

**Local Government and Community-based Responses to Changes in
Socio-economic Structures due to Flood Risks¹**
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Abstract

Local governments and communities in the Philippines remain vulnerable due to the lack of ability to resist the impact of flood disasters affecting their livelihoods, lands and other assets, and even access to health services. This paper examines such changes in socio-economic structures due to flood risks through local government and community-based responses in the Province of Iloilo, Philippines. Quantitative and qualitative techniques were employed through surveys, structured interviews and focused groups. Findings reflected that local government responses remain to employ Disaster Preparedness Plans as mandated by the National Disaster Coordinating Council (NDCC). Approaches to disasters remain to be primarily structural and technological through the assistance of national government and other funding agencies. Disaster Preparedness Plans, Staff Units, Task Committees and Operations Center were re-organized while other local governments conceived First Responder Groups to address the problems and needs of the victims in crisis caused by natural and man-made calamities. Community-based responses showcased the values of access to communication and information, planting-re-planting-and-re-growing approaches, openness to technology and intervention, planning for crop production decision-making, community-based flood controls, and community organization. It also highlighted community-based Indigenous knowledge focused on traditional forecasting methods and indigenous mitigating measures.

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1. Introduction

1.2. Flood Hazards in the Philippines

The Philippine archipelago due to its location and natural attributes is prone to natural hazards. It is situated in the Pacific Ring of Fire where two major tectonic plates of the world, i.e. the Pacific Plate and the Eurasian plate, meet; this explains the occurrence of earthquakes and tsunamis, and existence of 220 volcanoes of which 22 are classified as active because their eruptions have been found in historical records; It is located along the typhoon belt on the Western North Pacific Basin where 66 percent of tropical cyclones enter or originate. Typhoons average 20 events per year; five to seven of which can be rather destructive. The eastern seaboard is highly exposed to typhoons with wind speeds greater than 150 kilometers per hour; Mean annual rainfall in the country varies from 965 mm to 4,064 mm. Extreme rainfall events trigger landslides and lahar flows and are responsible for severe and recurrent flood in low lying areas. Tropical cyclones are responsible for an average of 40 percent of the annual rainfall in the country. Slow moving or almost stationary tropical cyclones account for extended periods of rainfall (Country Report, 2008).

From 1948 to 1991, 869 typhoons have passed the Philippine area of responsibility. These meteorological events may have a lower frequency during the El Nino and Southern Oscillation Periods, as many parts of the country experience severe drought in these intervals. The normal high incidence of typhoons brings in heavy rains when it coincides with the southwest monsoon occurrence in the months of June to September. Storm surges accompany tropical depressions and cause extreme flood occurrences. They devastate many low-lying coastal areas. The flood plains of Agno, Agusan, Bicol, Cagayan, Cotabato, Pampanga and Panay river systems are highly susceptible to severe flooding. Low-lying agriculturally developed and economically productive lands in Bicol, Central Luzon, Eastern Mindanao, Central Samar and Northern Samar regions are also frequently devastated by extreme flooding events (Zoleta-Nantes, 2000).

Flooding in the Philippines has become the most prevalent disaster since 2000. Areas along the over 17,000 km coastline are increasingly exposed to high risk and more vulnerable to tidal surges (some associated with seasonal typhoons) due to high population density. These are attributed to environmental factors such as denuded forests that continue to aggravate flood risks. The pace of deforestation since the 1930s accelerated in the 1950s and 1960s, before falling slightly in the 1980s. Even now, the effects of loose soil and reduced forest cover from past forestry activities are evidenced by frequent landslides and floods. The likelihood of drought and poor availability of water is also increased by the loss of forest cover (Country Report, 2008).

1.3. The Threats of Flooding

There have been many researchers who have considered floods as a natural hazard that have affected many people causing changes in social as well as economic structures such as damage to property and to life (UNDRO, 1976; Cuny, 1990; Gupta, 1990; Palm, 1990). Among the many factors that contribute to the natural occurrence and its adverse effects are brought about by overflow of rivers produced by prolonged seasonal rainfall, rainstorms, snowmelt and dam-breaks, accumulation of rainwater in low-lying areas with high water tables or inadequate storm drainage, and intrusion of seawater on to land during cyclonic tidal surges (Handmer et al., 1999 in Few, 2003).

Heavy rainfall is the most common cause of floods. 'These vary from the semi-predictable seasonal rains over wide geographic areas, which give rise to the annual monsoonal floods in tropical areas, to almost random convectional storms giving flash floods over small basins (Smith, 1996 in Few, 2003).' The magnitude, speed of onset and duration of the flood will then be influenced by factors such as topography, vegetation and soils, river alteration, land use and urbanization. Urbanization worsens floods by reducing the permeability of ground surfaces and increasing runoff rates.

Urbanization also complicates flooding events by increasing the area of impermeable surfaces by the encroachment of roads, housing and other land uses onto floodplains; the silting of canals and riverbeds or the obstruction of waterways due to improper construction (White 1945; Ward, 1978; Miller, 1999; in Zoleta-Nantes, 2000).

1.4. Impacts of Flooding

There has been the common notion that flooding is by no means a phenomenon solely of negative consequence. But it is quite contrary because it is not entirely so. Fundamentally, floods bring widespread economic and environmental benefits (Blaikie et al., 1994). Floods can irrigate and fertilize fields, flush out salts and toxins from soils and watercourses, and recharge reservoirs. In many regions, annual flooding sustains current levels of agriculture. On the personal level, it can be noted that there are even some who make financial gains from otherwise damaging floods – from laborers contracted to clear waste and raise yards to those national and local institutions sustained by the external resources targeted toward flooding.

Other benefits derived from flooding includes supplement of sediments, flushing of toxicity from sulphate soils, reduction of salinity intrusion, insects and rats are driven out of the fields, acid ground water storage, raising of water table, fish supply is increased due to planktons, catchments of snakes, frogs, snails and others, growing of edible vegetables, replenished fertility of floodplains, continuation of natural lifecycles to mention a few.

Negative impacts of flooding in the Philippines however have become predominant especially in terms of structural interventions to address certain

unwanted effects. It has brought about devastation to life and livelihood caused by episodic, catastrophic floods that drown people and livestock, sweep away bridges, vehicles and buildings, and force the survivors to abandon their homes. Moreover, in severe weather events such as hurricanes and tropical storms, flooding is often part of a hazards complex including mudslides and violent winds that compound the short-term and long-term devastation.

