. Norma P. Cordero
Municipal Planning & Development Coordinator, Municipality of Pototan
Cell # 0916-3480-085; Email: normacordero21@gmail.com

Ms. Cordero recalled her memories and told that it was early morning and at around 10 AM on 21st June 2008, she was at home as there was continuous rain for the week. The rain was not very heavy but at once the flood came and the water level started rising and within ten minutes the first floor of her house was full of water and mud. The water did not give her time to remove the things and all spoiled in water. She said that it took almost one month to clean the house as the mud was very heavy and thick. She described that almost the whole municipality got affected due to typhoon frank. She said that they did not receive any warnings and after typhoon frank now they start to issue warnings. MS. Cordero also suspected that the flood was due to the reason of illegal logging and she has never experienced such kind of flash floods in her whole life before.

The Municipality of Pototan consists of 50 barangays and there are two big rivers passing through the municipality. Now almost all the barangays have trained volunteers for relief and rescue work. Like

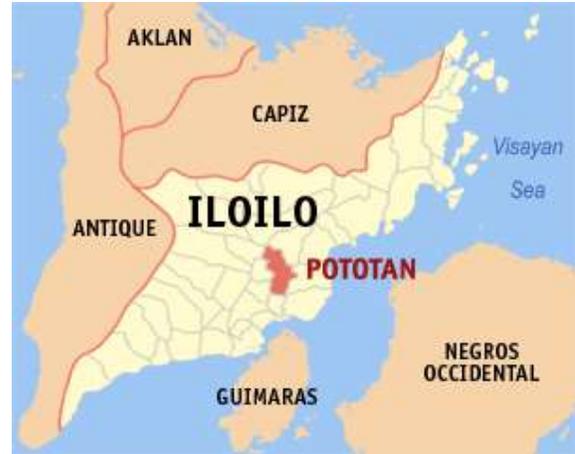


Figure 15: Pototan location map, Credit: Wikipedia

usual, schools, Municipality halls, gym etc. are already identified as evacuation centers. MS. Cordero shared that they already proposed a permanent building with all the facilities as evacuation center. Regarding their future plans, she said that they are planning to move people from non-safer zones especially the people or households living near or on the bank of the river. Mayor has a plan to give them notice and they will not allow anyone to make houses on danger or in non-safer zones. She said that now the municipality is well prepared to deal with natural hazards.

Interview: 22nd April, 2014, 11:00 AM to 12:15 PM

Municipality of Zarraga

- Ms. Seanne P. Concepcion
Municipal Planning & Development Coordinator, Municipality of Zarraga
Municipal Disaster Risk Reduction Management Office (Designate)
Contact # (033) 333-0474 / 0920-3872-090
Email: MPDO_Zarraga@yahoo.com.ph

Municipality of Zarraga was always vulnerable to floods as it is located on a flood prone area due to rivers and Iloilo strait. All the water from upstream or high land areas and Iloilo city pass through this municipality and it is always flooded even with little rains. Ms. Seanne explained that few days ago on 14th and 15th April, 2014 Zarraga, Baludi-I and Baludi II municipalities got flooded due to heavy rains and still there was flood water in so many areas even after a week. The rice fields were also not able to absorb water and when there were rains, water from rice fields spread all over the area. Further, she argued that if there is heavy rain then there is always a flood even without any warnings or flood signals and according to her now people are

used to with the situation because there is no solution.

Ms. Seanne memorized about Frank and described that on 21st June and around 6 in the morning; she was asked to report in the office to attend the MDRRMC meeting. She remembered that they were getting warnings and updates on regular intervals from different Government organizations including PAGASA. At 6 PM in the evening the water started going higher and flash flood came at 7 PM on the same day. All the neighboring municipalities were shouting for help but municipality of Zarraga was also flooded and unable to help them.

She further recalled her memories and said

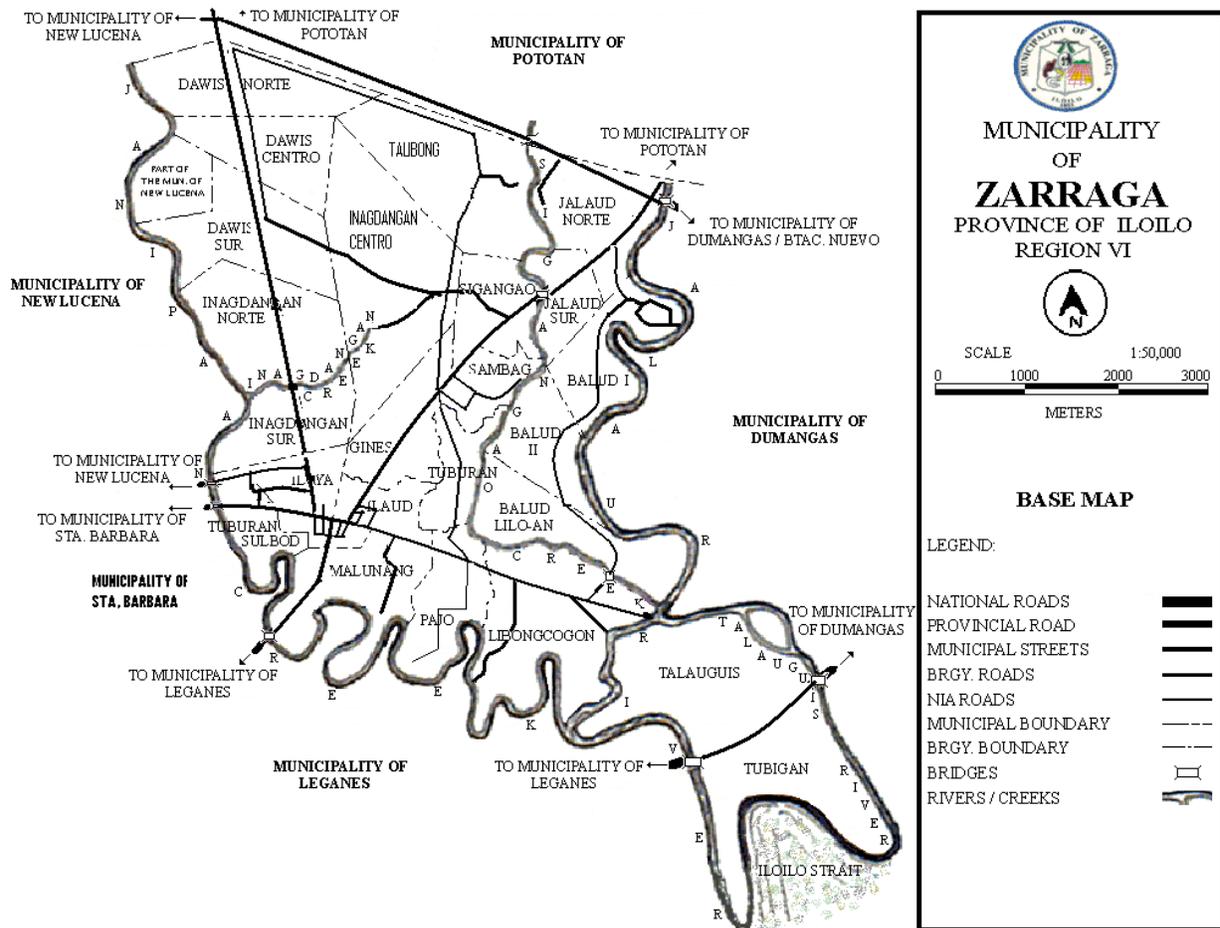


Figure 16: Base Map of Municipality of Zarraga, Provided by: Ms. Seanne P. Concepcion, Municipal Planning & Development Coordinator

that her husband called her that her house was nearly flooded. She borrowed a car from a friend in the police and rushed back to her house. The flood water was only half feet when she reached home but she told that the water level reached above four feet within five minutes. She evacuated her family members and neighbors rapidly. The water level on National Highway was above head means approximately six to seven feet and it was the first time that the highway got flooded. There was only one causality occurred due to flood and out of 24 barangays 18 were flooded.

Ms. Seanne further said that People did not take typhoons and heavy rains seriously before and now after experiencing Frank they are well aware and ready to move in evacuation centers in case of heavy rains although they have received trainings even

before the frank. Regarding Zoning of the Municipality, she described that till now they have not done zoning but soon they will develop a comprehensive land use plan. Further, they have a plan to buy land for relocation from some of the non-safer zones.

Lastly, regarding future plans she said they are planning for widening and deepening the rivers, construction of irrigation canals, plantation on the bank of the rivers and relocation from non-safer zones but they are not able to do these things without some external financial support. They also need an evacuation center because during frank almost all the places of the municipality were flooded except one school and the municipal gym which were used as evacuation centers.

Interview: 22nd April, 2014, 1:30 to 2:30 PM

Municipality of Santa Barbara

- Mr. Vincent S. Lusaya
Municipal Planning & Development Coordinator, Municipality of Santa Barbara
Municipal Disaster Risk Reduction & Management Officer (Designate)
Tele #: (033) 523-9608 / 523-9061; Telefax: (033) 523-8206
Cell # 0915-2095-879(Globe) / 0999-9528-389(Smart)
Email: vincelusaya@rocketmail.com

Municipality of Santa Barbara consists of 60 barangays. Out of these 60 barangays 14 are prone to flash floods as there are two rivers passing through their area. Mr. Lusaya discussed that they have developed DRR awareness raising materials with all the emergency contact numbers on it and distributed to all the stakeholders. Moreover, they have an emergency team consisting of twelve fully trained active volunteers who act as first responders in case of any emergency or hazard.

MDRRMO worked towards fulfilling their vision i.e. "A community aware of disaster

risks and vulnerabilities with building back capacity" and their mission to "Engage the community in espousing a holistic disaster risks awareness and preparedness to ensure human security and safety adaptive to resiliency".

