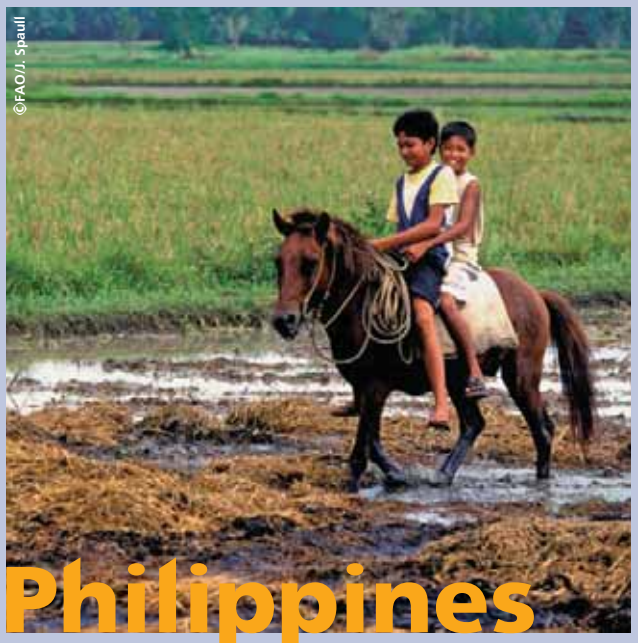

Philippines

Philippines

by Luis Eleazar*

■ 1. THE PHILIPPINES' VULNERABILITY TO NATURAL HAZARDS ■

Every year, countries throughout the world report on human and economic losses as a result of natural disasters. Most reports share the same common observation: that such disasters are increasing in their frequency, intensity and severity of impact, causing the death and dislocation of people, wiping out their communities and the resources vital to their livelihoods.

The challenge of rebuilding damaged communities and recovering lost property, particularly residential and farm lands, is exacerbated by the destruction of documentation that demarcates affected people's land and other associated assets, the informal land tenure status of many affected people, and the ethnic and gender discrimination that exists in many countries. Disasters particularly affect poor, vulnerable and food-insecure households due to their disadvantaged economic, social and political conditions; these conditions determine these households' vulnerability to such disasters. This particular sector of society largely either owns and cultivates small farms on flood plains, hillsides, and the edges of river systems and coastal areas, or for economic reasons lives informally on fragile public land such as critical watersheds, forests and coastal zones. These people are those most vulnerable to and least capable of coping with disasters, particularly when their impact results in major changes in land use, or changes in the sources of livelihood of the affected communities.

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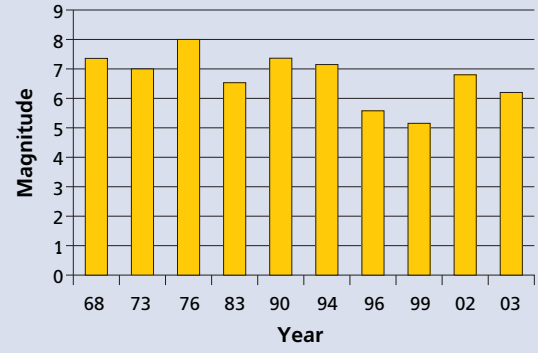
Until recently, significant national and international humanitarian efforts aimed both at reducing disaster risk and responding appropriately post-disaster, have not directly dealt with land tenure rights and property issues. These issues appear to be critical to the improvement of the planning and management of land use and other natural resources in areas vulnerable to natural disasters. The inadequate responses to date have been caused in part by a lack of clear understanding of the importance of such issues in the context of natural disasters. This work aims to depens the understanding of these issues in context of Land tenure in the Philippines.

FIGURE 1 – Magnitude of Destructive Earthquakes1 1968-2003



Note: 1990 figure is average of 3 earthquake magnitude.

1.1 Vulnerability to Natural Hazards

The Philippines is the second largest archipelago in the world, consisting of over 7000 islands, clustered in three major island groups (Luzon, Visayas and Mindanao), with a total land area of 300 000 km^2. Its location in the northwestern Pacific Ocean places the country directly in the path of the world's number one tropical cyclone generator, which brings destructive floods, landslides and storm surges. It also sits on the edge of the 'Pacific Ring of Fire', thereby experiencing periodic earthquakes and volcanic eruptions (CDRC, 1992; Duque, 1991). The combination of these two factors – 'being in an area of frequent tropical cyclones and being at the junction of several tectonic plate boundaries' (World Bank and NDCC, no date) – makes the Philippines the fourth most disaster-prone country in the world, according to the International Red Cross.

Geophysical Hazards

The geologic and tectonic settings of the Philippines are characterized by: (i) being located on two of the seven major tectonic plates – the Pacific Plate and Eurasian Plate – in the Earth's lithosphere (ii) having a major fault zone – the Philippine Fault Zone – cutting across the entire archipelago, and (iii) being subjected to periodic interaction of the different plates, displacements along the Philippine Fault Zone, and movements along other active faults. These factors combine to account for the country's vulnerability to natural hazards such as earthquakes, volcanic eruptions, tsunamis and landslides.

There are about 220 volcanoes in the Philippines, of which 22 are considered active. The country's most active volcanoes in terms of damage caused by eruptions are Mayon, Taal, Hibok–Hibok, Bulusan, Canlaon and Pinatubo. Volcanic eruptions are often characterized by the emission of fine ash and ash-laden gas forming huge clouds, including rocks, and the subsequent mudflows and landslides. Mudflows and landslides at times occur for an extended period of time after the eruptions. For instance, 16 years after Mount Pinatubo erupted in June 1991, the effects of mudflows or lahars from its slopes continue to threaten the rehabilitation of the 364 affected barangays[1] in 23 cities and towns within five provinces (Zambales, Pampanga, Tarlac, Nueva Ecija and Bulacan) in the Central Luzon Region. Lahars from the gullies of Mount Mayon also continue to destroy settlements and farmlands in one city and seven municipalities in Legazpi City, Albay, during tropical cyclones. A more recent project by the Manila Observatory (2005) on mapping the Philippines' vulnerability to disasters identifies the top ten provinces most at risk to volcanic eruption. These are either the sites of the most active or potentially-active volcanoes, or their land areas are small and can therefore be affected entirely by an eruption. The ten provinces are Camiguin, Sulu, Biliran, Albay, Bataan, Sorsogon, South Cotabato, Laguna, Camarines Sur and Batanes.

