

## **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<sup>2</sup> 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 <i>barangays</i>	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
Rice Rainfed	97 451	300 909	65 516
Rice 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.

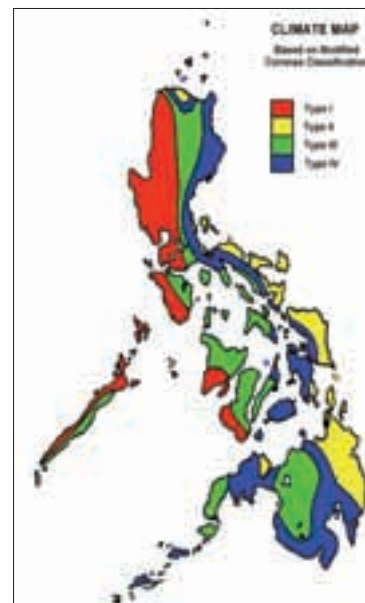


Figure 2. Climate map of the Philippines

### 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, III and IV. The categorization is broadly based on the characteristics of dry and wet months.

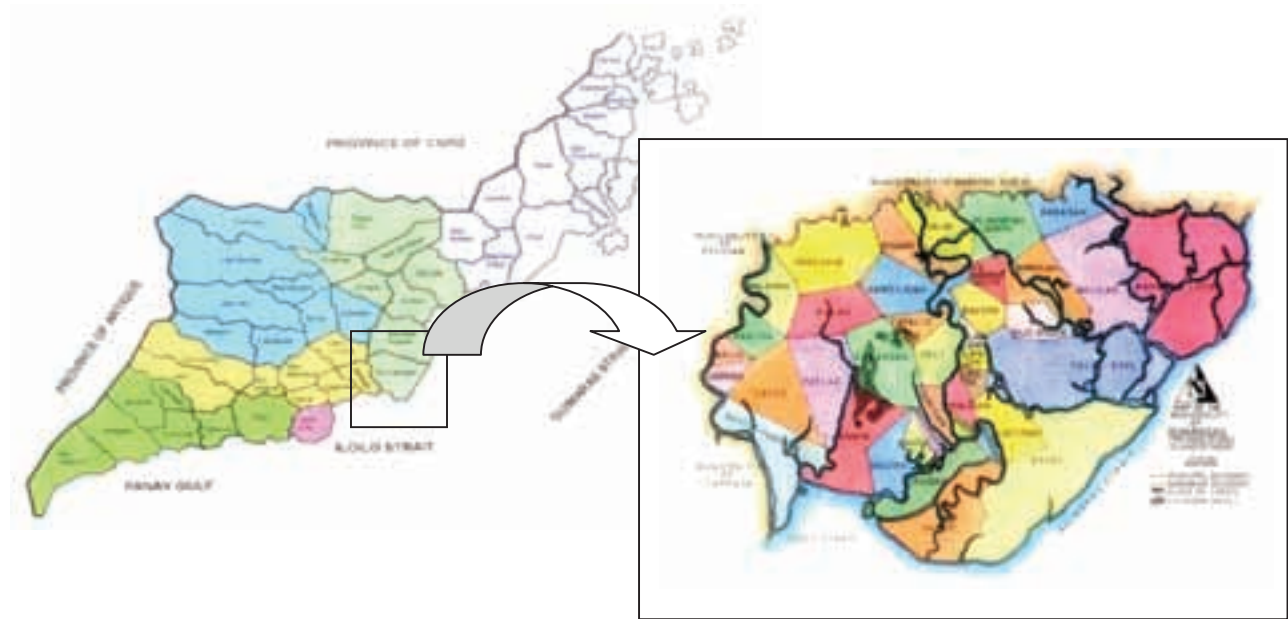


Figure 3. Location of the municipality of Dumangas

Table 3. Dumangas municipality profile (1998)

Location	Southern part of Panay island, 122°42'34" longitude, 10°49'22" latitude
Boundaries	North: Municipality of Barotac Nuevo; South and East: Guimaras Strait; West: Municipalities of Pototan and Zarraga
Classification (according to income)	3 <sup>rd</sup> class
Income	PHP33.5 million
Total no. of <i>barangays</i>	45
No. of <i>barangays</i> in the urban/ rural area	10/ 35
No. of <i>barangays</i> along the coast/ inland	17/ 28
No. of <i>barangays</i> 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 <i>palay</i> 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 *barangays*, Municipality of Dumangas

Least to non- flood prone	Flood-prone	
Barasan	Aurora del Pilar	Ilaya 1 <sup>st</sup>
Burgos Regidor	Bacay	Ilaya 2 <sup>nd</sup>
Dacutan	Bacong	Ilaya 3 <sup>rd</sup>
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 <i>barangays</i> 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
<b>Damage to infrastructure</b>			
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	
<i>Barangay</i> 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
<b>Damage to farmlands</b>			
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
<b>Damage to fisheries</b>			
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
<b>Damage to households</b>			
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 <i>barangays</i> affected, 2 168 families (10 689 people)	14 <i>barangays</i> affected, 1 344 families (8 001 people)	25 <i>barangays</i> 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 Jalaur River 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