Even frequent flood events of a lower magnitude can still bring serious damage and disruption by ruining crops and causing food scarcities, disrupting infrastructure and access to services, suspending business activities, and exacerbating health risks in the home and local environment (Blaikie et al., 1994). Moreover, the persistence of floodwaters means that people may continue to face those disruptions and hazards for weeks and even months on end. Most low-income residents of developing countries do not have a realistic option of moving elsewhere while waters recede. It can be noted that even in the case of extreme flood events, people may not move far from their former homes. As devastating floods usually shows that in many areas, displaced people were accommodated in local schools. In the Philippines, the same picture is reflected with people relocating themselves in nearby schools, gymnasiums and churches.

1.5. Coping Capacity

The capacity to cope is increasingly seen as a key component of surviving a disaster. At the end of the 1980s, Anderson and Woodrow stressed the need to identify the capacities that already exist in societies when designing disaster-related development interventions. Since then this positive aspect has been further explored.

Adaptation is a key concept among communities and governments. If exposure refers to the risk of floodwater incursion into 'living spaces', then resistance and resilience refer to human capacity to minimize the impacts of that incursion through some form of adaptation. Drawing on the previous discussion of coping mechanisms, it could be argued that people facing flood risk may take action (a) to prevent the spread and penetration of floodwaters through physical means, and (b) to reduce negative effects from floodwaters through actions such as livelihood diversification, relocation of belongings or the community distribution of emergency drug supplies. Blaikie et al. (1994) describe how such hazard coping strategies may comprise preventive, impact-minimizing or post-event coping actions.

1.6. Intervention at the Local Level

The potential scale of future flooding threats (IPCC, 2001) and the limited success of major technological interventions in flood prevention (Blaikie et al., 1994) suggest that intervention efforts designed to build up the assets of the poor to withstand shocks will be increasingly important in reducing the human burden from flooding. That implies support for actions at the local level designed to strengthen communities' own resistance and resilience to flood hazard – support

that takes on still more importance in contexts where the risk management capacity of governmental institutions is weak (Chan, 1997 in Few, 2003).

Seeing that intervention should also be provided to the local levels, the World Conference on Disaster Reduction held in January, 2005 in Kobe, Japan provided a framework for building the resilience of nations and communities. The “Hyogo Framework for Action 2005-2015 outlined one of the overarching principles which is the enhancement of the current capacities of local communities in order to resist disasters. That is why the role of local governance in strengthening communities’ capacities is paramount (Integrating Disaster Risk Management in Local Government, 2006).

Hazard-related fields have been relatively slow off the mark in engaging with the broader debates on governance, participation and community-based development. However, calls for greater community involvement in intervention programs and greater emphasis on strengthening coping capacities at the local level are now frequently heard (Maskrey, 1999) and intervention practice is shifting.

In the study conducted by Zoleta-Nantes (2000), people signify their intent to participate actively in flood mitigation and disaster management. For example, in Vietnam, people volunteer to work for ten days to a month annually to repair breached dikes and participate in other disaster mitigation activities.

Non-government organizations also play a crucial role to these programs such as determining ways to improve the garbage collection system in a community. The expertise of non-government organizations to develop social networking may be used for developing neighborhood-based trash collection and disposal and may be expanded to the development of a flood early warning system (Punongbayan, 1987). For an efficient flood disaster strategy, guidelines can be effective when they are not simply set by the workers of official and legal institutions. There is also the need to consider the residents of communities that face the challenges of inundation. Informal connections that exist among people and capitalizing on such relationships is also important.

Fostering community-based technologies for hazard reduction interventions can also aim to strengthen social and political capacities at the local level to organize and lobby. Intervention to strengthen capacities to cope is also seen as a positive step toward empowerment of communities rather than the reinforcement of dependency associated with flood relief efforts (Blaikie et al., 1994). Indeed, for some authors, this level of action is the key:

“Only by harnessing the huge and largely untapped potential of vulnerable communities to manage and reduce risks at the local level and by providing appropriate support to their efforts, will it be possible to look

forward to a more sustainable future in the next century and beyond (Maskrey, 1999).”

That is why the chances for developing an effective hazard reduction program are great if there is cooperation among different sectors of the community that is affected by flood hazards (Mitchell, 1988). At the same time, action to counter vulnerability to flood hazards needs to work hand in hand with action to reduce poverty and promote sustainability. Indeed, sustainable development in the context of a flood-prone area arguably implies supporting people’s capacity to ‘live with’ floods rather than attempting to ‘engineer’ away the problem. Sustainable development ‘means accepting the inevitability of flood occurrence and uncertainty of flood impact, and developing strategies to cope with this reality’ (Handmer, 2000 in Few, 2003).

1.7. Disaster Coordinating Council: Philippines

The National Disaster Coordinating Council (NDCC) is the focal organization in disaster risk management for the country. It was formally established by Presidential Decree (P.D. no. 1566) in 1978. It also functions together with the Regional Disaster Coordinating Councils and Local Disaster Coordinating Council. The disaster coordinating councils is an inter-institutional arrangement or “collegial body” consisting of 17 national government agencies and one non-governmental organization, the Philippine National Red Cross. The NDCC establishes the priorities in the allocation of funds, services, and relief supplied and plays an advisory role to lower Disaster Coordinating Councils through the Office of Civil Defense by issuing guidelines. The NDCC utilizes the facilities and services of the Office of Civil Defense (OCD) as its secretariat and executive arm. The NDCC issues guidelines on emergency preparedness and disaster operations (NDCC, 2008).

The national disaster preparedness plan specifies that disaster coordinating councils be established for national, regional, Metro Manila, provincial, city or municipal, and barangay level. All implementing plans shall be documented and copies furnished to National Disaster Coordinating Council through the Office of Civil Defense. Each disaster coordinating council shall maintain a disaster operations center. However, until this time, it could not be ascertained if all local government units have a working Disaster Coordinating Council.