Mr. Lusaya gave some recommendations to make improvements for better preparedness and response. He insisted that there should be a permanent position for PDRRMO and MDRRMO, as currently the provincial and municipal planning and development coordinators have been given an extra charge to work as PDRRMO or

MDRRMO. He feels that putting extra burden on the same official is not right and it affects the quality of work. Secondly, he discussed that the benefits or salaries for the employees working in difficult situations should be raised to uplift their motivational level. Further, there should be special benefits or allowances for the volunteers in order to retain them. Thirdly, He mentioned that MDRRM office need a new building but it's not allowed to use the funds for office building according to the current laws and he thinks that LGU should simply need to be innovative to fulfill the priority needs. Fourthly, he mentioned that the municipality is located very near to the airport and there is no preparedness regarding plane crashes or other air

incidents, although he has raised this issue several times.

Regarding the Disaster preparedness and awareness he described that his office is conducting regular trainings and drills at all levels including schools. Some of the trainings include; water search and rescue/recovery orientation training, Simulation Drill (Vehicular Accident), Disaster Emergency Assistance Rescue Training (DEART), First Aid trainings, Firefighting trainings etc... at the end he showed the need of an office with fully equipment state of the art equipment's.

Interview: 22nd April, 2014, 3:00 to 4:00 PM

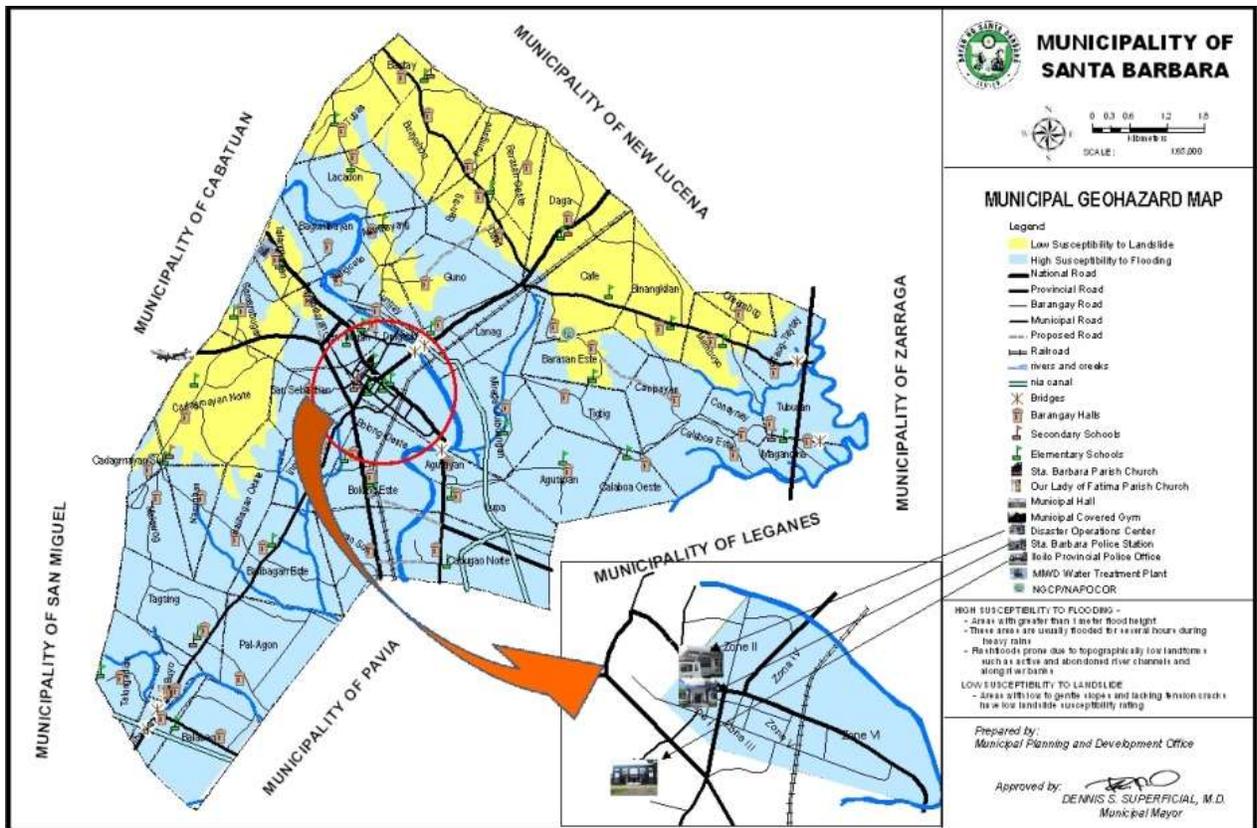


Figure 17: Municipal Geo-hazard Map, Provided by: Mr. Vincent S. Lusaya, Municipal Planning & Development Coordinator, Municipality of Santa Barbara

Iloilo City Disaster Risk Reduction & Management office

■ Mr. Darwin Joemil G. PAPA

Operations Officer, Emergency Medical Team-A; Iloilo City DRRMO

Telefax: (033) 335-1554; Mobile: 0928-2262-501; Email: icerdc3@gmail.com

Mr. Papa is one of those who experienced the typhoon frank. He memorized the past and discussed that it happened on 21st June and before the lunch time, approximately between 11:45 to 12:45 in the afternoon. He was in the field and at 11:30 AM he monitored the rivers and found that water level was normal and it's quite below than the warning level. After few minutes he came to know from someone from uplands that flood wall of 10 feet high moving towards their city. The weather was sunny and the rain started only after the flood. The flood came so fast and within ten minutes almost whole the city was flooded with a water level above 15 feet in some areas while the rest of the areas had water level of 6 to 7 feet.

Mr. Papa described that his house was 3 ft. elevated from the ground but even then the flood level was 6 to 7 feet in his house and when the water subsided, 3 ft. mud left in his house which was thick and heavy. He tried to reach the office but was unable because the water level was higher than the vehicle. Three vehicles were washed out in front of his eyes. Then he tried to go towards his home as there were only ladies and children at home but he was unable due to the wash-out. Then he helped others near him.

He described that the flood did not come in Iloilo River and river was calm and normal like usual. He told that Iloilo River is not a river, actually it's an arm of the ocean which passes from the city and there are several streams attached to it. Only a few times there were high tides in Iloilo river and the

highest tide was 2.5 meters high but during typhoon frank it was normal.

According to him, it was Jaro river which flooded during typhoon Frank and the main reason was that the flood control project which was under construction at that time had congested the river path. The maximum capacity of water flow of Jaro river is 600,000 cubic meters per second and during frank it doubled the water flow. Tigum and Aganan rivers converged flow into Jaro river and increased the water flow. The city DRRMO was in operation even before the typhoon frank but with the name of City Disaster Coordinating Council (CDCC) and they depended mostly on visual data, scatter charts for analyzing the weather. There were no warnings or predictions regarding the flash floods at that time. Evacuation centers were also flooded and they used big trucks to evacuate people from low lying areas. The second storey of Super Market (SM) Mall was treated as an evacuation center at that time and the ground floor and grocery of SM were also flooded. There was hardly any building in Iloilo city safe from severe flood.

Mr. Papa told that now the city Government is trying to identify some safer area for the construction of a resilient evacuation center for at least 1000 evacuees with all the necessary facilities but according to him there is no safe place in Iloilo city for such a construction. The city is flood prone due to the rivers and water coming from up lying areas.

Regarding his own house he told that his house was already elevated from the ground but now he has reconstructed the 2nd floor with 15 ft. alleviation. He has seen changes in construction pattern after typhoon frank and now people start considering building codes for construction which was ignored by them in the past. Now they have a much improved warning system and they are continuously in touch with PAGASA and other relevant offices and looking at weather updates. Additionally they are calling to up lying areas in case of rain to know the situation. The city DRRM office is working 24/7 and is equipped with relief and rescue equipment's. Mr. Papa told that now they are not using rubber boats as it is not useful for urban

environments and instead they have fiber boats.

At the end he discussed the things which need improvements. He showed the need of latest state of the art equipment. Secondly by considering some communities still living in dangerous areas and are reluctant to move, he emphasized on the need of relocating such communities in much safer places. Finally, the monitoring system of the city should need to be improved through High resolution CCTV cameras to provide on time relief in case of road accidents and other hazards.

