

## **FLOOD PREPARATION AND MITIGATION OF LOCAL GOVERNMENT UNITS OF CAGAYAN PROVINCE, PHILIPPINES**

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### **Abstract**

Flood preparedness and mitigation plan protects lives and properties from the flood's potentially devastating effects. The study used the qualitative survey research. It consisted of one thousand seventy eight (1078) respondents that include community residents and program implementers. Results showed that there is no specific flood preparedness and mitigation plans in all the Local Government Units (LGUs) under study, however, it is integrated in their disaster preparedness and mitigation plan. In general, all LGUs are "prepared" in all cycles of disaster preparedness, mitigation, response and recovery. Comprehensive municipal and barangay flood preparedness and mitigation plans, as well as contingency plans should be properly planned and maintained in operational status to increase the response capabilities and preparedness of organizations tasked to perform flood fighting and mitigating activities.

**Key words** : flood preparedness, mitigation, local government units, disaster preparedness

### **1. Introduction**

The Philippines is identified as a natural disaster-prone country in the world. The International Red Cross and Red Crescent Societies (Post-Disaster Needs Assessment, November, 2009) described the Philippines as the fourth most accident-prone country in the world. The two institutions concluded that some 5,809,986 Filipinos were killed or injured as a result of disasters or man-made calamities over a ten-year period from 1992 to 2001.

The Philippine National Red Cross (PNRC) Governor, Dante Liban, reported that the Philippines is a natural laboratory for floods, typhoons, monsoon rains, earthquakes, volcanic eruptions, and landslides. (Philippine Daily Inquirer, July 10, 2011).

In Cagayan Province, Philippines, municipalities vulnerable to severe flooding include Solana, Amulung, Alcala, Tuguegarao City, Enrile and Iguig. Other municipalities expecting flashfloods and flooding as an effect of three to four days continuous rain are areas near tributaries like Gattaran, Baggao, Sto. Nino, Lasam, Abulug, Piat, Tuao, Rizal, Gonzaga, Claveria, Camalaniugan, Lallo and Sta. Teresita. Tributaries that can cause

flooding and erosion to these municipalities include Cagayan River, the longest and the largest river in the country which traverses from North to South, the Dummun River of Gattaran, Zinundunga River of Lasam, Matalag River of Rizal, Chico River of Piat, Tuao and Sto. Nino, Pata River of Sanchez Mira, Abulug River, Buguey River, Cabcungan River of Claveria, Pared/Fulay River of Baggao and Alcala, and the Pinnacannauan River of Tuguegarao City (DSWD, R02).

Region 02, Philippines was affected by four(4) out of eight (8) cyclones in 2008 leaving behind millions of pesos in damages to properties. The typhoons affected 679 barangays with 56,016 families or 249,790 individuals. Totally damaged houses were reported at 1,961 and partially damaged houses at 11,029.

In December of 2011, the first-ever region wide flood summit, which was hatched amid the series of floods besetting Cagayan Valley in recent years, was held. The summit dealt with the impact of climate change on the agricultural sector, with emphasis on how to minimize or mitigate the effects of floods brought about by typhoons and torrential rains on food production. This is a concerted effort of all sectors of society, especially the agricultural sector which has been severely affected by recent floods (Philippine Star, 2011).

Learning how to prepare in advance and finding ways to cope in response to witnessing, hearing or living through a disaster are significant means to maintaining emotional health during the onslaught of stressful disasters. Ensuring one's safety and security during disasters is a concern of everyone. Psychological, physical, emotional, cognitive and other forms of preparatory support from individuals, families, neighbors, barangays, municipalities, provinces and the government and non-government organizations is a necessity.

With the Philippine's susceptibility to natural disasters, emergency preparedness has always been a priority concern. The Local Government Units have the primary responsibility to deal with disasters. Under the Local Government Code, the local government serves as the first line of defense. They are expected to prepare contingency plans, invest in prevention, preparedness and mitigation measures, establish a DDC with participation from civil societies, and set aside five percent of their local income for calamity fund. They may also allocate additional human and financial resources from their annual budget to disaster-risk reduction activities and establish permanent in-house capacity to manage disaster risk on a full time basis (<http://www.pdf.ph/pdna> Accessed March 12, 2012).

The importance of flood preparedness plans cannot be underestimated. An emergency can strike at any time. It comes like a thief in the night harming lives and destroying properties. Are the local government units of Cagayan, Philippines ready to face such emergencies? It is on this ground that this study is conducted.

## 2. Literature Review

A disaster is an event (i.e. earthquakes, flood, fire, landslide, tsunami) that causes temporary break in the life of a community and it reflects the impact of a hazard, causing a sudden or major misfortune, normally resulting in at least one of the following:

- a) casualties (death or injury)
- b) rapid decline of basic essentials leading to life threatening conditions
- c) damage or loss of property
- d) loss of infrastructure
- e) loss of essential utility services or means of livelihood
- f) diseases/illnesses
- g) temporary isolation

"A sudden local flood of great volume and short duration" is a definition provided to flashfloods (Maher, 2010). Despite advanced technologies, several societies worldwide still suffer the impact of flashfloods; it continues to claim lives of innocent people all over the world. Other losses are also worth mentioning like loss of property, and even infrastructure of whole areas.