Earthquakes are another major geophysical hazard that affects the Philippines. These are either tectonic or volcanic in origin. Tectonic earthquakes are found to be more destructive than volcanic ones. From 1970 to 2004, there were 26 033 plotted earthquakes reported by the Philippine Institute of Volcanology and Seismology (PHIVOLCs), with an average of 744 mild

[1] The term "barangay" is almost equivalent to a village, which is the lowest politico-administrative unit in the hierarchy of local government inuts. (LGUs) in the Philippines, next to a Municipality.

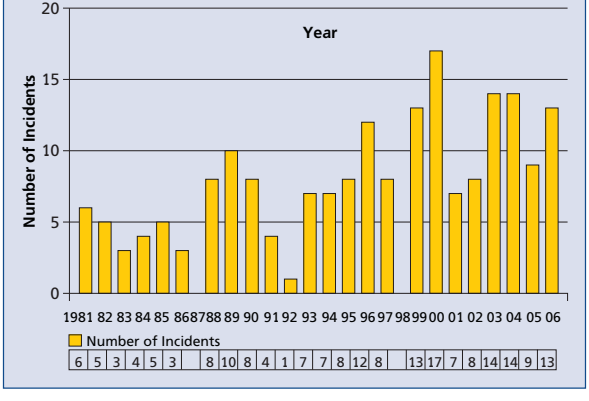
events occurring per year (OCD–NDCC, no date). By 1991, an average of five earthquakes per day occurred in the country. During the next 13 years (1992–2004), a slight increase to six a day was recorded (PHIVOLCS, no date). A total of 12 destructive earthquakes, with an average magnitude of 6.7 on the Richter scale, were reported by PHIVOLCS and OCD–NDCC. Of these, six major earthquakes occurred in Luzon, and three each in Visayas and Mindanao. The ten provinces most at risk of earthquakes – due to the presence of or their nearness to active faults and trenches – include Surigao del Sur, La Union, Benguet, Pangasinan, Tarlac, Pampanga, Ifugao, Davao Oriental, Nueva Vizcaya and Nueva Ecija (Manila Observatory, 2005).

Tsunamis are often caused by volcanic eruptions and earthquakes (at magnitude 7 or above on the Richter scale), although most tsunami occurrences in the Philippines since 1603 have been generated by local earthquakes. The proximity of Southern Mindanao to Celebes Sea, where undersea earthquakes frequently occur, makes this part of the country most vulnerable to tsunamis. Three of the ten provinces most at risk to tsunamis are located in Southern Mindanao, namely Sulu, Tawi–tawi and Basilan. The high vulnerability of Sulu and Tawi–tawi to tsunamis is attributed to the following factors: (i) their location between two nearby trenches (Sulu Trench and Cotabato Trench), and (ii) their high population densities. The other provinces most at risk to tsunamis include Batanes, Guimaras, Romblon, Siquijor, Surigao del Norte, Camiguin and Masbate (Manila Observatory, 2005).

Landslides occur because of the geological instability of a hill or mountain slope when there is an earthquake and/or heavy rain, as well as human activities such as logging and mining. Most of the country's provinces, except Palawan, are at risk of earthquake-induced landslides. From 1981 to 2006, the government monitored 194 landslide incidents (Figure 2), or an average of eight incidents annually (OCD, no date). The provinces most at risk to landslides are Ifugao, Lanao del Sur, Sarangani, Benguet, Mountain Province, Bukidnon, Aurora, Davao del Sur, Davao Oriental and Rizal (Manila Observatory, 2005).

Perhaps unsurprisingly, provinces such as Sulu, Camiguin, Ifugao, Davao Oriental, Sarangani, Benguet, Surigao del Sur and Lanao del Sur, which rank highly as regards their combined risk to the four major geophysical hazards (Manila Observatory, 2005), are also the areas with a High Poverty Incidence Rating (NSCB and World Bank, 2005). Correlation between the composite geophysical risk maps and land use maps of these provinces, made by Manila Observatory, shows that the very high risk areas are plantations and dipterocarp forests, which serve as a source of livelihood for local communities.

FIGURE 2 – Landslide Incidents, 1981-2006



Climate- and Weather-Related Hazards

The majority of climate- and weather-related hazards in the Philippines include tropical cyclones, floods, storm surges, tornadoes and droughts (Figure 3). Tropical cyclones (or typhoons, as they are commonly known in the Philippines) are regarded as the most destructive of all natural hazards in terms of a number of factors: (i) the number of people affected (ii) the total value of the damage they cause (iii) their frequent occurrence (iv) the size of the areas they affect, and (v) the high exposure and vulnerability of affected communities and households. During the 17 years from 1990 to 2006, 303 tropical cyclones occurred in the Philippines' area (Figure 3), amounting to an annual average of 18 cyclones (a little lower than the 19–20 cyclones recorded from 1948 to 2006). However, the greatest number of cyclones took place in 1993, when the country recorded 32, of which six were considered 'most destructive' by the National Disaster Coordinating Council (NDCC).

Areas frequently and hard hit by tropical cyclones are the Northern Luzon, South-eastern Luzon and Eastern Visayas (Manila Observatory, 2005), which face the Pacific Ocean. Tropical cyclones are less frequent in Western Visayas and Northern Mindanao, and rare in Southern Mindanao (CDRC, 1992). In the Philippines, the typhoon season may start as early as April or May and last until December or January, with most of the destructive cyclones usually occurring in the months of July, August and September. However, in recent years, destructive typhoons hit the country mainly in the last quarter of the year.

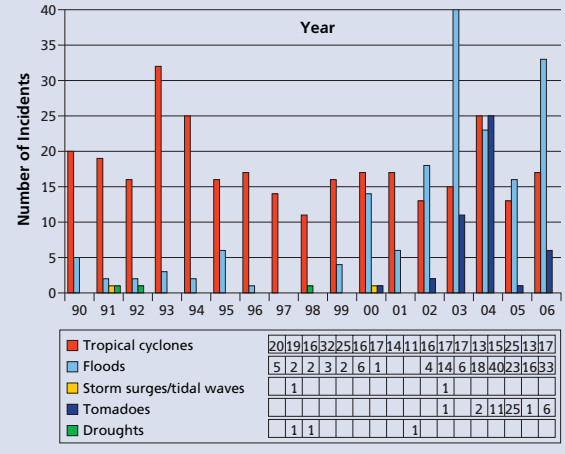
Tropical cyclones combined with heavy rains often produce flooding and flashfloods. In the Philippines several factors trigger the occurrence of floods:

- Expanding housing and settlement areas (both planned and unplanned) in the valleys, flood plains and delta throughout the country – these generally run a grave risk of disaster due to their location;
- The absence of effective vegetative cover – resulting from past and present clearing of the forests, watershed areas, hill and mountain slopes, and successive changes in land use;
- Siltation of the river systems – resulting from environmental degradation caused by anthropogenic activities such as unsustainable upland farming practices and large infrastructure projects;
- Inadequacy of drainage systems, particularly in many low-lying municipalities and cities;
- Subsidence of low coastal areas along the Manila Bay, such as Caloocan, Malabon, Navotas, Valenzuela and several towns in Bulacan, Pampanga and Bataan. The recorded sea-level rises are one meter over the last 30 years – or ten times the rate of global sea-level rise in the last century – caused by the rapid rise of water levels at the Manila Bay due to high extraction of groundwater by a growing population as well as economic activity (UP–NIGS, no date);
- Rising occurrence of persistent torrential monsoon rains, more than the areas' average annual precipitation, as observed in the Ormoc flashflood of 1991, the Camiguin flashflood of 2001, and the Aurora–Quezon–Nueva Ecija floods of 2004.