1.8. Case in Focus: Typhoon Frank (Fengshen)

In the period from July 2007 to August 2008, major typhoons hit the headlines and their secondary impacts continue to be contentious issues even after several months. In late June 2008, Typhoon Frank (Fengshen) battered 58 provinces across 15 regions indirectly affecting more than 900,000 families or 4M persons in 6,377 barangays of 419 municipalities.” A secondary impact of the typhoon was the sinking of a ferry that was suspected to carry a cargo of a toxic pesticide. There were 557 reported deaths with at least 827 injured and 87 missing. The

incident brought back recurring issues of the inadequacy of maritime safety and warning through “seven sea tragedies over two decades.” The coverage given by media to the incident also drew the attention away from some towns needing relief, some stakeholders accused (PDCC, 2008).

The total cost of damage to infrastructure and agriculture of Typhoon Frank (Fengshen) alone was PHP13.525B. Sixty percent of the damage was in the Western Visayas region, which contributes 6.5% to the national GDP. The amount is equivalent to 0.7% of annual GDP (PDCC, 2008).

1.8.1. The Wrath of Frank: An Overview on its Effect to Iloilo Province

In the Western Visayas region, the Province of Iloilo is grieving over its billion (P1,212,721,500) losses, not mentioning the national government managed infrastructures, after Typhoon Frank (Fengshen) inundated almost ninety per cent (90%) of its municipalities. Water was everywhere in the whole province. Rivers and creeks overflowed. Dams were damaged and constantly releasing more and more water. Erosions occurred in the mountain ranges in Central Iloilo that resulted thick silts to cover the flooded areas in the province. This incident has likewise led the city of Iloilo to suffer the same fate (PDCC, 2008).

“Frank” left a damaging trace on multi-million properties on agriculture and infrastructures. It affected more than half million population (612,071) and taking lives of one hundred twenty one (121) individuals as of June 27, 2008. Houses along the river banks were washed away while others suffered losses of properties. PDCC still expects more reports would come in (PDCC, 2008).

Iloilo residents claimed that this is the “FIRST” of its kind in Iloilo history. It is estimated that about 35% of the whole population lamented for their losses. According to the report of the Iloilo Provincial Disaster Coordinating Council (PDCC, 2008) as of June 26, 2008, thirty nine (39) municipalities were greatly affected by the tempest. Out of 1,721 total number of barangays in the whole province, 1,070 or 62% were directly affected. PDCC noted that a total of 117, 338 or approximately 45% of the total numbers of families were being flooded for 1-2 days.

The unexpected volume of water drowned several government infrastructures such as roads, bridges, public offices, school buildings, hospitals and agricultural properties. The total damage surmounted to over a billion pesos. According to the assessment provided by the Provincial Engineer’s Office (PEO), the stated losses on infrastructures alone are estimated at P91. 2 M. With the brunt of Typhoon Frank, 12 major bridges were destroyed and damaged with an estimated loss of P64 M. It also wrecked and corroded several roads leaving a damage of about P8 M that greatly affected the entire transport sector in the Province. These losses distressed the Iloilo Provincial Government, as it paralyzed the delivery of immediate relief services, specifically food, water and health services.

The Agriculture Sector also suffered a lot. Agricultural properties were badly damaged by the flood. Erosions occurred leaving thick silts covering the lowlands. The considered rice granaries of the province comprised of the municipalities of Pototan, Dumangas, Barotac Nuevo, Sta. Barbara, Pavia, San Miguel, Mina and Leon have been badly damaged. PDCC reported that a total of 24,162.28 hectares of farmlands in the 21 municipalities were affected, creating an estimated damaged of almost P800 M. All in all, it accounted to an estimated 83% total losses in agriculture.

On the other hand, fish farms also suffered a multi-million loss on production especially on the coastal areas of the province. PDCC noted that almost P230 M has been lost in 6 municipalities, comprised of Ajuy, Leon, Tigbauan, Banate, Dumangas and Barotac Nuevo.

For the health sector, three (3) District Hospitals, namely: Barotac Viejo District Hospital in Barotac Viejo, Federico Roman Tirador, Sr. Memorial District Hospital in the municipality of Janiuay and Dumangas District Hospital in the municipality of Dumangas, suffered great loss amounting to about P126 M. Hospital buildings, newly acquired equipment and facilities were destroyed. The remaining 10 district hospitals to include the Iloilo Provincial Hospitals were also partially damaged with a total estimated loss of P12M. Four (4) Rural Health Units (RHUs) in 4 municipalities and some of the Barangay Health Stations are included in the damaged report. It also created trauma among patients who are presently confined in these health institutions.

In the northern part of Iloilo Province, “Frank” blew away the school buildings. Desks were thrown away and the school facilities, books and reference materials were all wet and destroyed. Island schools were badly hit.

2. Objectives

The objective of the study is to analyze local governments and community-based responses to changes in socio-economic structures due to flood risks in the Province of Iloilo, Philippines in the aftermath of Typhoon Frank (Fengzhen) in 2008.

Specifically, the research tried to find out local government responses to changes in socio-economic structures due to flood risk; to identify the farming community’s response to changes in socio-economic structures due to flood risks; and to determine community-based knowledge among farmers in the management of flood.

3. Methodology

Local governments and communities in the Philippines remain vulnerable due to the lack of ability to resist the impact of flood disasters affecting their livelihoods, lands and other assets, and even access to health services. This paper

examines responses to such changes in socio-economic structures due to flood risks through local government and community-based responses in the Province of Iloilo, Philippines.

This was a descriptive cross-sectional study. Both quantitative techniques (questionnaires and structured interviews) and qualitative data collection methods (focus group discussions and key informant interviews) were applied. A list of frequently flooded areas in the province was drawn considering three municipalities that were seriously affected by Typhoon Fengzhen (Frank) based from secondary data. Three barangays for each municipality were then randomly selected to give the coverage of the sample with a view to accommodating local government and community responses to social changes due to flood risks. Choice for the case was based on the lessons the typhoon brought about and the damages it incurred. At the same time, it is significant to validate reports so that policies can be based from real needs of the people in such disastrous events. In terms of limitations of the study, considering that this is a part of a dissertation and that there is the lack of resources and time, the researcher only considered a few respondents.