In Vietnam, flood is one of the most common natural hazards that hit almost the whole country during the whole year of 2010. Historical flood in 1945 brought the establishment of the Central Committee for Dyke Protection - the farmer organization of the present CCFSC, an important land mark in Vietnam's efforts toward flood management and mitigation. In 1971, the founding of the comprehensive measure for floods prevention in the Northern Delta was done.

Here are some of the most devastating floods triggered by strong typhoons that battered the Philippines (<http://generalhowitzer.hubpages.com/hub/Worse-Floods-in-the-Philippines>, Accessed, March 23,2012).

September 27, 2009 was identified as one of the most horrible days in the Philippines. Tropical storm "Ondoy" pummelled the country with heavy downfall that caused massive flash floods killing at least 140 people, displaced half-a million people and destroyed more than one billion pesos (about 28 million dollars) worth of properties. Horrible sights of people getting carried away with the flash floods and eventually drowning them with the raging waves brought up by the flash floods were witnessed. Vehicles were washed away like toys and engulfed by the raging torrents and houses were turned down causing widespread fear among the residents that were affected.

Ormoc City in Leyte was once devastated by a colossal flood on the 15<sup>th</sup> day of November in 1991, killing about 8,000 people, wherein half of the victims' bodies were never recovered. Walls of mud and water emanating from the mountain washed away shanties and swept people into the sea, a tragedy that brought lamentations all over the place and in the whole Philippines.

In November 2006, a powerful super typhoon "Reming" caused floods and power outages especially in the Bicol area. More than 700 people were killed, 700 were reported to be missing and at least 2,000 people sustained injuries. This flood affected more than 3.5 million people.

The typhoon "Frank" clobbered Western Visayas with severe flooding in June 2008. It affected nearly 400,000 families (about 2 million people), not more than 2,500 were left injured, and caused the evacuation of 50,000 families. The province that took severe beating from typhoon "Frank" and triggered floods included Iloilo, Antique, Aklan, Capiz, Guimaras and Negros Occidental.

According to Hamper (2010), common strategies of flash flood risk assessment and mitigation methodologies include the following:

1. Risk Assessment
2. Characterization of the Area Concerned
3. Hazard Analysis
4. Hazard Assessment
5. Vulnerability Analysis

The concept of disaster preparedness encompasses measures aimed at enhancing life safety when a disaster occurs, such as protective actions during an earthquake, hazardous materials spill, or terrorist attack. It also includes actions designed to enhance the ability to undertake emergency actions in order to protect property and contain disaster damages and disruption, as well as the ability to engage in post-disaster restoration and early recovery activities.

Mitigation measures include appropriate land-use and coastal zone management practices, mandatory and voluntary building codes, and other long-term loss reduction efforts. In some cases, mitigation can also include moving neighborhoods and communities to other locations in order to avoid future losses.

The HYOOGO Framework for Action (HFA) is a 10-year plan to make the world safer from natural hazards. It was adopted by 168 Member States of the United Nations in 2005 at the World Disaster Reduction Conference.

During the conference, specific gaps and challenges are identified in the following five main areas:

- (a) Governance: organizational, legal and policy frameworks;
- (b) Risk identification, assessment, monitoring and early warning;
- (c) Knowledge management and education;
- (d) Reducing underlying risk factors;
- (e) Preparedness for effective response and recovery.

These are the key areas for developing a relevant framework for action for the decade 2005–2015. And perhaps these shall also be the practical areas that are necessary to be included in the flood preparedness plan for the Cagayan Philippine Province.

### **3. METHODOLOGY**

#### **3.1 Research Design**

This study made use of the qualitative survey research and descriptive survey.

#### **3.2 Respondents of the Study**

The study consisted of one thousand and seventy eight (1078) respondents distributed as follows: 106 MDDRMC members from the six LGUs, 331 BDDRMC members, and 641 Community Residents coming from the forty six (46) barangays.

#### **3.3 Instrumentation**

The instrument used is the questionnaire carefully drafted by the researcher after considering other sources as bases. The sample questionnaire was pre-tested to a small

group for validity and reliability. Questionnaire for the barangay residents was translated in Pilipino for ease of understanding.

Other data were gathered through interview and/or focus group discussion with the respondents relative to the extent of flood preparedness and mitigation activities of the MDRRMC.

### 3.4. Data Analysis

Descriptive statistics were used such as the frequency, percentage, and mean to analyze the data for the descriptive research questions.

## 4. RESULTS AND DISCUSSION

The study aimed to assess the flood preparedness and mitigation activities of six disaster prone Local Government Units (LGUs) in Cagayan. The study consisted of one thousand and seventy eight (1078) respondents distributed as follows: 106 MDRRMC members from the six LGUs, 331 BDRRMC members, and 641 Community Residents coming from the forty six (46) barangays.

### 4.1 Status of the Flood Preparedness and Mitigation Program of Disaster-Prone Local Government Units

#### 4.1.1. Flood Plans

During the Focus Group Discussion among the MDRRMC, of the six municipalities, the members revealed that all these municipalities have City/ Municipal Flood Preparedness and Mitigation Plan(MFPMP).

