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CASE STUDY

The role of local institutions in reducing vulnerability to recurrent natural disasters and in sustainable livelihoods development

Philippines

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CASE STUDY

The role of local institutions in reducing vulnerability to recurrent natural disasters and in sustainable livelihoods development

Philippines

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FAO Rural Development Division

ASIAN DISASTER PREPAREDNESS CENTER
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PREFACE

The Global data show that natural hazards are increasing in frequency and intensity. Recurrent natural disasters such as droughts, floods, and tropical storms have devastating impacts on the agriculture, livestock and fisheries, threatening the livelihoods of hundred thousands of rural people.

On the occasion of the World Conference on Disaster Reduction in Kobe, Japan (WCDR January 2005) governments, UN agencies and civil society strongly called for moving from concept to concrete action in disaster risk reduction. Building on the recommendations of the WCDR the General Assembly Resolution (March 2005) on 'International Cooperation on Humanitarian Assistance in the Field of Natural Disasters, from Relief to Development' calls upon all States to adopt, and requests the international community to continue to assist developing countries, appropriate measures to mitigate the effects of natural disasters and integrate disaster risk reduction strategies into development planning. Generally the WB estimated that economic losses worldwide in the 1990s could have been reduced by US$280 billion if US$40 billion had been invested in preventive measures, indicating a cost/benefit ratio equal to 7.

The Rural Institutions and Participation Service of FAO, SDAR, supports the view that "effective integration of disaster risk reduction into development, notably through strengthening the role and performance of rural institutions, will help transform 'vicious' spirals of failed development risk accumulation and disaster losses into 'virtuous' spirals of development risk reduction and effective disaster response".

The service tackles the topic of disaster risk management and its link to development from an institutional perspective, and more specifically within the context of ongoing decentralization processes. The working approach is built on the premises that the sound understanding of existing institutional capacities and possible gaps and the comparative strengths of different actors in DRM, particularly at decentralized levels, are key entry points for a successful shift from reactive emergency relief operations towards long-term disaster risk prevention and preparedness, as well as for the integration of disaster risk management into regular development planning. Over the last years SDAR has been and is implementing a range of field projects and normative activities in the areas of risk management and disaster preparedness. A specific programme focused on studying the "The role of local level institutions in reducing vulnerability to natural disasters", which has been implemented in collaboration with a range of partners including the Asian Disaster Preparedness Centre (ADPC), University of Cape Town (UCT), The World Food Programme (WFP), and several NGOs as well as local government representatives. This case study on the Philippines was commissioned in this context among other case studies. Its in-depth look at the situation in a disaster-prone area of The Philippines contributes to the understanding of the impact of local institutions in the design and implementation of disaster risk management strategies, as well as the role of local authorities in building community social capital for disaster prevention and preparedness. This understanding will provide insight and guidance on how disaster risk management may be integrated into development strategies.

TABLE OF CONTENTS

INTRODUCTION

1. 1 Background

The Philippines is one of the most disaster-prone countries in the world due to its geo-physical location and socio-economic conditions. The Dumangas Municipality in Iloilo Province of the Philippines was chosen for this case study because of its vulnerability to climatic hazards such as typhoons, floods and droughts. The study analyzes the role of local institutions in disaster management, looking specifically at response to recent natural hazards.

In the Iloilo area, most vulnerable people have livelihoods so fragile and delicately balanced that even a minor shock can endanger household security. Although the distinction is not always clear, it is useful to distinguish between household-specific, “idiosyncratic” shocks and community, “covariant” shocks.

When social mechanisms work well, household shocks, such as the illness or death of a breadwinner or the theft of livestock, may not require outside intervention. However, community shocks such as widespread crop failure due to natural hazards can affect everyone in the community to some degree and would require outside intervention. Hence, the role of community-based institutions in assisting communities to prepare for, respond to and recover from natural hazard-associated shocks becomes significant.

This study is based on the premise that successful disaster risk mitigation and management as well as successful rural development require strong links between central government line ministries and departments and local actors such as traditional authorities and civil society. It also takes into consideration the comparative advantage of coordinating and decentralizing actions and resources through local actors who bring local perspectives into policy-making, planning and implementation of rural development activities. In addition, through two-way communication with higher policy levels, local actors can participate in mobilizing local participation, with conscious links to the reconstruction, prevention and preparedness phases of disaster risk management and handling emergencies at the local level.

1.2. Conceptual frame work and key definitions

The definition and conceptual framework adopted are the following.

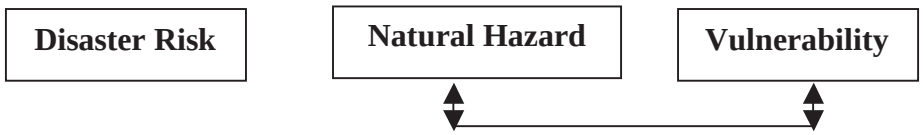
Natural hazard: Potentially damaging natural phenomenon.

Vulnerability: Propensity of a society to experience damage, disruption and causalities as a result of a hazard.

Disaster risk: Function of probability of the specified natural hazard event and vulnerability of societal systems.

Capacity: Ability of policies and institutional systems at the national and local household levels to reduce damaging potentials of hazards and reduce vulnerability.

Natural hazards such as earthquakes, hurricanes, floods and droughts spring to mind when the word *disaster* is mentioned. However, they themselves are not the disasters; they are the events, the natural *agents* that transform a vulnerable human condition into a disaster. Disaster risk is a sum of the frequency and intensity of hazards and the vulnerability of livelihood systems. In terms of community resilience and management systems, societal systems potentially can alter the hazard characteristics and reduce vulnerability through systematic interventions. Hence, the capacity of societal systems can act as a denominator in the disaster risk equation to determine the levels of risks, as illustrated in the figure below.



Methodology: The following methodology was used for the case study.

- Information gathering on the types of organizations and committees existing at the local level, their resources and the risk prevention activities they undertake. This included assessing minutes of meetings and government records and reports.

- Focus group discussions with disaster victims on their experiences, their perceptions and definition of risk, the resources at their disposal, including social capital, and their capacity to manage risks.

- Interviews with the local government unit at the municipal and *barangay* (village) levels, chief of the Punong *barangays*, head of the irrigators association and other stakeholders, highly vulnerable groups in the selected sites, and provincial and national government officials.

Dumangas municipality was selected because the area deals frequently with floods, typhoons and drought. Its Disaster Coordinating Council received a Presidential Award in 2003, because of its achievement in institutionalizing disaster preparedness and emergency response. The three individual Dumangas *barangays* selected for the study each has a different natural hazard risk level: Balud, in a low lying area, is exposed to typhoon flooding every other year; Maquina, in an elevated area, is exposed to typhoon flooding every three to five years; and Barasan, located in less flood prone area, is relatively safe although it could face damage from typhoons every 15 to 20 years.

Analysis of the information gathered was undertaken within the following framework.

Assessment: Assessment was made of the existing framework within the selected communities including the nature, constraints, incentives and capacities of the existing institutions.

- **Review:** Review was conducted on three levels, looking at:
  prevention and preparedness – the process of social capital consolidation and institutional capacity building in of hazards;

response and recovery – the role of social capital and institutions in managing an emergency after the impact of the hazard and how that role can be strengthened during the prevention and preparedness phases;
comparative advantages – the roles of decentralized, local-level, trans-sectoral and multidisciplinary institutions vis-à-vis central, sector-specific, mono-disciplinary institutions in dealing with both pre- and post-impact aspects of the hazard.

- **Identification:** Identification of participatory approaches, concrete actions and possible institutional innovations that have strengthened or will strengthen local capacities for disaster risk management and long-term development in high risk areas.

Structure of the Report

The report is presented in four main sections. The first section provides an overview of local institutions, hazards, vulnerability and disaster management and risk dimensions. The second section looks at the roles played by local institutions in managing the typhoon and floods of 2000 and the 2003 floods, flowed by a section presenting an assessment of the role of local institutions in managing disasters. The final section summarizes the overall findings into conclusions and lessons learned. .

THE ROLE OF LOCAL INSTITUTIONS IN REDUCING VULNERABILITY TO NATURAL DISASTERS, AND LONG-TERM SUSTAINABLE LIVELIHOOD DEVELOPMENT IN HIGH RISK AREAS

2.1 Philippine Hazard and Disaster Situation

The Philippines shares the unwelcome distinction of being one of the world's most disaster-prone countries with several Asian nations. The Centre for Research and Epidemiology of Disasters in Belgium recorded 701 disaster incidents from 1900–1991, or almost eight disasters a year. For the period 1987 to 2000, the National Disaster Coordinating Council recorded 523 disasters (clearly indicating an increase of numbers of disaster per year) with total cost of damage of PHP150.071 billion, or an average of 37 annual disasters (OCD, March and August 2001).

Non-governmental organizations (NGOs) also document local disasters which do not receive wide publicity, but are considered disasters at the community level. According to the accumulate documentation, almost 87 million individuals were affected by disasters from 1991 to 2000, indicating that many Filipinos are hit by repeated disasters (CDP, 2001). Aside from natural disasters, the figure includes human-induced disasters such as development aggression (when development projects are undertaken against the will of local communities), fire, labour repression and other industry-related events, armed conflicts and toxic waste contamination.

The Philippines' exposure to disasters is to a significant extent due to its geographical and physical characteristics. It is the world's largest archipelago comprising more than 7 100 islands. It lies along the world's busiest typhoon belt, Western Pacific Basin, and an average of 20 typhoons hit the country each year. Between 1988 and 2000, 198 typhoons entered the Philippines areas of responsibility, causing PHP22.105 billion in damage. The Philippines' coastal and extended swamp areas are prone to floods and storm surges during typhoons and, in recent years, even heavy rains associated with other climactic conditions such as monsoons and thunderstorms in the inter-tropical convergence zone have caused floods in the low-lying areas.

The country is also part of the Circum-Pacific seismic belt and lies between major tectonic plates whose movements create mountain ranges, islands, volcanoes, earthquakes and tsunamis. There are 220 volcanoes in the country, 21 of which are active. The country also has eight major earthquake generators and several minor ones and receives at least five earthquakes a day, although most of them imperceptible. However, the 7.7 intensity earthquake in Northern Luzon on July 16, 1990 claimed 1 666 lives, injured 3 500, and caused PHP11 billion damages to property and PHP1.2 billion damage to agriculture. Southern Mindanao is prone to tsunamis and the August 1976 tsunami caused some 4 000 deaths and left 12 000 homeless.

Rapid environmental degradation and resources depletion aggravates the country's vulnerability to natural disasters. The country now finds itself experiencing a cycle of flooding, drought and red tides. Deforestation has resulted in flooding, soil erosion, landslides and silting. Destruction of mangroves and coral reefs has led to a decline in fisheries production and the loss of natural protection of coastal communities from storm surges and beach erosion. El Niño occurrences induce drought in many parts of the

Philippines, regularly posing serious problems in agricultural production and potable water supply. During the 1998 El Niño, about 1 million families suffered from food scarcity in the highlands of Mindanao and other parts of the country.

The poverty situation of many Filipinos severely restricts their capacity to cope with the many natural hazards and, even more, to recover from the damages wrought by disasters. Adverse socio-economic situations force people to live in high-risk areas and engage in unsustainable and dangerous livelihoods. A collapse at a dumpsite in Quezon City in 2000 buried some 350 people.

Human-made disasters also take a heavy toll. From 1982 to 1990, there were 224 maritime accidents. The collision of MV Dona Paz with an oil tanker was the world's worst peace time sea tragedy with 4 342 confirmed dead. The Ozone disco fire in 1996 left 162 dead and 104 injured, the second worst disco fire in history. Armed conflict in the country, especially in Mindanao, causes displacement and contributes to the worsening disaster situation.

2.2 Study area profile

2.2.1 Iloilo Province

The province of Iloilo, located in the southeast end of Panay Island in the Western Visayas (southern part of the Philippines), is called the "food basket and rice granary of the Philippines". About 50 percent of its more than 4 700 km^2 of land is devoted to agriculture, with rice as the main product. Fish and sea produce abound, with prawn, milkfish and shrimp grown in fish farms. A food processing complex supports its food industry. The province's development agenda seeks an increase in livestock production, crop yield and other means of livelihood.

Figure 1. Location of Iloilo Province, Region VI, Philippines

The province's extensive road network reaches major production areas and market centres. Power supply exceeds current demand, and water supply is provided by 14 water districts. Some 65 percent of the area's 1.9 million people depend on agriculture. Ninety five percent of the crop area – some 204 385 ha – is devoted to rice cultivation, almost 50 percent of

which receives irrigation support through small-scale irrigation systems. Both rainfed and irrigation cropping systems are exposed to climate risks. There are 46 187 households, with most of the holdings less than 1 ha and vulnerable to climate risks.

Table 1. Provincial profile, Iloilo

Province	Iloilo
Capital	Iloilo City
Income/ financial resources (1999)	PHP534.5 million
Expenditure (1998)	PHP442.7 million
Population (2000)	1 916 707
Population growth rate (1995-2000)	2.10 % per year
Labour force (1998)	813 000
Employment rate (2002)	81.9%
Average family income/ year (2000)	PHP110 114
Avg. family expenditure/ year (2000)	PHP91 900
Land area	4 767 sq km
No of Cities / municipalities	1/ 42
No. of *barangay*s	1 901
Infrastructure facilities	Paved road network, power supply (Panay-Negros-Cebu Grid), Metro Iloilo Water District, telecommunications (300 existing land lines, fax, teleconferencing facilities, 5 mobile phone companies), Iloilo domestic/trunkline airport, Iloilo port (Iloilo river wharf, Old Foreign River, Iloilo commercial port complex), Iloilo fishing port complex
Major products	Agriculture: rice, corn, legumes, fruits, muscovado sugar, sugar cane, molasses Forestry: timber Aquaculture: shrimp, fish Manufacturing: food processing, metal craft, garments, furniture
Major industries	Agriculture, forestry, fishery, aquatic farming; manufacturing, construction, trading, tourism
Natural resources	Fertile land for farming

Table 2. Agriculture, aquaculture and livestock production, Iloilo Province (2000)

Crop		Area harvested (ha)	Production (tonnes)	No. of farmers
Rice	Irrigated	106 934	399 619	80 671
	Rainfed	97 451	300 909	65 516
	Total	204 385	700 528	146 187
Corn		6 476	11 333	8 119
Mung beans		4 835	1 224	4 256
Peanuts		332	433	925
Banana		9 871	34 905	8 330
Mango		290	6 981	423
Sugarcane			56 878	
Export sugar			225 420	
Domestic sugar			2 616 386	
Aquaculture				
Milkfish		24 705	16 024	
Prawns		410	85	
Freshwater fish		90	197	
Oyster		61	455	
Seaweeds		57	1 270	
Livestock		Commercial (head)	Backyard (head)	Total
Hog/swine		75 724	329 812	405 536
Water buffalo		35	88 066	88 101

Cattle	238	64 264	64 502
Goat	312	142 919	143 231
Duck	4 629	415 873	420 502
Chicken	853 510	3 515 465	4 368 975

Climate: Iloilo has two main climates. The southern portion, under Type I* climate, has two pronounced seasons: dry from December to June, and wet from July to November. Rains associated with the southwest monsoon come as early as May, with July to September as the wettest months. Northeastern Iloilo has Type III climate. It is relatively dry from November to April, and wet the rest of the year. A mountain range running north to south on Panay Island shields the northeastern areas from the southwest monsoon. November and December are the wettest months, because of the prevailing northeast wind. Figure 2 shows the climate map of the Philippines.

From November to January, tropical cyclones that develop in the northwestern Pacific generally move westward across the province. These cyclones bring strong winds and intense rainfall that often cause floods, loss of lives and property destruction. Typhoons that pass the northern part of the country during the southwest monsoon (June to September) or those that form over the South China Sea enhance the prevailing southwest wind flow, bringing monsoon rains over the province for prolonged periods.

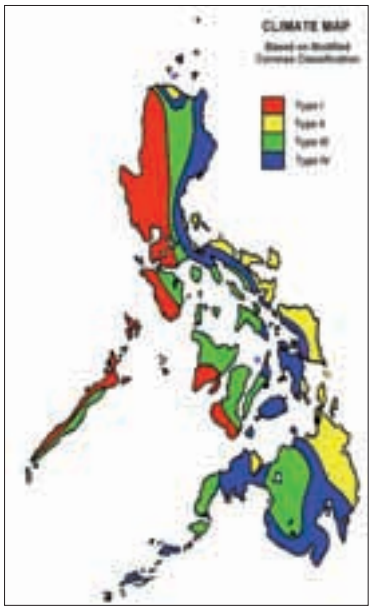


Figure 2. Climate map of the Philippines

2.2.2 Dumangas Municipality

Dumangas is a coastal town of Iloilo (Figure 3), with an economy predominantly based on agriculture and aquaculture. More than 55 percent of its more than 12 700 ha is utilized for farming and 35 percent for fish farms. Rice is the major farm crop. Its brackish waters are ideal for milkfish culture, which has an annual production of 2.5 tonnes per ha. About 800 people engage in municipal fishing. Municipal industry is mainly small-scale salt making, copra and *nipa* (grass roofing material) making. Tables 3-5 present the municipal profile; agriculture, aquaculture and livestock production and land use respectively. Table 6 shows the municipality's contribution to provincial rice production from 1995-2000.

Dumangas has Type III climate and, thus, is relatively dry from November to April and wet during the rest of the year. Average annual rainfall is 1 939 mm. Seven rivers traverse the area, the biggest of which, the Jalaur, drains out to the sea in Dumangas. The river basin has the highest annual flow in the province and is the major source of irrigation water for Dumangas and three other municipalities.

* There are four climate zones in the Philippines, Types I, II, II and IV. The categorization is broadly based on the characteristics of dry and wet months.