Interview: 22nd April, 2014, 5:00 to 6:00 PM

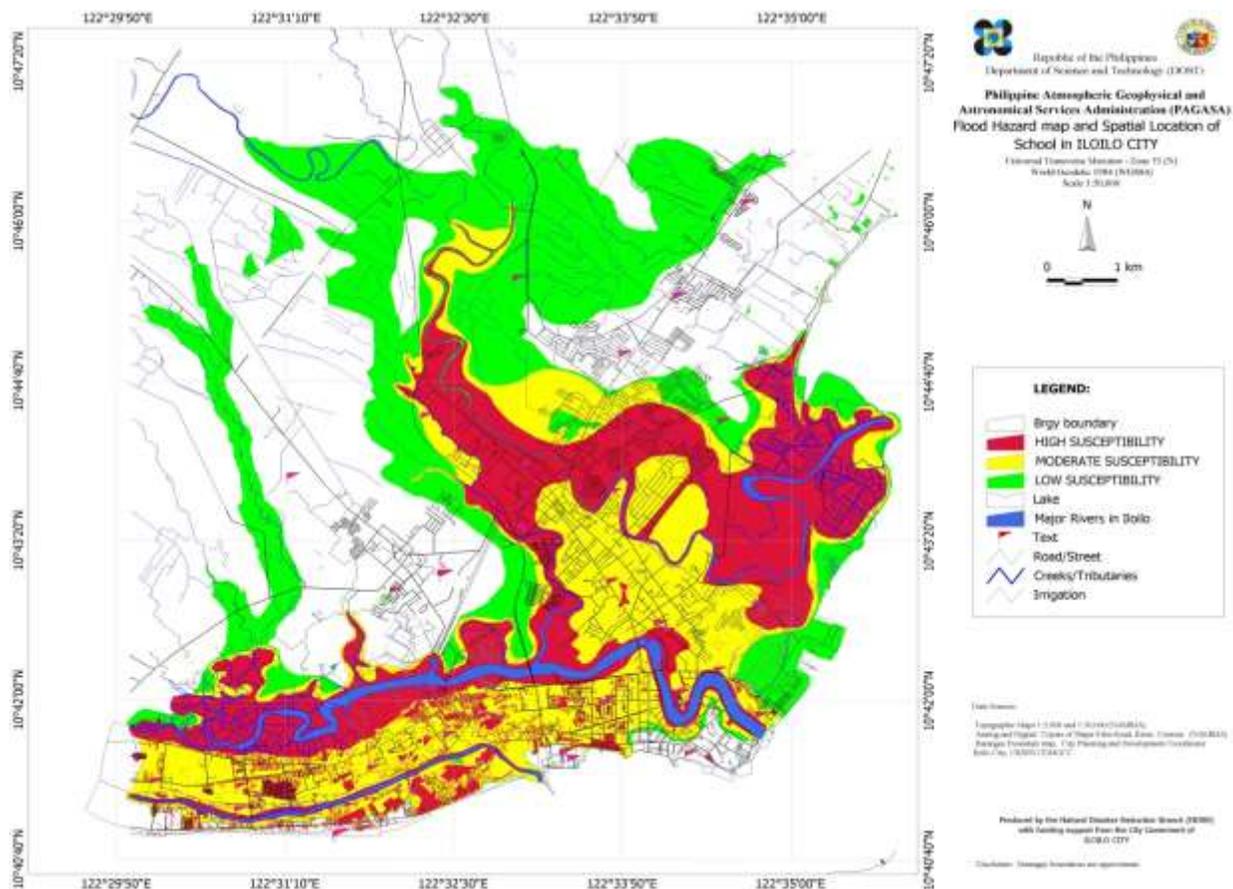


Figure 18: Flood Hazard Map of Iloilo City, Provided by: Mr. Darwin Joemil G. PAPA, Operations Officer, Emergency Medical Team-A; Iloilo City DRRMO

Further there is no benefit or incentive for the volunteers means no certificate, no reward, no training etc...

They tested this model both in typhoon Frank and Yolanda. Mr. Monroy is keeping all the record of text messages manually and he has all the records with him. This plan helps them in getting information from both formal and informal sources. Surprisingly, mobile companies are not the part of the plan and in Region VI, Public Information Agency (PIA) has text blast facility and they use that facility in case of issuing warnings.

Mr. Monroy further discussed that in the year 2011, Asian Disaster Preparedness Center, Thailand appreciated NDRRMC/OCD for the development and testing of Hazard Ready Toolkit. That kit was designed to

assess the community preparedness level / Early warning systems. He was one of those who developed that toolkit but he was sad that till now it is not yet implemented. Further, he described about his innovations that he developed Tigum-Aganan/ Jaro Flood early warning communications network and Flag warning signals for coastal areas and inland barangays (see Figure 20 below), they also tested and found it efficient but still not come into implementation stage. Mr. Monroy really needs the support of the Government and other relevant organizations for doing improvements in the communications and warnings systems and trying to make it much easier for the local community.

Interview: 23rd April, 2014, 10:30 AM to 12:15 PM

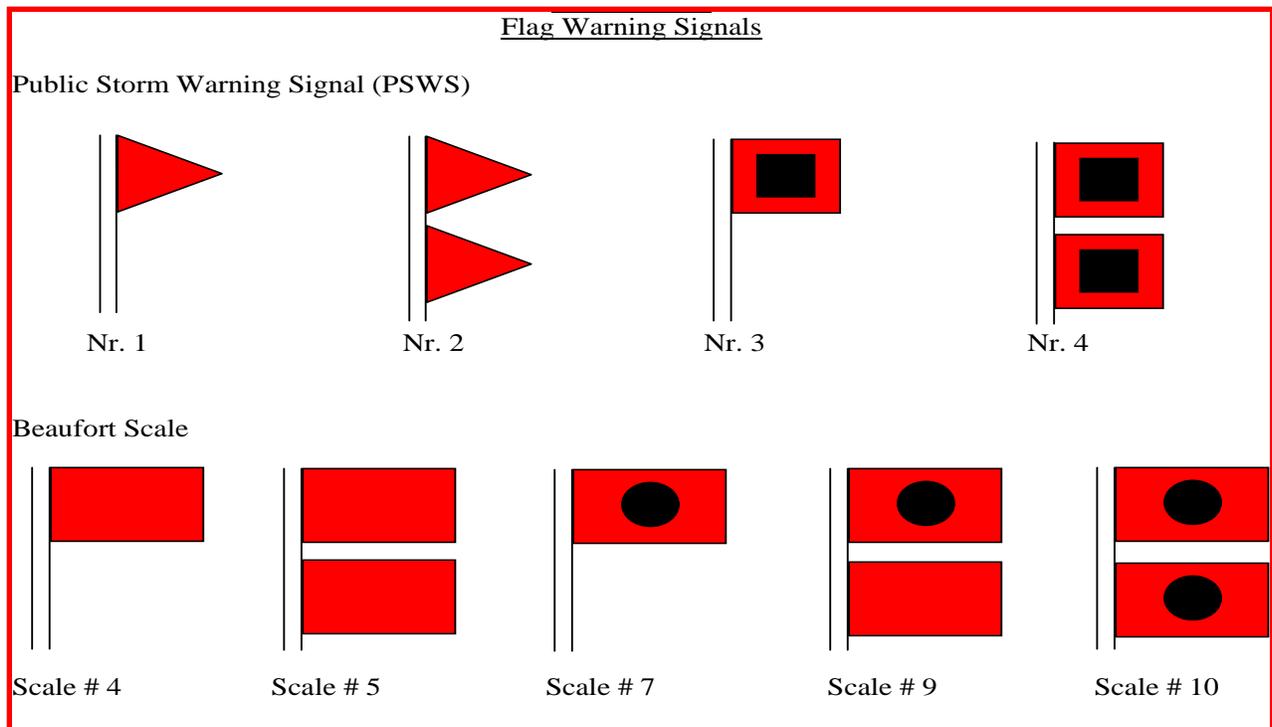


Figure 20: Flag warning Signals; Credit: Engineer Nestor Antonio P. Monroy, Regional Director, NTC, Iloilo

Field Interviews: Aklan Province

Municipality of Libacao

- Mr. Rey Z. Orbista
Secretary of the Sangguniang Bayan, Municipality of Libacao, Aklan
Cell # 0999-9346-442; Email: veyo.bista@gmail.com

Recalling his past, Mr. Orbista discussed that there were heavy rains in the evenings of Friday and on Saturday and they found that Libacao river got flooded. The municipality of Libacao consists of 24 barangays, 17 out of 24 are located near the river bank. There were no warnings from PAGASA at that time and the typhoon came at night so no one evacuated.

He also described the story of his house which was located 30 meters away from the river. He was upset when he had seen the flood and thought that his house was also damaged but luckily he was surprised that his house was safe as river changed his path due to more water and now river is 200

meters away from his house. Almost all the houses were under flood water and many called it as mud flood along with flash flood. The flood water came so fast from the mountains and within few minutes the level of water reached to above four feet. Luckily there were no casualties during typhoon frank but eleven people died in typhoon Yolanda. The reason of their death was that no one helped them to evacuate as most of these people are aged and living in far flung areas.

Mr. Obrista compared the typhoon frank and Yolanda and according to him during Frank there was more rain and less wind while in Yolanda wind was so strong and rain was less. Further regarding the typhoon

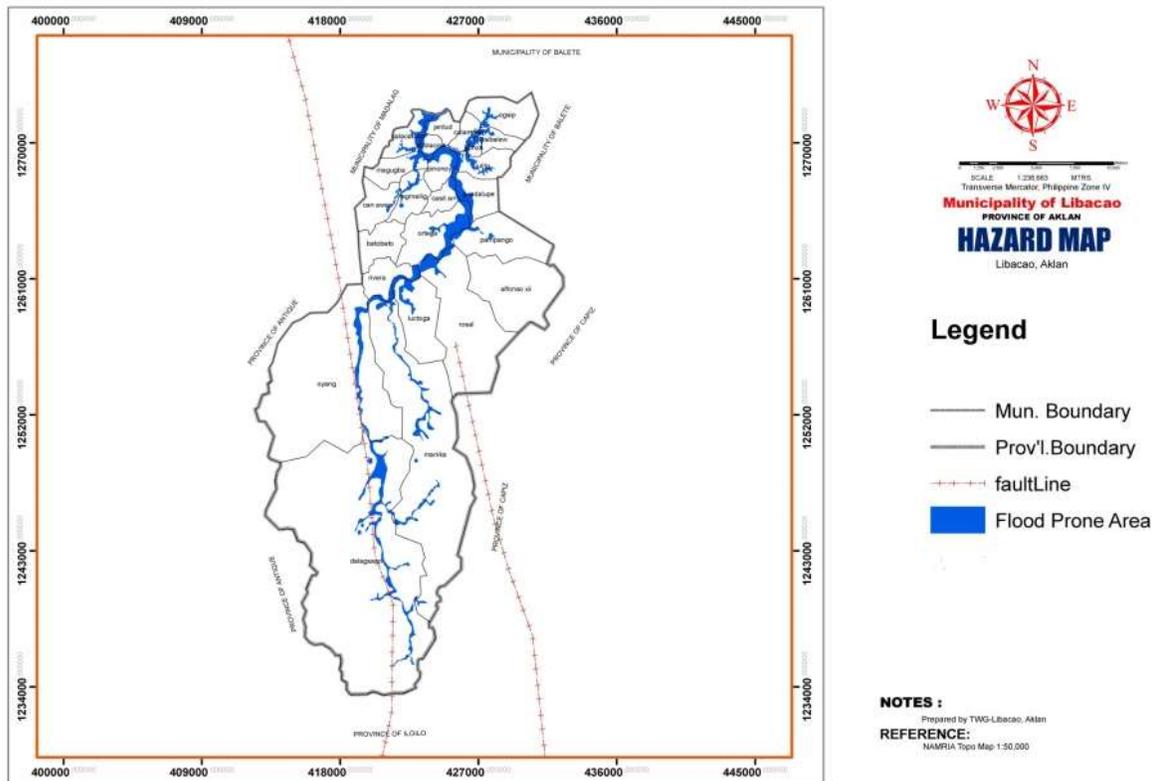


Figure 21: Hazard Map of Libacao Municipality, Provided by: Mr. Rey Z. Orbista

Yolanda they got warnings in advance and already moved the low lying people to evacuation centers. In some areas they did forced evacuation also as some thought that Yolanda will not hit to their area as the weather was not bad and there were no signs of typhoon. They appreciate PAGASA for giving accurate and timely forecast regarding typhoon Yolanda. Like usual, municipal hall and schools were treated as evocation centers as there was no permanent or fixed evacuation center available.