Local governments play essential roles in implementing effective preparedness and mitigation before disaster events. Floods are among the most common and destructive natural hazards causing extensive damage to infrastructure, public and private services, the environment, the economy and devastation to human settlements. While it is true that floods are short-lived, they remain to be threats to our economy. Considering these and the other impacts flood brings to our locality necessitates all of us to be part of a holistic planning process as we are all members of the simplest social system, the family. Hence, there is urgency for the special attention to be invested to this endeavor to minimize community losses and to ensure sustainable development.

#### 4.1.2. Facilities and Equipment

Table 1. Facilities/Equipment Related to Municipal Flood Preparedness and Mitigation Program

Facilities/Equipment	QUANTITY					
	Alcala	Amulung	Enrile	Iguig	Solana	Tug. City
<b>Evacuation Center</b>						
Gym	1	2	7	4	5	11
School	7	6	7	7	2	7
Barangay hall	7	5	7	4	2	10
<b>TOTAL</b>	<b>9</b>	<b>13</b>	<b>21</b>	<b>15</b>	<b>9</b>	<b>28</b>

<b>Transportation facilities</b>						
Motorized/ Rubber boat	2	3	3	1	1	1
Ambulance	1	3	-	1	2	3
Dump truck	-	4	-	1	4	28
Fiber glass boat	1	-	1	-	1	
Others-multi cabs			22			
<b>TOTAL</b>	<b>4</b>	<b>10</b>	<b>26</b>	<b>3</b>	<b>8</b>	<b>32</b>
<b>Rescue Facilities</b>						
Ropes	20 pcs	2	200 m		100 m	3
Live vests	20 pcs	15	12		13	8
Ringbouys	2	16	2		1	2
Spine board	1	1	1			3

All of the six municipalities have evacuation centers namely the school, barangay hall and the gymnasium. As seen in the table, there are 9,15,21,15, 9 and 28 evacuation centers for Alcala, Amulung, Enrile, Iguig, Solana and Tuguegarao City, respectively. For the transportation facilities, Tuguegarao has the most number totaling 32 followed by the municipality of Amulung with 26 units. Iguig has only three(3) while Alcala has only four (4) transportation facilities. Rescue facilities present in the LGUs are ropes, life vests ,ringbouy and spine boards. In Iguig, there was no mention of the number of rescue facilities. However, during the FGD, all the LGUs and even the barangays and residents, expressed the need for additional rescue equipment as well as supplies such as such as food and medicines.

#### 4.1.3. Manpower Pool of LGUs

Tuguegarao City has the most number of manpower consisting of 261 individuals followed by the LGU of Amulung with 154 individuals. The LGU with the least number of manpower is the LGU of Iguig with only 73 manpower. Complete team consisting of the medical group represented by the doctors and nurses, PNP, BFP, Social workers, MDRRMC members, and rescue team/volunteers.

Adequacy of manpower is not a problem to some LGUs. However, it was noted that they felt the need to strengthen trainings on some basic skills. Looking at their plans, all LGUs are not short of trainings for staff and rescue team volunteers. This will somehow improve capabilities of all persons who compose the team.

#### 4.1.4. Amount of Fund Allocation for Municipal Flood Preparedness and Mitigation Program

Fund Allocation for disaster by all LGUs amounted to several millions with Tuguegarao City having the highest fund amounting to 25,465,556 followed by Solana with 6.1 M. All the LGUs adhered to the approved implementing rules and regulations of Republic Act 10121, otherwise known as the National Disaster Risk Reduction Management Act of 2010. However, during the FGD, the LGUs common problem is the inadequacy of funds making them unable to acquire some of the needed rescue materials.

Taking into consideration the value of development gains which are wiped out through disasters, as also the huge quantum of funds required for post disaster relief and rehabilitation, any investment in disaster mitigation and preparedness will yield a higher rate of return than any other development project. Indeed, a life saved during a disaster

is more than enough success. Hence, a paradigm shift has now taken place with the shift in focus from plain disaster coordination to disaster risk reduction and management.

## 4.2. Flood Preparedness and Mitigation Activities of Selected LGUs in Cagayan and their extent of Implementation

Table 2. Flood Preparedness and Mitigation Activities and their extent of Implementation as Perceived by the Community residents