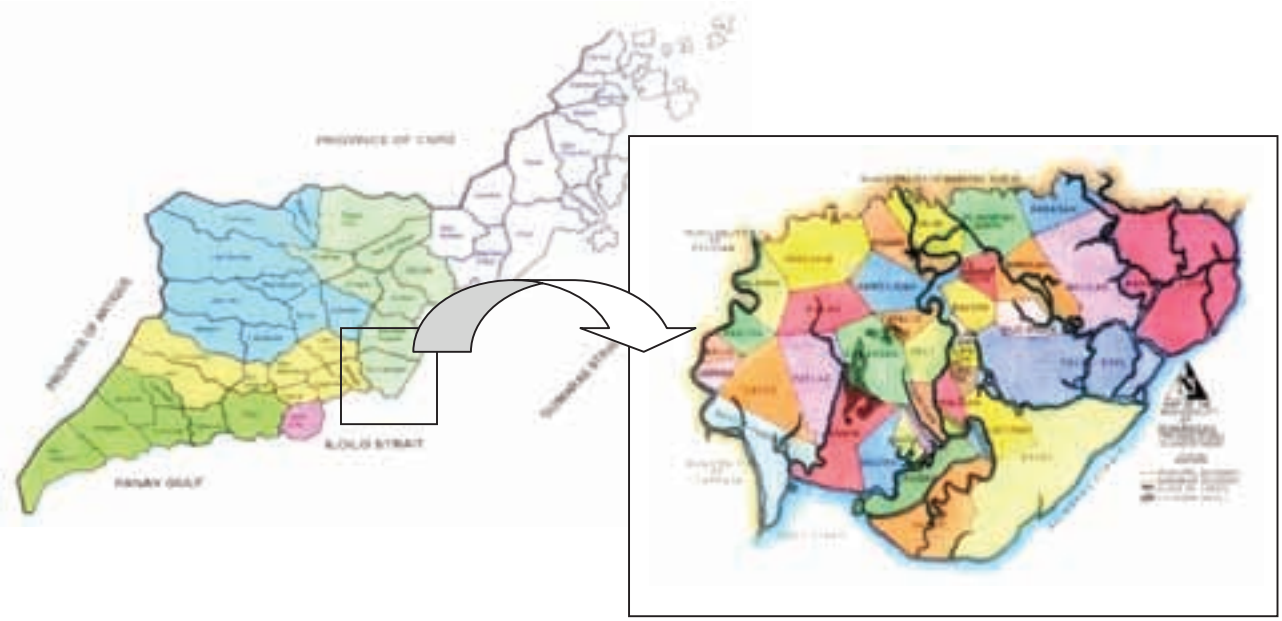


Figure 3. Location of the municipality of Dumangas

Table 3. Dumangas municipality profile (1998)

Location	Southern part of Panay island, 122º42'34" longitude, 10º49'22" latitude
Boundaries	North: Municipality of Barotac Nuevo; South and East: Guimaras Strait; West: Municipalities of Pototan and Zarraga
Classification (according to income)	3rd class
Income	PHP33.5 million
Total no. of *barangays*	45
No. of *barangays* in the urban/ rural area	10/ 35
No. of *barangays* along the coast/ inland	17/ 28
No. of *barangays* with electricity	45
Population (2000)	56 291
Population growth rate (1995)	44%
No. of households (2000)	11 262
Average family size (1995)	5
Literacy rate (1995)	82.61%
Economy	Agriculture, aquaculture
Land area	12 716 ha
Area devoted to farmlands	7 001 ha
Area devoted to fishponds	4 536 ha
Climate	Type III
Average annual rainfall	1 938.7 mm
Average *palay* production per hectare under normal condition	4 tonnes per ha in irrigated areas 2.5 tonnes per ha in rainfed areas
Coastline	21.6 km
No. of rivers	7
Major fish farm products	Milkfish, oyster, shrimp, crab, prawn
Average annual milkfish production/ hectare	2.5 tonnes
Infrastructure facilities	Port, wharf, power supply, water district (dug wells in remote areas), postal service, telegraph and telephone

Table 4. Agriculture, aquaculture and livestock production, Dumangas (1998)

Crop	Area planted (ha)	Production (tonnes)
Palay (rice)		
Irrigated	5 949	36 381
Rainfed	1 374	3 335
Total	7 323	39 716
Corn	32	1 843
Mung beans	70	12 618
Cassava	5.6	65
Sweet potato	5	50
Banana	120	1 200
Watermelon	199	989
Mango	6	72
Guava	3	24
Philippine lemon	1.5	22.5
Sugarcane	120	6 200
Coconut	140	1 120
Coffee	5	100
Cacao	5	100
Aquaculture	Area (ha)	Production (tonnes)
Milkfish	4 536	10 885
Oyster	4.6	4.6
Freshwater fish	2.6	1.3
Livestock		Heads
Hog/swine		5 668
Water buffalo		304
Cattle		163
Goat		4 383
Poultry		61 552

Table 5. Land use distribution Dumangas (1998)

Land use	Area in ha	Percent of total area
Built-up area	473.52	3.72
Agricultural	7 001.55	55.06
Fish farms	4 535.95	35.67
Swamps and marshes	512.03	4.03
Forest land	35.08	0.28
Open space	6.70	0.05
Mining and quarrying	8.50	0.07
Infrastructure	142.47	1.12

Table 6. Contribution to provincial rice production (1995-1999)

	1995	1996	1997	1998	1999
Irrigated (tonnes)					
Dumangas	37 816	42 580	42 081	36 381	45 903
Iloilo	292 107	326 725	317 910	361 581	441 167
Rainfed (tonnes)					
Dumangas	6 950	6 078	3 667	3 335	3 842
Iloilo	293 423	281 277	246 717	136 404	318 145
Total production (tonnes)					
Dumangas	44 766	48 658	45 748	39 716	49 745
Iloilo	585 530	608 002	564 627	497 985	759 312

The municipality is prone to flooding. When the Jalaur River overflows, its strong current sweeps away crops, poultry and property. The flood waters bring water-borne diseases that afflict children and damage infrastructure including the farm-to-market roads. Affects of the flooding are compounded when water backs up into the river during high tide. High winds from typhoons that pass the area also cause damage to agriculture. Drought associated with El Niño further impacts agriculture. In 1997, the damage was especially devastating when floods damaged the first crop and drought damaged the second crop.

2.2.3 Study Sites: Balud, Maquina, Barasan

Balud and Maquina, located along the banks of the Jalaur River, are flood-prone communities highly dependent on agriculture for livelihoods. Barasan, though traversed by the Barasan River, is less flood-prone and depends on agriculture and fish farms for livelihoods. Table 7 gives the profile of these selected sites.

Table 7. Profile of selected sites (1998)

	Balud	Maquina	Barasan	Municipality
Land area (ha)	78	171	266	12 716
Population (2000)	474	819	963	56 291
No. of households	94	163	204	11 262
Farm area (ha)	48	130	261	7 001
No. of farmers	14	77	200	3 606
Fish farm area (ha)	-	-	29	4 536

All three sites have a *barangay* hall, basketball court/social hall, primary school and day care centre. Maquina has a community chapel.

2.3 Hazard profile

Dumangas is affected by tropical cyclones that pass from the northwestern Pacific from November to January bringing strong winds and intense rainfall. From June to September, typhoons that pass the northern part of the country, or those that form over the South China Sea, enhance the prevailing southwest wind flow, bringing prolonged monsoon rains to Iloilo. In Dumangas, where 32 of the 45 *barangays* are flood-prone (Table 8), excessive rainfall often causes floods, mostly from October until December (Table 9). The *barangays* Balabag, Balud, Bantud Fabrica, Compayan, Maquina, Pagduque, Patlad and Pulao are considered most vulnerable since they suffer the worst impacts of flood.

Table 8. Flood-prone *barangay*s, Municipality of Dumangas

Least to non- flood prone	Flood-prone	
Barasan	Aurora del Pilar	Ilaya 1st
Burgos Regidor	Bacay	Ilaya 2nd
Dacutan	Bacong	Ilaya 3rd
Jardin	Balabag	Lacturan
Lopez Jaena	Balud	Managuit
Mabini	Bantud	Maquina
Nanding Lopez	Bantud Fabrica	Pagdugue
PD Monfort North	Baras	Paloc Bigque
PD Monfort South	Bolilao	Paloc So-ol
Sulangan	Calao	Patlad
Talusan	Cali	Pulao
Tambobo	Cansilayan	Rosario
Victorias	Capaliz	Sapao
	Cayos	Tabucan
	Compayan – most vul.	Talusan
	Embarcadero Buenaflor	Tanboilan

Table 9. Flood events associated with typhoons Dumangas (1990-2003)

Event date	Typhoon name	No. of *barangay*s affected	Area affected (ha)	No. of farmers affected	Estimated damage on agriculture (PHP '000)	Estimated damage on fishponds (PHP '000)
Nov 1990	Ruping	37	7 436	2 960	16 850	5 680
Dec 1993	Puring	11	865	938	1 340	925
Sep 1995	Mameng	15	1 230	1 860	1 500	2 650
Oct 1995	Pepang	26	3 800	1 502	2 394	1 854
Nov 1995	Rosing	14	3 207	1 807	3 000	1 508
Dec 1995	Sendang	12	947	865	1 250	898
Nov 1996	Toyang	18	1 505	1 239	2 900	2 560
Oct 1998	Loling	31	1 326	1 342	2 244	1 400
Dec 1998	Norming	32	3 765	1 535	7 318	1 300
Dec 2000	Ulpiang	22	5 658	1 908	11 650	1 520
Nov 2001	Nanang	14	1 130	831	5 787	3 249
May 2003	Chedeng	25	4 961	2 244	4 280	5 284

Balud and Maquina, located along the Jalaur River, are prone to floods. Maquina, however, is upstream so has less flooding than Balud. A devastating flashflood that occurred in May 2003 did not affect Maquina (Table 10).

Barasan, though traversed by the smaller Barasan River, is classified as least flood-prone. In fact, both Balud and Maquina were affected by floods associated with Typhoon Nanang in 2001 but Barasan was not. However, Barasan received damage from high winds.

Table 10. Damage brought by typhoons in the selected sites

	Dec 2000	Nov 2001	May 2003
Typhoon name:	Ulpiang	Nanang	Chedeng
Hazard	Floods and high winds	Floods and high winds	Flashfloods
Damage to infrastructure			
Dike (Balabag-Maquina-Balud-Compayan- Bantud Fabrica)		7 km PHP20 million	
National road (Balabag-Maquina-Balud-Compayan-Bantud Fabrica)	5 km PHP11 million	3.5 km PHP7 million	
Barangay roads: Balud-Maquina	1.5 km PHP2 million	0.5 km PHP300 000	
Compayan-Balud	0.4 km PHP740 000	0.1 km PHP40 000	
Bolilao-Barasan	3 km PHP4 million	2 km PHP3 million	
Barasan-Agcuyawan Pulo	2.75 km PHP3.5 million	2 km PHP3million	
Total (municipal level)	74 km PHP102 million	55 km PHP91 million	5 km PHP2.5 million
Damage to farmlands			
Balud	48 ha 41 farmers affected	60 ha 45 farmers affected	4 ha (seedling) 3 farmers
Maquina	102 ha 79 farmers affected	90 ha 75 farmers affected	
Barasan	50 ha 35 farmers affected	14 ha 8 farmers affected	20 ha 16 farmers
Total (municipal level)	5 658 ha 1 908 farmers PHP11.65 million	1 130 ha 831 farmers PHP5.8 million	62 ha (seedling) PHP215 000
Damage to fisheries			
Barasan	28.95 ha PHP1.158 million	12 ha PHP480 000	8 ha PHP320 000
Total aquaculture	448 ha PHP17.9 million	163 ha PHP3.35 million	423 ha PHP3.5 million
Total municipal fishery	PHP260 000	PHP160 000	PHP765 000
Damage to households			
Balud	98 families (488 people affected)	102 families (605 people) affected	21 families (142 people) affected
Maquina	163 families (819 people affected)	162 families (971 people) affected	
Barasan	120 families (480 people affected)	38 families (163 people affected)	25 families (150 people affected)
Total (municipal level)	22 *barangay*s affected, 2 168 families (10 689 people)	14 *barangay*s affected, 1 344 families (8 001 people)	25 *barangay*s affected, 1 428 families (8 170 people)

High winds from typhoons that pass over the municipality affect all communities (Table 11). All three are also vulnerable to drought associated with El Niño.

Table 11. House damage report due to high winds and floods, Typhoon Ruping, November 1990

	No. of houses totally damaged	No. of houses partially damaged	Total no. of houses damaged	Total estimated worth of damage
Balud	19	31	50	158 000
Maquina	55	105	160	432 500
Barasan	33	111	144	416 000
Municipal	107	247	354	1 006 500

When asked about the frequency of floods and drought in their community, respondents in Balud said that these hazards impacted them in 13 out of 15 years (87 percent); in Maquina, 7 out of 10 years (70 percent), and in Barasan, 3 out of 10 years (30 percent).

2.4 Vulnerability profile

Recurrent natural disasters weaken people's ability to cope. When, during the process of recovery, another hazard impacts the community, it puts strain on already very limited resources.

Many respondents said that, because they have been ravaged by typhoons, floods and droughts through the years, they have grown wiser in terms of their behavioural responses to disasters. Now, they feel less threatened although they know that their lives and physical properties may be endangered. Their confidence comes from the knowledge that they will somehow recover from a natural disaster. The forecasts respondents get from the radio, television and the municipal government have also made them more confident that they will have ample time of a natural hazard, giving them time to secure their families, animals, homes and movable properties, if not their crops. However, respondents also said that their greatest vulnerability is potential loss of livelihood or of capacity to recover their losses after a disaster.

2.4.1 Balud

Balud, located on the banks of the Jalaur River, is vulnerable to floods and to the strong typhoon winds that damage dwellings made of light materials. In addition to this physical vulnerability, they also have economic vulnerability.

Most men in the community engage in farming. However, most do not own the land that they till. Of the 48 ha of agricultural land in Balud, 20 ha are owned by one landowner. The landowner provides agricultural inputs, farmers provide labour and receive 10 percent of the produce. Most areas are not reached by irrigation and depend on rainfall. However, areas close to the JalaurRiver can use water pumped from the river.

Farmers plant by direct seeding. The first crop is planted in June and harvested in September. When rains come early in May, which has happened only three times in the past 10 years, they are able to advance planting. The second crop is planted in October and harvested in January. The first crop is more vulnerable to the floods that can come at harvest time which, according to the respondents, has happened 4 times in 10 years. If floods damage the second crop, farmers plant again. Re-planting inputs are still provided

by landowners and labour is provided by farmers. Farmers still receive 10 percent of the harvest, but for double the labour contribution. In addition, the second crop is also vulnerable to drought. Respondents said they lost their second crops because of drought four times from 1992 until 2002.

At slack times, some farmers work in sugarcane fields where they can earn PHP70 per day while others work in construction jobs. Skilled workers, such as carpenters, earn about PHP4 000 per month, while non-skilled workers, such as labourers, earn about PHP2 000 per month.

The produce that farmers receive for their work provides food for their families. If the harvest is good, which is rare, they sell some rice. Some farmers have backyard vegetable or fruit gardens, which add to their food source. Cost for primary education for children in local public schools is minimal but household costs increase when children begin attending secondary school in nearby towns.
Of the farmers interviewed for this study, the following three have livelihood structures that are representative of the area:

- Roberto Braga – 20 percent of income from farming, 10 percent from raising swine, 10 percent from poultry and 60 percent from carpentry and other odd jobs.
- Romulo Baiyo – 100 percent of income from raising swine (about PHP5 000 per month).
- Remia Basto – non-stable income, she is a housewife, her husband works as a labourer at a construction site.

Photo 1: Vulnerable household in Balud, on the banks of the Jalaur River (seen in the background).

Remia Basto is a housewife with five children, two young and at home, three in primary school. Her husband works as a labourer at a construction site, where he earns PHP500 per week. When his construction job is completed, he works as a farmhand and receives one sack of *palay* during harvest. Neighbors often share food and clothing with the family although, at other times, they must borrow. Their one-room house, located on public land next to the Jalaur River, is made of light material and raised on stilts to keep the floor dry during floods.

A large number of children also contributes to family vulnerability. One farmer who has ten children once had to augment his income by borrowing about PHP1 000 a month up to six times a year from friends and relatives who allowed him to repay in installments at no

interest. He said that his borrowing is greatly reduced because his older children are now working.

2.4.2 Maquina

Maquina, a predominantly agricultural community, has 130 ha of agricultural land, producing 90 percent rice and 10 percent sugarcane. Most fields are irrigated, but those at the end of the irrigation system do not get water during the dry season. Farmers plant their first crop during the June rains, using direct seeding to minimize planting expenses. In 2003, only 90 percent of the agricultural land was planted because some farmers had financial difficulty acquiring farm inputs. The second crop is planted between the last week of September until early October. All 130 ha are planted if there is enough irrigation water, which comes from a catch basin. Shallow tube wells also provide water and two of the 77 farmers in the community draw water from the Jalaur River.

The first crop (at fruit/harvest stage) is vulnerable to October floods, or to heavy rains that cause crop lodging. Respondents said that in the last 10 years, they lost the first crop once because drought (1997) and six times because of floods, and they lost the second crop twice because of floods. Those farmers located at the end of the irrigation system who do not have shallow tube wells lost their second crop three or four times because of drought.

More than half of the farmers do not own the land they till. They pay 24 sacks of palay per ha per year to landowners as rent. Average production from the first cropping is 80 sacks per crop per ha (each sack of palay weighs 42 kg), of which 12 sacks are given to the landowner. Respondents said that they usually keep only about 10 percent of the harvest for themselves, as they have to repay their investment (seeds, fertilizer, etc.). They said that they find this difficult to manage.

To make ends meet, most farmers engage in non-farming activities such as construction labourers and carpenters, transport (pedaled tricycles) and other odd jobs. According to the respondents, 50 percent of the households in the community are poor and most are located near the banks of the Jalaur River.

Photo 2. Farmers and *barangay* officials interviewed in Maquina

2.4.3 Barasan

The community's main sources of income are farming (about 260 ha), aquaculture (about 30 ha) and fishing. All farmland is irrigated. As with Balud, not all farmers own the land they till. Farmers provide all farm inputs, landowners receive 15 sacks of palay from the first crop and none from the second crop. Fields at the end of the irrigation system face water shortage during the second cropping (January and February).

About 2 percent of households own farmland and a fishpond. One respondent said that he has 0.5 ha for rice farming and 1 ha for fish farming and that fish farming provides more income than rice farming. He can harvest fish three or four times per year, for a net income of about PHP18 000 per harvest. He said that converting a field from rice to fish farming is possible only if the rice field is close to the river so water is available to fill the pond.

Fishing in municipal waters can bring an additional PHP1 000 per week. Fishing is favourable when a tide of about 1.5 m brings in fish and shrimp.

The average family size in Barasan is seven people. Barasan households are more affluent than those in Balud and are able to support a large family.

The community is vulnerable to high typhoon winds that affect their dwellings and rice crop. The community is not vulnerable to riverine flooding. A flashflood in May 2003, following three days of continuous heavy rains, caused heavy losses for fishpond operators. One respondent said that he lost his entire fish crop, amounting to PHP35 000, and had to borrow PHP8 000 (at 8 percent interest) to start again. Of the 60 fishpond operators, about 50 percent are able to finance replacement costs. The May 2003 flood was a shock to most residents, as they were preparing for their children's schooling, which starts in June.

Collectivity is a strength of the community. Residents formed a *barangay* power association that bargained with the electric power provider. The association collects power consumption information and payments from residents. They get a 3 percent rebate for full payment of bills.

2.4.4 General vulnerability features

The livelihood patterns of most of the rural households in the study area, particularly in Balud and Maquina, are fragile. The seasonal income gaps are often bridged by loans of varying interest rates from different sources. Because of collateral requirements, loans from organized institutions, such as banks, usually go to the wealthier and middle-income groups in rural communities. Poorer community members are forced to borrow money from relatives without interest or at high interest from local money lenders. They use this money mostly for unanticipated expenditures such as medicine for sick family members. While everyday risk is a constant threat to livelihoods, periodic weather-related shocks keep the livelihood systems continuously swinging between crisis and recovery.

Most vulnerable households within the community are forced to live on the edge of the Jaluar River in poorly constructed, fragile houses. In fact, the degree of household vulnerability is visibly apparent in the location and quality of homes.

Floods with strong currents, caused by dike breaches, high winds or sea surges, are quite destructive. They pose danger to human life and also may destroy property and livestock (particularly smaller livestock such as pigs and chickens), and damage irrigation and public infrastructure.

Less violent floods that inundate large areas for long periods may be less immediately devastating but they have severe economic and social impacts. Long-standing floodwaters damage crops and property, can make household articles unusable and weaken house structures. Livestock that survive the flooding still may succumb to disease outbreaks that often occur following the floods. If food stocks stored in the house are ruined, food security may be threatened until the next harvest.