Between 1990 and 2006, 175 flood occurrences (Figure 3), or an average of about ten per year, have been reported (NDCC–OCD, no date; ADRC, 2002). From 2002 to 2006 the Philippines witnessed drastic increases in the occurrence of floods, even exceeding the flooding caused by tropical cyclones in most years. This indicates the increasing vulnerability of many low-lying and near-river settlement areas to the incidence of frequent and destructive floods, resulting from persistent moderate to heavy rains. Major flood-prone areas identified by the MGB–DENR (Conda, 2007) are in Northern and Central Luzon (Pampanga, Nueva Ecija, Pangasinan, Tarlac, Bulacan, Llocos Norte), Metro Manila, Southern Luzon (Oriental Mindoro) and Mindanao (Maguindanao, North Cotabato). However, the recent flood records show more extensive areas affected, covering the entire archipelago.

Storm surges and tornadoes are other key climate- and weather-related hazards that cause extensive damage, but a complete time series data on their occurrences and effects for the period 1990–2006 is not readily available. Data on storm surges (1990–2000) for the country was obtained from the ADRC's *20th Century Asian Natural Disasters Data Book*, published in 2002, while that on tornadoes came from NDCC's *Tornado Incidents monitored from 2000 to 2006*. Region XII (SOCCSKSARGEN) – particularly the provinces of South Cotabato, North Cotabato, Sultan Kudarat – in Mindanao is the area most at risk to tornadoes, having been hit 20 times from 2000 to 2006, followed by Western Visayas provinces (Negros Occidental, Capiz and Antique) which experienced eight tornado incidents during the same period.

FIGURE 3 – Climate/Weather-Related Hazard Occurrences, 1990-2006



BOX 1 – THE ORMOC FLOOD OF 1991

On 4 November 1991, according to CDRC (1992), 'a combination of flashfloods and landslides killed about 8000 people in Leyte and Samar at the height of storm Uring (International Codename: Thelma). In Ormoc, the floodwaters swept down barren mountainsides and ruined 90 percent of the city, including bridges, schools, buildings and homes. The disaster affected 224 904 people in the Visayas… Total crops and property damages reached PhP 736 million (about $ 17 million).'

'A comparatively weak tropical cyclone at 75 kph, Uring was particularly destructive because of the massive deforestation in Ormoc, abetted by other factors like topography and a six-hour non-stop torrential downpour. Typhoon Uring dumped 140.2 mm of rainfall, an unprecedented event which occurs only once in 50 years.'

Source: ADRC, 1992. Disasters: The Philippine Experience.

If tropical cyclones and floods are more frequent in the Philippines, so in more recent years are droughts, although complete information on this latter hazard is not readily available. Many scientists and researchers have increasingly linked the occurrence of droughts to climate change issues (Greenpeace, 2007; Jose and Cruz, 1999), indicating their effects to be more widespread and devastating, particularly to agriculture which supports the primary livelihoods of two-thirds of Filipinos living in rural areas. Based on the three drought incidents reflected in Figure 3, the areas most at risk to extreme dryness or temperature increase are provinces in Central and Western Visayas and Mindanao, which support the study conducted by Manila Observatory (2005).

When the combined risk to four climate- and weather-related hazards (tropical cyclones, El Niño-induced droughts, projected temperature increases and rainfall changes) in the country was mapped out by Manila Observatory (2005), the areas most at risk to simultaneous incidence of such hazards are Southeastern Luzon and Eastern Visayas. The Observatory explained 'that the risk to typhoons and risk to projected rainfall change dominate the sum'; this confirms the substantial amount of rain dumped on the country, almost all year round, by large-scale atmospheric phenomena. However, the uneven distribution of rain over time and space varies the severity of the impact of disasters across provinces and regions. Half of the top 20 provinces (Albay, Sorsogon, Sulu, Ifugao, Northern Samar, Masbate, Biliran, Western Samar, Basilan, Camarines Sur) that run a higher risk to all climate- and weather-related hazards (Manila Observatory, 2005) also have a High Poverty Incidence Rating (NSCB and World Bank, 2005).

Poverty and Vulnerability

The greater vulnerability to natural hazards of provinces and regions with high poverty incidence emphasizes the importance of understanding the links between poverty and the country's vulnerability beyond its geophysical characteristics. These linkages are illustrated in a recent study conducted by the World Bank and NDCC (no date: 13):

> *''Poverty and vulnerability to natural hazards are closely linked and mutually reinforcing. Poor and socially disadvantaged groups are usually the most vulnerable to hazards, reflecting their social, cultural, economic and political environments … Indeed, at the household level, poverty is the single most important factor determining vulnerability, in part reflecting location of housing (e.g. on floodplains, riverbanks, steep slopes …); level of access to basic services (e.g. refuse collection)*

particularly for illegal squatters; sources of livelihood; and level of access to financial and other assets and resources, leaving limited recourse to inter-temporal consumption smoothing.'

In that same study, the country's poverty incidence is reported at 26 percent in 2000, which remains a major challenge to national development. The study further describes poverty as highly concentrated in rural areas, where about 77 percent of the poor reside; two-thirds of these people rely on the agriculture, fishing and forestry sectors for their livelihoods. Absence or lack of land tenure is a central issue among the poor, forcing many to live and work in high-risk areas (World Bank and NDCC, no date), such as in the danger zones of the six most active volcanoes and practically all deforested mountains, riverbeds, low-lying flood plains and coastal areas in the country. While most of the poor are now aware of the risk and vulnerability of these areas to natural hazards, they have no other choice but to accept or ignore such realities, in order to be closer to their sources of livelihood. These areas attract the poor, who often have no assets in the more developed lowland areas for constructing houses and developing livelihoods. As a result, informal settlements including resettlement sites have gradually expanded in high-risk areas in recent years. Even the remaining natural barriers such as patches of forested slopes and mangroves have not been spared from this informal settlement expansion.