Activities	Local Government Unit												ALL LGUs	
	Alcala		Amulung		Enrile		Iguig		Solana		Tug. City		X	QD
<b>Flood Preparedness/Mitigation</b>	X	QD	X	QD	X	QD	X	QD	X	QD	X	QD	X	QD
Flood control gates preventing back up of high flood waters	4.25	VGE	4.00	GE	3.63	GE	3.00	ME	3.00	ME	3.67	GE	3.59	GE
Flood control dams and retention dikes to protect urban areas and agricultural lands	4.00	GE	3.50	GE	3.17	GE	2.50	LE	3.33	ME	3.75	GE	3.37	ME
Intensive orientation on RA 10121	4.82	VGE	4.63	VGE	4.38	VGE	3.25	ME	4.00	VGE	4.20	VGE	4.21	VGE
Organized rescue groups armed with WASAR and BLS skills	4.82	VGE	4.88	VGE	4.57	VGE	2.25	LE	5.00	VGE	3.86	GE	4.23	VGE
Construction of multipurpose and one-stop-shop evacuation centers	4.40	VGE	4.00	GE	4.00	GE	3.50	GE	3.00	ME	4.00	GE	3.81	GE
Active and very functional rescue units readily available at any casualties	4.83	VGE	4.70	VGE	4.25	VGE	2.75	ME	4.67	VGE	3.89	GE	4.18	GE
LGU is equipped with complete rescue paraphernalia like rubber boats	4.58	VGE	4.78	VGE	4.50	VGE	4.00	GE	5.00	VGE	3.67	GE	4.42	VGE
Installation of on-line facility to monitor weather updates	4.42	VGE	3.67	GE	4.25	VGE	3.50	GE	4.67	VGE	3.89	GE	4.06	GE
Acquisition of amphibian crafts/trucks for smooth delivery of needed relief services	4.36	VGE	4.13	VGE	3.88	GE	2.50	LE	4.33	VGE	4.13	VGE	3.88	GE
Uses ON-LINE technology in searching out disaster situation for the province	4.17	GE	4.00	GE	4.43	VGE	3.50	GE	3.67	GE	3.70	GE	3.91	GE
Designated evacuation centers are in place	4.91	VGE	5.00	VGE	4.38	VGE	3.67	GE	4.33	VGE	4.56	VGE	4.55	VGE
Pre-positioning of foods and non-food items to evacuation areas	4.67	VGE	4.67	VGE	4.25	VGE	3.50	GE	3.67	GE	4.50	VGE	4.21	VGE
Deployment of rescue paraphernalia, such as rubber boats, ropes, etc.	4.75	VGE	4.89	VGE	VGE	3.50		GE	4.33	VGE	4.44	VGE	4.38	VGE
<b>Category Mean</b>	<b>4.54</b>	<b>VGE</b>	<b>4.37</b>	<b>VGE</b>	<b>4.16</b>	<b>VGE</b>	<b>3.19</b>	<b>ME</b>	<b>4.08</b>	<b>GE</b>	<b>4.02</b>	<b>GE</b>	<b>4.06</b>	<b>GE</b>

4.2.1. Flood preparedness and mitigation activities had a category mean of 4.06 described as to a "great extent" of implementation.

#### 4.2.2. Extent of Implementation of Mitigation Activities of Selected LGUs in Cagayan as Perceived by the Implementers

The category mean for the extent of implementation of mitigation activities that include widening and deepening of tributaries and natural drains and construction of diversion channels and retention ponds or retarding basins to divert floods to pre-designed wetland areas where habitations and agricultural activities are avoided was 3.35, with qualitative description of "moderate extent".

It must be noted that the two identified mitigation activities are structural mitigation activities. Hence, cost-benefit analysis must be conducted in each municipality to determine its economic benefit before its implementation.

Table 3: Level of Preparedness of LGUs with respect to Flood Preparation Activities

Activities	LOCAL GOVERNMENT UNIT												ALL LGUs	
	Alcala		Amulung		Enrile		Iguig		Solana		Tug. City		X	QD
<b>Preparation</b>	X	QD	X	QD	X	QD	X	QD	X	QD	X	QD	X	QD
Flood control gates preventing back up of high flood waters	4.25	VMP	4.00	MP	3.63	MP	3.00	ModP	3.00	ModP	3.67	MP	3.54	MP
Flood control dams and retention dikes to protect urban areas and agricultural lands	4.00	MP	3.50	MP	3.17	ModP	2.50	ModP	3.33	ModP	3.75	MP	3.37	ModP
Intensive orientation on RA 10121	4.82	VMP	4.63	VMP	4.38	VMP	3.25	ModP	4.00	MP	4.20	VMP	4.21	VMP
Organized rescue groups armed with WASAR and BLS skills	4.82	VMP	4.88	VMP	4.57	VMP	2.25	LP	5.00	VMP	3.86	MP	4.23	VMP
Construction of multipurpose and one-stop-shop evacuation centers	4.40	VMP	4.00	MP	4.00	MP	3.50	MP	3.00	ModP	4.00	MP	3.81	MP
Active and very functional rescue units readily available at any casualties	4.83	VMP	4.70	VMP	4.25	VMP	2.75	ModP	4.67	VMP	3.89	MP	4.18	MP
LGU is equipped with complete rescue paraphernalia like rubber boats	4.58	VMP	4.78	VMP	4.50	VMP	4.00	MP	5.00	VMP	3.67	MP	4.42	VMP
Installation of on-line facility to monitor weather updates	4.42	VMP	3.67	MP	4.25	VMP	3.50	MP	4.67	VMP	3.89	MP	4.06	MP
Acquisition of amphibian crafts/trucks for smooth delivery of needed relief services	4.36	VMP	4.13	MP	3.88	MP	2.50	LP	4.33	VMP	4.13	MP	3.90	MP
Uses ON-LINE technology in searching out disaster situation for the province	4.17	MP	4.00	MP	4.43	VMP	3.50	MP	3.67	MP	3.70	MP	3.91	ModP
Designated evacuation centers are in place	4.91	VMP	5.00	VMP	4.38	VMP	3.67	MP	4.33	VMP	4.56	VMP	4.37	VMP
Pre-positioning of foods and non-food items to evacuation areas	4.67	VMP	4.67	VMP	4.25	VMP	3.50	MP	3.67	MP	4.50	VMP	4.21	VMP
Deployment of rescue paraphernalia, such as rubber boats, ropes, etc	4.75	VMP	4.89	VMP	4.38	VMP	3.50	MP	4.33	VMP	4.44	VMP	4.38	VMP
<b>Category mean</b>	<b>4.54</b>	<b>VMP</b>	<b>4.37</b>	<b>VMP</b>	<b>4.16</b>	<b>VMP</b>	<b>3.19</b>	<b>ModP</b>	<b>4.08</b>	<b>MP</b>	<b>4.02</b>	<b>VMP</b>	<b>4.73</b>	<b>VMP</b>