2.5 Disaster risk management

This section presents an institutional profile of actors actively involved in disaster risk management (DRM) in the Philippines. The section presents a bottom-up perspective, starting with local-level profiles and then describes the formal DRM system.

2.5.1 Local institutions involved in DRM

2.5.1.1 Social institutions in the community

Real kinship
Personal alliance systems can consist of kin, both biological and ritual, grantors and recipients of favours, friends, or partners in commercial exchanges. However, as elsewhere in the country, these systems are anchored by kinship, beginning with the nuclear family. Kinship starts with the immediate, nuclear family, then extends by affinity and consanguinity to include a large number of people including aunts and uncles and their relatives, in-laws and their relatives, etc. Closeness in relationships depends very much on physical proximity.

Ritual kinship
Ritual kinship is established through godparenthood or sponsorship that grows out of three ceremonial occasions: baptism, confirmation and marriage. It creates personal alliances from which one can expect help in the way of favours such as jobs, loans or just simple gifts on special occasions. In asking a friend to become a godparent to a child, a Filipino is also asking that person to become a closer friend. Thus, it is common to ask acquaintances who are of higher economic or social status than oneself to be sponsors. Such ritual kinship can be depended on in moments of crisis, but not to the same extent as real kinship.

Utang na loob relationships
Personal alliance is also formed between a grantor and recipient of favour based on the concept of *utang na loob* (debt of goodwill). Although it is expected that the debtor will attempt repayment, it is widely recognized that the debt (as in one's obligation to a parent) can never be fully repaid and the obligation can last for generations. Saving another person's life, providing employment or supporting a young person’s education are "gifts" that incur *utang na loob*. These gifts initiate long-term reciprocal interdependency in which the grantor of the favour can expect help from the debtor whenever the need arises and the

debtor can, in turn, ask other favours. This traditional value remains strong in rural communities.

Suki relationships
Suki (market exchange) relationships develop between two people who agree to become regular customer and supplier. In the marketplace, Filipinos buy regularly from certain suppliers who, in return, give them reduced prices, good quality and, often, credit. Regular patrons often receive special treatment in return for their patronage. Trust is vital and often these marketplace relationships blossom into genuine friendships.

Patron-client relationship
Patron-client bonds maybe formed between tenant farmers and their landlords or when a patron provides resources and influence in return for a client's personal services and general support. The reciprocal arrangement typically involves the patron providing a means of earning a living or of help, protection and influence, and the client providing labour or personal favours, ranging from performing household tasks to political support. These relationships often evolve into ritual kinship ties, as the tenant or worker may ask the landlord to be a child's godparent. Similarly, when favours are extended, they tend to bind patron and client together in a network of mutual obligation or long-term interdependency.

Friendships
Friendship, often placed on a par with kinship, is the most central of Filipino relationships. A willingness to help one another provides the prime rationale for the relationship.

Interpersonal relationships form an alliance system
All of these interpersonal relationships are components of a Filipino's personal alliance system. Thus two individuals may be cousins, become friends and then cement their friendship through godparenthood. Each of their social networks will typically include close or distant relatives (consanguine or affine), ritual kin, one or two patron-client relationships, one or more close friends, a large number of social friends, and a dozen or more market-exchange partners. *Utang na loob* may infuse any or all of these relationships. In all, a network of social allies can include 80 or more people, integrated and interwoven into a personal alliance system. This provides a dependable social net that can be depended on in times of crisis.

Pakikipagkapwa
Pakikipagkapwa is a Filipino trait where individuals extend an act of kindness or goodwill to other persons for whom they have compassion or with whom they identify.

Bayanihan
Bayanihan is the spirit of community volunteerism. Community members combine their strengths or resources to help a person or a family in need. This can mean support during harvests, when a house damaged by typhoon needs repair or in times of crisis. It edifies cooperation and solidarity.

2.5.1.2 Non-governmental organizations (NGOs)

Dumangas Fisheries and Aquatic Resources Management Council (FARMC)

The Dumangas Fisheries and Aquatic Resources Management Council was organized in July 2002 (Administrative Order No. 196, series 2000) to institutionalize the role of fishermen and other resource users in planning and formulating of policies and programmes for the management, conservation, protection and sustainable development of fisheries and aquatic resources. FARMC acts as a consultative body of the municipal government on fisheries-related issues and concerns, facilitates the *Bantay Dagat* Programme (coastal resources watch) in the *barangays*, and monitors fisheries operations in the municipality relative to the environment, zoning ordinances and other local laws. It has responsibility for conducting coastal and river cleanups and plays a key role in disaster management by undertaking crucial activities before, during and after a disaster.

Pre-disaster activities begin with informing the community of impending disaster, and advising:
- fishpond operators to temporarily cease operations,
- fishermen to stow fishing gear and strengthen their residential and fishing structures,
- community residents on what to do and where to go in times of disaster.

Disaster-response activities include assisting in:
- evacuating flood victims from river banks and coastal areas using *bancas* (small fishing boats),
- *barangay*-level rescue operations in coordination with/support to the Dumangas Rescue and Emergency Assistance Movement (DREAM),
- distributing relief assistance in coordination with the *barangay* council.

Post-disaster activities include:
- providing assistance, in the form of labour and provision of food for labourers, to fishers who need help rehabilitating their fishing operations;
- providing food and medicine to worst affected fishers and their families;
- responding to requests for assistance from the Bureau of Fisheries and Aquatic Resources and providing fishing gear to the worst affected fishers.

Irrigators' Association

The Tamboilan-Paloc Bigque-Bolilao Irrigators Association (TAPABIA), organized in 1991 in coordination with the National Irrigation Administration (NIA), addresses disputes among farmers on water distribution issues and airs farmers' grievances to the NIA and to the municipal mayor. Its functions include the following.
- Regular clearing of irrigation facilities (lateral canals)
  Funding support from NIA (PHP1 400 a month) is deposited in the association's account and used for travel and meeting expenses.
- Collection of irrigators' service fee (ISF) from NIA concessionaires.
  The association keeps a percentage from the amount it remits to NIA, if remittance is at least 75 percent of the total amount due.
- Arbitration services to settle disputes for its members.
  If unable to resolve the dispute, the matter is referred to the Punong *barangays*.

Each *barangay* under TAPABIA is divided into five total service areas (TSAs), each with a chairman responsible for disseminating warning in his/her area. It also has key roles to play before, during and after a disaster.

Pre-disaster phase:
- reinforce dykes and make them higher to withstand higher flood levels,
- ensure that rice/palay storehouses are elevated,
- disseminate flood warnings to constituents to enable them to prepare for the flood,
- open the irrigation drop to drain water upon receipt of flood warning,
- advise members to seal field openings to prevent water logging in the rice paddies and to move hand tractors to higher ground.

Response phase:
- help monitor the flooding situation,
- assist in evacuation.

Post-disaster phase:
- clear paddies and irrigation canals of debris,
- assist members in need of assistance (e.g. reconstruction of damaged dwellings),
- report crop damage to the Philippine Crop Insurance Corporation for assessment and possible extension of assistance,
- report crop damage to the municipal agriculturist for certification of crop damage to enable deferment of NIA payment,
- lobby for the extension of possible local government assistance to affected farmers.

Kabalikat Civicom Association, Inc.
The Dumangas Kabalikat Civicom Association was established in January 2000 as local Chapter 215 of the nationwide Kabalikat Civicom Association of radio communicators. Chapter 215, with a current membership of 42, serves as a support group for the Intercontinental Broadcasting Corporation's Radio Budyong Iloilo – Station DYBQ-AM – an Iloilo city-based radio station. It is an accredited NGO in the municipality along with other special municipal bodies such as the Municipal Peace and Order Council and the Municipal Disaster Coordinating Council (MDCC).

Its regular activities include nightly net calls and programmes; assistance to the municipal government in disseminating information of important programmes, projects and activities; monitoring of and assistance to travelers; assistance to the municipal government in the implementation of projects in its capacity as member of the local special bodies; and other duties such as tree planting, and coastal and river cleanup. Its role in disaster management includes the following.

Pre-disaster phase:
- monitoring hazards and reporting to the municipal mayor for establishing appropriate actions (the group is divided into sub-groups that are assigned areas of responsibility for monitoring),
- providing early warning of impending hazard through the municipal/*barangay* officials,
- disseminating warnings, reports, updates and advisories through DYBQ AM radio,
- preparing floats for use during evacuation.

Response phase:
- assist DREAM and MDCC in rescue operations by volunteering as drivers, guiding evacuees during evacuation procedures, etc.,
- monitoring situations and informing appropriate agencies,
- volunteering vehicles for transportation of relief goods, medicine, clean water, etc.,
- assisting in relief distribution.

Post-disaster phase:
- assist the municipal government in consolidating a damage report,
- assist in medical missions to transport medicines,
- donate and disseminate food items and clothing to disaster victims.

Dumangas Rescue and Emergency Assistance Movement (DREAM)

The municipal government established DREAM in July 1999. It is designed to:
- provide active and sustained support to the MDCC in the areas of emergency preparedness and response, vulnerability reduction and disaster risk control,
- respond quickly in times of disaster,
- monitor and report on any disaster situation and recommend appropriate measures to the MDCC,
- participate in programmes, projects and activities of the municipal government.

Registered as an NGO, DREAM currently has 36 volunteer members, including four women, who are trained in search and rescue. It covers six flood-prone *barangays*. Their expertise in search and rescue as well as in hazard monitoring, information dissemination, relief operations, medical missions and damage assessment have been put to test in flooding incidents associated with typhoons since 2000. DREAM also provides search and rescue in marine navigation accidents, such as the sinking of the fishing boat FV Angelica with 24 crew at the Guimaras Strait in September 1999. In non-disaster times, DREAM is involved in activities aimed at reducing risks for floods, such as river and coastal clean-up and reforestation.

DREAM is a member of the Local Special Bodies. Its financial support is provided by the Municipality of Dumangas.

Civic and Religious Organizations

The municipal government has agreements with civic and religious organizations to assist, in the spirit of volunteerism, in relief and rescue during emergencies as well as to participate in the formulation of the Municipal Disaster Preparedness Plan. They include:
- Rural Improvement Club – a women's civic organization,
- Rotary Club of Dumangas – a civic organization,
- Knights of Columbus – a religious organization.

In addition, the Catholic Parish Pastoral Council Church supports relief operations by providing financial resources to the BDCC.

Municipal Economic Council – a private sector business consortium

The Municipal Economic Council, created by the Municipal Executive Order No. 31 in 2000, is chaired by the municipal mayor. It is co-chaired by representatives of business proprietors engaged in rice retailing, groceries, pharmacies, dry goods, fuel stations and construction supplies. All accredited business proprietors in the Dumangas Public Market are members of the Council. The Council advocates programmes, projects and activities that foster municipal economic growth and development. It also recommends policies to the Municipal Mayor and the '*Sangguniang Bayan'* that can enhance the operations of the business sector as well as benefit its clientele. Its key role in times of disaster is to provide, on loan, goods and items required for disaster response.

2.5.2 The National Disaster Risk Management System

The Philippine government, from pre-Commonwealth days until today, has supported a scheme to counteract the effects of disasters, both natural and human-induced. The 1978 Presidential Decree 1566, "Strengthening the Philippine Disaster Control and Capability and Establishing the National Programme on Community Disaster Preparedness", is the country's basic law on disaster management. It lays down a policy and institutional and operational framework for the country's disaster risk management system.

From this legal mandate, the National Calamities and Preparedness Plan approved in 1983 was revised in August 1988 and issued together with Implementing Rules and Regulations to P.D. 1566. An updated Calamities and Preparedness Plan has been submitted for approval of the National Disaster Coordinating Council. Efforts have been made since the mid-1990s to update and amend P.D. 1566. This Bill, now called "Philippine Disaster Management Act of 2003", has received comments from key stakeholders and is with the House Committee on Defense for consideration of the legislators. While the updated legislation is pending, functional institutional and operational arrangements have been set in place.

Policies for National and Local Disaster Risk Management

P. D. 1566 lays the following policies disaster risk management at all levels.

- Responsibility for leadership rests on the provincial governor, city/municipal mayors, and *barangay* chairpersons, each according to his/her area responsibility.
- Self-reliance shall be developed by promoting and encouraging the spirit of self-help and mutual assistance among the local officials and their constituencies.
- Each political and administrative subdivision of the country shall utilize all available resources in their respective areas before asking for assistance from neighbouring entities or higher authority.
- Primary responsibility rests on the government agencies in the affected areas in coordination with the people themselves.
- All government departments, bureaus, agencies and instrumentalities are responsible for documenting plans for their emergency functions and activities.
- All national government offices in the field shall support the operations of the local government in times of emergencies and according to their level of assignment.

Key Actors: Disaster Coordinating Council Network

The Disaster Coordinating Council Network, proposed to be called Disaster Management Council in the Disaster Management Act of 2003 and the updated Calamities and Preparedness Plan, offers a multisectoral, multiagency and multilevel approach to disaster risk management. Coordinating Councils and Disaster efforts are supported by the government and the private sector. Operations Centres exist at all governmental levels including (Figures 5, and 6)

- National Disaster Coordinating Council (NDCC)
- 17 Regional Disaster Coordinating Councils (RDCC)
- 79 Provincial Disaster Coordinating Councils (PDCC)
- 114 City Disaster Coordinating Councils (CDCC)
- 1 496 Municipal Disaster Coordinating Councils (MDCC)
- *41 960 Barangay* Disaster Coordinating Councils (BDCC)

The NDCC is the highest policy-making, coordinating and supervising body for disaster management. It advises the President on the status of the national disaster preparedness programme, disaster operations and rehabilitation. Membership of the NDCC, chaired by the Secretary of National Defense, consists of almost all cabinet members plus the Secretary-General of the Philippine National Red Cross. The Office of Civil Defense (OCD) provides the operations centre and secretariat functions as well executive-director functions through its administrator.

The NDCC is replicated in regional and local coordinating councils that function substantially like the NDCC, except that they operate and utilize their own resources at their respective levels. The RDCCs and the local DCCs constitute the core of the disaster management system. It is at this level that emergency is most felt and protection, rescue, evacuation, relief and rehabilitation operations are launched and carried out. The DCCs are expected to be proactive, with activities such as dissemination of information on natural disasters and disaster preparedness, identification of evacuation centres, upgrading of evacuation centre facilities, and assignment of responsibilities to member agencies during emergencies.

NDCC members include almost all of the Cabinet Secretaries.

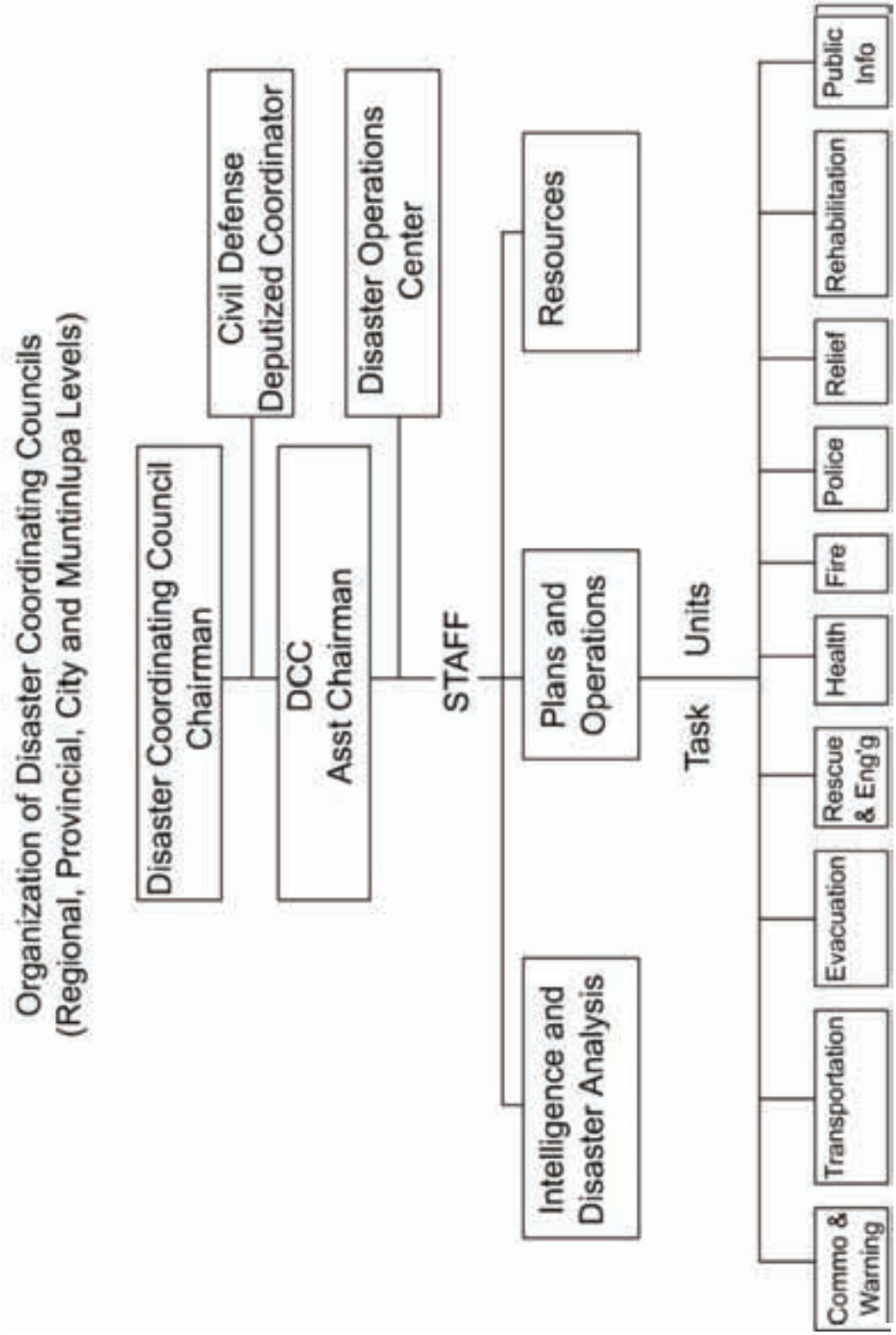
- **Secretary, National Defense – Chairman**
- Secretary, Interior and Local Government – Member
- Secretary, Public Works – Member
- Secretary, Health – Member
- Secretary, Social Welfare – Member
- Secretary, Agriculture – Member
- Secretary, Education – Member
- Secretary, Finance – Member
- Secretary, Labour and Employment – Member
- Secretary, Trade and Industry – Member
- Secretary, Transportation and Communication – Member
- Secretary, Science & Tech. – Member
- Secretary, Budget – Member
- Secretary, Justice – Member

- Secretary, Environment and Natural Resources – Member
- Director, Philippine Information Agency – Member
- Sec–Gen, Philippine National Red Cross – Member
- Chief of Staff, Armed Forces of the Philippines – Member
- Administrator, Office of Civil Defense – Executive Officer

The updated Calamities and Disaster Preparedness Plan proposes to also include these Cabinet members and officials as members of the NDCC:

- Secretary, Department of Science and Technology (DOST)
- Secretary, Department of Foreign Affairs (DFA)
- Secretary, Department of Tourism (DOT)
- Director-General, National Economic and Development Administration (NEDA)
- Office of the Press Secretary
- Presidential management staff

Figure 4. Organization of the DCC



NDCC's Comprehensive Emergency Management Framework

The NDCC has an all-hazards approach to disaster risk management. It follows the "golden hour" principle of consequence management that determines the time within which lives could be saved and injuries minimized. This includes the following strategies.