During typhoon Frank there were 2,753 houses damaged (457 totally and 2,296 partially damaged) while in Yolanda the number of houses damaged were 3,122 which are more than typhoon frank. The Mayor and vice Mayor of the municipality

are father and son and they excellently managed the situation and facilitate the evacuees.

Regarding future planning they have a plan to build a permanent evacuation center in the municipality but they need funds from an NGO or donor and nowadays they are trying to contact with different stakeholders for fund raising.

On the day of visit, there was an event in the municipality in which Red Cross was distributing P10,000/- as a first installment for the repair of damaged houses. They will give P60, 000/- to each household which suffered from typhoon Yolanda for repairs but in installments and on conditions.

Interview: 24th April, 2014, 8:45 to 10:00 AM

Municipality of Banga

- | | |
|---|--|
| ■ Ms. Erlinda M. Maming
Municipal Mayor- Banga
Tel # : (036) 267-5823
Cell #: 0917-7172-068
Email: mmo_lgu.banga@yahoo.com
banga@yahoo.com | ■ Ms. Melrose R. Carbonell
Social welfare Assistant
Municipal Social welfare & Development
office; LGU-Banga, Aklan
Tel # (036) 276-6634
Cell # 0909-7903-466 |
| ■ Mr. Edgardo M. Gerardo
Consultant on Community Development
Cell # 0949-1292-651 | ■ Mr. Mario A. Perucho Jr.
MDRRMO-Designate, LGU-Banga
Tel # (036) 267-5823
Cell # 0921-4013-388
Email: Pmario54@yahoo.com |

The Group along with Ms. Maming (Municipal Mayor) described the situation during typhoon frank. They said that at that time there were no warnings or information from PAGASA and no timely evacuation took place. They recalled their memories and discussed that there were continuous rain for a week and in the afternoon of 21st June at around 3'O Clock, Flood came so fast that within few minutes the water level raised to 7 or 8 feet means above head. The Color of the flood was dark brown and



Figure 22: Location map of Banga Municipality, Credit: Wikipedia

carried thick mud with it. On 22nd June, the water left 2-3 feet of thick mud everywhere and it took months to clean that mud.

After few minutes of discussion, they started talking about typhoon Yolanda as they were more interested to talk about it. They received warnings and weather updates from different agencies including PAGASA almost a week earlier than typhoon, so according to them, they were well prepared to deal with it. They informed all the barangay captains and did timely evacuation of people from low lying areas. The municipality consists of 30 barangays and out of these, 17 barangays are located near to major Aklan River. They shifted the people to the Municipal hall which was considered to be a safe evacuation center but when the strong wind came during typhoon Yolanda it carried with it the roof of that building and during strong winds they shifted the evacuees to another building nearby. Three got injured due to that. People stayed in this evacuation center for five days and they provided the relief to the community for a month after

the typhoon. Five people died in typhoon Yolanda due to heart attack, sudden shock, and fear and similar other diseases.

It is common in almost all the municipalities that they think the municipal hall, gym, schools and some big buildings are suitable to be used as evacuation centers without doing any inspection and then they faced difficulties during typhoons as there is no permanent safe evacuation center available in any of the municipality. The group further discussed that till now there is no early warnings system installed for the people living near the rivers but they are planning to install it. Further they discussed that MDRRMO staff is working in difficult situation but their salaries and wages are very low and it should need to be increased for raising their motivational level. The MDRRM office is providing Disaster preparedness trainings to the community and they also have trained volunteers for relief and rescue work.

Interview: 24th April, 2014, 10:45 AM to 12:00 Noon

Municipality of Numancia

- Mr. Richard F. Vega
MDRRMO, Numanica, Municipality of Numancia
Email: richardfvega03@yahoo.com

Mr. Vega was appointed as MDRRMO on 1st October, 2013 and he was one of the victims of typhoon Frank and Yolanda. He described the situation about typhoon Frank that PAGASA gave the weather warnings before Frank that there will be continuous rain for a week with the possibility of floods. According to him there was a big land slide covering 40 hectares of area near to Libacao municipality which dropped into the Aklan River and created flash floods

with mud and badly destroyed the agriculture and infrastructure.

Mr. Vega spoke about his house that his house was 70 meter far from the river and 2 feet elevated from the ground but his house was also flooded and there was 7ft. of water in his house. When water passed, 2 ft. thick mud left in his house which took weeks to clear. Flood came at 4 PM in the afternoon on 21st June and in less than an hour it reached the height of 7 ft. He could

manage to save his family and his life by moving into the 2nd floor of his house. Luckily, he was at home on that day. Most of the people protected their lives by staying on the roofs. He further explained that it was the worst flood in the history of his life and in Aklan. The media highlighted only Iloilo and after 3 or 4 days they started discussing about Aklan.

Mr. Vega was working as a seaman and spent much part of his life on the ship. He is experienced and got several trainings like firefighting, water rescue, first aid and many more during his seaman ship job. The Mayor offered him the position of MDRRMO due to his experience and he accepted the offer. Regarding the MV princesses of the stars ferry incident which happened during Frank, he said it seemed that the master of the ship ignored the warnings and that incident happened due to negligence. He further discussed that they have never seen the flash floods and strong winds before Frank and they were not prepared. At that time there was no evacuation took place and everyone tried to save themselves by their own.

Then Mr. Vega shifted the discussion towards Typhoon Yolanda and he said that they received warnings in advance from News, TV, Radio & PAGASA and informed all the barangays. On November 06, 2013 they organized an emergency seminar and on November 07 there was a briefing in municipal office and did all the preparation in advance. Mr. Vega along with his team



Figure 23: Location map of Numancia, Credit: Wikipedia

moved around the municipality and made people aware about the typhoon. On November 07, at around 4 o'clock, first group of evacuees arrived in court hall and sports court. The sports court was not the safe place as it opened from all the sides so they shifted the evacuees to another building nearby which they considered as safe. Actually they have no safe building and now after typhoon Yolanda, they are planning to construct some safe evacuation center, although they already bought a land for the MDRRM office and an evacuation center but they require funds for the building. Mr. Vega further discussed that there is no safe building in the custody of LGU and mostly they identify schools as evacuation centers. They are doing awareness & preparedness drills and trainings at all levels for better preparedness to deal with future hazards or disasters.

Interview: 24th April, 2014, 1:30 to 3:15 PM

Municipality of Makato

■ Ms. Merly T. Tabernilla
Municipal Social Welfare Officer
DCW II, Municipality of Makato
Cell # 0948-5049-878

■ Ms. Bing Mowtano-Rioja
Municipal Link -Makato
Pantawid Pamilyang Pilipino Program
Cell # 0930-1941-991



Figure 24: Location map of Makato Municipality, Credit: Wikipedia

Ms. Tabernilla and Rioja remembered that during typhoon Frank there was heavy rains with wind and flash flood came with mud. The height of the flood was more than 7 ft. and almost the whole municipality was affected.

They discussed very little about typhoon frank and more enthusiastic to discuss about typhoon Yolanda. They described that they received warnings before typhoon Yolanda and on November 07 at around 10 o' clock in the evening, forced evacuation took place from low lying areas. They shifted more than 1000 evacuees in the municipal sports complex building and provided them necessary relief and rice. On November 08, strong winds came in the afternoon and they remembered that due to the wind the sports complex building started shaking and it seemed that it will collapse due to wind. During strong winds they started shifting the evacuees to the new municipal building and a hospital nearby. They vacated the sports complex building but after some time the windows of the new municipal building also collapsed due to strong winds. Then they again shifted the evacuees to the ground floor of that building. The wind stayed strong for

two hours and at around 3' o clock in the afternoon it become weakened. Luckily there was no causality and injury during typhoon Yolanda.

The DSWD building is also very old and it looks debilitated. According to them it would collapse any time. They further discussed that there is no safe building in the municipality which can be considered or treated as an evacuation center. Even some schools refused to give their buildings for evacuation. The evacuees stayed there in the evacuation center till Nov 09 and then they returned to their barangays. The Municipal officials provided continuous relief for some weeks and UN-WFP also provided one sack of rice to each household. DSWD also provided relief goods. Cash grants and health grants were also provided to the affected.

Ms. Tabernilla and Rioja further deliberated that there is a big plan to build a safe evacuation center but still it is on paper and it will take time to reach to the implementation stage. They have no radio systems to broadcast the warnings to barangays officials and mostly relying on cell phones. They expressed that their cell phones was remained working during typhoon Yolanda and that was the only way by which they could contact with their families and other barangays. They considered typhoon Yolanda as the worst typhoon regarding winds and typhoon Frank regarding rains and flash floods. About preparedness trainings they argued that they are delivering only basic overview and not detailed trainings. At the end they said that GOD safe them even without any safe building or evacuation center.