In Table 3, it is shown that the overall mean of the 6 LGUs as regards Preparation Activities is 4.73, described as "very much prepared". Taking them per municipality, the LGUs of Iguig and Solana are "moderately prepared" and "much prepared", respectively. Iguig has the lowest mean on preparation activities with only 3.19, described as "moderately prepared." Tuguegarao City garnered the highest preparation mean of 4.73. This may be attributed to its adequate budget, as expressed by the head of the City Disaster Risk Reduction and Management Council (CDRRMC).



Looking at the table, items that attained high scores are mainly non-structural preparedness such as "Designated evacuation centers are in place", "Pre-positioning of foods and non-food items to evacuation areas ", etc. Items that gained the lower scores are those that are in the area of structural preparedness.

#### 4.2.3 Level of Preparedness of Selected LGUs in Cagayan with respect to Flood Mitigation Activities.

Data revealed that the 6 municipalities are "moderately prepared" in the area of flood mitigation. Again, those two items on mitigation are structural mitigation.

Table 4. Level of Preparedness with respect to Flood Response Activities

Activities	LOCAL GOVERNMENT UNIT												ALL LGUs	
	Alcala		Amulung		Enrile		Iguig		Solana		Tug. City			
Response	X	QD	X	QD	X	QD	X	QD	X	QD	X	QD	X	QD
Damage assessment and needs analysis	3.67	MP	3.70	MP	3.25	Mod P	3.75	MP	4.00	MP	3.80	MP	3.69	MP
Relief	3.67	MP	3.90	MP	3.13	Mod P	4.00	MP	4.00	MP	3.60	MP	3.71	MP
Search and rescue	3.75	MP	3.70	MP	3.25	Mod P	3.25	Mod P	4.00	MP	3.70	MP	3.60	MP
Incident Command System	3.42	MP	3.10	ModP	3.25	Mod P	3.00	Mod P	3.00	Mod P	3.40	MP	3.19	Mod P
WATSAN/Health	3.75	MP	3.70	MP	3.13	Mod P	3.75	MP	3.67	MP	3.50	MP	3.58	MP
Temporary Shelter	3.67	MP	3.80	MP	3.25	Mod P	4.00	MP	3.33	Mod P	3.80	MP	3.64	MP
Others: emergency relief	3.67	MP	3.80	MP	3.13	ModP	4.00	MP	3.00	ModP	3.70	MP	3.55	MP
<b>Category Mean</b>	<b>3.66</b>	<b>MP</b>	<b>3.67</b>	<b>MP</b>	<b>3.20</b>	<b>ModP</b>	<b>3.25</b>	<b>ModP</b>	<b>3.57</b>	<b>MP</b>	<b>3.64</b>	<b>MP</b>	<b>3.57</b>	<b>MP</b>

Table 4 shows that of the 7 response activities, only Incident Command System (ICS) got a rating of "moderately prepared" with a mean of 3.19. The other six items had a rating of "much prepared". Taking them per LGU, however, reveals that Enrile and Iguig are only "moderately prepared" in their response activities especially in the areas of Temporary shelter, search and rescue and Incident Command System. Most of the items are rated "much prepared" and "moderately prepared" hence, the need to strengthen this area in these municipalities.

In the province of Cagayan, a team, known as All Hazard Incident Management Team (AHIMT) was already created, the provincial governor is the overall head, with ten members. LGUs, too, have already organized their ICS.

An Incident Command System is a standard, on-scene, all-hazard incident management concept introduced in the Philippines through the ASEAN-US Cooperation on Disaster Management, Phases 1(2004-2006) & 2 (2009-2012); US Department of

Agriculture-Forest Service (US DA-FS) as implementing agency and USAID as funding agency. It can be used by all DRRMCs/ emergency management and response agencies.

In an interview with the Provincial Disaster Risk Reduction Management Council head, he said that there was a training on ICS conducted by the OCD. This is part of a series of trainings being conducted by the OCD nationwide, in partnership with USAID, US Fire Service and ASEAN" to cope with the DRRMC Council's thrust of establishing regional cooperation during time of disaster or calamity. At the provincial level, basic and intermediate incident training was the first level. At the second level, "All hazard incident management training (AHIMT) was conducted. The center head said that they are conducting echo-seminars at the municipal level. In Sanchez Mira and Claveria, for example, what were given to them are some basic information on ICS.

Level of Preparedness with respect to Flood Recovery Activities

With regard to recovery activities, all of the LGUS are "much prepared" in terms of livelihood, housing, lifelines, education, infrastructure and loan availment. Only Enrile has a rating of "moderately prepared" with a category mean of 3.17.

Data gathered reveal that Enrile got the lowest rating in all the areas evaluated. This may be attributed to its budget which got the lowest of only 4 million pesos for its annual budget on disasters.

Response and Recovery activities are two important cycles in disaster preparedness which should not be taken for granted. We may have saved individuals and families from drowning and accidents but how to bring back these people to their normal routine and habitat is also foremost.