- Mitigation: insurance coverage of public and private property; safety regulations, land-use, zoning, etc; building and fire codes; legislation and local ordinances on safety of communities; dams, levees, flood control and other structural measures;
- Preparedness: contingency plans, e.g. fire and earthquake plans; public information, e.g. rapid dissemination of information through an emergency broadcast system, population awareness; orientation of local officials, deputized coordinators, auxiliaries, volunteers, drills and rehearsals, education and training activities; capable response units, equipment, manpower, location, contact numbers for people and resources;
- Response: alerts, e.g. receipt and rapid dissemination of warnings to threatened communities and populations; immediate notification of response units;
- Rehabilitation: emergency funding from local and national calamity funds and other sources; loans and grants from national and international NGOs; assistance from NGOs, foreign governments, etc.

Office of Civil Defense

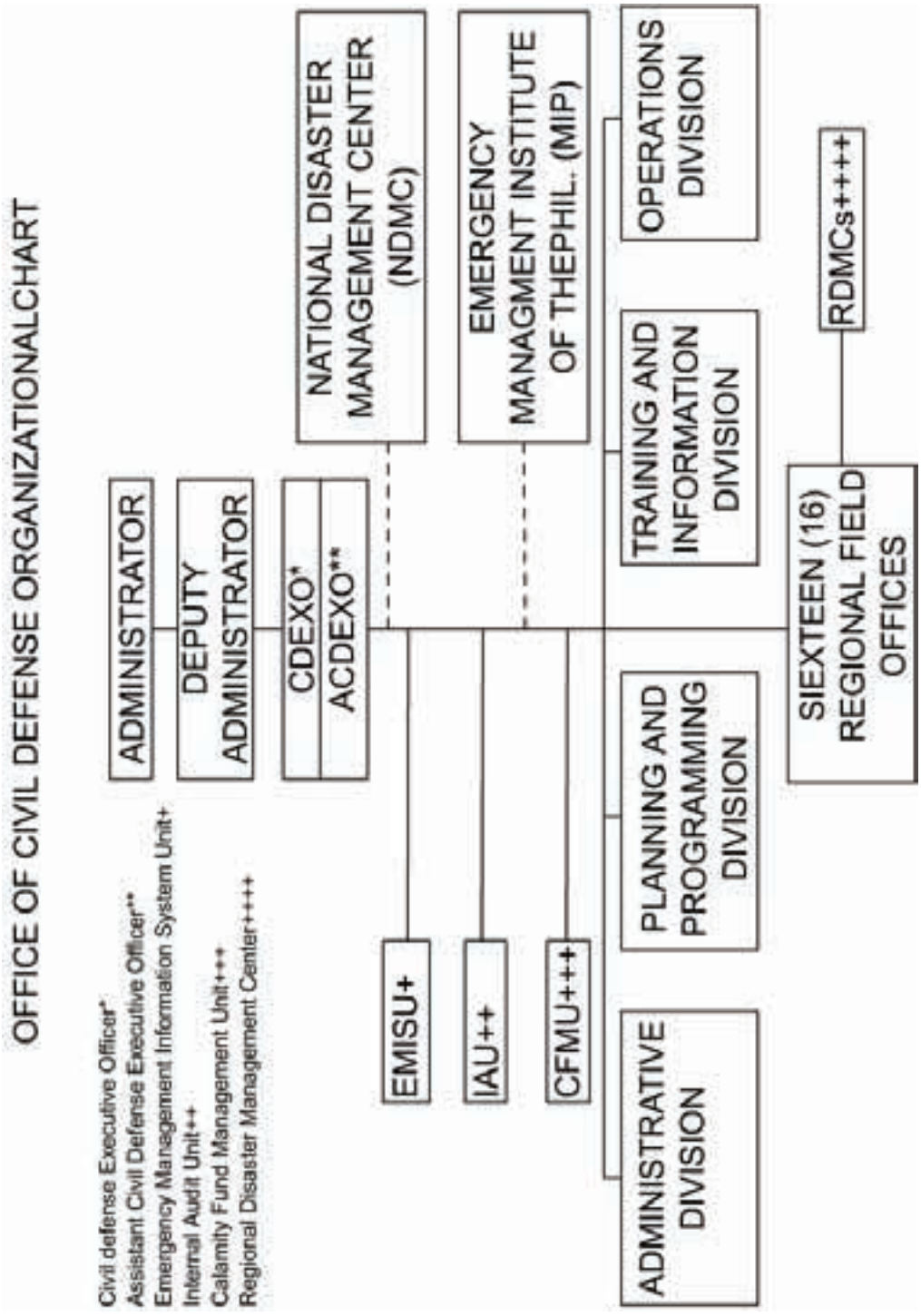
The Office of Civil Defense (OCD) is the operating arm and the secretariat of the NDCC. Its primary task is coordinating the activities and functions of various government agencies and instruments, private institutions and civic organizations for the protection and preservation of life and property during emergencies. The office executes and monitors implementation of NDCC policies and programmes and provides secretariat services to the Council. It operates and maintains the Council's National Defense Management Centre (NDMC). It has 16 Civil Defense Regional Centres (field offices) nationwide for regional operations and has designated Civil Defense Coordinators (Action Officers) at the provincial and municipal/city levels. The Regional Civil Defense offices man the operating facilities of the Regional Disaster Management Centres of the RDCCs on a 24-hour basis. The Regional Disaster Operations Centres are mostly located in the Philippine National Police regional commands.

Operations Flow: If more than three municipalities are affected, the province assists in operations. If more than three provinces are affected, the region assists in operations. If more than two regions are affected, the national assists in the operations. Coordination is usually organized by the PDCCs and member agencies of the RDCC.

Programme Thrusts and ongoing activities for 2003-2005

- Civil protection and preparedness
- Disaster operations and support services
- Risk and vulnerability reduction
- Human resource development
- International partnership and cooperation
- Emergency resource data generation
- Policy development and implementation programme
- Resource generation
- ICT development for disaster management applications

Figure 5. Organizational Structure of the Office of Civil Defense



Ongoing Activities in Disaster Risk Management in the Philippines

- Preparedness
  - Capability building for emergency response – training for collapsed structure search and rescue teams
  - Conduct of basic life support and emergency medical services training
  - Contingency planning for emergencies for local government units
  - Preparations for establishment of NDCC Preparedness Centre at Camp Aguinaldo – stockpile of relief items for 10 000 people and housing of NDCC disaster response equipment
  - Review of learning competencies in disaster preparedness for primary, secondary and collegiate level Forging linkages among NDMC and NBN4 and Philippine Broadcasting System, to work with private media and serve as primary carriers of video and audio warnings
- Mitigation
  - Non-structural
    - GSIS proposal for insurance coverage of selected local government properties
    - Working for approval of Villar Bills to amend use of 5 percent Local Calamity Funds (LCFs) for preparedness activities
    - Working for approval of Disaster Management Act of 2003
    - Commissioned World Bank study on Vulnerability of the Philippines to Disasters
    - Forged Memorandum of Agreement among DENR-DILG- LGU on strengthening partnership on devolved and other forest management functions
  - Structural – Flood Mitigation Project in Central Luzon
- Response
  - Water search and rescue operations – distribution of 28 rubber boats
  - Relief assistance augmentation
- Rehabilitation
  - Funding support to rehabilitate damaged infrastructure in affected areas
  - Kalasag Awards – given to DCCs, government organizations, NGOs and individuals for excellence in disaster management
  - Formation of 4 NDCC Technical Management Group Committees for mitigation, preparedness, response and rehabilitation and various subcommittees to conduct studies and recommend policies on various DM concerns
  - Community-based disaster management

Financial Resource Mobilization for DRM

Resources for national and local comprehensive emergency management come from either emergency funding from the Local or National Calamity Funds (LCFs, NCFs) or other sources such as loans and grants extended by local and international NGOs or assistance extended by NGOs, foreign governments, etc.

The NCF is designated through the annual General Appropriations Act (GAA) and is available for aid, relief and rehabilitation services to communities and areas affected by calamities. This includes training of personnel and other pre-disaster activities as well as repair and reconstruction of permanent structures including capital expenditures for pre-disaster operations. The following policies guide the use of the NCF

1. The NCF can be used only for the following purposes:
   a. aid, relief, rehabilitation and reconstruction and other works or services in connection with calamities which may occur during the budget year or have occurred during the previous two years

   b. pre-disaster activities such as training, and
   c. capital expenditures such as purchase of equipment for pre-disaster operations and rehabilitation.
2. NCF shall be used in the following order of priority:
   a. Priority I – for urgent and emergency relief operations and emergency repair and rehabilitation of vital public infrastructures and lifelines damaged by calamities occurring within the budget year, e.g. hospitals, schools, major roads and bridges, and farm-to-market roads;
   b. Priority II – for repair, rehabilitation and reconstruction of damaged public infrastructures which are not emergency in nature but are necessary for disaster mitigation;
   c. Priority III – for pre-disaster activities outside the regular budgets of line agencies and proposed capital expenditures for pre-disaster operations.
3. NCF cannot be used for the following:
   a. repair/rehabilitation of government buildings damaged by fire, e.g. hospitals, school buildings, capitol buildings and public markets;
   b. relief and rehabilitation requirements for specific calamities with specific appropriations under special laws, except when the appropriations have been fully expended or utilized.
4. Release of Quick Response Funds to concerned agencies is subject to the Calamity Fund provisions of the annual GAA.
5. Putting up of a local counterpart fund by local government units (LGUs) as follows:
   a. 1st class – 50 percent of the total project cost
   b. 2nd class – 40 percent
   c. 3rd class – 35 percent
   d. 4th class – 30 percent
   e. 5th/6th class – exempted but request should not exceed PHP3 million

For 2003, the GAA has appropriated PHP800 000 for the National Calamity Fund. Of this, 25 percent has immediately been released to the DSWD, 15 percent to OCD and another 15 percent to the NDCC as Quick Response Fund, and 20 percent to the DPWH for reconstruction activities. The balance was reserved as a standby fund.

The President has also discretionary funds that can be drawn upon in disasters, but they also are used for other priorities, such as school construction in depressed areas. See Section 2.5.2 for more details on the LCF at municipality and barangay levels.

2.5.3 DRM coordination at municipality level and below

2.5.3.1 The Municipal Disaster Coordinating Council (MDCC)

The Municipal Disaster Coordinating Council was established by PD 1566, the Local Government Code in 1999 and reorganized in 2001 by Municipal Executive Order No. 16. It is headed by the Municipal Mayor who serves as chairman and the Station Commander of the Philippine National Police who serves as vice-chairman and action officer. Representatives from the private sector and municipal officials perform specific emergency functions and the membership includes national officials assigned to the municipality. With the 2001 reorganization, the task units were streamlined as follows:

- Health Service Committee – chaired by the Municipal Health Office, with private clinics as members,
- Security and Fire Committee – chaired by the Philippine National Police, with the Fire Service Unit and *barangay* tanods as members,
- Communication, Warning and Public Information Committee – chaired by the Office of the Mayor, with the Liga ng mga *barangay* President and all Punong *barangays* as members
- Transportation, Rescue and Evacuation Committee – chaired by the Municipal Engineers Office, with the Department of Education, Culture and Sports (DECS), Philippine National Police, Department of Public Works and Highways (DPWH), the Sangguniang Bayan and the Sangguniang Kabataan as members
- Relief and Rehabilitation Committee – chaired by the Municipal Social Welfare and Development Office (MSWDO), with the Municipal Planning and Development Office, Municipal Engineers Office, Municipal Agriculture Office, Municipal Transportation Office, and representatives from the NGO and the bus transportation sectors as members

In addition to these task units, NGO and disaster welfare desks were set up within the MDCC to coordinate NGO assistance and to provide information on disaster victims, respectively. The MDCC has the following functions and responsibilities:

- coordinate disaster operations activities;
- implement MDCC guidelines within the municipality;
- advise the *barangay* Disaster Coordinating Councils regarding disaster management; and
- submit reports and recommendations for allocation of needed resources.

The **Disaster Operations Centre** is the facility where field activities are monitored and controlled. It is made up of the:

- Intelligence and Disaster Analysis Unit – evaluates information and advises member agencies of the MDCC of an impending disaster, makes recommendations on how to prevent disaster and/or suggests precautionary measures to minimize the impacts of disasters, submits recommendations for allocation of needed resources, and prepares appropriate recommendations to relevant authorities of possible declaration of the existence of state of calamity in affected areas.
- Plans and Operations Unit – recommends courses of action to be taken based on the recommendations of the Intelligence and Disaster Analysis Unit, determines the type of service units to be utilized in the disaster area, recommends implementation of existing plans, maintains and/or supervises progress of operations, determines the necessity of utilizing additional service units, and prepares appropriate reports upon termination of operations.
- Resources Management Unit –identifies and secures possible sources of funds for disaster victims, and gathers the necessary statistics on resources such as food, clothing, construction materials, medical supplies, transportation and other relief and rehabilitation items.

Each task unit formulates its own action/operations plans that are then consolidated to form the overall Municipal Disaster Preparedness Plan.

2.5.3.2 The Municipal Disaster Preparedness Plan

The Municipal Disaster Preparedness Plan details activities to be undertaken, including funding requirements and sources, prior to, during and after an emergency. It envisions a peaceful, self-sustaining municipality of God-loving people who are cohesive, self-reliant and actively engage in confronting disasters on a total system approach – from preparedness, prevention and mitigation to emergency relief, rehabilitation, recovery and development. It aims for the optimum management of disasters by pooling resources, both human and material, and the application of practical operational technique. Its objectives are to:

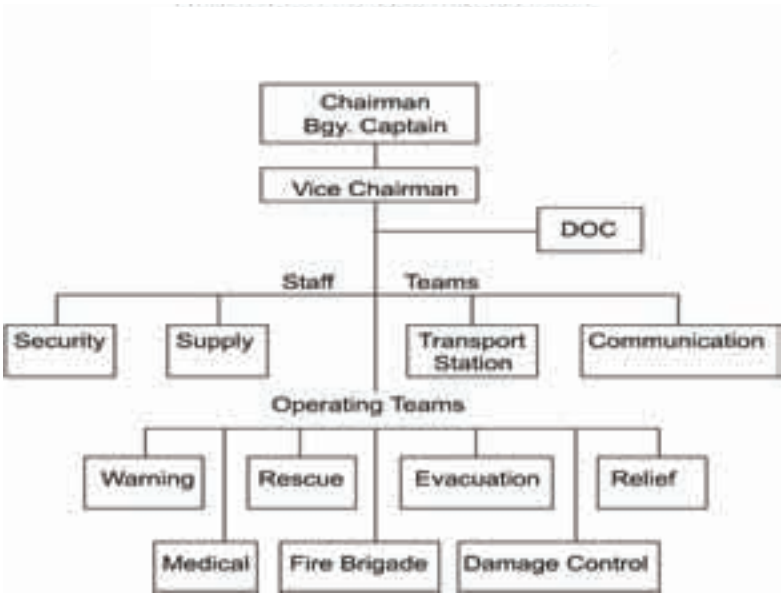
- reduce the undesirable impacts of disasters in the municipality,
- prevent or mitigate the occurrence of natural and man-made hazards,
- implement disaster management, not as a periodic reaction to individual circumstances but as a comprehensive and continuous activity.

It details the functions and responsibilities of the MDCC, the strategies for, and extent of, interventions.

2.5.3.3 The Barangay Disaster Coordinating Council (BDCC)

Prior to 1991, the *Barangay* Disaster Brigade had local responsibility for monitoring emergency situations, communicating with the municipal government, receiving and facilitating distribution of relief assistance and, in spite of lack of formal training, executing rescue operations in cooperation with the *barangay* tanods. According to the communities interviewed, the *Barangay* Disaster Brigade responded according to need and performed well because of its experience and knowledge of the community. The *barangay* brigade was replaced by the *Barangay* Disaster Coordinating Council (BDCC) in 1991, with clearly delineated roles assigned to specific people. The communities interviewed said they appreciated being clear on who has responsibility over certain tasks and the fact that they are not limited to responding to a need in times of emergency. The BDCC's organizational structure shown below was established by the Local Government Code in 1999.

Figure 6 : The organic chart of the BDCC.



2.5.4 DRM resource mobilization at local levels

2.5.4.1 Financial Resources

Local Calamity Fund (LCF) comes from the 5 percent of estimated revenue that is set aside by the local government as an annual lump sum appropriations for relief, rehabilitation, reconstruction and other works and services in connection with calamities which may occur during the budget year. This is provided for by Section (324 (d) of the Local Government Code. Pre-requisites for the use of the Local Calamity Fund are:

- appropriation in the LGU budget as annual lump sum appropriations for disaster relief, rehabilitation and reconstruction;
- useable for calamities occurring during the budget year in the LGU or other LGUs affected by a disaster or calamity;
- passage of a Sanggunian Resolution declaring a calamity area;
- usable only for relief operations in case of fire.

Unlike the National Calamity Fund, the 5 percent LCF, as originally designed, could not be used for disaster preparedness activities of the LGUs. The authors of RA 8185 reasoned that the local government units should programme their preparedness activities in their respective budgets for the ensuing year. If unused during the budget year, this fund is added to the municipality's general fund for the subsequent year.

However, bills are pending in the Philippine Congress to allow the use of the LCF for preparedness activities. A Memorandum Circular issued by the Department of Interior and Local Government (DILG) and the Department of Budget and management (DBM) in 2003 provides for the use of the LCF for preparedness activities for human-induced threats, including terrorism. The municipality has imaginatively used this provision in funding disaster management training for *barangay* tanods by integrating disaster management into police counter-terrorism training.

Municipal development fund comes from the 20 percent of the internal revenue allotment (IRA) from the national government. The IRA is appropriated to local government units proportionate with the LGU's population and land area. This development fund supports the municipality's programmes in the agriculture, health, social welfare, infrastructure, environmental management, disaster preparedness, tourism and youth sectors, including the appropriation of development funds for each of the 45 *barangays*. Recognizing that disaster management is a key component of development, the municipal mayor utilizes the development funds to support disaster management in the relevant sectors (e.g. rehabilitation of roads and drainage systems from the infrastructure sector appropriation, medical missions from the health sector appropriation, etc.). Table 12 shows the appropriation of the municipal development fund for various disaster management-related activities.

Other sources of funds include un-appropriated funds in the municipal general funds, special budgetary allocations from the national government, donations from businesses and the private sector, and assistance from other governmental and non-governmental agencies, such as the DSWD, Philippine National Red Cross and others.