4. Demographic and Socio-economic Characteristics

Respondents of all ages (18 to over 60) were represented in the household survey. The survey indicates that the main occupation of most households (63.3 per cent) is subsistence farming, which is fairly typical of the general population. The modal gross family income was below Php 2,500 (USD50), which represented 72.8 per cent of households. Only 6.3 per cent earned above KES 9,000 (USD180). These low-income levels among the study population may be attributed to low levels of education with only a quarter (24.5 per cent), ownership of land (26.1 per cent), and lack of access to health services (26.5 per cent). This trend could be associated with slow economic progress and low income per capita in the area.

5. Research Findings/Results

Data from this study reveals only 8.7 per cent of the respondents first become aware of impending floods through official means when Typhoon Frank came. It was fortunate to have happened during early morning after having alerted by sirens of fire trucks. The rest (91.3 per cent) relied on informal flood detection techniques such as schools, church and barangay center bells. There were those who said that they were informed out of the commotion brought about by panic of some residents. Others claimed to have been alerted when neighbors called upon them that water was fast rising. Others claimed to have awakened when stones were hurled over their houses by their neighbors thus alerting them. On the other hand, there were those who claimed to have predicted floods because of observing changes in the rain that heavily poured and the swift rising of river levels. Such observations helped them to prepare in any flood events that would occur.

5.1. Government Response

Data for the survey reflected that half (50.2 per cent) received support from multiple sources among respondents who experienced flooding. It was noted that a greater percentage (87.1 per cent) of support received was from the government disaster programs. Around 17.2 per cent received help from non-governmental organizations while 1.7 per cent was from assistance provided by relatives, friends and private donations. Assistance included temporary shelter and distribution of food, blankets, water and water purifying tablets and mosquito nets. Respective barangay officials and concerned citizens also engaged the local community in digging proper drainage systems while at the same time declogging canals. There were also some MRFs (materials recovery facilities) that bought recyclable garbage that hastened clearing but at the same time provided money to the residents. Various organizations also encouraged tree planting by distributing seedlings to schools and village youths.

5.1.2. The immediate interventions

The ruins of Typhoon Frank (Fengshen) has touched many concerned groups to lend their hands to the victims. Spearheaded by the Iloilo Provincial Government, relief goods, medical supplies and financial aid were given to the victims. On the same day, coordination with government line agencies, NGO's, Philippine National Red Cross, US government thru US Navy and European Union, the IPG was able to raise aids in various forms amounting to almost P50 M. Of the total amount, almost P24M went to social welfare and another P24M went to the basic health services. IPG also allocated an amount of P1M for the immediate repair of public structures (Province of Iloilo, 2008).

The Chairman of the Provincial Disaster Coordinating Council and the various departments of the Iloilo Provincial Government conducted monitoring and assessments in the aftermath of the typhoon and looked into immediate needs of the people such as food, shelter, clothing and medicines. While the typhoon victims were temporarily housed in schools, churches and public plazas, others sought temporary refuge among their relatives and friends. Most of the relief goods were brought and given in various refuge centers all over the province. The Provincial Health office personnel also conducted medical missions in various centers to minimize and prevent spread of communicable and water-borne diseases (Province of Iloilo, 2008).

5.1.3. Flood Control Project

Located in the tropical climate zone, the Philippines is hit by typhoons that are born in the Pacific Ocean annually. In addition, Iloilo City and its outlying areas, stretching over low and flat land, are vulnerable to large-scale flooding and mudslide disasters frequently during the rainy season. Every year, the flooding problem in Iloilo causes millions of pesos in damages and unfavorable investment competitiveness (PIA, 2009).

The Iloilo Flood Control Project is the long-term solution to the perennial flooding in the city and outlying areas. It also aims to improve living environments and sanitary conditions of local residents, and consequently help develop the regional economy, by setting in place disaster prevention civil works in the state of Iloilo on Panay Island. With a budget of P4.3B, it is the largest infrastructure investment Iloilo City has ever received. The project is due for completion in 2009.

5.1.3.1. Component I

Package 1 – This package included the construction of Jaro Floodway (4.75km) including four bridges (344m in total) from Aganan, Pavia to Brgy. Balabago-Bito-on, one hydraulic structure, five drainage outlets, and two invert siphons; Improvement of Tigum River (2.90km) including one bridge (105m) and 17 drainage outlets; Improvement of Aganan River (3.88km) including one bridge (105m), one hydraulic structure, and 15 drainage outlets. Package 1 is under contract with Hanjin Heavy Industries and Construction Co., Ltd. (Korea).

Package 2 – This package included the improvement of Iloilo River (4km) including one bridge (114m), riverside park improvement, and 12 drainage outlets; Improvement of Upper Ingore Creek (2.96km) including seven box culverts; Improvement of Jaro River Mouth (5.63km) including one box culvert at Ingore, outlet structure for Ingore diversion, and 13 drainage outlets. Package 2 is under contract with China International Water & Electrical Corporation (China).

Package 3 – This package included the development of Sooc Relocation Site, Mandurriao, Iloilo City; and the upgrading of Access Road to Kasadyahan Relocation Site in Brgy. Balabag, Pavia, Iloilo.

Package 4 – This package included the development of 25-30 hectare property/land that will be purchased by the Iloilo City Government

5.1.3.2. Component II

The second component includes assistance in the resettlement of project Affected Families (PAFs) including the preparation of the livelihood program for the PAFs; Information Education Campaign on flood control and the prevention of illegal waste disposal into the waterways; Study on the sediment condition in the upper basin (Watershed management study and formulation of watershed management plan); and Study on the improvement plan of the solid waste management program specifically for project sustainability.

5.1.4. Disaster Preparedness Plan – Province of Iloilo

Before the onslaught of Typhoon Frank (Fengshen) in June 2009, The Province of Iloilo has already conceived a disaster preparedness plan approved for implementation in 2004. The primary objective of the Plan was to ensure effective and efficient implementation of civil protection program through and integrated, multi-sectoral and community based approach and strategies for the protection and preservation of life, property, heritage, culture and environment (PDCC, 2004).