Poverty compels people to build houses from light scrap materials or locally-collected bamboos and palm leaves that are unable to withstand the impact of tropical cyclones, floods, landslides and storm surges. Repair or reconstruction of houses becomes a frequent activity of the poor after every disaster. Lack of secure tenure also reduces incentives for people to invest in housing improvements and in permanent agricultural production systems, or to modify their micro-environment to protect their farms and fishing grounds against floods, landslides, droughts, etc. This desolate condition weakens the capacity of the poor to prepare for disasters, or adapt to changes and recover after such events. Consequently, as the World Bank and NDCC (no date) reports, 24 of the 30 families who suffered from the 1991 Ormoc flood returned to their original areas because they had nowhere else to live, although they recognized the dangers of living on the riverside. In other cases, families returned to their original areas even when resettlement sites were made available to them, due to the proximity of these to their place of work and other means of livelihood[2]. Surprisingly, neither the affected families nor the support organizations have given attention to land tenure issues following disasters.

In major cities, urban poverty is manifested by the uncontrolled expansion of informal settlements on public land and hazard-prone areas. The vulnerability to disasters of informal settlements in key urban areas is magnified by the following: (i) a lack of land tenure or legal ownership of the land (ii) structures are usually made of scrap and lightweight materials (iii) a lack of a logical spatial pattern of settlement, due to the absence of land development plans; hence there is no provision for safety structures such as alleys, roads, easements (iv) the majority are located in easements such as along rivers, creeks or drainage systems and/or danger zones such as under bridges, beside railroad tracks, and inside garbage dumpsites (Vicente *et al.*, 2006). In the area of Quezon City, for example, a tragedy occurred in the biggest dumpsite in Metro Manila called the Payatas area, when a huge mountain of decaying garbage collapsed in July 2000 burying 224 people, injuring 36 and leaving 16 missing. This damaged 103 houses and affected 135 families, or 680 people.

Ecological Degradation

In addition to adverse socio–economic conditions that lead people to inhabit high-risk areas, many people also engage in unsustainable and dangerous livelihoods. In the Payatas landslide, for instance, affected families had been engaged in scavenging and recovery of recyclable materials, despite awareness of the dangers they would be exposed to in this enterprise. The tragic 1991 landslide in Ormoc City, Leyte Province, and the 2004 devastating landslides and flashfloods in Aurora and Quezon Provinces, had been partly attributed to logging (legal or illegal) and other wood-based industries. In the latter provinces, these activities have served as the main sources of people's livelihoods, reducing forest cover to only 20 percent in Quezon Province and 70 percent in Aurora Province (CDRC, 2004). As the areas affected by landslides lie along

[2] For example, an interview with two of the more than 220 affected families after the 2006 Typhoon Reming flood and mudflow (in Barangay Padang within Legaspi City, Albay), found that they returned to their former areas because they could readily find sources of livelihood, such as selling ready-to-eat food and fishing on nearby municipal waters. These sources were not available in the resettlement site located in an upland section of Barangay Taysan. The families also cited the proximity to market, the transport network and the stable supply of potable water in their areas, as compared with the resettlement site, as factors involved in their decision to stay.

the Philippine Fault Line, logging and inappropriate mountainside farming practices make these areas unstable generally and thus more vulnerable.

In urban areas, environmental degradation arises from the unplanned growth of informal settlements, indiscriminate waste disposal and clogging of waterways, and inadequate drainage systems (Vicente *et al.*, 2006). Inappropriate urban land development practices also contribute to disasters, such as that which occurred in an upper middle-class subdivision in the eastern part of Metro Manila. This borough was issued with an Environmental Clearance Certificate (ECC), despite the unsuitability of its geophysical characteristics to support such structures. Overall, improper land development, absence of a sound land-use policy, and the poverty–environmental degradation nexus, combine to increase vulnerability to disasters.

■ 2. MAJOR NATURAL DISASTERS AND THEIR SOCIO-ECONOMIC CONSEQUENCES ■

2.1 Disasters from Major Natural Hazards for the Period 1990–2006

Between 1990 and 2006, the Philippines experienced 520 disasters from seven major natural hazards (Table 1), which killed 20 898 people, injured 20 095 and left 6375 others missing. About 1230 people were killed each year. These disasters affected 19 298 190 families or 94 809 689 people. This suggests that many of these people were repeatedly affected, particularly by tropical cyclones, floods and/or landslides during this period. More than 5.9 million houses were damaged, either totally or partially, mainly because many were made of light materials and semi-concrete structures located in high-risk areas.

Volcanic eruptions. Six volcanic eruptions had been recorded from 1990 to 2006, as shown in Table 1, resulting in the deaths of 958 people and injuries to 201 others, affecting 339 149 families or over 1.6 million people, and damaging 112 698 houses. The Mount Pinatubo eruption of June 1991 was by far the worst disaster in the country's history. This eruption affected a densely-populated area in five provinces in Central Luzon Region – the rice granary of the Philippines – covering 364 barangays, involving 249 371 families or 1.18 million people[3]. They represent about one-fifth of the entire region's population. Of these families, about 8000 families or 35 000 people belong to the indigenous people called Aetas. The Mount Pinatubo disaster accounted for around 74 percent of the total families affected by volcanic eruptions during the period under review. Total damage to agriculture, infrastructure, and personal property was at least PhP 10.1 billion (US$374 million) in 1991 and an additional PhP 1.9 billion (US$69 million) in 1992. Foregone business was estimated at PhP 454 million (US$1.4 million) in 1991, and an additional PhP 37 million (US$1.4 million) in 1992. The costs of caring for evacuees was at least PhP 2.5 billion (US$93 million) in 1991–92, and an additional PhP 4.2 billion (US$154 million) was spent on dikes and dams to control lahar during the same period (Mercado *et al.*, 1999).

The same study also estimated a PhP 1.6 billion, or a 2.3 percent reduction, of gross regional domestic product (GRDP) in the Central Luzon Region from 1990 to 1991 as the economic impact of the disaster. Almost all sectors of the economy were affected by the eruption. Among the hardest hit were manufacturing, mining and quarrying, agriculture and private services. The effect on agriculture was more prominent such that agricultural productivity in 1992 was still below the 1991 level, because the lahars took additional agricultural lands out of production in 1992.