Table 12. Municipal fund for disaster preparedness, mitigation and response

Item	2001 (PHP)	2002 (PHP)	2003 (PHP)
Calamity Fund		2 041 684	2 282 171
Development Fund			
Construction/repair/rehab of drainage systems	250 000		
Repair/rehab of *barangay* roads irrigation system	600 000	300 000	361 685
Installation of water system in various *barangays*	100 000		100 000
Construction of water impounding centre operation of Bgy. Balabag Pumping Station			150 000
Repair of various *barangay* health stations			100 000
Purchase of utility vehicle	150 000	100 000	
Purchase of dump trucks	1 000 000		
Operation and maintenance of heavy equipment	100 000	300 000	300 000
Repair/rehabilitation of government vehicles		270 000	200 000
DREAM equipment	50 000		
Disaster preparedness equipment (VHF repeater system, etc.)			300 000
Purchase of fiberglass boat	250 000		
Health programmes (medical missions, etc.)	100 000	200 000	200 000
Livelihood programmes (including training)		150 000	200 000
Clean and green programmes (river and coastal cleanup portable toilets, etc.)			150 000
Public safety program			200 000
Disaster preparedness Training			100 000
Barangay Development Fund (for 45 *barangay*s)	720 000		1 440 000
Operation of demo farm and agromet station			200 000
Municipal contribution to Jalaur-Suage Rivers irrigation system rehabilitation			100,000
Total	3 320 000	3 361 684	6 383 856

In line with the self-reliance espoused by the Local Government Code, *barangays* have their own calamity funds (5 percent of *barangay* income) for disaster relief, rehabilitation and reconstruction. When available funds are not sufficient to meet their needs, external assistance is sought from the municipal government.

2.5.4.2 Relief Goods

As agreed with members of the Economic Council, the municipality acquires goods and materials for disaster relief and rehabilitation on loan. This includes rice, canned food, medicine, clothing, cooking utensils, fuel and construction supplies. Payment is made upon the release of the LCF. The municipal government ensures that payments are made on time to maintain business proprietors' confidence. Council members also have donated goods to disaster victims even when not requested, indicating their level of confidence in the local government. Surplus goods from previous events are also additional sources of relief goods.

2.5.5 Disaster risk management tasks pursued by the municipality

Early warning. The Municipal Mayor, who is the MDCC Chairman, issues the official early warning as soon as information of an impending hazard is received, to give people ample time to undertake preparatory actions. Information sources include the Philippines

Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), National Irrigation Administration (NIA) which manages the Jalaur-Suage Rivers irrigation system, and individual reports of observed conditions from the Punong *barangays* via handheld radio sets.

Communication. Each *barangay* has a handheld radio set for communication. In distant *barangays*, there can be a problem with weak transmission signals.

Evacuation. Evacuation is carried out by the BDCC.

Damage-and-needs assessment. An initial damage-and-needs assessment is conducted within six hours of the hazard's impact to determine what response was undertaken by the local disaster coordinating council, estimate requirements for follow-up response and serve as the basis for decision-making at higher levels and for future planning. Extent of damage is reported within 12 hours of the hazard impact.

Declaration of state of calamity. Upon receipt of the damage-and-needs assessment, the MDCC Chairman recommends that the Municipal Council declare a state of calamity. This is needed for the mobilization of the calamity fund and to enable other agencies to extend assistance.

Disaster response operations. Rescue and relief teams are sent to affected *barangays* to address pressing needs the *barangays* are unable to meet.

Rehabilitation. Rehabilitation work is usually completed about 15 days after the impact of the hazard. However, for infrastructure outside the jurisdiction of the municipality, such as national and provincial roads, bureaucratic procedures can delay repair work and cause longer dislocation for affected residents. Certified seeds stored at the Municipal Demonstration Farm are distributed by the Municipal Agriculturist Office to affected farmers.

Mitigation. Several activities have been initiated to mitigate the impacts of floods. The municipal government oversees an annual clearing and cleaning of rivers and coastline. Weather forecasts from the local agrometeorological (agromet) station are disseminated to various agencies, institutions and communities to guide anticipatory actions in future climate/weather conditions. Training and symposia have been conducted on disaster management and prevention, involving community leaders and key agencies.

2.5.6 Disaster risk management in the study sites

2.5.6.1 Balud

In Balud, roles are clearly delineated and assigned. The *barangay* chairman is the BDCC Chair, supported by the seven members of the *barangay* council. The *barangay* youth organization, which supports community youth development and anti-drug activities, is involved in the BDCC transportation committee. This organizational chart is prominently displayed at the *barangay* hall.

The community recognized the improvements in the communication and transportation systems when BDCC superseded *barangay* disaster brigade. A handheld radio provided by the municipal government facilitates communication with the MDCC, other *barangay*s and NGOs. Emergency transportation, such as transportation for evacuations, is now coordinated and an earth dike, constructed along the Jalaur River, has decreased the incidence of flooding in the community.

Hazard monitoring is done by everyone in the community. Water level in the Jalaur River is monitored using marked tree trunks at the riverbank as flood markers. Upstream river conditions are reported from other *barangays* by radio. Community members also observe upstream cloud conditions.

Release of water from the dam located in upstream municipalities also causes flooding, but a warning is issued by the dam operators so the community is always prepared. The May 2003 flood was however unexpected, as water level at the Jalaur River was low. The heavy rains flooded only the rice fields.

Most farmers have small huts in higher areas that they can move to when the residential area is flooded. An elevated school building, built in 2002 a few meters away from the *barangay* hall, serves as an evacuation centre (Photo 2).

Photo 3. School building used as an evacuation centre in Balud.

The *barangay* has one small row boat and four pedaled tricycles, all privately owned, that are volunteered during emergencies. Rafts made of bamboo or banana trunk are built for use during evacuations. Some members of the BDCC's evacuation team were trained in search and rescue in 1998 by the Mountain Tigers, a provincial rescue organization. Other members of the BDCC received training in disaster management in 2000. According to the respondents, a religious NGO that has been in Balud for 40 years assists in the distribution of relief goods (the NGO does not provide the goods itself).

2.5.6.2 Maquina

All 11 council members of the *barangay* are involved in resource mobilization. The 18 *barangay* tanods are involved in rescue and evacuation, in addition to their regular duties of securing the *barangay*. *Barangay* income pays the honoraria of the *barangay* officials (PHP1 700/month for the Punong *barangay*, PHP1 270/month for each council member, and PHP125/month for each *barangay* tanod). Five percent of the *barangay* income is allocated as local calamity fund for disaster relief.

Everyone in the community, but especially the BDCC, monitors the height of the Jalaur River whenever there is heavy rainfall in the community or upstream. They also observe the debris content of the river, as well as bubbles in the water caused by the strong current, as these are indications of rushing water from upstream. River conditions are also reported to the MDCC. Flood warning are given 24 hours in advance, to enable the community to prepare. Official warning comes from the MDCC. Respondents, however, said that when they see the water level in the river rising, they initiate preparatory actions even if official warning has not been received.

As a good practice, this *barangay* ties ropes to the trees that lead to the evacuation centre in order to guide people during evacuation, especially since the floodwater current is strong.

2.5.6.3Barasan

The community receives warnings of an impending hazard and corresponding advisories from the AM radio, and from the municipal hall (MDCC) through the handheld radio communication network.

Photo 4. Farmers and *barangay* officials engaged in rice and fish farming in Barasan

2.6. RISK PROFILE

2.6.1 Community perception of risk

The words "risk" and "disaster" are not commonly used by people in Dumangas. Instead, they use the word *kalamidad* for any event that is not desired or causes destruction of property, livelihoods or their capacity to engage in a livelihood activity. They consider *kalamidad* or disasters either natural or human-made. From their own experiences, natural disasters include typhoons, flooding, drought, rat infestations, pest infestation and tidal waves. The respondents reported that they recognize that events such as fires are human-made disasters include fires, but they also perceive that floods and droughts are human made.

The respondents also perceived that a list of human-made disasters should include graft and corruption, the expansion of fishponds in river pathways, the establishment of fishponds in municipal coastal waters, the importation of rice and the agricultural policies of the government that further marginalize small farmers. They felt that these human-made disasters can have a broader and more destructive impact and affect more people and communities than natural disasters. Moreover, they perceive that natural disasters allow faster economic, physical and social recovery and that human-made disasters can have long-term effects that are more economically, socially and politically debilitating.

2.6.1.1 Typhoon and flooding

Of the natural disasters the respondents had experienced, typhoons and flooding were the most common. Typhoons, accompanied by strong wind, destroy relatively unstable houses and cause palay washout in farming communities, as well as washout of fishnets and fishtraps for fishing communities. For fishpond operators, the destruction of dikes is the greatest concern.

When flooding comes, physical dislocation occurs low-lying areas of the municipality. Animals, agricultural equipment and household fixtures that cannot be moved to higher grounds are often washed away. Flooding cuts off access to sources of potable water since most households still draw drinking water from wells with manually-operated water pumps. Fever, flu and diarrhoea among the elderly and children are often attributed to contaminated water and food.

It is, however, interesting to note that most respondents do not necessarily perceive typhoons and flooding as disasters if they do not negatively impact on their lives and livelihoods. Heavy losses of capital and invested non-financial capital that result from floods and typhoons render many incapable of immediate debt repayment, providing for family needs (from several days to several months), or immediately going back to their accustomed livelihoods. Respondents in Maquina and Barasan expressed that financial losses may range from 75-100 percent of the capital they have invested in their farming and fishing activities. In turn, these losses lead to psychological stress, multiple economic burdens for parents who wish to provide for their families, and possible loss of traditional livelihoods for those who are unable to recover immediately. In addition, while adults concern themselves with economic capacities and losses, children see typhoons and floods, in particular, as opportunities for them to swim in pools created by floods.

2.6.1.2 Drought

Droughts are considered far worse than flooding and typhoons in terms of crops loss. In the case of flooding, only sections of farmlands, fish traps and breeding areas are washed out. Droughts, on the other hand, have wide-ranging effects causing plants to either grow stunted or die, meaning that grazing animals will have nothing to feed on. Crops such as palay will most likely have the same fate without enough water, leading to losses. Fishing communities suffer from drought as well. The fishermen perceive that fish often prefer cooler temperature habitats, meaning that when water temperature and salinity rise, the fish tend to migrate to cooler habitats – either upstream in rivers or into deeper waters. Oysters and other mollusks, a major source of income for those residing near the coastline, are also affected.

2.6.2 Environmental Issues

The municipal government recognizes that forest degradation, and silting and obstruction of waterways have contributed to increased flood risk in recent years. The mouth of the river has narrowed due to an increase in the number of fishponds located there, increasing the risk of flooding. Environmental protection laws exist but often are not implemented. The continued expansion of fishponds by fishpond operators not only denies small-scale fishers access to traditional fishing grounds, it also causes river pathways to narrow. Thus, flooding occurs heavy rains come and the water cannot flow through the river with ease.

In the case of those living near the municipal water coastline whose livelihoods traditionally depend on access to municipal fishing grounds, the establishment of private fishponds in municipal waters limits and blocks their access to the very source of their livelihood. According to respondents, while natural disasters allow them to recover in a shorter time period, human-made disasters such as the continuous expansion of private property into what should have been common or municipal property (such as rivers and municipal waters) may signal the end of their traditional livelihoods.

LOCAL INSTITUTIONS RESPONSE TO RECENT NATURAL HAZARDS

3.1 Hazard events – 1990 and 2000

3.1.1 Typhoon Ruping, November 1990

Typhoon Ruping was one of the most intensive and destructive tropical cyclones of 1990. It entered the Philippine Area of Responsibility on 10 November 1990 from the western Pacific Ocean (Figure 7), slowly moved west/southwest, made landfall in Leyte and crossed the Visayas on November 13. With maximum winds of around 220 km per hour, Ruping devastated the provinces of Cebu, Negros, Iloilo and Bohol and then exited in the South China Sea towards Vietnam. Aside from devastating winds, Ruping also generated significant amount of rainfall causing flooding in most areas. In Iloilo, several days of heavy rains flooded the Jalaur River and inundated low-lying areas.

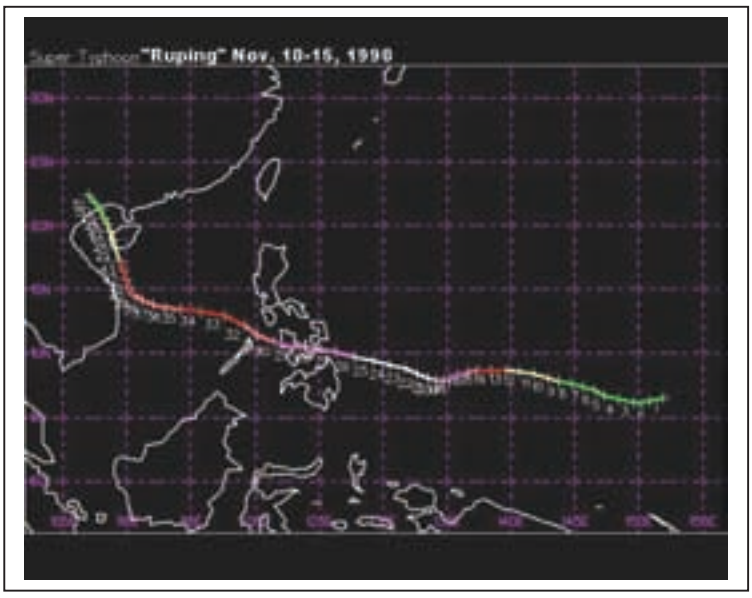


Figure 7. Track of Typhoon Ruping, November 1990

Although there is no record of local government action taken during the event, residents of Barasan still clearly remember the event, as this was a strong typhoons that gravely affected their livelihoods, damaging the rice crop which had been ready for harvest and destroying animals (chickens, ducks and hogs) who died due to hypothermia.

3.1.2 Typhoon Ulpiang, December 2000

Although one of the weakest tropical cyclone in terms of wind strength to hit the country during the last quarter of the year, Typhoon Ulpiang battered Western Visayas on 7 December 2000 when it dumped huge amount of rainfall leaving several people dead, widespread property damage and hundreds of families homeless. Several days of incessant rains inundated the provinces of Capiz and Iloilo. Typhoon Ulpiang formed in the central Philippine Sea on the morning of December 6, and cut across central Philippines where it degenerated into a low pressure area on the morning of December 8. Figure 8 shows the track of tropical depression Ulpiang.

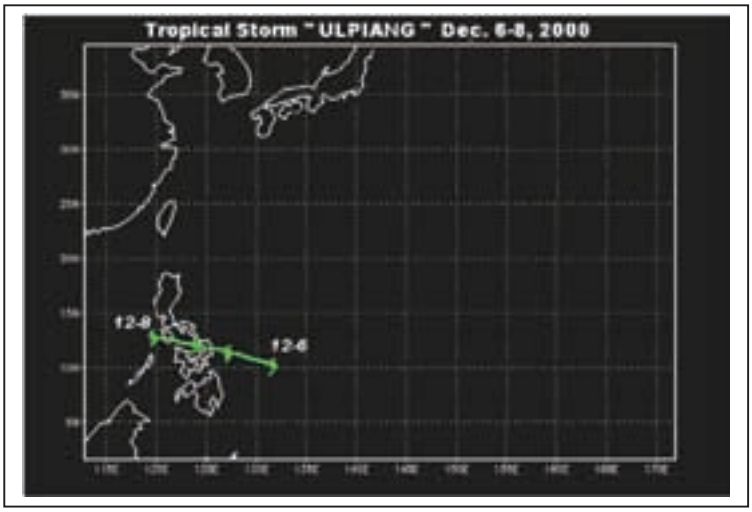


Figure 8. Track of Typhoon Ulpiang, December 2000

Figure 9 shows the rainfall brought by tropical depression Ulpiang at Roxas City and Iloilo City PAGASA stations. Compared with the long-term average, the December 6 and 7 rainfall at Roxas City were way above normal while at Iloilo City, rainfall on the same days was near normal. Although less rain fell, the Jalaur River at Dumangas still experienced flooding, probably because of the large amounts of rainfall that occurred upstream (represented by the Roxas station).

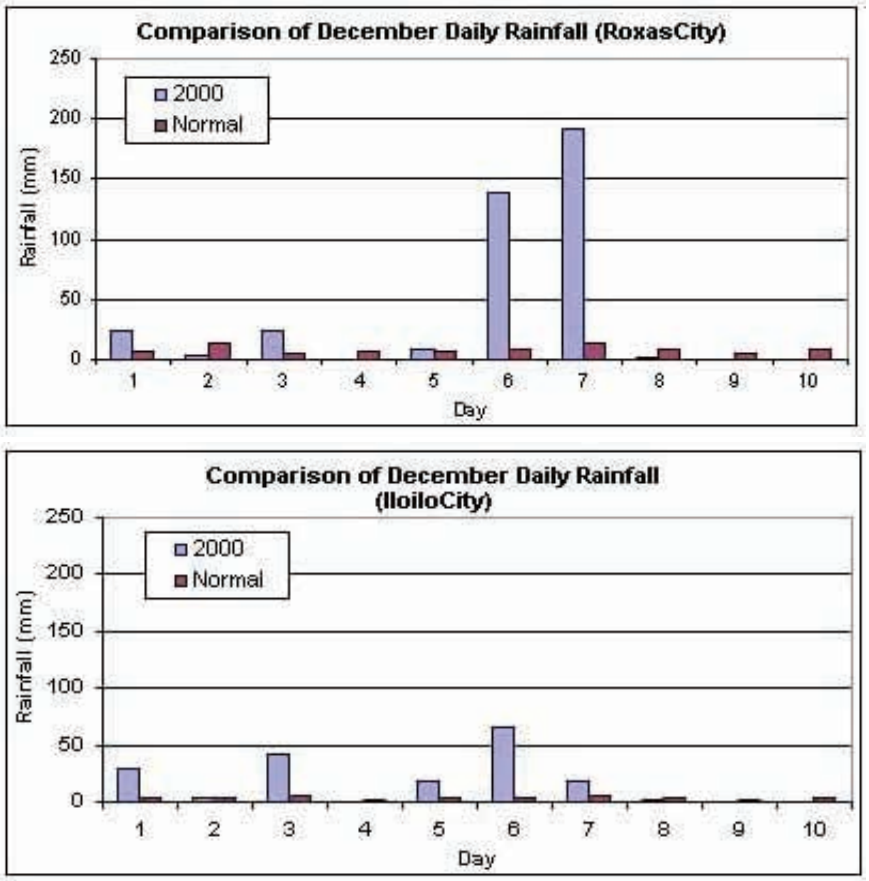


Figure 9. Rainfall from the passage of tropical depression Ulpiang, December 2000

Residents of Balud still vividly remember the flooding of December 2000 – The barangay was isolated, as houses, farmlands and roads were under water. The floodwater current was strong, one person drowned and all households were affected. They said that floods of this magnitude have happened three or four times in 10 years.

The *barangay* hall was used for evacuation, but it was small and could not accommodate more than 5 to 10 families (Photo 5). Therefore, most being evacuated stayed with others whose dwellings had second floors.

The *barangay* used its calamity fund for medicine and food. Partially damaged dwellings were repaired by residents themselves (e.g. reinforcing structures with bamboo poles). The municipal government also provided galvanized iron sheeting for roofing.

There was incidence of diarrhea, colds and cough, especially in children. The municipal government sent a doctor and health workers on a medical mission to the *barangay* and other affected communities.

The respondents felt that it takes time to recover losses when disaster strikes. For example, those who worked odd jobs in construction sites could not resume their activity until things had gone back to "normal". Some had to borrow from relatives and friends who had money to spare.

Photo 5. Focus group discussion with Balud residents at the *barangay* hall

According to respondents in Maquina, typhoon Ulpiang brought floods that destroyed about 20 houses located near the riverbanks, killed all their poultry due to hypothermia and caused 100 percent loss of the rice crop. They said that if there had been no warning given, even their household items would have been destroyed as well. There were, however, two farmers who did not heed the warning, and were caught unprepared. They did not have access to potable water and food and, although their neighbors did not approve of their negligence, these neighbors shared food and water in the spirit of *pakikipagkapwa.*

3.1.3 Local Institutional Response

The account of the community and municipal government activities before, during and after the disaster is presented in Table 13.