This Plan embraces all conceivable contingencies, short of war emergencies making use of all available resources, both government and private. It also develops self-reliance by promoting and encouraging the spirit of self-help and mutual assistance among the local officials and their constituents. It is expected that each political and administrative subdivision of the country shall utilize all available resources in the immediate area before asking for assistance from neighboring units or higher authority. While emergency preparedness is a joint responsibility of the national and local governments, its effectiveness will depend largely on the skills, resources and the involvement of private organizations and the general public in the area of disasters. To this end, regular exercises and drills will be conducted at all levels to enhance the people's reaction capability and ensure precision and spontaneity in responding to emergencies.

This Plan presents among others the composition and responsibilities of the municipal organization for emergencies, the organization that will provide the vehicle for a concerned and coordinated disaster control effort from the municipal to the barangay level. Under this Plan, the Provincial Disaster Coordinating Council (herein referred to as the PDCC) shall exercise direction and control local emergency operations.

The Council shall coordinate the support/assistance activities in disaster management through this organizational arrangement of local offices, agencies and organizations. It shall likewise provide top executive management and control over-multi-office types of disaster-stabilization operations. The functional relationship between the Council and the Tasked agencies of the government shall be such that the different offices and agencies extend support/assistance to the Provincial Disaster Coordinating Council. Following are the tasks and staff elements:

Tasks

The Provincial Disaster Coordinating Council shall have the following tasks:

1. Establish a physical facility to be known as the Provincial Operations Center
2. Coordinate from the Center concerning disaster operations activities
3. Implement within the Province guidelines set by the Regional Disaster Coordinating Council
4. Advise the Barangay Disaster Coordinating Councils in the locality regarding disaster management
5. Submit recommendations to the RDCC, as necessary; and
6. Place the Municipal/City Disaster Coordinating Councils and its units under the operational control of the PDCC during emergencies which effects the towns and the city itself
6. Coordinating Instructions
7. Administration and Logistics
8. Control. The direction and control of disaster operations at the municipal level will be exercised by the PDCC. Direction and control will be exercised through the Disaster Operations Center.

Staff Elements	Duties and Functions
1. Intelligence and Disaster Analysis Unit	This unit evaluates disaster situations, determines courses of action to follow in times of emergency and formulates guidelines in evaluating disaster situations. a. Evaluate information and advises the member-agencies of the national/provincial/city/municipal disaster control center of impending disasters. b. Make recommendations on how to prevent disasters, if possible, and/or suggest precautionary measures to minimize the effects of disaster. c. Prepare appropriate recommendations to proper authorities for possible declaration of the existence of a State of Calamity in affected areas. This recommendation shall serve as a basis for the request for the release of calamity funds to ameliorate the sufferings of the disaster victims. d. Submit recommendations for allocation of needed resources.
2. Emergency Management Information system (EMIS)	This Unit provides vital information on the following: a. Emergency reporting and monitoring b. Emergency logistic management c. Emergency food management d. Geographic information system (GIS)
3. Vulnerability Reduction and Risk Management	This Unit conceptualize and facilitate programs, projects and activities of DCCs concerning vulnerability reduction and risk including hazard and risk mapping.
4. Rapid Needs and Damage Assessment	a. Determines extent and nature of damages in terms of private properties, infrastructure, damaged. Lifeline agricultural production, population and casualties; b. Obtains complete picture of the situation, past impacts, initial actions surveys, follow-up survey and the development of information picture c. Assesses the needs and requirements of the stricken communities. d. Establishes accessibility into and within the stricken area/s for purposes of emergency response operations and provision of immediate assistance.
5. Plans and Operations Unit	a. Determines courses of action to be taken based on recommendations of the Intelligence and Disaster Analysis Unit. b. Determines the type of service units to be utilized in the disaster area. c. Maintains and/or supervises progress of operations and determines the necessity of utilizing additional service units. e. Prepares appropriate reports upon termination of operations.
6. Resources Management Unit	Undertakes a survey of urgent items needed in helping the victims of disasters and calamities as well as gathers the necessary statistics on resources such as: 1. Food - rice, corn, canned goods, vegetables, fish, meat, soft drinks and other grocery items; 2. Clothing - clothing materials and footwear; 3. Construction materials - lumber, cement, roofing materials and hardware; 4. Medical supplies - medicines;

	<p>5. Transportation - government and private vehicles be made available; 6. Other rehabilitation items - seeds, planting materials, pesticides, fertilizers, livestock and fingerlings. Resources surveys will include the names and address of dealers, agencies or persons who may donate, contribute or make available such resources which may be needed to ameliorate disaster or calamity victims and to release such data for immediate reference to those who are called upon to render assistance and relief to the victims. b. It shall be the continuing task of updating its data and furnishing same to all concerned for ready reference and guidance.</p>
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Provincial Disaster Coordinating Council Disaster Preparedness Plan 2004,
Province of Iloilo, The Philippines

Period	Measures
Pre-Disaster	<p>1. Keep the surroundings clean; 2. Free the waterways/canals/drainage system from trash and solid waste materials; 3. When typhoon warning is announced, batten down or secure weak habitations against strong winds or swift currents, as well as, board up windows with lumber securely fastened; 4. Check everything that may be blown or turn loose; 5. Those residing by the banks of rivers, subject to sudden rise of water levels during rainstorms, should be prepared to evacuate early to designated Evacuation Centers, when typhoon warnings are issued; 6. Stock adequate supply of rice, canned food/goods and ready-to-eat food; 7. Stock adequate supply of safe/purified drinking water; 8. Prepare enough pieces of dry and clean clothes; 9. Every household must have a ready kit consisting of a flashlight with extra battery cells, candles, lamp or “petromax” and lighters/matches; 10. Every household must have a supply of antibiotics, paracetamols and antipyretics, disinfectant antiseptic (alcohol), bandages and other medical supplies for use in case of emergency; 11. Check supply of Liquefied Petroleum Gas (LPG) or stock of firewood; 12. Ready battery operated transistorized radio and keep extra batteries; 13. Each member of the family, under the concept of “family disaster preparedness” must be briefed of their roles and respective responsibilities in case of evacuations; 14. Submit for immunization against cholera, dysentery and typhoid, as required by health authorities; 15. Trim/cut branches of trees growing beside the road/highways or near houses/buildings or electrical lines. In case branches actually touch or are very near the lines, seek assistance/advice from ILECO local office; 16. Take other</p>