Earthquakes. Of the 12 major earthquakes that hit the country from 1968 to 2006, nine occurred during the last 17 years of this period (1990–2006). The nine earthquakes affected 262 174 families or 1 444 913 people, and caused the deaths of 1394 people, injuries to 3566 others, and left 329 missing. These earthquakes damaged 115 937 houses, around a quarter of which were completely wiped out. In recent decades, the Luzon earthquake of July 1990 was the most destructive, registering a death toll of 1283 people, or 92 percent of total deaths recorded for the period 1990–2006. It also affected 227 918 families or some 1.3 million people, accounting for 87 percent of total affected families and people for the same period. The damage it caused to housing (estimated at 98 554 units) represent 85 percent of total housing units destroyed.

Landslides. From 1990 to 2006, the country recorded 142 landslide incidents, with an average of eight

[3] A much higher number of families and people affected, estimated at 329 411 and 2.1 million respectively, were reported by Mercado *et al.*, 1995 and De Guzman, undated.

TABLE 1 – Major Natural Disaster Impacts in the Philippines, 1990–2006

Disaster Type	Freq	Casualties			Population Affected		Houses Damaged	
		Dead	Injured	Missing	Families	People	Totally	Partially
Volcanic eruption	6	958	201	23	339 149	1 619 029	44 247	68 451
Earthquake	9	1394	3,566	329	262 174	1 444 913	27 276	88 661
Landslides	142	735	387	81	15 422	75 147	719	1574
Tropical cyclones	139	12 274	15 184	4524	15 422 872	76 638 345	1 430 039	4 224 617
Floods	175	5523	685	1364	1 107 405	5 253 367	9234	35 828
Tornado	46	14	72	54	7227	38 950	652	1364
Drought and the El Niño phenomenon	3	0	0	0	2,143,941	9 739 938	0	0
Total	520	20 898	20 095	6375	19 298 190	94 809 689	1 512 167	4 420 495

Source: Data obtained from National Disaster Coordinating Council, Office of Civil Defense.

incidents annually. The frequency of the landslides, however, increased if compared with six for the previous decade (1981–1990). The Guinsaugon landslide of December 2003 in St Bernard, Southern Leyte, was one of the most disastrous events, killing 154 people, displacing and disrupting the lives of 3811 families, and incurring about PhP 115.0 million of damage to agriculture and infrastructure.

Tropical cyclones. These are the single most important cause of disasters in the Philippines. About 46 percent of the 303 cyclones that hit the country during the last 17 years turned destructive, with at least eight occurring annually. Two of these eight destructive cyclones per year were considered 'most destructive', causing the highest number of casualties, affecting families and damaging houses, and incurring the highest cost of damages. Between 1990 and 2006, the 139 cyclones have killed about 16 800 people (including missing people), of which about 6400 died during Typhoon Uring, which submerged the entire Ormoc City in Leyte Province. For the same period, cyclones killed about 990 people and incurred over PhP 8.0 billion of total damages each year.

Floods. The combined confluence of geological and climate factors has caused more flooding incidents than any other hazard that hit the country in the period 1990–2006. There were 175 flooding incidents, which killed 5523 people, affected about 1.1 million families or over 5.2 million people, damaged 45 062 houses, and caused financial losses amounting to around PhP 6.08 million. The misplacement of human settlements, including livelihood sources, in high-risk areas has clearly contributed to the environmental degradation that enhances the occurrence of flood, even in the absence of tropical cyclones. The available limited studies (World Bank and NDCC, no date; Vicente *et al.*, 2006) tend to support this observation.

Storm surges. These are another hazard facing the Philippines, but little information on storm surges is available. ADRC (2002) recorded two occurrences of storm surges in 1991 and 2000, which killed 10 people in Samar and Leyte Islands and left 5250 others homeless. No estimates on economic damages were reported.

Tornados. Forty six tornadoes struck the Philippines during the period 1990–2006, which claimed the lives of 14 people, injured 72 and left 54 others missing. Overall, these incidents affected 7227 families or 38 950 people, the majority living in the provinces of North and South Cotabato, Sultan Kudarat, Maguindanao, Sulu and Zamboanga Sibugay in Mindanao, and Negros Occidental, Leyte, Southern Leyte, and Cebu in the Visayas. In Luzon, although these events were not so significant, tornados also caused human and property impacts in the provinces of Zambales, Tarlac, Nueva Ecija and Bulacan. Total tornado damages have been estimated at around PhP 128.62 million.

Droughts. The El Niño induced drought has recently caused damage on a wider scale in the Philippines. Although there were only three drought incidents during the period 1990–2006, the 1998 drought produced the most extensive damage to the country's economy. Apart from causing severe water supply problems throughout the country (covering all 16 regions), it also paralysed agricultural production in over 368 469 hectares, with an estimated value of PhP 20.6 billion. Extreme dryness also brought about several forest fires in 41 barangays within 17 cities and

municipalities in eight provinces, covering 5482 hectares, with damages valued at PhP 42.8 million. This drought also inflicted damage on various industries because of the reduced capacity for power generation and increased scarcity of water supplies, resulting in partial operations and the dismissal of workers.

2.2 Economic Impacts of Major Natural Disasters

In the Philippines, economic impacts of natural disasters have been measured in terms of direct losses to agriculture, public infrastructure and private property. Between 1990 and 2006, the average annual direct damage to the country as a consequence of the major natural disasters reviewed in the previous section, has been estimated at around PhP 9.2 billion (in current prices; Table 2). This direct damage was equivalent to an average of 0.2 percent of the country's Gross Domestic Product (GDP) every year, a marked difference from an earlier study (calculated at 0.7 percent) prepared by World Bank and NDCC (no date) based on data over a longer time span (1970–2000). However, the problem of data inconsistencies[4] as regards annual damages by disaster type could partly account for the difference in the estimated average percentage of annual direct damage to GDP. Tropical cyclones and earthquakes caused the most damage to the country over the period 1990–2007, with cyclones alone accounting for about 87 percent of total damage, reflecting their high annual frequency (World Bank and NDCC, no date). Earthquakes accounted for about 9 percent of total damage. These two extreme events also caused over 65 percent of total deaths recorded during the same period.

Flooding, which accounted for the second highest death toll and human impact after tropical cyclones, amounted to an additional 4 percent of total damages. This hazard has shown an increasing occurrence in recent years, reflecting the continuing growth and densification of populations and human settlements, as well as the intensification of agricultural activities in high-risk areas. Other natural disasters (tornados, landslides and volcanic eruptions) accounted for only 0.15 percent of total damages, partly reflecting the localized nature of their impacts.

[4] Some tabulated data on different natural disasters obtained from NDCC contain certain discrepancies – even for a similar time period – as regards disaster occurrences, human and housing impacts, and economic damages. This might be explained by the periodic updating undertaken by NDCC, in which the specific dates of data updating or revision are not indicated or reflected.