Interview: 24th April, 2014, 3:30 to 4:15 PM

Municipal Disaster Risk Reduction & Management office, Kalibo

- Mr. Michael Vincent R. Castro
MDRRMO-Kalibo
Cell # 0919-2771-522; Email: mailmemiker@yahoo.com

During the time of typhoon Frank, Mr. Castro was not in Kalibo as he was doing a job in Manila. He came to know from some of his house member on phone that his house was under severe flood so he returned to Kalibo on 22nd June, 2008 and found that there was more than 5 ft. flood in his house and in some areas the flood level was more than 20ft.

Then he expressed the story of typhoon Yolanda. According to him, his office received warnings few days ago before Yolanda from PAGASA and already prepared to face the situation. On November 5, 2013 they did forced evacuation from low lying areas and shifted them to already identified evacuation centers i.e. Colleges, Municipal hall, and some other buildings. There are total 16 barangays in the municipality, 8 out of 16 are located at low lying areas.

On November 8, 2013 from 8:00 to 11:00 in the morning, he went to field for evacuating some more families from coastal areas. The local community thinks that the typhoon will not hit to their area and not ready to evacuate, so forced evacuation took place. On the same day at around 1 PM in the afternoon strong winds came and their intensity continuously increased till 3 PM. As Kalibo was not in the track of Typhoon

Yolanda so it only experienced the strong winds for 2 hours.

Mr. Castro then discussed the role of his office and said that they continuously monitored weather websites and issued warnings through Face book, Media, Text, radio etc. Further, they have made partnerships with the private sector and especially with the big malls to provide them access to necessary items in case of emergency. The MDRRM office consists of 18 staff and they worked 24/7 hours. They are regularly providing preparedness trainings to local community and they have trained volunteers for relief and rescue work.

At the end of discussion Mr. Castro mentioned the need of more state of the art equipment, Big Trucks, Ambulances, Loaders, Civil defense Siren, satellite phone to improve the services of MDRRMO. Currently, they have no ambulance and they requested DSWD in case of emergency. According to him almost every night there is some accident due to the people violating traffic rules and drive after drinking, his office face difficulties in the absence of ambulance to provide in time help.

Interview: 24th April, 2014, 4:45 to 5:45 PM

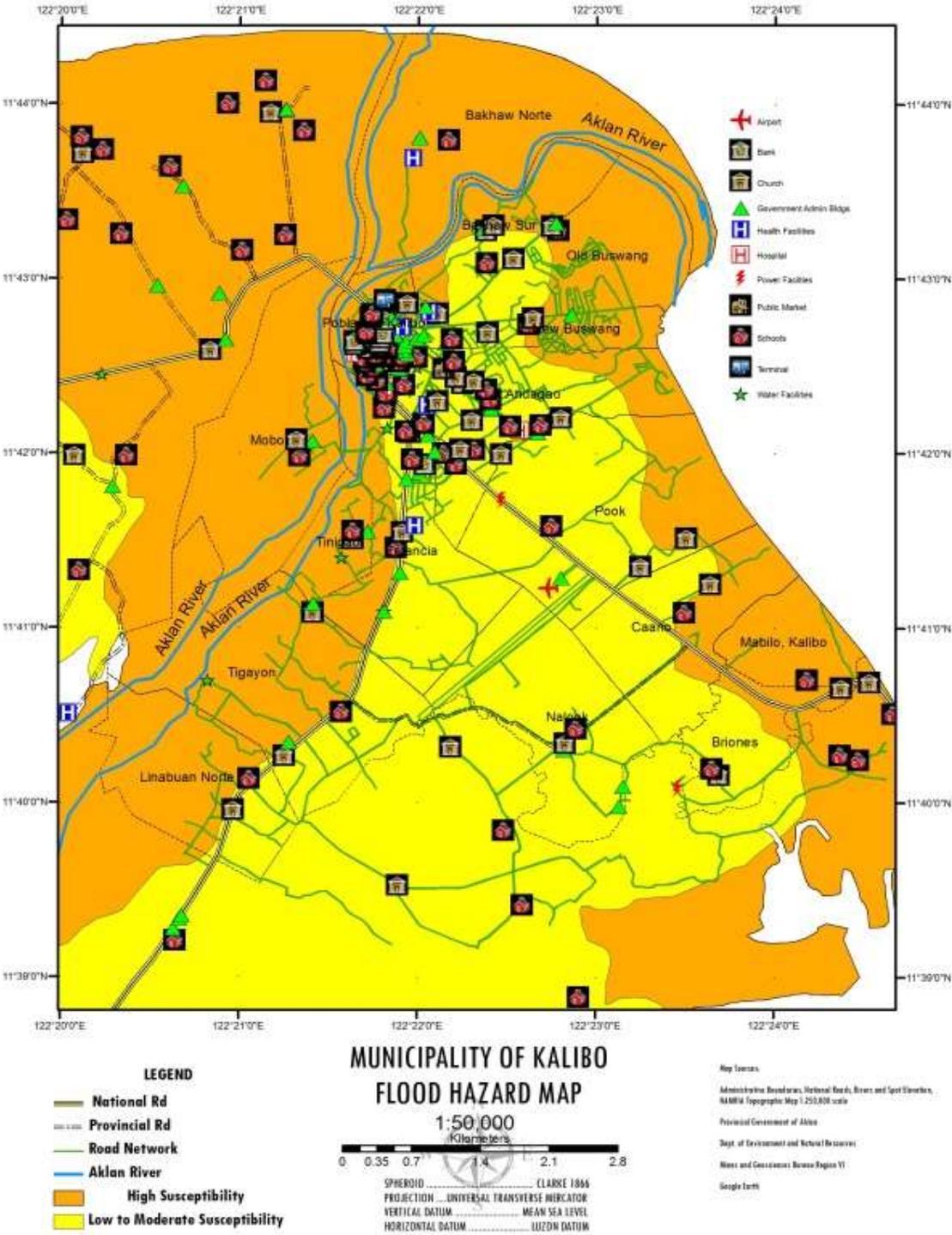


Figure 25: Flood Hazard Map of Kalibo Municipality, Credit: Mr. Michael Vincent, MDRMO-Kalibo

Provincial Disaster Risk Reduction and Management office, Aklan

- Mr. Galo I. Ibardolaza
Executive Officer
Aklan Provincial Disaster Risk Reduction and Management office, ABL Sports complex, Aklan Provincial Capital Compound, Kalibo
Tel # (036) 268-7420; Fax # (036) 268-7420
Cell # 0919-3866-059
Email: galo_ibardolaza@yahoo.com

- Mr. Amelito I. Santos
PDRRMO (Staff) - Aklan
Provincial Governors Office
Kalibo, Aklan
Cell # 0927-5620-881
Email: dondi.santos@yahoo.com

Mr. Ibardolaza discussed about his office and their role in emergencies. They have limited staff and temporary small office in provincial capital complex but they have a plan to build a new office and furnish it with all the necessary equipment. Currently, they have no ambulance and other equipment and relying on other government agencies in case of emergencies. Further, unlike other DRRM offices, they are not working 24/7 hours but they have trained volunteer groups who are working 24/7 hours and respond in case of emergencies.

Like others they have no permanent evacuation center and they also use municipal hall, sports complex, schools and colleges as evacuation centers. On the day of visit they are celebrating Aklan day and as a part of their celebration activities they had a big ceremony to appreciate the NGOs, Volunteers and Government departments (both national and international) that played active role during typhoon Yolanda and he said that they are holding such events every year.

Interview: 25th April, 2014, 9:30 to 10:45 AM

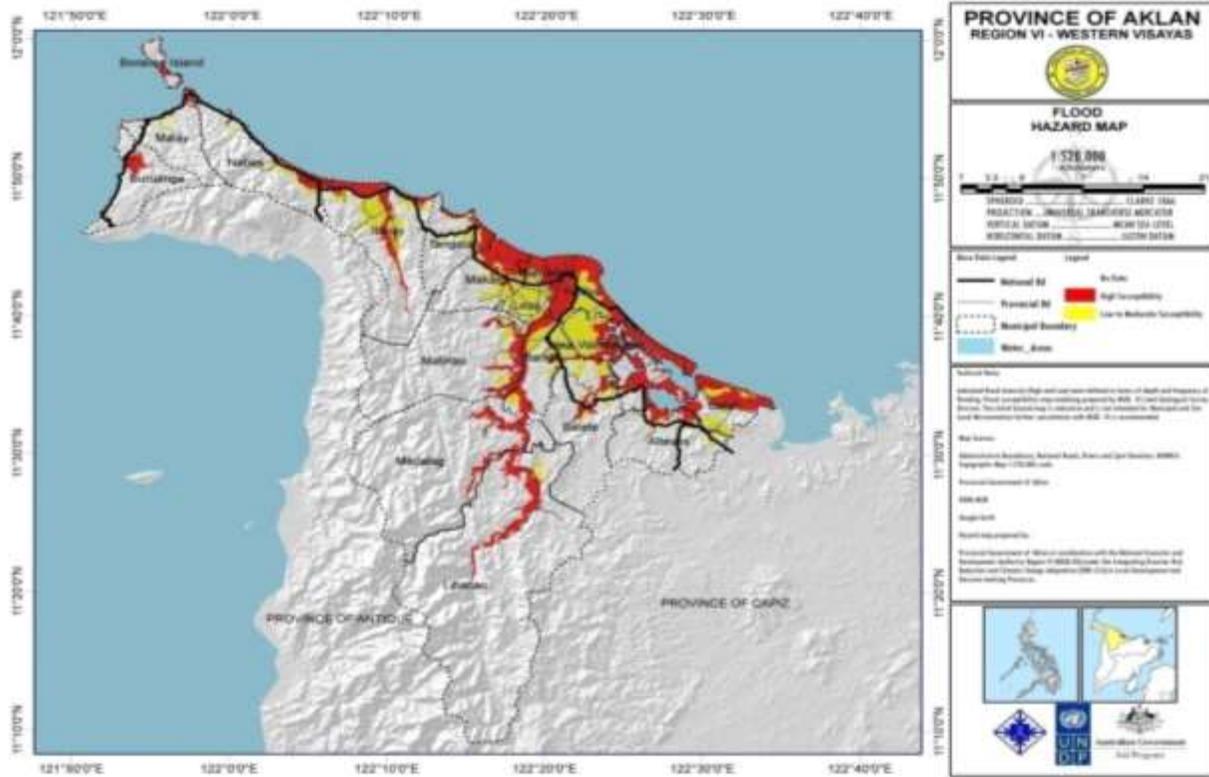


Figure 26: Flood Hazard Map of Aklan Province, Credit: UNDP, Australian Govt. Aid Program