	necessary precautionary measures/preparations.
During Disaster	<p>1. Keep battery transistorized radio on and listen for the latest PAGASA bulletin and announcements and monitor local situation; 2. Turn off the Main Electrical Breaker/Switch when the water starts to rise; 3. When the area is flooded, treat all fallen wires as “alive” or still carrying electricity and warn all those around, especially children to keep away and immediately call up local office of ILECO. 4. When there is flood, unplug all appliances and place them in high and dry locations; 5. During thunderstorms, turn off and unplug all appliances and remove the cable T.V. connection; 6. Never use the electrical poles to anchor your houses or clothesline or go near the poles during wet weather; 7.If possible stay inside the house during flood and stay dry 8.When necessity requires one to go out of the house during the occurrence of flood the following must be observed; to wit: a. Be cautious of canal/drainage openings or erosions; b. Avoid roads/ways leading to the river/open drainage; c. In crossing a river with strong current, use a rope where one can hold with the other end fastened to a permanent structure or tree; d. Upon return to the house, wash feet and legs with clean water and soap or alcohol. 9. Occupants of dwellings affected by swift currents should move to high areas or to an Evacuation Centers when the depth of flood is still below knee depth; 10. If one is outdoor, stay on higher ground and keep dry; 11. If one is inside a vehicle, drive to higher ground, wait until the flood recedes and drive when conditions permit; 12. Do not go swimming or boating for fun on rivers during flood; 13. When the area is flooded, be extra-careful of snakes, rats and insects; 14. Do not sleep or spend the night in dwellings close to the bank of the rivers when there are indications of fast rising water levels due to continuing strong rains; 15. Each member of the family must function their respective roles and responsibilities during evacuations; 16. When the stock of drinking water supply runs out, drink only boiled or purified water; 17. Eat only well cooked food or canned goods and protect left-over against contamination; 18. Refrain from getting intoxicated; 19. Stay away from low-lying beaches or other locations which may be swift by high tides or storm waves; 20. If the eye of the typhoon passes over your place, there may be a lull lasting for a few minutes to half an hour, make emergency repairs during the lull if necessary, but remember the wind will return suddenly from the opposite direction and usually with even greater force; 21. Be calm. Your ability to meet the calamity will inspire and help others; 22. Extend help to those in need; 23. Take other necessary precautionary measures.</p>

Post Disaster	1. Make necessary coordination with the Barangay Disaster Coordinating Council and render report on damages, missing members of the family and/or casualties; 2. Bring victim/s that need medical attention to the nearest medical center; 3. When the stock of drinking water supply runs out, drink only boiled or purified water; 4. Eat only well-cooked food or canned goods; 5. Protect left-over against contamination; 6. All residents must immediately clean their respective households and surroundings; 7. Switch-on the Main Electrical Switch only when all lines and outlets are already dry and repaired from any damage; 8. Take other necessary precautionary measures.
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5.1.5. Re-Organizing the City Disaster Coordinating Council

One of the local governments considered in the study was the City of Passi which was also affected by Typhoon Frank (Fengshen) in 2008. It devastated vast agricultural lands and structures that promoted the city government to re-organize the city disaster coordinating council (City Disaster Coordinating Council, 2009). The purpose of which was to enhance the local survival capability against all types of natural disasters. It was also intended to make the council operational and functional with the organization of a Special Reaction Team composed of the Staff Units, Task Committees and the Operations Center to perform specific duties and functions as follows:

Staff Unit	Duties and Functions
1. Intelligence and Disaster Analysis Unit	Evaluate information and advice member agencies of impending danger; make recommendations on how to prevent disasters and suggest precautionary measures to minimize the effects of disaster; submit reports and recommendations for allocation of needed resources.
2. Plans and Operations Unit	Recommend courses of actions to be undertaken based on the recommendations of the Intelligence and Disaster Analysis unit; determine the types of service unit to be utilized in the disaster area; recommend the implementation of existing plans; maintain or supervise the progress of operation and determine the necessity of utilizing additional services; submit appropriate reports and recommendations upon the termination of operations.
3. Resource Management Unit	Identify and secure possible sources of funds for the victims of disaster/calamity; gather data on urgent items needed in helping the victims of disaster and calamities as well as the necessary resources such as food, clothing, construction materials, medical supplies, etc.
Task Committees	Duties and Functions
1. Health Service	Provide and prepare plans for the orderly and systematic

	<p>conduct of health service operations in the disaster area; undertake necessary measures to prevent health hazards which may be caused by the calamity on disaster; undertake necessary measures to prevent health hazards which may be caused by the calamity on disaster; supervise the sanitation of the affected area during and after the emergency; protect and preserve human lives through proper information and mobilization of all medical services as well as administration of medical needs; determine site of facilities for use as field hospital.</p>
2. Security and Fire	<p>Provides security in the disaster area; organize police auxiliary services and auxiliary fire services in the city and barangays; provide fire prevention and control services.</p>
3. Communication, Warning and Public Information	<p>Coordinate, direct and control communications and warning operations; provide, operate and maintain a continuous and reliable communications and adequate warning system throughout the period of disasters and calamities; provide accurate and timely information and instruction to the civilian population in the state of disaster; provide plans for the proper dissemination of information to prevent public panic in the disaster affected area; coordinate with government and private media in advocating the public on disaster preparedness and operation; provide effective communication linkages/facilities among the various agencies involved.</p>
4. Transportation, Rescue and Evacuation	<p>Prepare transportation plans for the council to consider; provide transportation facilities needed by the council prior to, during and after an emergency or calamity; initiate rescue and evacuation operations of lives and properties in the affected areas; determine in advance ideal sites for evacuation of all types of disaster.</p>
5. Relief and Rehabilitation	<p>Provide relief and rehabilitation services to victims of disaster/calamity; receive cash and item donations for victims of disaster/calamity; facilitate distribution of goods to the affected constituents; prepare rehabilitation plans for the victims of disaster/calamity.</p>
Operations Center	<p>Prepare and consolidate the overall plans as to the task, duties, capabilities of the different units, committees and members of the council; make a continuous updated estimate of personnel/manpower and resources capabilities of the different member agencies; ensure the optimum operation efficiency during calamities; consolidate all reports and recommendations upon the termination of operations for submission to higher disaster coordinating councils.</p>

5.1.5.1. Organization of the First Responder Group

One of the local government initiatives to address the problems and needs of the victims in crisis caused by natural and man-made calamities in the City of Passi, Province of Iloilo was the organization of a First Responder Group in 2009. Responding to the challenges of the past typhoon, the team was organized composed of 29 members to perform the stated major duties and function. Besides the orientation of their tasks, the team is also undergoing a series of trainings. Among them is a Medical Orientation Course aimed at increasing their knowledge and skills in the disaster management and emergency response operations. Objectives of which is to equip members the proper knowledge and skills on application of First Aid Emergency Medical Treatment; handling and usage of medical equipments and apparatuses; proper application of emergency medical treatment to victims; and fully equip and organize the First Responder Group (CDCC, 2009).