Because the disaster recovery process begins before the disaster, the best chance to foster post-disaster change is to include sustainability issues in local pre-disaster planning.

Regardless of community size or the nature of the disaster, local government leaders are responsible for overseeing all four phases of emergency management—preparedness, response, recovery, and mitigation. The government plays a supporting role in the immediate aftermath and in providing funding and guidance for long-term recovery and mitigation.

After a major disaster, the recovery process takes months and even years to bring a community back to a "new normal" and as strong as or better than before the disaster.

Frances L. Edwards (2006) Associate Director of the Collaboration for Disaster Mitigation in San Jose, California, says the recovery process begins "when the situation is no longer getting worse, all the living have been rescued, and the community has found the floor."

Brett Kriger (2006) Director of the Institute for Building Technology and Safety's (IBTS) Disaster Management Group, says the recovery process begins even before the response stage is complete because decisions made while responding to the emergency can affect the recovery process. "There's usually a 30 percent overlap in the middle where the community is still responding while gearing up for recovery," Kriger says.

5.immediate funding of disaster related projects and provision of soft loan for livelihood programs to affected families

## **4.2 Flood Preparedness and Mitigation Activities of the LGUs**

Flood preparedness and mitigation activities of LGUs are as follows:

- a. Construction of Flood control gates preventing back up of high flood waters
- b. Intensive orientation on RA 10121
- c. Organization of rescue groups armed with Water, Safety and Rescue (WASAR) and Basic Life Support (BLS) skills
- d. Purchase of complete rescue paraphernalia like rubber boats
- e. Designation of evacuation centers
- f. Pre-positioning of foods and non-food items to evacuation areas
- g. Deployment of rescue paraphernalia, such as rubber boats, ropes, etc.

### **4.1.1. Disaster Preparedness in the Family and the Community**

Six hundred forty one (641) selected families were asked of their disaster preparedness. Following are their responses.

1. Families and the community they belong are prepared for a flood disaster incident;
2. The community residents are aware of the existence of a Barangay Disaster Risk Reduction Management Council (BDRRMC).
3. The community residents are aware of sources of information to prepare for disasters. Sources of information given are radio, TV and text messages from concerned relatives and friends.
4. The families discuss some disaster preparedness with family members like how to be safe when they are out of the house and how to seek safe shelter.
5. Some of the flood hazard hunt they did in their homes include doing some home repairs like fixing leaking roofs, weak scaffoldings, etc.
6. The families don't have first aid kit, were not trained on first aid, are not familiar in CPR and had no emergency drills for the past five years.
7. All are knowledgeable in turning off gas ranges, electrically operated gadgets, water facility, etc.
8. With the advent of mobile phones, all have mentioned of the presence of out-of-area phone contacts that include relatives and friends and some acquaintances who are considered reliable sources of information and warning and are ready to help in times of disasters.

#### **4.2.2. Disaster Preparedness for BDRRMC Members**

The level of disaster preparedness was asked among the 331 BDRRMC members. Three areas of preparedness were included in the survey questions namely social preparedness, physical preparedness and economic preparedness.

##### **4.2.2.1 Social Preparedness**

In general, the BDRRMC are “knowledgeable” in terms of social preparation. Only four are rated “quite knowledgeable” in areas like preparedness measures installing warning devices, the preparation of reports, and understanding the dynamics of the victims of flood.

##### **4.2.2.2. Physical Preparedness**

Physical preparedness includes the acquisition of material things like food, medicines, equipment and other supplies and the availability of buildings for evacuation.

Of the nine items on physical preparedness, evacuation facilities like kitchen utensils, lighting and blankets, and medical facilities and storage facilities were found “inadequate” by BDRRMC.

##### **4.2.2.3 Economic Preparedness**

The level of adequacy of the community in terms of foods, non-food supplies and disaster funds to victims of flood was rated “inadequate”. This problem of inadequacy has been repeatedly confirmed in FGDs of all groups, MDRRMC, BDRRMC, community residents and some other key informants like the Director of DILG.

During the FGD, one of the primary problems encountered by both groups -LGUs and BDRRMC- is insufficiency of funds.

##### **4.2.2.4. Practice**

BDRRMC members were asked to rate themselves of how adequately equipped is their organization to readily respond to disasters.

Data show that “ability to administer first aid”, “ability to manage evacuation centers,” and “ability to rescue and save lives” were found to be “inadequate”. While items which are found to be adequate are “ability to manage mass feeding”, “ability to manage relief operations” and ability to prepare disaster reports.

Ability to administer first aid and ability to rescue and save lives are two activities that need to be prioritized over other activities. There needs to be continuous training and updating on these skills with emphasis on BLS and WASAR.

While it is true that trainings and exercises have been conducted, as documented earlier, re-training and updates on recent rescue techniques and paraphernalia must be part of regular capability building activities.

### **4.3 Extent of Implementation of the Flood Preparedness and Mitigation Activities as Perceived by:**

#### **4.3.1 The Community Residents**

The overall mean of the 141 community residents representing the 46 barangays in terms of the extent of implementation of the preparedness and mitigation is 4.06, described as "great extent" of implementation.

#### **4.3.2 Flood Preparedness and Mitigation Implementers**

The overall mean for the extent of implementation of flood preparedness and mitigation activities as perceived by the implementers was 3.35, with qualitative description of "moderate extent" of implementation.