Common Findings from the interviews

- Almost in all interviews, the interviewees discussed that there were continuous rain for a week with not strong winds during typhoon frank. The flash flood came very fast with a height of 4ft to more than 20th ft. in some areas. Flood carried very big amount of thick mud which took months to clean. Many protected their lives by staying on the rooftops.
- Only few discussed that there were warnings before typhoon Frank about heavy rains and floods but most of them said that they were not aware. First time they experienced such kind of flash floods in their life and most of them mentioned that Frank was the worse typhoon they have seen in their life.
- There was no pre-evacuation at that time and evacuation took place only after flood. Some municipalities are flood prone and mostly flooded even with moderate rains.
- None of the municipality have permanent evacuation center, all considered schools, gyms, sports complex and other big buildings as evacuation center. Almost all have discussed that they have a plan to build permanent resilient evacuation center but have no funds.
- No one is inspecting the structure of pre-identified evacuation buildings before use as an evacuation center.
- Nearly all have identified the need of office building for the DRRM. They mentioned that they have planned to build it and furnish it will all the necessary equipment and machinery.
- Most of the DRRM offices are working for 24/7 hours and almost all have trained volunteers for relief and rescue work. The focus of all offices is on preparation and rescue trainings and all think that they are now well prepared.
- Few discussed that the salaries and wages of DRRM staff are low and need to be increased for retention and motivation.
- Some discussed about informal settlers and need to relocate to some safer zones. Most of the municipalities have Geo-hazard maps with them and aware of possible natural hazards which affect to their area.

- Almost everyone appreciated the good job of PAGASA during typhoon Yolanda by mentioning that they received well in time warnings which helped them to evacuate people before typhoon.
- Regarding improvements all showed the need of state of art equipment's, more vehicles, loaders, ambulances with a separate building for DRRM office.

Analysis of Disaster preparedness and response

As part of the report, a simple one page questionnaire was designed to assess the awareness level of local community regarding Disaster Risk Reduction and Management (DRRM). The questionnaire consists of ten simple questions and easily fillable within 3 to 5 minutes. The first five questions are designed to evaluate the understanding of local community regarding different widespread terms like Typhoon, landfall, storm surge etc.... and the meaning of these terms to local community. Question 6 was regarding warnings. The objective of that question was to judge the effectiveness of warning system and community response to those warnings. Questions 7 to 10 are regarding disaster preparedness and how much they are ready to face the natural calamities or disasters. (See Annex III for questionnaire)

Responder's Profile

Region VI was the focus area of the study and total of 94 responses received from 62 barangays of 12 Municipalities from 3 Provinces i.e. Iloilo, Aklan and Capiz. The questionnaires are filled by students, MDRRMO Staff, LGU officials, other Govt. officials, NGO Staff and local Community. The responders fall in the age group of minimum 15 to maximum 63 years.

Level of understanding or awareness

About the level of understanding and awareness the following is the analysis of the responses: See Figure 27 for responses in percentages (%).

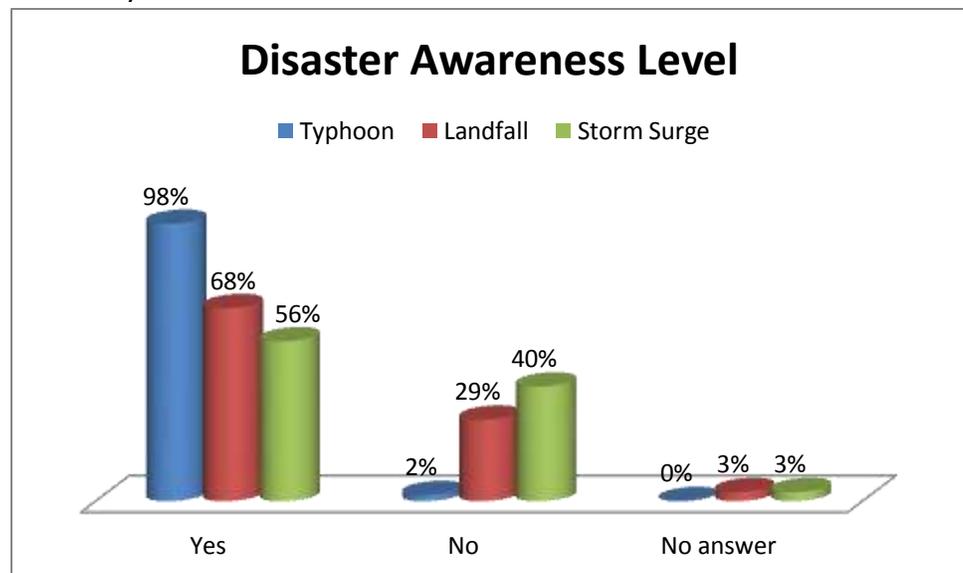


Figure 27 : Disaster Awareness Level regarding commonly used terms, graph showed the data in %, developed on the basis of survey conducted in Region VI.

- 1) **Aware about "Typhoon":** 92 answered "Yes" and 2 "No"
Regarding defining "Typhoon or Bagyo" many answered that; very strong winds with heavy rain fall, some said worse flooding, falling trees and flying houses, others answered destruction of lives and properties as a result of strong winds and heavy rainfalls. 36 did not answer the question.
- 2) **Heard the term "Landfall":** 64 replied "Yes", 27 "No" and 3 left blank
Almost everyone felt difficulty to describe landfall and more than half (49) did not answer the question. Most of the respondents define landfall as typhoon or storm falling or hit the land resulting in destruction of everything, some said falling of rocks from the mountains is the landfall, and other defines Low Pressure Area (LPA) touches to the land is called landfall.
- 3) **Listened about "Storm Surge":** 53 responded "Yes", 38 "No" & 3 "No answer"
56 respondents out of total 94 did not answer the question and those who answered define storm surge as same like Tsunami, high tides, big waves or something associated with the typhoons.

Another related question was asked i.e. have you experienced any typhoon?: Total 88 reacted with a breakdown i.e. 8 experienced typhoon Frank; 41 have seen Yolanda; 33 have experienced both typhoon Frank and Yolanda and 6 mentioned other typhoons like Ruping, Quinto, Sendong, ondoy, Pablo and basyang. 6 left blank

Then another question was asked about their knowledge regarding other possible disasters. 43 did not respond and 51 answered. Out of these 51 most of them mentioned that they are aware of earthquake, Flash floods, land slide and storms. The rest of the disasters mentioned by few include Tsunami, drought, Fires, accidents, volcanic eruption, tornado and chemical explosion.

Regarding worse painstaking typhoon; 50 think typhoon Yolanda as eviler, 17 Frank, 4 considered both Frank and Yolanda and only 3 discussed about typhoon Ruping. 20 did not answer.

Knowledge and Effectiveness of Warnings

Question 6 was regarding warnings and 71 said that they got warnings, while 17 did not get any warning before typhoons or cyclones, 6 left it blank. Then there was an associated question i.e. what are the meanings of warning numbers/ signals to them? And it was the hardest thing to answer but they replied it as:

Warning # 1: 58 did not answer and left blank, others answer like Prepare, be ready , strong winds, fix the houses, tolerable , Low Pressure Area, No elementary level classes and rainfall with slight winds.

Warning # 2: like the same 58 unable to answer and rest mostly retorted like be ready, prepare, get set, stronger winds, stock necessary food and medicine, hard to tolerate, prepare for evacuation, Tropical Depression, No elementary level classes and moderate to heavy winds with rainfall.

Warning # 3: Only 38 replied the question and meaning of warning # 3 to them include: ready, go to evacuation center, strongest winds, very hard to tolerate, listen to news on radio and TV & stay at home, Tropical storm, No classes at all levels and Heavy rains with strong winds.

Warning # 4: 41 answered about the warning # 4 as forced evacuation, very strong wind with very heavy rains, not tolerable, typhoon or super typhoon, Worse scenario, destruction to lives and properties and deadly rain and wind like Yolanda.

Regarding highest warning received by them: 39 left blank and 55 answered with a breakdown: 36 said warning # 4; 17 received warning# 3 and 2 got warning # 2.

And the sources of warnings answered by 66. Out of these 66, 48 received warning from TV, Radio and Media and 18 from PAGASA, MDRRMO, LGU, PNP, Neighbors, and Internet. 28 stayed silent and have not replied the question.