Table 13. Community and municipal government account of the December 2000 flood

Date	Community activities: Maquina	Government activities
Pre-disaster phase		
5 December 2000, 08:00	Warning of impending flood was received by handheld radio network. The Punong *barangay* mobilized the BDCC, which promptly informed all community members to prepare for the impending flood.	Called the attention of all Punong *barangay*s for vigilance in monitoring the water level at Jalaur River, and to always monitor weather reports through commercial radio stations. Advised Punong Brangays to disseminate the information to constituents so that they could prepare their belongings, livestock and poultry for possible future action.
09:00	The BDCC initiated the following preparatory actions: • Prepared raft from banana trunk and bamboo	Coordinated with the National Irrigation Administration on the water-level situation at upstream Jalaur-Suage dam (Dingle municipality).
14:00	• Arranged for the use of private vehicles for evacuation	Called an integrated meeting with MDCC, DREAM, communicators group, etc. to prepare all necessary materials and equipment for disaster operation, and to maximize information dissemination.
16:00		Evacuation centres checked for readiness.
18:00 onwards		Continuous monitoring of water level at Jalaur River.
19:00		Asked assistance of Bombo Radyo, a popular commercial radio station in the province to inform people of possible flooding.
6 December 2000, 08:00	Warning for evacuation – BDCC asked people near riverbanks to move to higher ground.	Issued warning for evacuation especially those living at the banks of the Jalaur River.
08:30	The BDCC prepared the evacuation centre, a six-room school building, with cooking utensils, rope access to the building, used clothing, bedding, including tents if more room would be needed.	Called the Municipal Economic Council for a meeting; made loan arrangements for them to acquire goods and other materials needed for disaster-related operations.
14:00	The following preparatory actions were undertaken by the community: • Secured potable water, food and cooking utensils to bring the evacuation centre or to higher ground	Called the Municipal Health Office, Philippine National Police (PNP) and volunteers for a meeting on possible action if and when the water level at the Jalaur River continues to rise.
15:00 onwards	• Put household and other items on higher ground • Transferred animals to higher ground	Organized DREAM into several teams in coordination with the communicators group, the PNP and the volunteers, in order to patrol the *barangay* clusters. Monitored all reports from various sources and made directives to various offices concerned.
17:00	• Started moving to the evacuation centre.	Issued a stern warning to evacuate all people and secure properties vulnerable

Onwards		to floods. Ordered stocking goods from members of the Economic Council Continuously monitored water level at the Jalaur River.
19:00		The mayor personally checked *barangay* readiness for the impending flood.
21:00	• Other residents moved to the 2nd floor of their houses.	Ordered all concerned to continue monitoring the Jalaur River and check weather updates.
Disaster Phase		
7 December 2000, 03:00		Water overflowed the Jalaur River, inundating numerous *barangay*s; members of DREAM were stationed at their respective areas of responsibility.
08:00	Reported to the MDCC the situation at the evacuation centre (number of people, need for additional food and medicine), and the situation in the community	Convened the Municipal Council for declaration of state of calamity.
10:00		Packed up goods for distribution.
11:00		Distributed goods, medicines, etc. to affected *barangay*s.
12:30		Received reports on insufficiency of potable water in various *barangay*s
13:00		Ordered the Bureau of Fire Protection to fill fire trucks with potable water for distribution to affected *barangay*s.
14:00 onwards	Help came from the municipality eight hours after request was made. Water and relief goods were delivered using dump trucks.	Stringent monitoring of flood situation.
8 December 2000, 00:00	Evacuees still at the evacuation centre	Continuous monitoring of water movement at Jalaur River and of weather updates. DREAM deployment.
09:30		Called meeting of the Municipal Treasurer, Budget Officer and Accountant regarding the immediate release of the calamity fund.
11:00		Called the Office of Civil Defense for possible extension of rice assistance to the municipality.
12:00		Received reports that some areas could not be penetrated by dump trucks anymore because of high of floodwaters and strong current.
12:30		Requested permission from the National Food Authority to allow the municipality the use of its rubber boat in disaster operations.
13:30		Requested the provincial government to lend to the municipality its bigger trucks to transport food items, medicines, etc. to affected *barangay*s.

onwards		Monitoring.
9 December 2000, am	Evacuees still at the evacuation centre	Called and wrote provincial, regional and national offices for possible relief assistance.
pm		Deployed the medical team in areas still reachable reached by transportation. Monitoring of water level and weather situation
10 December 2000, am	Evacuees started returning to their homes and assessed damage. They reported damage to the local DSWD and requested assistance. Residents whose houses were damaged stayed with relatives or friends.	Water level began receding. Initial reports on damages received showed some residents began returning to their homes. Others whose dwellings were damaged stayed in evacuation centres or with neighbors.
pm		Ordered the Municipal Social Welfare and Development office to facilitate the provision of housing assistance to affected families. Monitoring of the Jalaur River and of the weather condition.
23:00		Water receded to the level of the Jalaur River.
Post disaster phase		
11 December 2000, am		Sent the Municipal Agricultural Officer, Municipal Engineer, Municipal Planning and Development Coordinator, Municipal Social Welfare and Development Officer to assess damages. Called all offices concerned for a consolidated damage report.
pm		Sent requests for financial assistance relative to the assessed damage to concerned offices. Requested the Department of Public Works and Highways and the Provincial Government for the immediate repair of various damaged national and provincial roads.
12 December 2000		Ordered Municipal Health Office to conduct medical missions. Ordered immediate repair and rehabilitation of municipal and *barangay* roads. Checked the processing of papers for the provision of housing materials for the flood victims.
31 December 2000	Roofing materials and lumber costing about PHP2 000 was provided per affected household from 3 to 4 weeks after the flood subsided.	

Respondents are of the view that materials requested for repair of damaged dwellings should be provided immediately to minimize dislocation, and enable them to return to

normal as fast as possible. They said that the *barangay* would stockpile housing material if it could afford it.

3.2 Hazard events – 2001 and 2003

3.2.1 Typhoon Nanang, November 2001

Typhoon Nanang hit Panay Island on 7 November 2001 (Figure 11), bringing torrential rains (Figure 12) over an extensive area. It submerged 14 *barangay*s in Dumangas, affecting 1344 families. Damage to farmlands, fishponds and infrastructure totaled more than PHP100 million. The increased preparedness of the communities and local government led to a decrease in the number of households affected when compared to that of the previous event (Figures 10 and 11).

Figure 10. Track of Typhoon Nanang, 6–10 November 2001

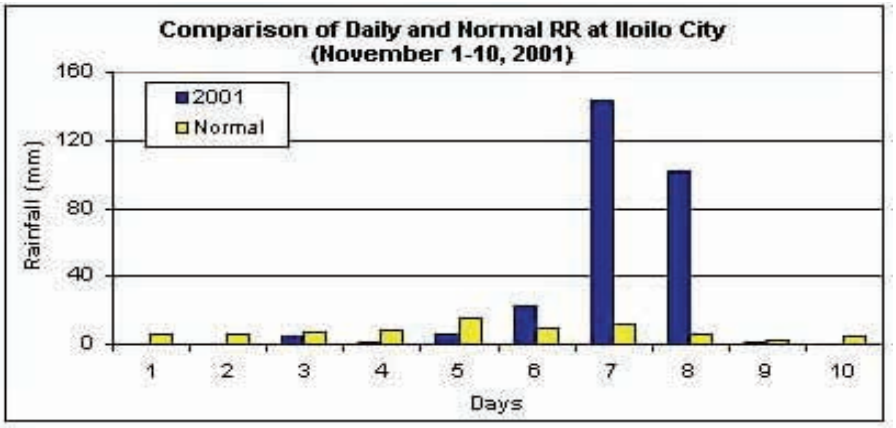


Figure 11. Daily rainfall at Iloilo synoptic station during the passage of Typhoon Nanang on 7 November 2001. Note the large deviation from the long-term average during November 7 and 8.

3.2.2 Typhoon Chedeng, May 2003

On 25 May 2003, a low pressure area located west of the Luzon Island (northeastern South China Sea) intensified into tropical storm Linfa (locally named "Chedeng") and gained strength as it moved eastward across northern Luzon, exiting at the northern border of the Philippine Area of Responsibility on 29 May 2003 (Figure 12). Although Chedeng developed during the early southwest monsoon season, it enhanced the southwest flow, dumping significant amounts of rainfall along the western parts of the country that triggered flashfloods in some areas in Iloilo province. Satellite imagery taken on 27 May 2003 revealed the large band of clouds associated with the disturbance and with the southwest flow that covered Panay Island (Figure 13).

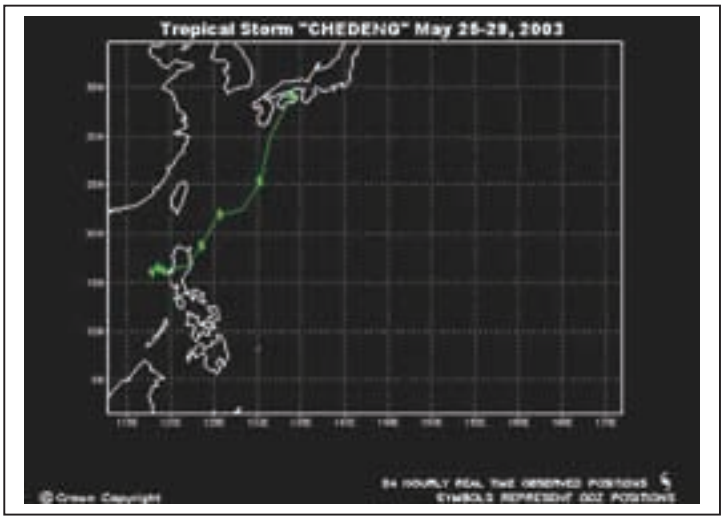


Figure 12. Track of Typhoon Chedeng, May 2003

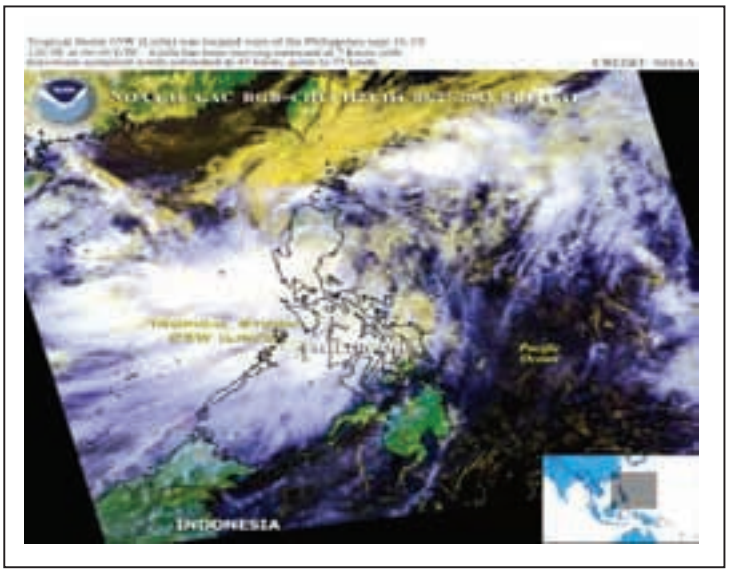


Figure 13. Cloud band associated with Typoon Chedeng and the enhanced southwest flow.

Comparison of the average and daily rainfall values from 25–30 May 2003 with the long-term average rainfall values for Dumangas indicate that the six-day rainfall episode was

anomalous and responsible for the flashflood that occurred in some areas in Iloilo, especially Dumangas, on 28 May 2003 (Figure 14). Comparison of rainfall in Dumangas and Iloilo City during this period further points to the localized rainfall anomaly as shown in Figure 15. Twenty-five *barangay*s in the municipality were submerged in floodwaters, affecting 377 families (2 244 people) and damaging crops and infrastructure.

There was no indication of an impending flood since the dry season had just ended water and water levels at the Jalaur River and the irrigation canals were relatively low. Farmers had sealed their plots to catch the early rains. This proved detrimental however, when continuous rains, which started on 24 May and peaked on 28 May, inundated the farms.

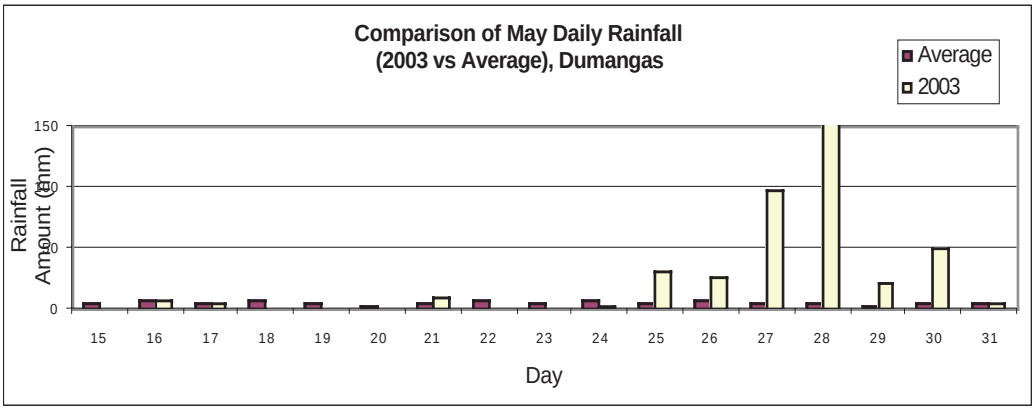


Figure 14. Daily vs. long-term average rainfall for May, Dumangas, Iloilo

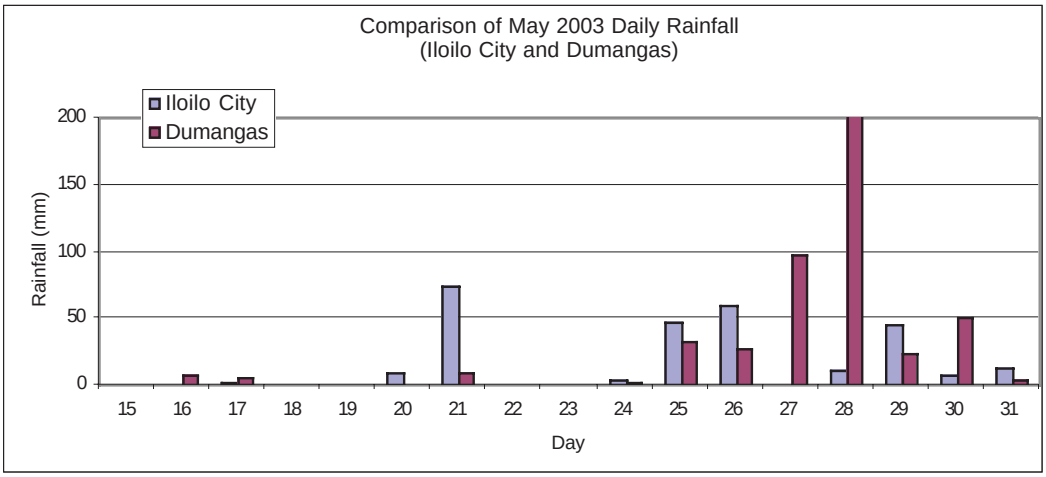


Figure 15. Daily rainfall in Iloilo Cityand Dumangas, May 2003

3.2.3 Institutional responses

Below is the account of the municipal government's and the community's activities in response to the flood disaster (Table 14).

Table 14. Community and municipal government account of the May 2003 flood

Date	Community activities: *barangay* Barasan	Government activities
Pre-disaster phase		
27 May 2003	Three days of rain but no indication of any flooding. Farmlands were not planted yet. Fish in fish farms were ready for harvest.	Water in both the Jalaur River and the irrigation canals relatively low. No indication of impending flood.
Disaster Phase		
28 May 2003, 00:30		Reports that water levels in the municipality's rivers were rising fast. Called on all Punong *barangay*s to check their areas for rise in flood-waters and inform their constituents of the situation. Those in most vulnerable locations urged to move immediately to evacuation centres.
01:30		Received reports that some *barangay*s were already underwater. Ordered all Punong *barangay*s to wake people up for transfer to evacuation centres, and salvage whatever property possible.
03:30		Initiated MDCC for action. Deployed DREAM to *barangay*s to check situation and assess damage. Asked all driver-employees to report to Municipal Hall immediately for deployment of vehicles to affected *barangay*s.
08:00	Farmlands were inundated – no damage as they were not planted yet. All fishponds were washed out and all stocks lost.	Municipal Council declares State of Calamity.
09:00	School building and *barangay* hall used as evacuation centres.	State of Calamity declaration officially reported to Office of Civil Defense.
09:30		Called the Economic Council for the acquisition of goods on loan
12:00		Distributed goods and provided potable water to affected areas.
Post disaster phase		
29-31 May 2003	Evacuees (about 140 people) stayed at the evacuation centres for three days until floodwaters subsided. *Barangay* calamity fund used to buy rice and canned goods. No external assistance was received. Services received from medical mission sent by the municipal government. The *barangay* was without electricity for 5 days.	Finalization of damage assessment. Request various national agencies for financial assistance to address pressing needs of victims. Ordered medical missions to affected *barangay*s. Ordered immediate repair and rehabilitation of municipal and *barangay* roads.

In Balud, all farmlands were inundated but the rice crop was not yet flowering. No external assistance was received for crop damage so the farmers had to replant from their own resources. The three worst effected households were evacuated to the school building. No other damage was reported. A rubber boat was dispatched to the *barangay*. The respondents noted the improved communication system led to the municipal government's fast delivery of assistance and services. Table 15 indicates that evacuees in Balud were able to provide for themselves.

Table 15. Flood victims served by the Social Welfare Department

Barangay	No. affected		Served inside evacuation centres		Served outside evacuation centres		Total served	
	families	people	families	people	families	people	families	people
Balud	21	142	-	-	-	-	-	-
Maquina (not affected)	-	-	-	-	-	-	-	-
Barasan	25	150	4	24	-	-	4	24
Municipal Total	1 428	8,170	109	797	209	1,257	318	1 746

Early warning for floods is based on the monitoring of water levels at the Jalaur River and the irrigation canals, both in Dumangas and upstream. However, the May 2003 experience demonstrated the need for monitoring conditions at the farmlands as well.

3.2.4 Household responses

Awareness in the two flood-prone *barangay*s (Balud and Maquina) is high and community members monitor river conditions. Most initiate preparatory actions based on the river conditions they observe, even when an official warning has not been issued by the BDCC. They move animals, family members, agricultural implements, and personal and household belongings to higher grounds and give children and the elderly priority during evacuation. There are some community members, however, who move only when they see the floodwaters coming.

The primary concern of fishpond operators when threatened with strong pressure from rising waters is hiring workers to reinforce the dikes. This is done despite the higher wages demanded by workers. In fishing communities, however, when there is evidence of a typhoon or a typhoon warning, the primary concern is collecting nets and fish traps, reinforcing of unstable houses, moving *bancas* to higher areas of the coastline, and setting up nets at the shoreline to catch fish that overflow from fishponds during flooding.

The BDCC, with its clearly delineated roles, organizes the local management of disasters, from hazard monitoring and warning dissemination to evacuation, relief and rehabilitation.