5.1.6. Adoption of Early Warning System for Disaster

In the 2008 Annual Report of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) of the Department of Science and Technology (DOST), it has successfully implemented the grant aid project entitled "Establishment of Early Warning and Monitoring System for Disaster Mitigation in the Philippines" in 2008. The project was funded by the Government of Korea, through the Korea International Cooperation Agency (KOICA). Among the partners of DOST-PAGASA in the implementation of the project is the provincial government Iloilo. The equipment installed under the project provides local planners and decision-makers with real-time data for use in the issuance of early warnings for floods. The observed data can also be used in the issuance of climate outlook and advisories for planning and decision making in order to mitigate the impacts of hydrometeorological extreme events. The direct beneficiaries of the project are the communities living in the flood prone areas in the province Jalaur river basin (Iloilo) and others.

With the prevalence of flooding in recent years, the community-based FFWS was introduced where observation facilities are operated manually by the Local Government Unit (LGU) and some members of the community. The KOICA project features a combination of both automated and manual system that are monitored by the DOST-PAGASA and the LGUs. The project highlights the participation and involvement of the LGUs and the community in the operation and maintenance of the FFWS facilities and the issuance of flood warnings based on warnings protocols provided by DOST-PAGASA.

The local government units included underwent training in the operation of the early warning system (EWS) as well as training of communities on how to respond to the flood warnings.

5.2. Community-Based Responses

5.2.1. Responses During the Flood

Nearly 96 per cent of respondents reported that Typhoon Frank (Fengshen) was one of the worst flood experiences that they ever had. They also claimed that it caused much destruction to their homes, farms and animals compared to the previous experiences that they had. There were those who further said that if it happened during the night, the impact of the flood could have been more disastrous. Among the emergency flood risks in this study were damage to shelter, loss of crops, shortage of food, loss of livestock, prevalence of disease, death and interruption of schooling. For some, leaving their homes was the only prudent decision. They also expressed concern on how to recover from such calamity. Some of them also grieved over their losses and was asking for assistance. Others were obstinate refusing to leave their homes because they had to watch over their properties. There were also those expecting that assistance from the local government would come the soonest possible time to provide for food, shelter and clothing. Prevention of the spread of diseases especially in evacuation centers was also one of their concerns.

5.2.2. After the Flood

Measures taken immediately after the floods included scrubbing and sweeping walls and floors while water is subsiding (89 per cent) while others cleared their vicinity with debris, drilled holes through walls to allow flood waters to flow through, removed flood waters from the house using containers, cooked on top of tables and other raised surfaces, and de-silting of trenches. It is only during extreme flooding that people evacuated. After the floods subsided, soil and mud remains on the floor that needed further cleaning. Other however could not longer go back to their homes and needed to stay in evacuation centers since their homes have been totally devastated. Major efforts made to avoid and/or reduce flood-related diseases included treating or boiling drinking water and gathering of debris and garbage (90 per cent). However, there were those who said that they were not able to have access to free check ups, consultations and medicines.

5.2.3. Disaster Interventions to Typhoon Frank Affected Families: Case In Focus

The Homeless People's Federation Philippines, Inc. (HPFPI) and Philippine Action for Community-led Shelter Initiatives, Inc. (PACSII) in 2008, together with the two urban poor federations in Iloilo City that comprised the Iloilo City Urban Poor Network (ICUPN) have facilitated the construction of transit houses and the provision of housing materials assistance for the Typhoon affected families. In the form of a loan, worth P5,000 per family-beneficiary, targeting 200 families in total. This project aims to support individual families through community associations to reconstruct/repair their houses. It was sponsored by the Misereor (Germany-based donor, Slum Dweller's International (SDI) and the Jersey Overseas Aid (UK-based NGO).

The project also aimed at building and empowering communities' and Network's capacities in financial, procurement, management and leadership skills. A team (Typhoon Frank Team as it was called), consisting of HPFPI and new ICUPN representatives, was created to assist the potential communities in the process and project monitoring. The implementing agencies are currently undertaking community orientation and participatory planning with target communities.

The Team tried to establish the procurement process at the community level by involving the people in the quotation, purchasing, ordering, releasing and recording of ordered materials. This community-based procurement process has been adopted by the Network, with first hand experience from Community Led Infrastructure Finance Facility (CLIFF) which is currently being implemented also in Iloilo City.

Community savings was also being induced in every aspirant community purposely to build communities' financial capacity and management. Individual repayment through the Association was treated as savings until the loan is fully paid. Repayment starts a month after full delivery of materials to every community. Savings was used as a strategy for people to appreciate the value of savings and eventually adopt it as a way of life. Some of the communities have already started community savings years ago but just needed revival efforts.

Two local associations, SILANA and COSHENA, or 75 families have also been receiving housing materials based on the individual order, eventually repairing their houses as proposed. The Team conducted project evaluation/assessment highlighting experiences and lessons learned among the communities as the project implementation occurred. Lessons learned were well-noted and taken into consideration to set as example for other communities.