Preparedness

There are only four simple questions to assess their preparedness level to deal with future natural hazards and the responses are as under:

- Have received any preparedness training?: 36 said "Yes"; 56 "No"; 2 "no answer"

- Are you prepared for the disasters or typhoons: 56 "Yes"; 37 replied "No"; 1 left blank

- House in safe Location: 45 think "Yes"; 46 considered

"No" and 3 did not

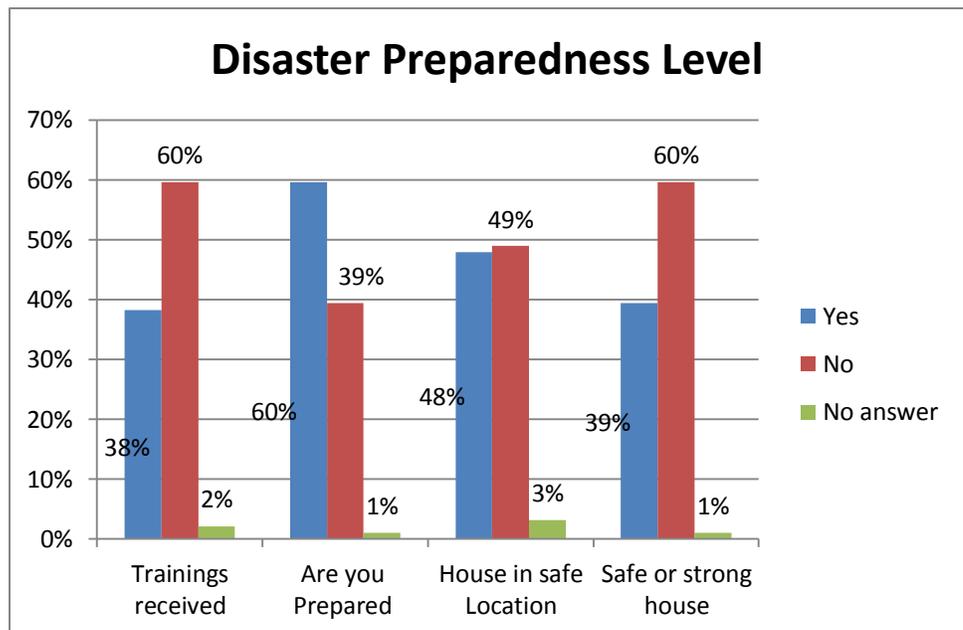


Figure 28: Disaster Preparedness Level, graph showed the data in %, developed on the basis of survey conducted in Region VI.

answer

- Safe or strong home: 37 considered “Yes”; 56 “No” and 1 left blank.

Figure 28 showed the same data in percentages, 60% did not receive any trainings 39% are not prepared, 49% think that their houses are not located in safe location and 60% of the respondents have considered their home as not safe in case of disasters. Although the sample size was small but it clearly showed that the improvements required at all levels to safe people and properties from destruction or disasters.

Humanitarian Assistance & Response

During typhoon Frank, the flash floods came suddenly and no one was expected such a big amount of flood due to rainfall, no preparation or precautionary measures can put into place. The first responders are the local community or volunteers along with LGU who helped the victims to shift them into some safe place. Most of the volunteers and rescuers are also not able to function efficiently due to extra ordinary amount of flood but they are the one who helped the local community.

Agencies	Relief Assistance	Amount (Php)
National Disaster Coordinating Council (NDCC)	22, 140 sacks of rice	20,202,750.00
Deptt. Of Social Welfare & Development (DSWD)	Food Packs and NFIs	53,891,760.94
Department of Health (DOH)	Medicines and medical supplies	16,284,863.42
Department of Education (DepEd)	Repair of school buildings	30,000,000.00
Local Govt. Units (LGUs)	NFIs and other materials	24,612,647.54

Table 5; Relief assistance provided by Govt. Agencies in Emergency relief Phase, table is based on the data presented in NDCC final report on typhoon Frank

The Provincial, National Government agencies along with NGOs and relief organizations came after the incident for helping in relief and rescue work. According to NDCC final report on typhoon frank, the total cost of assistance provided by the Government during the emergency relief phase was Php 145.719 Million with Php 24.613 Million provided by the various affected LGUs²⁵, the breakdown of the amount is shown in Table 4

According to the same report the total cost of assistance provided by NGOs in both cash and kind to beneficiaries was Php 4.150 Million²⁶.

Every NGO or Humanitarian assistance organization have their own reports which showed the record of amount spent by them for relief or assistance but there is not any single report which present the total amount spent by NGOs along with sector wise information except NDCC final report on typhoon Frank.

²⁵ (NDCC- National Disaster Management Center, 2008)

²⁶ (NDCC- National Disaster Management Center, 2008)

There are details available in NDCC report regarding the International and local donations with the following breakdown²⁷:

International Donations - (Foreign Governments and INGO's)

- Cash and Cheques – USD 613,074 & Aus \$ 500,000
- In Kind- Php 22,300,000 & USD 650,000,000

Local Assistance (Local Donors)

- Cash – Php 1,038,162.50
- In Kind – Php 2,662,198.70

The above assistance seems to be very little as compared to Php 13.52 Billion loss. It needs years to recover from that loss but unluckily the country struck with a new typhoon every year before recovering from the previous. The intention of donor agencies shifted with the occurrence of new typhoon or hazard and slowly they overlook the old one.

Role of Media

Media plays an essential role in informing, disseminating and recording information; it includes both the traditional and social media. Nowadays the traditional media is also upgrading their selves by providing on-line information and sharing through their Face Book (FB) pages.

Most of the information in this report is supported by articles and news clips published by different newspapers and media agencies. All of them noticed about the track changes of typhoon frank and forecasting errors incurred by Metrological and Weather agencies. Moreover FB users also criticize on these issues and used social media for finding their love ones and helping others.

According to an article titled "The Role of Social Media during a Natural Disaster" written by Rajashree on November 18, 2013; Social media is used in four ways during a disaster²⁸ :

- Sharing information and spreading awareness.
- For relief operations; e.g. building communities, volunteering etc.
- For collecting funds
- Monitoring and providing insights to the whole situation

And he also thought that People are very active on social media and Social media generates enormous amount of data which can be processed and analyzed for future planning and decision making.

²⁷ (NDCC- National Disaster Management Center, 2008)

²⁸ (Rajashree, 2013)

There is another article regarding “The Role of Social Media in Disaster Response” published by Third Team Media; in which they described that more people are now turning to social media platforms, such as Facebook and Twitter, in times of social crisis. According to author Amy Sample Ward, the three core reasons behind this are bandwidth, response, and power. This is tantamount to reach, action, and impact. On a positive note, social media played a huge role in disaster response during the recent calamities in the Philippines. Some of the uses mentioned in the article include: connecting with loved ones, notifying the authorities, organizing relief efforts, increasing public awareness, empowering and stress debriefing for survivors²⁹.

The use of social media is increasing day by day and almost everyone spending some time on social media in a day. Many DRRM offices also have developed FB pages for updating the public and some send tweets for giving updates. In some areas they issued warnings through FB also during typhoon Yolanda. Adopting the latest technology and better ways of disseminating information or warnings will help in declining the amount of destruction both in term of lives and properties during natural calamities and disasters.

Recommendations

Typhoon Frank was remarkable both due to its flash flooding and huge amount of destruction. Many have the views that they have never seen such amount of floods and they were not ready at that time but every unusual thing which brings destruction is a kind of disaster and it is much better to prepare instead of learning from hard experiences; some of the recommendations are as follows:

- Currently in most of the areas the provincial and municipal planning & development coordinators have been given additional charge to work as PDRRMO or MDRRMO which is like putting more burden on the same position or person instead of hiring new staff. The PDRRMO and MDRRMO should need to be permanent positions for more efficient and effective work.
- DRR System is much improved as compared to the past but it need to be more effective and efficient. The focus of all DRRM offices is on trainings and drills which is an essential component of preparedness but along with that the offices should need to be equipped with state of the art equipment’s and technology.
- Only trainings will not safe the people from future hazards in the absence of resilient evacuation centers. It’s a usual practice in almost all over the Philippines that school, gyms, sports complex and municipal halls are

²⁹ (Ward)

considered as evacuation centers due to their big capacity to absorb the evacuees without inspecting the buildings. During the field interviews in different parts of the country there are several examples in which the LGU did forced evacuation and shifted the people to evacuation centers but in the course of typhoon, the evacuation centers start collapsing or shaking and then they shifted the evacuees to other buildings. Luckily they got safe but if something happened to that evacuation centers then it will be a more big disaster with thousands of casualties.

- Although PAGASA have improved their forecasting system by installing more radars and newly developed rainfall measurement system but it need more technological improvements for better forecasting and issuance of well advance warnings or advisories.
- The Warning or advisory system should need to be more efficient by making it more easy or understandable. Innovative warnings or alert systems should need to be introduced for common public like color alert, alarm airing, flag raising etc.
- There is hardly any LGU which is giving advises or guiding people regarding resilient or safe construction of houses. After every typhoon or disaster the people construct the same kind of houses and they again got affected in next disaster. The continuous re-building of houses without observing proper construction code would bring more poverty to common people. The resilient designs instead of old local construction should need to be introduced for adapting the common public in this approach which may protect them from hazards and natural disasters.
- Most of the respondents of the survey think that either their houses are not in secure zone or not safe enough to sustain during typhoons or disasters. The survey clearly indicates that the residents are aware of possible danger and need assistance to solve this problem.
- The informal settlers or the people living near the river banks become victims of typhoon or disasters resulting in more vulnerability. There is a severe need to provide them permanent shelters with some livelihood interventions.
- Flood control measures should need to be updated or upgraded to meet the future needs. There should be continuous communication between high lying and low lying areas during rains so that people could get timely information about floods. Retention or Flood control walls should need to be built in required places.

- Many of the DRRM offices staff discussed about the little compensation for the hard and risky work they are performing. The salary of the staff should need to be competitive or market based. This would help in retaining experienced and qualified staff along with attracting more talented workers.
- Only few DRRM offices have their own permanent buildings and the rest are still planning due to unavailability of sufficient budget. For efficient work it is recommended that the DRRM office should have their well-furnished and well equipped buildings as they have a duty for 24/7 hours.
- The disaster management model of other countries should be followed to bring improvement in the existing infrastructure of rescue, relief and risk management agencies. DRR should also need to be part of sustainable development.
- The coordination of all stakeholders at all levels is necessary for better planning, implementation and mitigation. The community based approaches should need to be adopted for efficient and effective development plans.
- Deforestation, illegal logging, pollution, inefficient mining etc. should need to be controlled.
- Green technologies, environment friendly approaches and more plantations should also need to be part of DRR preparedness.
- Advanced backup system for electricity and communications should need to be installed for stay active in case of emergencies.
- The mock earthquake and flood drills should be conducted on regular basis to prepare the general public for all type of disasters.