3.2.5 Household adaptive capacity

Communities that must deal with recurring floods, such as Balud and Maquina, have built their adaptive capacities by raising their houses on stilts, building temporary second levels of plywood close to the ceiling, and building new houses with second floors. In Balud, about 20 percent of dwellings have a second floor. Huts in farms of higher elevation are

built to provide refuge in times of flood and sheds for chickens and ducks are raised. Some farmers in Maquina have adapted by acquiring farmland plots in elevated areas to ensure that will have something to harvest, even when there are floods. One farmer interviewed said that he has a 8 000 m^2 farm in the low area and a 2 000 m^2 plot in the higher area.

ROLE OF LOCAL INSTITUTIONS IN MANAGING RECENT DISASTERS– AN ASSESSMENT

This assessment of local institutional response to recent disasters has been undertaken with reference to each major phase of the disaster management cycle. While detailed analysis is given in the succeeding paragraphs, the highlights of assessments are shown in the figure. It may be observed that the thick line reflects the strong capacity exhibited by local government organizations in undertaking pre-disaster preparedness and response measures. However, due to various constraints, the management of the disaster recovery phase reveals some gaps. Strategies that integrate prevention and mitigation into development planning are at the nascent stage.

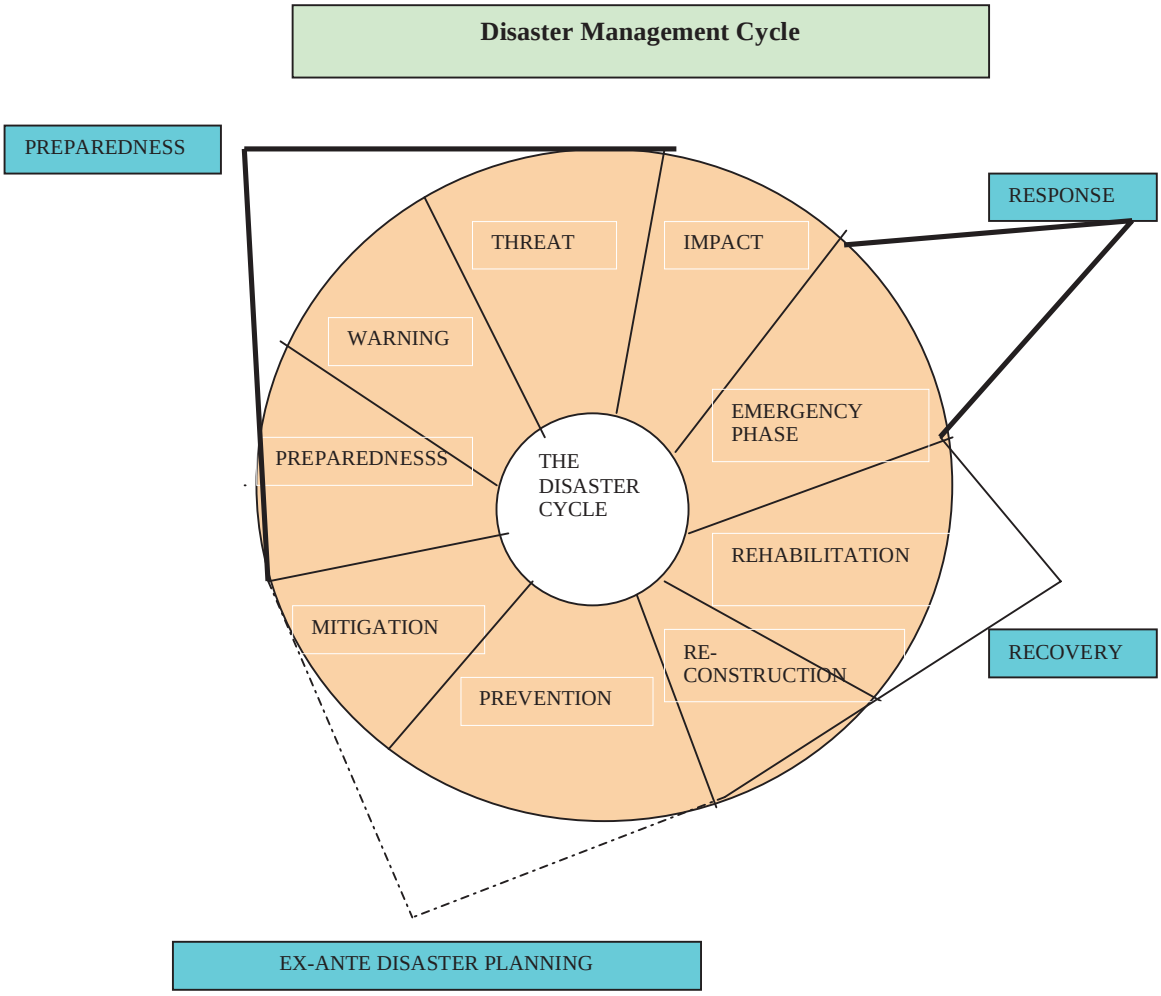
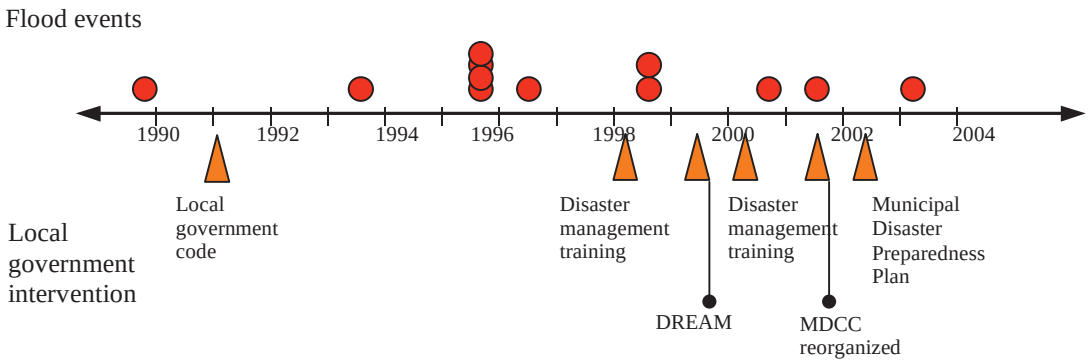


Figure 16: Disaster management cycle

The next section looks at the evolution of institutional responses since 1950s. Subsequently, the weaknesses discernable in recovery and mitigation phases of the disaster management cycle are discussed. This section also captures the recent initiatives of Dumangas local government to address these gaps.

4.1 Evolution of institutional response

Figure 17 shows the timeline of disaster events, with the corresponding government intervention.



4.1.1 Developments up to 1990s

After independence (1950) and until the mid-1960s, the communities recall severe hardships due to typhoons, flooding and other weather risks. They organized Disaster Brigades to save lives during floods. Later, from mid-1970s through the 1980s, the Disaster Brigades were transformed into Mountain Tigers. The Mountain Tigers received professional training in search and rescue operations through a provincial NGO. While this development could instill confidence and minimize the loss of lives, due to inadequate early warning and communication systems, disaster-related losses continued to seriously impair livelihood systems in terms of loss of houses, household assets, livestock and crop losses.

4.1.2 Developments during early 1990s

People could vividly recall discernable improvements in the 1990s when local governments were established with decentralized powers. The organizational arrangements at the municipal and *barangay* levels were systematically reorganized based on lessons learned during the periodic natural hazard events. Every natural hazard event triggered institutional changes for managing subsequent disasters better.

Prior to November 1998, the institutional arrangements for monitoring hazard and emergency situations were weak. The local government relied on PAGASA weather updates and typhoon advisories broadcast from commercial radio stations, police reports on any flood-related incident, and motorists' information on impassable roads.

4.1.3 Developments since late 1990s

A response system was organized in response to the impacts of Typhoon Loling in November 1998. Training in disaster management received by MDCC staff and *Liga ng mga barangay* in March 1998 proved helpful. Arrangements were made with various agencies for early warning, disaster monitoring and response. Volunteers were trained in search and rescue in 1999 and, in 2000, BDCC staff and *barangay tanods* received training in disaster management. In July, 1999, the municipal government encouraged an NGO, called the Dumangas Rescue and Emergency Assistance Movement, to ensure quick response and monitoring and reporting of disaster situation. This movement was built upon the earlier experience of Disaster Brigades and Mountain Tigers. An NGO radio communicators group (Kabalikat Civicom Association, Inc.) was formed in January 2000, to provide hazard monitoring, emergency situation monitoring and relief assistance support to the MDCC. A Memorandum of Agreement signed with the National Food Authority allowed provision of 50 sacks of rice for relief operations. The Municipal Economic Council, a private sector business consortium, was established in 2000 to support disaster relief requirements (see box) This response system was tested in the flood that accompanied Typhoon Ulpiang in December 2000.

Economic Council fills relief gaps

The Economic Council was established to eliminate delays in providing relief assistance in terms of food and other essential items to flood victims. The government code allows commitment of resources from the calamity relief fund only after the formal declaration of disaster in a given area. The disaster impact assessment is a prerequisite for declaring a disaster area. This procedure would normally take at least a week. The Council's private sector members are authorized to release, on credit, food and other essential items to flood victims immediately. The municipal government can then authorize reimbursement after completing formalities relating to formal disaster declarations. This arrangement has ensured quick and decentralized delivery of essential commodities to flood victims. It transparent and has proven to be cost effective as no large-scale emergency foodstuff transport was called for.

These activities resulted in improved lead-time of more than 48 hours of impending events and enhanced the community and household level preparedness to withstand the impact of natural hazards.

The establishment of specialized task forces linked to municipal-level local government and NGO and private sector systems with well orchestrated coordination arrangements has resulted in efficient delivery of disaster management services. For example, relief assistance reached the communities at the evacuation centres within three to six hours. The households were able to preserve not only their lives but also household and livestock assets. An interview conducted with the community members revealed that preserving livestock assets could greatly help faster recovery. The municipal officials mentioned that expenditure on relief has come down significantly to the households in recent years.

The MDCC was reorganized in October 2001 to orient the disaster management approach in a systems mode. Key agencies with resources and functions relevant to the MDCC functions were involved to lead the different MDCC units. For instance, PNP works with the Assistant Chairman, the Disaster Operations Centre and the Intelligence and Disaster Analysis Unit; *Sangguniang Bayan* works with the Resources Unit as their resolution is needed for mobilization of the local calamity fund; DECS works with evacuation since school buildings are used as evacuation centres, etc. The number of task units was reduced

from ten to five, merging units whose functions were inherent in the lead agencies, such as merging relief and rehabilitation with MSWDO, and to improve coordination, such as among transportation, rescue and evacuation. The decrease in the number of households affected in the flood of November 2001, compared to that in the previous event (Table 9), attests to the improved response system and enhanced coordination among agencies.

Table 16 summarizes the improvements made in managing emergencies from the point of view of the municipal government.

Table 16. Improvements in disaster management, Municipality of Dumangas

Before 1998	Present (2003)
A. Community	
People lost their poultry and livestock because of lack of preparation	People have effective ways of securing their poultry and livestock in times of floods
People were hesitant to go to evacuation centres	People readily go to evacuation centres upon the advise of the municipal or *barangay* officials
Communication was difficult due to the lack or insufficiency of communication media	VHF handheld radios, cellular phones, and presence of organized information dissemination teams both at the *barangay* and municipal level facilitate speedy communication processes required in times of disasters
Transportation problems due to lack or insufficiency of vehicles	Municipality now owns 3 ambulances, 4 patrol jeeps, 3 dump trucks, 2 utility vehicles, 1 Liga ng mga *barangay* vehicle, 1 patrol boat and 1 rescue boat. 10-wheeler trucks are readily volunteered by private individuals when needs arise.
B. Municipal government	
Disaster response was not very systematic	The MDCC has a structured organization and an established system for pre-disaster, disaster and post-disaster operations
Insufficiency of communication equipment	All the Punong *barangay*s have handheld radios; the local Philippine National Police, Bureau of Fire Protection and Area Coordination Centre all have handheld radios and official cellular phones; and several volunteer communication groups are actively involved.
Municipal government focused activities on disaster response and not on disaster preparedness/mitigation	The MDCC of Dumangas is composed of various units that have specific functions prior to, during and after disasters. The agromet station is an essential factor in disaster preparation/mitigation. In addition, the municipal government has invested in improving its communication and promoted the concept of disaster preparedness/mitigation through the dissemination and use of climate information and other relevant data.
No established system of relief and rescue operations	The Dumangas MDCC has specific teams handling relief and rescue operations. Rescue operations are handled by DREAM which is composed of highly-skilled members, most of whom are employees of the municipality and officials of the *barangay*s.
Poor linkage with support agencies such as the PNRC, NFA, OCD, etc.	The municipal government has very strong links with various support agencies that extend ready support to the municipality in its pre-disaster, disaster and post-disaster endeavours.

The flood event in May 2003 showed that the system was not able to anticipate an anomalous event. Normally, floods come in October and November, so this flood in May, at the end of the dry season was unexpected. Hazard monitoring had been confined to the observation of water levels at the Jalaur River and in the irrigation canals, which at that time were relatively low. Thus, because hazard monitoring and early warning failed, residents were caught unaware of the flood that came at midnight. This, however, provided an opportunity for systems adjustment. Hazard monitoring now includes rainfall monitoring and the observation of farmland conditions.

4.2 Recover, mitigation and prevention – gaps

4.2.1 Recovery from disaster

Local institutions with favourable national policies and support can establish efficient disaster preparedness and response systems through trial and error over a period of time. However, discussions with affected households reveal that dislocation of agricultural activities and delay in restoring damaged infrastructure continue to be a major concern and affect the recovery of households from disaster impacts. Moreover, the most vulnerable households continue to face risks due to inadequate support to meet their recovery needs.

4.2.1.1 Rehabilitation of agriculture

Paddy crop is exposed to risks from weather hazards in varying degrees in all the seasons. The first wet season crop sown in May/June and harvested in August/September is affected by heavy rains at the time of harvest. The floods in November seriously affect the winter crop (planted in October/November and harvested in February/March) at active-tillering stage and sometimes force the farmers to replant. In addition to investment loss, replanting activity forces shifting of crop schedule and exposes the crops to April droughts. Seed assistance is given to land owners and not to tenant farmers. Hence, the investment made by the tenant farmers in terms of labour is not compensated. On an average, farmers get about a third of income from paddy crop after adjusting the remaining income towards payment of loans availed for investment. Losing a portion of net income due to natural hazards increases household vulnerability.

4.2.1.2 Rehabilitation of most vulnerable households

While enhanced disaster preparedness and response enables farmers to move livestock such as pigs and cattle to safer places, the assets typically owned by agricultural labourers such as poultry are exposed to water-related diseases. As most vulnerable households depend on income from these sources, any loss of poultry or duck increases vulnerability and delays recovery.

Discussions with most vulnerable households who are very poor and eke out a marginal existence revealed that they suffer disproportionately. The relief assistance for shortages shortage is distributed equally to all affected households. The better off households who receive relief assistance however, will share part of the assistance they receive with the vulnerable households.

There was a consciousness among all respondents that help should be extended in times of disasters and, thus, help is always available for community members in times of disasters. It can be it in the form of offering one's house for shelter to those affected by floods, sharing food or cooking areas, helping community members move to designated evacuation areas and rebuild destroyed houses, facilitating access to medical and relief services, and even sharing financial resources. When asked why they were compelled to help, they responded that it was part of their way of life as Filipinos. Simply put, they cannot sleep or eat well with the knowledge that there are members of their community who suffer physical dislocation and are threatened by hunger and cold.

While formal political institutions do not address differential vulnerability of communities, the informal social networks act as conduits to redistribute relief assistance to most vulnerable households. While community help could partially address most vulnerable households during crisis periods, it seldom addresses their recovery needs.

4.2.3 Reconstruction

The swift reconstruction of basic infrastructure such as bridges, roads, irrigation systems, schools and health clinics following disasters has immediate benefits The reconstruction of these infrastructure facilities are under the control of sectoral institutions of national government agencies, not of local institutions.

In an interview, the Municipal Mayor who chairs the MDCC identified one of the major constraints as the long process for receiving external assistance from the provincial and national governments. He explained that currently, damage assessment is handled by external evaluators from concerned provincial/national agencies. For example, damage to infrastructure is evaluated by the DPWH, damage to agriculture by the Department of Agriculture, and damage to fisheries by the Bureau of Fisheries and Aquatic Resources.

The Municipal Mayor felt that damage assessment should be done at municipal level and then validated by the Regional Disaster Coordinating Council to expedite the process. He also recommended a definite time frame for processing requests, as delays have an impact on the local economy.

The discussions with community members revealed that any delay in reconstruction affects the recovery process. They suggested that the community could contribute labour and local materials for restoration of damaged infrastructure, and the local and national government departments could provide necessary resources to undertake reconstruction. Immediate undertaking of these activities would provide immediate employment to the population as well as reestablish much needed communication facilities to speed up the recovery process.

4.2.4 Prevention and mitigation

Interviews with household members indicated they were aware that the recent increase of fishponds to more than 4 000 ha and other inappropriate uses of waterways have contributed to increased incidences of flooding and also increase the impact of floods when they occur. While a few households with fishponds benefit from increased income, most, particularly the most vulnerable households, are exposed to greater risks. Hence, any disaster prevention measure should address risks arising out of these developments.

4.3 Recent initiatives of local government

Recognizing these difficulties, the Municipal Disaster Preparedness Plan was drafted in 2002, with participation of representatives from NGOs, civic organizations and business operators. The plan detailed prevention, mitigation, preparedness, emergency relief and rehabilitation activities.

Disaster prevention, mitigation and preparedness activities are increasingly being given the same importance as emergency relief, rehabilitation and reconstruction. This can be seen in a comparison of budget appropriations for different development activities in the municipality from 2001 until 2003, as shown in Table 12.

Livelihood programmes, started in 2002, take into consideration the potential for natural hazards. For instance, a swine-raising project is set up with the government giving a family one hog to raise and multiply with the understanding that the family will give two piglets back to the programme for distribution to other families. The hogs can be evacuated more easily than chickens and ducks in case of flooding.

4.3.1 Use of Climate Information

Realizing the benefits of issuing climate information with sufficient lead time to allow contingency planning, in November 2002 the municipal government established an agromet station to provide local weather and climatic data. Technical support is provided by PAGASA. With daily observation of climatic parameters (e.g. rainfall) undertaken by trained municipal employees, data are transmitted to the PAGASA central office in Manila for interpretation and then back to the agromet station for dissemination. Agencies such as the municipal agriculture and irrigation offices use this information in formulating response strategies.

For example, when below normal rain was forecast for Dumangas for the dry season from November 2002 till March 2003, the agriculture office prepared an impact outlook which revealed that farmers at the end of the small-scale irrigation system would not receive enough water for cultivating rice crop. As a result, the office immediately prepared an advisory, informing farmers of the impending water scarcity during the critical stages of rice growth, and advised them to plant alternate drought-resistant or short-duration crops (e.g. watermelon, vegetable, etc.) and to concentrate on mango production. Advisories were relayed through the Punong *barangay*s during their weekly meeting with the Municipal Mayor, and were repeated during the nightly radio programme of the Punong *barangay*s using the handheld radios available in each *barangay*.

Table 17 shows the increased area planted with watermelon and mung bean, and the value of crops harvested. Had the farmers planted rice, they would have lost the crop and not realize this benefit.