5.2.4. Measures to Avoid Negative Flood Effects

Overall, community-based responses from the study on these key household practices revealed the most notable measures to avoid negative flood effects were:

- a. Clearing/digging of trenches
- b. Raising the floor of houses
- c. Planting trees/sisal around homes and farms
- d. Storing medicine
- e. Building terraces
- f. Evacuating to higher ground
- g. Listening to weather news/information in local radio stations – most accessible form of media since it is cheap, affordable and can easily be accessed even in the hinterlands
- h. Crop production – using varieties suited for wet season but it incurs further expenditures and difficulties due to its unavailability and expensive seedlings as well as the lack of access to these varieties

- i. Re-planting and re-growing of crops
- j. Planting less during flooding season
- k. Abandoning the fields
- l. Openness to technology and intervention
- m. Planning for crop production decision-making
- n. Controlling flood through irrigation, dams, dykes
- o. Reliance on external support systems – aids, government agencies, ngo, social institutions
- p. Community Organization - contribute money that is used to assist them during the flood times, community mapping and planning

5.2.5. Community-based Indigenous Knowledge

Traditional forecasting methods included:

- a. Prediction of coming of rains – variety of signs ranging from appearances of heavenly bodies such as observation of the skies and dark clouds that would cause heavy rains and rising level of waters, behavior of local fauna such as howling of dogs and extraordinary movements of insects, birds for natural disasters to occur, performance of local flora such as blooming of flowers for a fair weather.
- b. Superstitions when commencing farm activities – good luck and bad luck beliefs influenced decisions on timing planting and harvesting, and cultural approaches to certain farm operations such as rituals and offerings to spirits of the land to spare their farmlands from pestilence and floods.

Indigenous mitigating measures included: the construction of high-raised or elevated ‘kubo’ where they can place their products and furniture in times of flood; bamboo-make shift rafts are prepared as means of transportation during floods; Church and school bells as early warning devices; used cans as early warning devices to alarm the people that water is rising in the rivers.

6. Discussions and Conclusions

6.1. From Disaster Preparedness Plans to Disaster Risk Management

The Province of Iloilo and its cities have commendable disaster preparedness plans as responses to changes in the daily lives of their constituents. These efforts have been pursued to provide security, safety and as well as the social and economic well-being of constituents. It has addressed the need for effective disaster response through collaboration and cooperation among task groups, committees and units. There have also been attempts to develop a culture of prevention through the involvement of other stakeholders in the community. But despite being prepared, when disaster strikes such as the June 2008 inundation of the Province of Iloilo, and the entire region for that matter, as well as the most recent typhoons that ravaged the northern part of the country, destruction was very persistent and prevalent. Sadly, it is always the community-based organizations that provide the first line of relief when floods strike.

The very basic components of disaster risk management include risk assessment, disaster prevention and mitigation, and disaster preparedness. There are of course other models and modifications but the point is that DRM clearly shows that besides disaster preparedness, there are other measures that need to be considered. Community risk assessment refers to the community's awareness of any registers or records of past disasters and major natural events, precise studies including specific geological and climatic hazards and their causes in the local setting, surveys of the endangered population by gender and vulnerability, and participatory preparation and updating of hazard maps and vulnerability profiles. Community disaster prevention and mitigation refers to the community's awareness of disaster prevention and mitigation measures such as setting and enforcing local development and plans such as land use and structures, training the population and representatives of the community on disaster management, building up and strengthening local disaster management capabilities, sustainable resource management, improvement of local infrastructures. Community disaster preparedness refers to the community's awareness of disaster preparedness in terms of participatory drafting of emergency plans, infrastructure measures such as emergency accommodation in times of flooding, carrying out disaster preparedness exercises, building up and/or strengthening local disaster preparedness capabilities and local rescue services, local coordination and deployment planning, and indigenous knowledge and other early-warning systems to include setting up and operating communications systems, delivery of technical equipment, and operator training.

A disaster risk management model should be an approach developed by respective local governments' disaster risk reduction agenda when there are complex problems such as flooding and other disasters. Respective local governments will make it possible the formulation of proactive units or task committees at various functional and organizational levels of the local government. Such bottom-up approach in DRM will hopefully serve as basis for actions that needs to be done by provincial, regional or national government and other entities.

6.2. An Uneven Response

Despite the provision by the national councils of mitigating measures, responses among local governments and communities are 'uneven' in quality. Some regions and LGUs do not have a functional or viable disaster coordinating councils while other communities resort to the usual escape-and-evasion approach. Others on the other hand have learned how to live with floods and have made their lives even more productive. These differences can be attributed partly due to a lower level of recognition, value or importance of the hazards and risks by the inhabitants and the politicians that govern them. In one of the interviews conducted, it took a local government a year to 'take action' in improving their disaster preparedness plan and the organization of a First Response Group despite the unwanted effects of Typhoon Frank (Fengshen). This devolved

disaster management function among many local government units seems not to have dedicated offices to handle it unless disasters once again strike. Few local government units have opted to establish a disaster action center such as the one in Iloilo City while others have none. That is why adaptation approaches should be framed within the needs and experiences of respective communities while at the same time be included as a priority among politicians.

6.3. Integrating Structural and Non-structural Mitigation Measures

There is still a lot of emphasis placed on structural mitigation measures, and very little on non-structural measures that could contribute to reduce vulnerability in dealing with future floods. In the first place, the community is always the first to confront disaster risks and the ones who need to adjust to the changes that they will experience after the calamity. They will lose their livelihoods and incur additional expenditures on their part just to recover. Another reality is that most of the respondents were convinced about structural interventions. They believe that the area will be risk free from flood once the flood control project in Iloilo becomes functional. Such perception hopefully does not lead to the local community undermining its own coping capabilities and begin relying more on external aid. There have been mixed successes to structural interventions although a plenty have proved costly in financial and environmental terms such the P 4.3 billion flood prevention project. While maintenance remains to be costly, failure or poor maintenance of some have even exacerbated flood hazards such as artificial damming and eventually breakage of bridges causing more hazards. At the same time, some regions could not avail of structural solutions because they are just too costly or unaffordable.

There is therefore the need for local government and community sensitization to integrate structural and non-structural mitigation measures that would require partnership and cooperation. Local government should continue providing structural mitigation measures together with the community. Both stakeholders must be involved in the decision-making and management to achieve sustainability of projects and the creation of a risk free environment. Such is the involvement of the local community in watching over or guarding early warning devices installed in the Jalaur River Basin of the Province of Iloilo. At the same time, such integration can take place when local stakeholders such as farmers are also considered target clientele for transfer of appropriate technology, climate and climate information and forecasts and other modern interventions besides their indigenous forecasting methods.

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