Conclusion

Typhoon Frank was amazing in terms of flash floods which no one has experienced in the past. The flood came so fast that within few minutes it reached above head level with an extra-ordinary amount of thick mud. It took months to clear the mud. Most of the stakeholders argued that they were not informed about the floods and are not prepared. The evacuation took place mostly after flood. Many criticize PAGASA and other Metrological agencies for the forecasting errors but it was due to track changed by typhoon frank so many times. Always errors are possible in forecasting as nature is not predictable. The saddest incident attached with typhoon frank was the sinking of the ferry which doubled the number of causalities. The

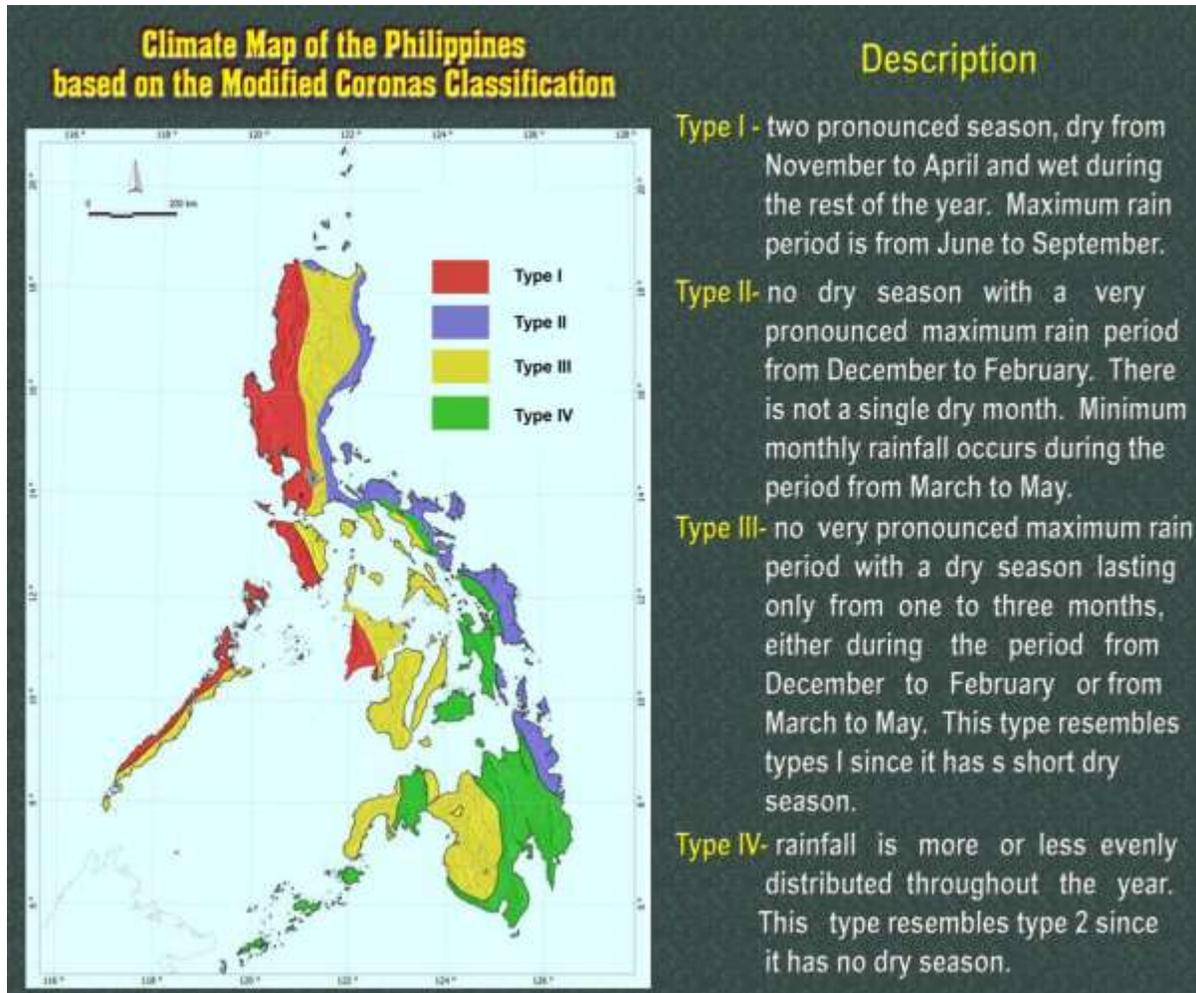
destruction brought by typhoon frank was also remarkable and country would take years to recover from this loss.

Although Philippines are always vulnerable to typhoons and cyclones but every time the local residents did not take it seriously as they have not experienced such way of devastation before. Every typhoon brought new or unique ways of destruction which was not seen in the past like the flash floods of Typhoon Frank, extra ordinary amount of rainfall during typhoon ondoy, powerful strong winds and heavy rainfall of typhoon Pablo and 6 landfalls, storm surges, unpredictable powerful winds of typhoon Yolanda. The power and intensity of the typhoons are increasing with the passage of time which require more preparation at all levels to sustain and safe the country from more destruction.

Better planning, proactive, efficient and coherent Disaster Risk Reduction and Management system should need to be placed. The focus will need to be shifted to resilient housing instead of traditional ways of construction. There should be at-least one permanent evacuation center with all the necessary facilities in each and every municipality. The nature friendly plans, climate change issues, less pollution, more plantations etc. are some of the ways to prevent the country from more destructive future hazards. The coordination amongst the stakeholders at all levels would result in more appropriate planning which may lead towards sustainable development.

Annexures

Annex – I, Climate Map of the Philippines³⁰



³⁰ (PAGASA- DOST)

Annex: II - Public Storm Warning Signals (PSWS)³¹

PSWS No.	Meanings	What to Do
1	<p>A Tropical Cyclone will affect the locality. Winds of not more than 60 kph may be expected in at least 36 hours*.</p> <p><i>Disaster preparedness plan must now be activated to alert status.</i></p>	<ul style="list-style-type: none"> ✓ Listen to your radio for more information about the weather disturbance. ✓ Check the ability of the house to withstand strong winds and strengthen it if necessary. ✓ The people are advised to monitor the latest severe weather Bulletin issued by PAGASA every six hours. In the meantime, business may be carried out as usual except when flood occurs.
2	<p>A moderate Tropical Cyclone will affect the locality. Winds of 61 to 100 kph may be expected in at least 24 hours*.</p> <p><i>Disaster Agencies / organizations concerned must act now to alert their communities</i></p>	<ul style="list-style-type: none"> ✓ Special attention should be given to the latest position, the direction and speed of movement as the cyclone may intensify and move towards the locality. ✓ The general public, especially people travelling by sea and air are cautioned to avoid unnecessary risks. ✓ Protect properties before the signals are upgraded. ✓ Board up windows or put storm shutters in place and securely fasten it. ✓ Stay at home.
3	<p>A strong Tropical cyclone will affect the locality. Winds of 101 to 185 kph may be expected in at least 18 hours*.</p> <p><i>Disaster agencies / organizations concerned must now be ready to act in response to actual emergency.</i></p>	<ul style="list-style-type: none"> ✓ Keep your radio on and listen to the latest news about typhoon. ✓ Everybody is advised to stay in safe and strong houses. ✓ Evacuate from low-lying areas to higher grounds. ✓ Stay away from coasts and riverbanks. ✓ Watch out for the passage of the “Eye” of the typhoon.
4	<p>A very intense typhoon will affect the locality. Winds of more than 185 kph may be expected in at least 12 hours*.</p> <p><i>Disaster Agencies / Organizations concerned are now fully responding to emergencies and in full readiness to immediately respond to possible calamity.</i></p> <p><small>*Times are valid only the first time the signal numbers is raised.</small></p>	<ul style="list-style-type: none"> ✓ Stay in safe houses or evacuation centers. ✓ All travels and outdoor activities should be cancelled.

³¹ (PAGASA-DOST, 2012)

Annex-III, Questionnaire for Analyzing the Awareness Level

This questionnaire is designed to assess the awareness level of local community regarding Disaster Preparedness and response. The output will be used for study purposes and improvements for better preparedness, if required.

Responder's Info:		
Name: -----	Age: -----	Cell #: -----
Barangay: -----	Municipality: -----	Province: -----

1). Are you aware of Typhoons/Bagyo? Yes No
If "yes" Have you Experience any Typhoon, write the name of Typhoon: -----
What is the meaning of Typhoon/Tropical Cyclone/Bagyo to you?

2). Have you heard the term Landfall? Yes No
If "Yes" how can you define Landfall?-----

3). Have you listened about Storm Surge? Yes No
If "Yes" what you mean by Storm Surge? -----

4). What are the other Disasters/ Hazards, you heard or aware of?-----

5). What is the worse Typhoon you experienced in your life: -----

6). Have you received any warnings in life about Typhoons or disasters? Yes No
If "Yes" what are the meanings for you regarding these warning numbers:
Warning # 1:----- Warning # 2: -----
Warning # 3:----- Warning # 4:-----

What is the highest warning number you received or experienced: -----
From whom or how you received the Warning: -----

7). Have you received any trainings regarding Disaster or typhoon Preparedness? Yes No.

8). Are you Prepared for the Typhoons/Disasters/Natural Hazards: Yes No

9). Either your House is located in "Safe" Location/Area: Yes No

10). Are you consider your home "Safe" in case of Natural Calamities: Yes No

☺ Thank you ☺

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