Table 17. Crops planted during the dry season 2002-2003 in anticipation of below normal rains based on the climate forecast information provided to farmers

Crop	Area planted, 1998 (ha)	Area harvested, 2003 (ha)	Total value of production (PHP'000)
Watermelon	199	1 284	192 600
Mango	6	500	450 000
Mung beans	70	1 130	38 420
Fruits and vegetables		300	72 000
Total			753 020

Encouraged by the success of the 2003 experience, the municipal government appropriated funds for the operation of the agromet station and to support climate forecast information application. This climate forecast information application programme, implemented by the Asian Disaster Preparedness Centre, allows farmers, the agriculture and irrigation offices and PAGASA, the climate forecast provider, to seize the opportunity provided by advance climate information to mitigate the impacts of disasters. Advance information on the onset of the rainy season and the characteristic of rainfall, for example, can guide farmers' decisions on when and what to plant, reducing risk of crop loss.

A regular consultative meeting, facilitated by the municipal mayor, brings together representatives of farmers' groups, FARMC, the municipal agriculture office, municipal irrigation office, and, when necessary, the provincial agriculture office and the regional irrigation office, to discuss needs for information and technical assistance among other issues.

4.3.2 Community-based Flood Forecasting and Warning

Efforts are underway to establish a community-based flood forecasting and warning system at the Jalaur River Basin, in collaboration with PAGASA and with funding support from the from 4th District of Iloilo Province. Community involvement will be sought in identifying risks and measures to reduce them. Community recommendations in other pilot locations include the installation of flood markers and a network of rainfall stations for monitoring. A simple correlation model that the local government can use to forecast flood will be developed by PAGASA.

4.3.3 Public Awareness

Pulong-Pulong sa barangay were started in June 2000 to empower people by increasing their understanding of their responsibilities and rights during emergencies and orient them to agencies they can ask for assistance in times of need. These meetings also provide opportunities for dialogue between the community and the municipal government.

In addition, with an aim to empower the people through information dissemination, the municipal government has planned to set up a community radio station to broadcast time-relevant and accurate information and advisories during emergencies, as well as informative/educational programmes for public education and awareness raising. Also included in the planned programming are programmes on farming techniques and new technologies, health care, livelihoods, and an interactive programme that would serve as a

platform for community-local government dialogue. Financial assistance has been sought from and committed by the district congressman.

4.3.4 Mitigation and prevention

Infrastructure
The 7 km Balabag-Maquina-Balud-Compayan-Bantud Fabrica Dike was constructed to block floodwaters from the Jalaur River and protect the crops of 740 farmers in Balabag, Maquina, Balud, Compayan and Bantud Fabrica whose main source of income is farming. In addition, a network of farm-to-market *barangay* roads allows transport of farm implements, supplies and produce between the farms and the market.

Ongoing projects
- River Control Project, Jalaur River
- Diversion canal for floodwaters from Jalaur River to the sea

4.4 Constraints to undertaking prevention and mitigation measures

Recognizing the need for an integrated approach to manage disaster risks and avert their negative impact on development, the local government's efforts currently are focused on prevention, mitigation and preparedness activities. However, national government policies are yet to incorporate these concerns. The funding mechanisms for calamity management needs reappraisal. Resource constraint has proven to be a formidable barrier for local governments that want to integrate disaster prevention and mitigation measures into development planning.

An examination of government finance as per the Local Government Code of 1991 reveals that the national government has to transfer 40 percent of internal revenue collections and, since 1994, at least 10 percent of total expenditures to local governments to meet the costs of devolved responsibilities. The Code has also given LGUs some fiscal responsibilities.

The Philippines contains considerable economic, social and physical diversity. In terms of devolution, this means that some types of services can be better provided by local authorities who can adjust them to local needs and preferences than by the national government. The allocation of national government resources to LGUs is determined by a formula awarding 50 percent of the resources according to population size, 25 percent by land area and 25 percent divided equally between all local governments of the same category (i.e. provinces, cities and municipalities). This formula effectively aims to improve the quality of life in the least densely populated areas (World Bank, 1995b).

However, the World Bank argues that "the amounts transferred bear no necessary relationship to the actual cost implications of devolved functions. Nor do they take into account the capacity of local governments to raise their own resources or to carry out devolved functions" (World Bank, 1995a:43). Indeed, the Bank reports that, in practice, resources appear to have been channelled particularly to those LGUs that already have more fiscal resources and that, in this way, the system is doing little to help reduce regional inequalities.

Regional differences in the nature and rate of incidence of natural hazards also have implications for the equity of this division of resources. Devolved responsibilities include a number of duties directly or indirectly related to disaster prevention, mitigation, preparedness and response. For example, responsibility for infrastructure projects entailing the construction of seawalls, dikes, drainage and sewerage, flood control, communal irrigation and small-scale water impounding projects which serve the needs of local residents of either *barangay*s or provinces, cities and municipalities has been devolved to LGUs.

Social welfare services, including the post-disaster relief activities of the Department of Social Welfare and Development, have also been devolved.[1] Meanwhile, local governments are further obliged under the 1991 Local Government Code to set aside 5 percent of their estimated revenue from regular sources as an annual lump sum appropriation for use in meeting unforeseen expenditures arising as a consequence of natural disasters. However, varying levels of funding are actually drawn down depending on the incidence of disasters in a particular year.[2]

Clearly, different LGUs face varying expenditure demands with regard to natural disasters at particular points in time, depending on their vulnerability to disasters and need for prevention and mitigation projects, and on the actual incidence and severity of disasters. Yet these differences are not taken into account in the allocation of national resources to LGUs. Moreover, the consequences of this shortcoming could be increasingly felt in the future as LGUs take over more responsibilities and, thus, face increasing financial constraints.[3]

Although external grant assistance could potentially play a role in alleviating regional disparities, the national government is often only willing to forward external assistance to LGUs on a loan basis, with LGUs paying for the loan even if the national government originally received the assistance on a grant basis. This effectively means that LGUs feel obliged to use such funding in full cost-recovery projects, a practice that could discriminate against investment in disaster prevention and mitigation projects.

Natural disasters also have implications in terms of the revenue-generating capacity of LGUs, again raising questions of equity in the regional allocation of national government resources. Provinces, municipalities, cities and *barangay*s are allowed to levy certain taxes, fees and other charges for their own use, including business and real property taxes. Such taxes should be equitable and based, as far as possible, on ability to pay.

LGUs can also grant tax exemptions, relief and incentive privileges as they deem fit. In consequence, natural disasters can lead to a decline in revenue both via their potentially dampening impact on economic activities and also via the introduction of disaster-related tax exemptions. For example, land can be exempted from land taxes which accrue to LGUs

[1] Other devolved responsibilities with indirect implications for disaster prevention and mitigation include agricultural extension and on-site research and community-based forestry projects (of areas not exceeding 50 km^2). LGUs are also responsible for enforcing environmental protection laws and for preparing extensive land-use plans.

[2] This reserve had originally been set at 2 percent under Presidential Decree 477 (which pre-dates Presidential Decree 1566 of 1987 [see below]).

[3] To date, the World Bank (1995a) reports that total transfers to LGUs have exceeded the cost of devolved functions although some LGUs have received insufficient resources.

if natural disasters legally or physically prevent improvement, use or cultivation of that land. In addition, both LGUs, acting on the recommendation of the local disaster coordinating council (DCC), and the President have the power to reduce or cancel property taxes following a general crop failure or natural disaster (Nolledo, 1991) Such cuts can help alleviate financial difficulties experienced by households and the private sector but also represent an additional financial disadvantage for more disaster-prone regions of the country.

To help alleviate disaster-related pressures on LGUs, restrictions on rates of disbursement of LGU revenues can be lifted in the event of a natural disaster.[4] However, disbursements can only be made for purposes and amounts included in the approved annual budget, implying little flexibility in the reallocation of resources to reflect changes in expenditure priorities. Furthermore, any overdraft outstanding at the end of a fiscal year must be met from the first collections of the following year's revenue, implying that the local fiscal implications of a natural disaster may be carried through to the following year if, for example, a disaster reduces revenue and thus results in a negative end-of-year balance (Nolledo, 1991).

In summary, there are clear disaster-related inequalities in the availability of LGU resources that could ultimately impinge on the overall standard and level of provision of services and infrastructure in more hazard-prone areas of the country.

[4] Under nominal circumstances, total disbursements must not exceed 50 percent of the uncollected estimated revenue for that year.

CONCLUSIONS AND LESSONS LEARNED

Based on information gathered during the course of this study, the following conclusions and recommendations are offered concerning the role of local institutions in reducing vulnerability to recurrent natural disasters and in sustainable livelihoods development.

Local institutions demonstrated an efficient disaster preparedness and response delivery through measurable indicators:
The establishment of a triple sourced early warning and communication system with a feedback arrangement enabled communities to undertake pre-disaster preparatory activities. The early warning system is based on information from i) PAGASA, the national forecast agency on weather parameters, ii) local irrigation authorities on hydrological parameters and iii) communities on actual river level positions based on their observation and experience. This information flow provides site-specific disaster warnings.

The early warning system works through a communications specialized NGO to various users, providing communities at least 24 to 48 hours lead-time. This lead-time saves lives and preserves livestock and household assets. Relief assistance can reach affected people in designated evacuation centres within six hours of evacuation. Due to the better early warning system in place the expenditure on relief assistance has come down significantly in recent years.

The empowerment of local institutions through national policies promoted the establishment of an on-site disaster management system:
The adoption of local government code 1991 gave local institutions greater decision-making powers at the local levels and provided opportunities to search and apply localized solutions to problems posed by natural disasters. Disaster happens at the community level and local governments, being closer to the communities, can tailor national norms and plans to match community needs. During the 2000 typhoon-related floods and 2001 flooding, the disaster management experiences of Dumangas municipality plus its local support organizations, such as communications specialist NGOs, search and rescue NGOs, the Economic Council, the private sector consortium and the BDCs of affected *barangay*s, managed to carry out the following without outside interventions:

- search and rescue
- survey, assessment and reporting
- first aid
- mobile medical assistance
- evacuation
- emergency welfare (e.g. mass feeding programmes)
- emergency shelter (e.g. set up tents, emergency building repairs)
- emergency logistics
- staffing of emergency operations centres (EOCs), including mobile ones
- information management

The role of local government in ensuring on-site disaster management capability freed national and sectoral agencies from these essential response functions. The role of national agencies were restricted to coordination and information-sharing activities.

Local institutions succeeded in building up experiences from previous disasters and refined locally sustainable disaster management systems:
Over the years, communities have evolved their own coping mechanisms to manage disaster situations. The accumulated experiences of the communities and the resilience that experience brings are valuable assets in disaster reduction and management. The local institutions, being closer to communities, make use of these experiences and strengthen them by supportive and empowering measures. For example, the evolution of institutional management systems in Dumangas illustrates how it drew from the experiences of Disaster Brigades and Mountain Tigers to establish DREAM volunteers. The DREAM volunteers received specialized training in search and rescue from the 505th Search and Rescue Group of the 502nd Search and Rescue Squadron of the Philippine Air Force. As these trained personnel are part of the community, their services are available continuously without any additional costs to the local government and hence sustainable.

Local institutions demonstrated a creative use of local resources and hence operated cost effective:
The entire disaster management system is built on local resources. The trust and motivation of participating communities endow it with a high level of social capital. Hence, large-scale interventions from centralized agencies are not called for. In fact, in recent times the local governments have provided services for rescue operations. In addition, the decentralized Economic Councils can provide relief assistance to affected populations, obviating the need for centrally managed, high-cost relief procurement storage and delivery systems.

The local government was creative in using the fund for disaster preparedness to human-made threats (made available by the Memorandum Circular issued by the DILG and DBM). It integrated disaster management into the training programme for *barangay tanods* and the national police to counter crime and terrorism.

Locally available, but nationally controlled, expertise was used for training communication and DREAM NGOs. The municipal government equipped the team and provided honoraria to team members. It also provided opportunities to involve the team in disaster prevention activities, such as river and coastal cleanup, during non-disaster times.

Local institutions created and sustained an inclusive participatory institutional system for effective disaster management:
The establishment of specialized task forces to carry out warning, communication, transport, rescue, evacuation, supply, relief, medical, fire damage assistance, security and overall damage control at the *barangay*s level under the overall coordination of *barangay* captain ensured inclusion of the total community in disaster management. Each taskforce had 15-20 members and all the households of the *barangay*s had a membership in one of the task units. Almost all of the households participated in at least one of the specialized functions and thus the system involved the entire community in disaster management activities. The all-inclusive and community participatory system, with its high level of social capital, ensured the functioning of community-based disaster management systems.

The local institutions have stepped into active mediating roles with national agencies to bring in locally relevant scientific advancements for effective disaster management:
PAGASA provides climate forecast information year round for the entire country. This climate forecast information is specific enough for use at the local level. Recognizing the

frequency of crop failures due to climate hazards, the local Dumangas government approached PAGASA to provide localized forecast information. PAGASA expressed inability to provide such information due to its limited observation system in the country and limited resources for establishing local observation systems.

Considering recurring losses and the value of climate information in minimizing climate risks and maximizing potential benefits of climate resources, the local government offered to provide space and initial investment for establishing agromet stations. PAGASA and ADPC agreed to provide technical expertise for establishing a climate forecast application system. Now, the local agromet stations greatly enhanced lead-time and it have potential to be applied to disaster management in Dumangas.

The local institutions have established a system to respond to highly localized but locally devastating disasters, to which national institutions do not respond:
The management experiences of the May 2003 flooding in Dumangas illustrated how localized disasters can undermine livelihood systems of communities and, when recurrent, how they can cause accumulation of community risks. National agencies are not sensitive to this kind of locally devastating development. Effective management of the May 2003 floods by the local institutions greatly helped minimize the disaster impacts.

The informal social networks provided mechanisms to take care of most vulnerable households:
Conversations with the most vulnerable households in Maquina and Balud indicate that the 2003 relief assistance was distributed equally. The 11 Maquina households and seven Balud households that were the most vulnerable and deserved a higher allocation of relief assistance were actually treated correctly. Discussions with the vulnerable households revealed that because of kinship relations, the well-off households that received assistance handed over part of what they received to vulnerable households. While formal local institutions could not evolve a mechanism to provide relief assistance according to vulnerability, the informal social network addressed the gap.

Despite considerable achievement there were also limitations of informal social networks:
The traditional social security system depends the communities' "social capital and the natural resource base" to provide assistance to most vulnerable households. The gradual depletion of natural resources through pressure on land and natural resources, change of traditional occupations, and commercialization of labour and tenancy systems has caused a shrinkage of the community abilities for independent self help. During severe disaster events, erosion of the "social and natural resource base" combined with competitive market relationships enhances the collective risks of vulnerable households. However, minimal social assistance to tide over vulnerable households in a crisis situation is still available. There is a need to understand the role of traditional mutual mechanisms in the redistribution of relief assistance during disasters.

Gaps existed in addressing different vulnerabilities:
Relief assistance for rehabilitation of agriculture is given to the farmers who own the affected land in the form of seeds. As most of the farmers are tenants, they do not have access to the kind of relief assistance that would enable them to recover faster from disaster impacts. The rehabilitation assistance is calculated and provided according to absolute, and

not relative, loss due to disasters. The poor households incur disproportionately greater losses when compared to losses suffered by wealthier households. Hence, there is a need to evolve a mechanism to provide rehabilitation assistance that considers capacity to recover rather than total loss incurred by households. The local institutions could articulate this requirement of poor and vulnerable household and provide a livelihood package in accordance with households needs.

The vulnerable households have devised various strategies to reduce risks. These risk management strategies entail adoption of hazard risk minimization rather than income maximization strategies. Thus, these strategies render vulnerable households unable to exploit potentially income enhancing opportunities. In the aftermath of disasters, even if credit facilities are available, the poor households cannot take advantage because of the need for collateral. These factors cause delay in recovery of affected vulnerable households. Any subsequent disasters then compel them to borrow from informal credit markets with high monthly interest rates of 20 to 30 percent. This has resulted in accumulation of debts, moving into a debt spiral. The local institutions could act as intermediary institutions between banks and the vulnerable households to evolve a credit delivery mechanism to suit the livelihood needs of vulnerable households.

Natural disasters have implications for the relative revenue-raising capacity and pattern of expenditure of different local government units. In 1991, the Philippine Government introduced a gradual programme of devolution, transferring responsibility for some taxation and a number of duties, directly or indirectly related to disaster prevention, mitigation, preparedness and response. Local governments also are obliged to set aside 5 percent of their revenue for use in the event of a disaster.

Clearly, individual LGUs face varying disaster-related expenditure demands and revenue-raising capacities depending on the incidence and severity of hazards. Yet these differences are not taken into account in the allocation of national government resources. Ultimately, inequalities in the availability of resources among LGUs, arising as a consequence of natural disasters, could impinge on the overall standard and level of provision of services and infrastructure in more hazard-prone areas of the country.

Local institutions established successfully a mechanism for contingency funding for reconstruction recovery:

The damage to bridges, roads, irrigation systems, schools, health clinics, communication facilities, etc., seriously impairs the recovery of affected population. Swift reconstruction of basic infrastructure following disasters has immediate social benefits. However, the national and sectoral agencies responsible for maintenance and upkeep of physical infrastructure do not undertake immediate repair and restoration because of procedural and resource constraints.

The local institutions could be entrusted with restoration of these infrastructure with participation of communities. Discussions with affected household revealed that they were willing to contribute labour and local materials. In addition, the local government could provide some resources and supervision and the national government could provide financial and technical resources. These participatory arrangements, with contingency funding for reconstruction recovery spearheaded by local institutions, could promote speedier reconstruction recovery processes.

Local institutions mediated between local communities and national governments for policy changes to take care of locally relevant development measures:
Not all local government units are equally disaster prone. Some local governments are in highly disaster-prone areas and recurring disasters have serious impact on local government finances. However, national policies for devolution of finances do not recognize these differential vulnerabilities. Also the reconstruction of damaged infrastructure requires reappraisal of national policies. The local institutions can articulate these nuances and help national governments evolve appropriate policies to address varying vulnerabilities.

The study confirmed that natural hazard risk must be treated as a continuous threat and a holistic approach needs to be evolved to minimize these risks and promote sustainable development:
The production environment before and after a disaster has a large impact on the capacity of people to recover. Various emergency efforts could contribute to improving ability to cope immediately after a disaster. However, the risk of severe damage to household livelihood conditions constrains the recovery process. In 2000, floods in the affected areas were followed by heavy rains in September 2001 during the first crop season, droughts during the 2002 first crop season, and flooding in May 2003. Having disasters repeat three years in a row seriously affected recovery of households. Climate risk is a continuous threat and, thus, a holistic approach is needed to treat disaster management as a continuum from preparedness to emergency response to recovery, reconstruction, mitigation and prevention. The local governments have already evolved an integrated disaster management and development plan covering all cases of disasters. National policies are yet to recognize and factor this approach of integrated disaster management into development planning. The initiatives taken by the local governments could motivate national policy-makers to evolve and implement a holistic disaster management policy.

Thr role of local institutions in reducing vulnerability to recurrent natural disasters and in sustainable livelihoods development

Philippines

This case study was commissioned by the FAO Rural Institutions and Participation Service. Its in-depth look at the situation in a disaster-prone area of the Philippines contributes to the understanding of the impact of local institutions on the design and implementation of disaster risk management strategies, as well as the role of local authorities in building community social capital for disaster prevention and preparedness. This understanding will provide insight and guidance on how disaster risk management at local level can be strengthened and integrated better into development strategies.