As revealed in the data, there was a difference in the perception of the community residents and the implementers on the level of preparedness and mitigation measures in all the LGUs.

### **4.4 Level of preparedness with respect to preparation, mitigation, response and recovery**

The overall mean of the 6 LGUs as regards Preparation Activities is 4.73, described as "very much prepared".

The 6 municipalities are "moderately prepared" in the area of flood mitigation.

Of the 7 response activities, only incident command system got a rating of "moderately prepared" with a mean of 3.19. The other six items had a rating of "much prepared".

With regard to recovery activities, five of the LGUS are "much prepared". Only Enrile has a rating of "moderately prepared" with a category mean of 3.17.

### **4.5 Best Practices of the Six Selected LGUs in Cagayan with Respect to Flood Preparedness and Mitigation**

- a. Strong networking and linkages with coordinating agencies
- b. Preparedness of the barangays that are affected by flood
- c. Adequate Trainings on Disaster Preparedness and Rescue Operations
- d. Cooperation and coordinated efforts among civic organizations, GOs and NGOs.
- e. Provision of soft loan for livelihood programs to affected families
- f. Quick coordination among member agencies before any calamity occurs
- g. Delineation of responsibilities to facilitate smooth cooperation and coordination among member agencies, and
  - Presence of early warning system

#### **4.6 Problems Encountered by LGUs in the Implementation of Flood Preparedness and Mitigation Activities**

The following are the common problems identified.

**4.6.1. Limited resources.** All LGUs expressed the inadequacy of their budget and other needs such as rescue paraphernalia, foods and medicines. According to Dr. Leonardo Molina of the DILG, the 5% DRRM fund is insufficient such that LGUs seek other sources when depleted. This was the same problem expressed in the Barangay level during the Focus group discussion with the Barangay Disaster Risk Reduction Management Council members.

**4.6.2. Stubborn Barangay Residents.** Affected families are very stubborn. They don't want to evacuate for the reason that they don't want to leave their belongings and houses.

#### **4.7 Policies for Flood Preparation and Mitigation Designed to Uniquely Address the Problems and Needs of Respondent-LGUs**

Following are the proposed policies and projects to uniquely address the problems and needs of LGUs:

- a. Strengthening of capability building and trainings from the barangay to the municipal levels
- b. Forced Pre-emptive evacuation
- c. Reinforcing the implementation of climate change adaptation in schools through the help of CHED and DepEd
- d. Provision and installation of flood warning signs in strategic places
- e. Strong information dissemination in schools from the elementary to the tertiary levels
- f. Tree planting
- g. Creation of Barangay and Family Disaster Contingency Plan

#### **4.8 Changes in Disaster Plan**

Majority of the respondents said they have nothing to change in their existing plans since they find them to be effective; however, they gave the following minor changes:

- a. Incorporation of more training especially in rescue operations and in managing evacuation centers.
- b. Specific unique plans are to be incorporated in the existing plans based on the problems and needs of the LGUs.
- c. Conduct of researches especially on the latest topography of the municipality.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

1. There is No specific Flood Preparedness and Mitigation Plans in all the LGUs under study. At the present time, majority of the LGUs don't feel the need of additional equipment and manpower. However, continuous trainings especially on rescue operations are highly identified as one of the major needs of the LGUs and the constituent barangays.
2. The perception of the implementers and the community residents on the extent of implementation of the flood preparedness and mitigation activities, that is, it varies from "great extent" to "moderate extent"
3. In general, all LGUs are considered "prepared" in all the cycles of disaster preparation-preparedness, mitigation, response and recovery.
4. The 6 LGUs have unique and common best practices. Studying its adaptability and replicability to a certain LGU is the concern of the policy makers.

### **5.2 Recommendations**

1. Comprehensive municipal and barangay flood preparedness and mitigation plans and contingency plans to respond to flood events should be properly prepared and maintained in operational status in order to increase response capabilities and preparedness of organizations tasked to perform flood fighting activities. The plan should be based on an integrated approach covering all relevant aspects of water
2. For a successful flood preparedness and mitigation planning, it is imperative to learn from the experiences and best practices of others for greater collaboration and information sharing. The integration of flood preparedness and mitigation plan in the overall developmental plan may enhance the implementation of the project. In addition, involving barangay folks offering an array of ideas, resources and local level knowledge results in ownership of results.
3. There is a need to train and mobilize people in the community to seek external funding inasmuch as flood preparedness and mitigation demands are greater than the financial resources available in the community.
4. Plans must be built up from the grassroots level, respecting the unique qualities of each community, and from the bottom up. Experiences drawn from communities that have suffered from past hazards, geographical and vulnerable conditions of specific communities must be incorporated in the plans.
5. There is a need for a holistic, coordinated and integrated approach to preparing and mitigating floods in all its components.
6. To minimize the human, property and environmental losses, along with the social and economic disruption associated with extreme hazards, critical assessment must be made to address the structural as well as non-structural

- measures adaptable to the localities under study considering its short-term and long term impacts.
7. That all academic institutions, private and public, must offer in their tertiary curriculum, Disaster Preparedness and Climate Change Adaptation as three-unit course to prepare students in the dispensing of their civic responsibilities and to further strengthen their knowledge and awareness on the issue.
  8. To address agriculture losses and the problem of food insecurity, researches along agricultural production practices that are more appropriate to the local environment, crop adaptability and new planting calendar could be conducted by concerned agencies like the Department of Science and Technology (DOST) and the Department of Agriculture (DA).
  9. That an Incident Command System must be strengthened to improve efficiency and effectiveness of individual agencies as they work toward the common goal of stabilizing the incident and protecting life, property, and nature.
  10. Lastly, ensuring the participation of the community, empowering each family to mitigate flood risk is vital to achieving zero casualty and reduced economic losses during disasters.