The agriculture, fisheries and forestry sectors suffered the biggest losses from disasters, averaging PhP 5.5 billion or about 60 percent of total damage per year over the period 1990–2006. These losses were equivalent to an annual average of at least 0.7 percent of GDP originating from this sector. Public infrastructure losses amounted to PhP 3.1 billion or 34 percent of total damage per year, which included damages to agricultural support systems such as dams, and irrigation and drainage facilities. Losses to private property accounted for about PhP 0.6 billion, or 6 percent of total damage per year. The relatively low value of private property losses partly reflects the qualities of the housing and other structures owned or in the possession of affected households.

2.3 Consequences on Agricultural Production and Livelihoods

Agriculture, including fisheries and forestry, plays a major role in the Philippines' economy for two main reasons: (i) two-thirds of the total population depend on farming for their livelihood, and about half of the total labour force is employed or engaged in agricultural activities (ii) some 13.0 million hectares or 43 percent of the country's total land area is devoted to agricultural crops (Jose *et al.*, no date). In more recent years (2003–2006), the agriculture sector contributed an average of 15 percent to GDP per year, and registered 3.85 percent growth in 2006 (DA, 2007). The output gains throughout the years, however, have not significantly benefited and improved the lives of farmers, particularly small landowners, landless tenants and farm workers. This could be attributed to the existing farm structure in the country, where a majority of the farms are small (averaging about 2.0 hectares), and about 21 percent of the agricultural farms covering some 8.0 million hectares have yet to be titled, according to the 2002 Census of Agriculture (DA, 2007). Many poor farmers with small farm areas lack the capital to invest in improved production technologies and more drought-

TABLE 2 – Estimated Total Damage from Natural Disasters (at Current Prices), 1990–2006[5]

Year	Geophysical Disasters			Climate/Weather Related Disasters			Total
	Volcanic eruption	Earthquake	Landslides	Tropical cyclones	Floods	Tornado	
	Estimated Damage (Millions of Pesos)						
1990		12 380.04		11 176.00	62.00		23 618.04
1991				3516.00	1044.81		4560.81
1992				5183.00			5183.00
1993			0.01	20 076.00			20 076.01
1994		513.02		3200.00			3713.02
1995				16 255.00	720.00		16 975
1996			0.01	699.00			699.01
1997				1010.00			1,010.00
1998				17 017.00			17 017.00
1999		333.19	0.03	2578.00			2991.22
2000		10.79		7470.00	841.38	15.00	8337.17
2001				6968.00	402.27		7370.27
2002		132.99		829.00	912.84	3.29	1878.12
2003		40.66	41.69	4171.00	449.89	3.38	4706.62
2004			25.72	13 262.46	212.84	97.01	13 598.03
2005			10.32	2552.66	317.46		2880.44
2006			10.12	20 227.03	1224.05	9.94	21 471.14
1990–2006	2.80	2235.10	12.60	8001.20	618.75	25.70	9181.45
average percentage share by disaster type	0.01	8.60	0.06	87.25	4.00	0.08	100

Source: Data obtained from National Disaster Coordinating Council, Office of Civil Defens.

[5] Available data on volcanic eruption obtained from OCD-NDCC has only reflected the total number of events from 1991 to 2006, and the corresponding total damages broken down into the following sectors: agriculture, infrastructure, private property.

resistant crop varieties. Unlike rich landowners with large farms, poor farmers are unable to undertake risk-reducing measures, such as contour farming, tree planting along paddy field borders in hilly areas, and the construction of protective dikes.

Past records show that 'Dramatic increases or decreases in agricultural output have been, in most cases, associated with the occurrence of severe weather events and changes in the climate system' (Jose *et al.*, no date). Between 1991 and 2000, World Bank and NDCC (no date) found that annual 'rice crop losses equivalent to 2.6 percent of actual production (in volume terms) were experienced as a consequence of typhoons and flooding'. Drought caused an annual loss of another 1.5 percent of the actual rice production for the same period. The worst impact of the combined typhoons, floods and drought on agriculture was experienced in 1998 with the highest agricultural losses recorded at about 18 percent of actual rice production (in volume terms). During this year, poverty incidence in the country soared to 28 percent, following a gradual improvement of this measure from a high of 34 percent in 1990 to 25 percent in 1997. As a consequence, agricultural output in 1998 shrunk to about 8.6 million tons, or 24 percent lower than that produced in 1997. Agricultural employment also dropped to about 10.1 million people or 11 percent lower than in the previous year (DA, no date). Freeman, Keen and Mani (2003) estimated that 'about 50 percent of the increase in headcount poverty in the Philippines during the 1998 crisis has been attributed to El Niño'. This 1998 crisis demonstrated how the living conditions of the rural poor in general, and the farmers in particular, could easily worsen in the face of natural disasters. Such disasters not only destroy their houses and other properties, but also severely impact their primary sources of livelihood by destroying crops, killing livestock, etc, resulting in reduced production and income. In extreme events, such as the 1991 Mount Pinatubo eruption, the 2006 Guinsaugon landslide and the 2006 Typhoon Reming, the impact had been a permanent loss of cultivated farmlands for thousands of farmers.

2.4 Consequences on Land Tenure and Property of Affected Households

In the Philippines, there has been no study to examine the direct impacts of natural disasters on land tenure and property. Existing literature only refers to land tenure in relation to poverty in the context of the poverty–disaster nexus (World Bank and NDCC, no date; Vicente *et al.*, 2006). This section therefore draws on the views of government and non-government

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officers who have been involved in disaster relief and mitigation activities, and the experiences of some disaster–affected people from the Province of Albay in Bicol Region.

Disasters cause undue displacement of affected households, thereby resulting in either temporary or permanent changes in land tenure and property. The severity of impact differs in terms of: (i) whether the affected people have secure or insecure tenure on their property (ii) whether the disaster caused lasting damage on the property (iii) the capacity of the affected people to recover their lost property, or to restore and improve their tenure security, which is mainly defined by their socio-economic status.

People with secure tenure are more confident about reclaiming their property if the damage is not permanent. In the case of households that were affected by mudflows from Mount Mayon resulting from Typhoon Reming in Albay, those with titles returned immediately to their properties, given their awareness that the title records kept at the Register of Deeds would confirm legally the location of their boundaries. Moreover, because houses on titled properties are often built of stronger construction materials, finding the exact locations of the properties is not so difficult, because of the high likelihood that parts of the structures may still be intact after the disaster. This was the case for many residential property owners affected by the Mount Pinatubo eruption. In circumstances where the landmarks could not be easily reestablished after the eruption, owners have sought the services of geodetic engineers to relocate their boundary markers, based on the approved survey plans (Gerochi, personal communication, 2007).

In contrast, those affected households with no secure tenure are likely to have greater difficulty in relocating or reclaiming their original occupied properties following a disaster. This is more pronounced in the case of farmlands, especially when trying to locate the original position of farm dwellings. In the absence of boundary marks and permanent structures, returning to the property is made easier by community recognition of each others' rights to occupancy, because neighbours help each other in reestablishing the original boundaries of their formerly-occupied properties, based on trust. This sense of cooperation is strong among affected community members immediately after a disaster, since they share a common experience and a willingness to help each other in coping with its after effects. However, the possibility of boundary disputes may arise once the parcel boundaries are delineated once more via surveys (Oyardo, personal communication, 2007).

Where the damage to land is permanent, affected people, regardless of their tenure, often find themselves eased out of their original communities and relocated in government-designated resettlement sites. This is particularly true for informal settlers, who have no choice but to accept moving to the resettlement sites so as to establish new dwellings and engage in other livelihood activities. However, in many cases, the relocation sites do not provide better alternatives to their former way of life. For instance, affected families in Aurora, Quezon, after the 2004 landslides that were triggered by four consecutive typhoons, were advised that their original community was no longer suitable for habitation because of the dangers it posed to people and property. Nevertheless, affected people thought that the relocation site was too far away from their original area, and would force them to alter their source of livelihood from fishing to farming (Gerochi, personal communication, 2007). In the same vein, the affected families in Barangay Padang, Legazpi city, found themselves landless after Typhoon Reming hit Albay in November 2006; houses were damaged and farms were covered by rocks and mudflows unloaded by flashfloods from the gullies of Mount Mayon, making the farms unsuitable for agriculture (Echaluci, personal communication, 2007). However, many families still chose to stay in the area: the large boulders that piled up in settlement areas and farmlands meant that quarrying emerged as a new industrial activity, although the types of equipment found operating in the area suggest that the operator was not among the affected people. In another affected barangay, in Guinobatan, Albay, former farmers found themselves employed as labourers in quarrying companies. Work in this sand and gravel mining was made possible by the ease of accessibility to the quarries – located in the former barangay – from the new Mabugos Resettlement Site, given that the a distance between them is only about one kilometre. For some farmers who accepted resettlement on the new site, renting farmland has been another option, allowing them to continue their agricultural production activities and eke out a living (Oyardo, personal communication, 2007).

The situation is different for the Aeta people – a hunting and gathering indigenous group hit by the Mount Pinatubo eruption. Documented case studies (Seitz, 2004) reveal that the disaster affected the Aeta people in three ways: (i) some faced up to the inevitability of life in the lowlands (ii) others abandoned the resettlement site and went back to their original habitats (iii) others opted to stay in offsite settlements which the Aetas have established. In each of these

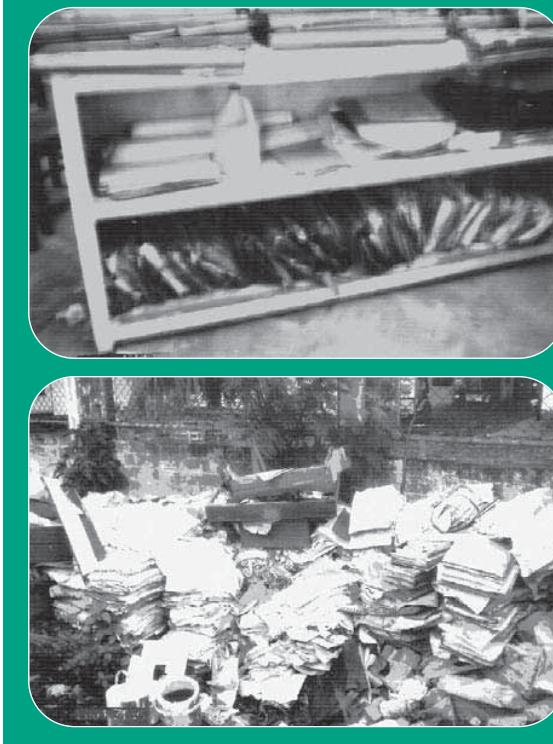
scenarios, the effect is loss of their ancestral domain, and forced adaptation to new ways of life. In the first scenario, they became significantly exposed to Christian Filipinos, and ended up as labourers largely dependent on the government and NGOs for support, eventually losing their jobs and the prospect of alternative employment. As a result, many families returned to the hinterlands of San Marcelino, Zambales. In the second scenario, those who initially stayed in the resettlement sites and went back to their original habitats have imbibed permanent agriculture, such as planting wet rice – a lowland farming practice – instead of growing tubers which had been their tradition. In the third scenario, some adapted a more permanent mode of settlement but separated themselves from the lowland population, which helped to preserve their traditional culture and practices.

2.5 Difficulties in dealing with the Consequences of Disaster Damages on Land Tenure and Property

The main difficulty in dealing with the consequences of disasters on land tenure and property lies fundamentally in the lack of awareness of the importance of land tenure and property in a disaster context. It is very apparent from the documentation reviews and interviews conducted for this task that there is no clear recognition so far of the extent to which land tenure issues come into play in disaster prevention, emergency relief work and rehabilitation. Thus, there is no systematic way of gathering information on the effects of disasters on the land tenure and property rights of affected families. As a result, these concerns do not feature in the current disaster prevention programmes, emergency work programmes, and rehabilitation programmes of governments and other organizations.

However, the field observations, interviews and documentation reviews undertaken have highlighted a number of administrative and legal constraints in the existing land administration system that will make it difficult for governments and other organizations to address these issues. These constraints are as follows[6]:

Absence of a complete cadastre. The land offices (DENR–LMB, RoD, LGU's Assessor Office) do not have complete records of all rights to land. The presence of many agencies involved in land titling and land administration has led to the duplication of and overlaps in records, in some cases resulting in issuance of double titles over the same property. There is no comprehensive set of maps that supports the title records issued, thereby increasing the probability of overlapping titles. In the context of rehabilitation after a disaster, this situation aggravates the probability of issuing multiple titles on the same property.



Land survey records damaged by Typhoon Reming in Albay in November 2006, consisting of:

- Cadastral maps for surveys for the whole province.
- List of survey claimants for surveys, and
- Technical descriptions of surveys.

Source: DENR PENRO/CENRO, Legaspi City, Albay.