## REFERENCES:

Alessandro G. Colombo, Javier Hervás and Ana Lisa Vetere Arellano (2002): *Guidelines on Flash Flood Prevention and Mitigation* Published by: Institute for the Protection and Security of the Citizen Technological and

Bankoff, G. (2003, August). Vulnerability as a Measure of Change in Society. *International Journal of Mass Emergencies and Disasters*, 21(2), 5-30. Retrieved January 6, 2009 from AMU

Committee on Homeland Security and Governmental Affairs, 2005. *FEMA's Response to the 2004 Florida Hurricanes*. Washington DC.

Committee on Homeland Security and Governmental Affairs, 2005. *Hurricane Katrina in New Orleans: A Flooded City, A Chaotic Response*. Washington DC.

Committee on Homeland Security and Governmental Affairs, 2006. *Preparing for a Catastrophe: The Hurricane Pam Exercise*. Washington DC.

Haddow, G., Bullock, J., Coppola, D. (2008). *Introduction to Emergency Management (3rd ed.)*. San Diego.



Harrald, John. 2006. *Agility and Discipline: Critical Success Factors for Disaster Response*. pp. 256-272. Retrieved Jan. 25, 2009.

Economic Risk Management Natural Risk Sector I-21020 Ispra (VA) Italy report number: EUR 20386 EN

Badilla, Roy. "Flood Modelling in Pasig-Marikina Basin," M.Sc. thesis, ITC, March 2008, [http://www.itc.nl/library/papers\\_2008/msc/wrem/badilla.pdf](http://www.itc.nl/library/papers_2008/msc/wrem/badilla.pdf)

Borje, Julie et al. 3cd Sound Practice Series.

Cox L.A. (2001): *Risk Analysis - Foundations, Models and Methods*. Kluwer Academic Publishers, Dordrecht, Germany.

Horlick-Jones T., Amendola A. and Casale R. (1995): *Natural Risk and Civil Protection. Proceedings of the International Conference on Natural Risk and Civil Protection* organized by the Commission of the European Communities, held in Belgirate, Italy, 26-29 October 1993. E & FN Spon, London, UK.

Vose D. (2000): *Risk Analysis - A quantitative Guide*. John Wiley & Sons, London, UK.

Glossary of Meteorology.Baguio.Retrieved on 2008-06-11.

Atlantic Oceanographic and Meteorological Laboratory, Hurricane Research Division. "Frequently Asked Questions: What are the upcoming tropical cyclone names?".NOAA.<http://www.aoml.noaa.gov/hrd/tcfaq/B2.html>. Retrieved 2006-12-11.

Republic of the Philippines.Department of Science and Technology.Philippine Atmospheric, Geophysical and Astronomical Services Administration.(n.d.).The Modified Philippine Public Storm Warning Signals.Retrieved February 24, 2011.

Leoncio A. Amadore, Ph.D. Socio-Economic Impacts of Extreme Climatic Events in the Philippines.Retrieved on 2007-02-25.

"Situation report no.50 on Typhoon Ondoy (Ketsana) and Typhoon Pepeng (Parma)". Philippine National Disaster Coordinating Council.2009-11-17.

**Websites**

[^http://www.mnn.com/earth-matters/climate-weather/stories/as-typhoon-nesat-departs-philippines-tallies-the-damage](http://www.mnn.com/earth-matters/climate-weather/stories/as-typhoon-nesat-departs-philippines-tallies-the-damage)

[^http://210.185.184.53/ndccWeb/images/ndccWeb/ndcc\\_update/TC\\_FRANK/sitrep33\\_tyfrank.pdf](http://210.185.184.53/ndccWeb/images/ndccWeb/ndcc_update/TC_FRANK/sitrep33_tyfrank.pdf)

<http://australiasevereweather.com/cyclones/2004/summ0406.htm>. Retrieved 2007-01-13.

(<http://generalhowitzer.hubpages.com/hub/Worse-Floods-in-the-Philippines>, Accessed, March 23,2012)

(<http://webapps.icma.org/pm/9102/public/cover.cfm?author=christine%20becker&title=disaster%20recovery%3A%20%20a%20local%20government%20responsibility>)

<http://www.usgs.gov/themes/flood.html>

[http://www.gisdevelopment.net/application/natural\\_hazards/floods](http://www.gisdevelopment.net/application/natural_hazards/floods)

[http://en.wikipedia.org/wiki/Flood\\_mitigation](http://en.wikipedia.org/wiki/Flood_mitigation)

<http://www.merineews.com/catFull.jsp?articleID=123321>

<https://online.apus.edu/educator/temp/mk1275/edmg502a001win09/Weekfour/agilityanddisciplinecriticalsucess.pdf>