Absence of a programme for the maintenance of control points. Many of the control points installed in the past decades throughout the country have been damaged or destroyed, for a variety of reasons. The

[6] Many of these issues were based on the reports and experiences of the Land Administration and Management Project Phase 2 (LAMP2) in the Philippines, funded by the World Bank and AusAID.

government does not have an active monitoring and maintenance programme to reestablish the control points. In the case of the Mount Pinatubo eruption, for instance, the National Mapping and Resource Information Authority (NAMRIA) has not been successful in gaining the funds necessary to reestablish primary control points; these are required to guide subsequent cadastral surveys for relocating the parcel boundaries of property owners.

Many of the land records have been lost, damaged or destroyed. Most DENR field offices have incomplete and outdated land records; these have been lost because of frequent transfers and theft, and damage caused by fire, floods and vermin infestation. The DENR provincial office in Albay, for instance, lost 2445 cadastral maps and other land survey records when the roof of its office building collapsed during Typhoon Reming. Reconstitution of records is difficult and costly, as the DENR does not maintain a systematic filing system for such records. It will need to rely on the file copies of the DENR Regional Office and surveyors to reconstruct the lost or damaged records. This situation is true in many parts of the Philippines. In order to resume the processing of applications for original title, land claimants will have to reconstitute their documents in cases where they were damaged or lost at the DENR. For many affected families who have lost their homes and properties, however, this will take time, as the documents will have to be reconstructed and/or secured again from other government offices. An additional complication is the fact that other land-related offices, such as the RoD in Albay, also experienced damages to an undetermined number of title records due to the flash floods caused by Typhoon Reming. In this case, the owners would have to file for reconstitution of the original file copy at the RoD.

Costly and lengthy process of title reconstitution. This is a legal process whereby the owner files a petition in court to reconstitute the title records that were lost or damaged at the RoD. The owner shoulders all the related costs, including legal fees, which are estimated to be about PhP 20 000 (Villanosa, personal communication, 2007). The process could take months to complete, given that that the RoD does not have a complete cadastre. Experience from the World Bank and AusAID funded Land Administration and Management Project (LAMP) reveals that one of the causes of double titling is judicial reconstitution, whereby the court issues new title copies for records which have been lost or destroyed. A surge in applications for title reconstitution is noted in areas following a disaster (Cledera and Suarez, personal communications, 2007).

Costly and lengthy process of securing title copies. Property owners who have lost their copies of titles will have to secure a second owner's copy at the RoD. This is also a purely legal process whereby the owner petitions the court to grant the RoD an authority to issue a second owner's copy. This process is initiated by the owner, and expenses incurred are again shouldered by the owner. Once more the process could take months to complete, and may cost the owner about PhP 10 000 (Villanosa, personal communication, 2007). An increase in applications for a second owner's copy is also noted in areas following a disaster (Cledera and Suarez, personal communications, 2007).

Costly process of relocating parcel boundary marks. This process is undertaken and paid for at the initiative of the property owner. The Geodetic Engineers of the Philippines (GEP) has set standards for this service, which would cost the property owner an average of PhP 10 000 to 12 000. The government does not have a programme to support affected families in relocating their parcel boundaries following disasters.

Presence of many erroneous surveys. The relocation of boundary marks is made more complex by the presence of many erroneous surveys. The experience of LAMP was that an additional process had to be introduced – called survey validation – to determine whether the quality of survey works warranted the issuance of titles. This has been necessary due to poor survey practices, and a lack of monitoring and supervision of survey works. The end result is the increased probability of misplacing boundary marks.

The above difficulties relate mainly to people who already who have secure titles before a disaster strikes. Informal settlers face a different set of challenges, since there are no records to refer to as basis for reclaiming their former occupied areas. First, there are no existing maps which record the 'metes and bounds' of their occupied areas before the disaster. This information is preserved in the minds of elders and community members, who would recognize the location of each others' properties. Hence, in the event of the deaths of elders and community leaders, this information will be difficult to reconstruct. Second, those who have no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secure rights to land prior to disasters are at risk of being permanently displaced through the relocation sites offered by the government. In many cases, the sites are unattractive and do not match their pre-disaster situations. This was true for many affected people in major disasters such as the 1991 Pinatubo eruption, the 1991 Ormoc City flashflood, the 2005 Aurora–Quezon flooding and landslide, the 2006 Typhoon Reming, and the 2006 Guinsaugon / St Bernard landslide in Southern Leyte. Most of the resettlement sites do not provide enough space, are far from the resettled people's original sources of livelihood, lack basic facilities and services, and offer entirely different socio-economic environments that require the resettled people to adapt their well-established traditions, livelihoods and lifestyles. As a result, these people are forced to return to their former lands despite the fact that these have become unproductive due to the damage caused by the disaster. Alternatively, they must find other suitable areas where they can start a new life and sustain their culture, as in the case of the Aeta, who established their own offsite resettlement sites in the aftermath of the Mount Pinatubo eruption in Zambales. All of these circumstances make the resettled people highly vulnerable to another disaster, which exacerbates their poor socio-economic conditions.

■ 3. LAND TENURE AND LAND ADMINISTRATION ISSUES RELATED TO NATURAL DISASTERS ■

3.1 Current Land Use and Tenure Risks after Natural Disasters

Alienable and disposable (A & D) lands, which are private property, account for about half of the total land area of the Philippines. Between 2002 and 2004, LAMP funded a series of studies on land laws, land markets, tenancy and land tenure. Their key findings give a clear picture of the country's current land use and land tenure issues. LAMP (2004) summed up these findings as follows:

> *'… some 60 percent of the real property of the country is informal. Considering that some 46 percent of the A & D lands are untitled, and much of the forest domain is occupied and used by people without secure rights, it can be seen that this figure of 60 percent, although extremely high, is not unreasonable. Any country with so much wealth remaining informal, can expect that the economy would have a limited contribution from the property sector. In addition to securing ownership for the remaining 46 percent of A & D land parcels, LAMP has proposed in the land laws and the tenancy study reports that secondary rights be registered, such as long-term leases.*
>
> *The land tenancy study showed that there are about 2 million hectares of farms (estimated 1 million parcels of farm lands) for which agrarian reform beneficiaries are yet to receive formal long-term leases. In the urban sector, the number of informal settlers in Manila is some 4 million, and the LAMP land laws study of 2002 suggested that long-term leases could provide immediate tenure security in the absence of or while awaiting the protracted process of transferring full ownership.*
>
> *Further, this land tenure study shows that the forest domain accounts for some 50 percent of the surface area of the country. Unfortunately, estimates of number of land parcels in the forest land could not be obtained from this study. This should be followed up so that cost and impact/benefit analysis to support policy formulation on increasing land tenure security in forest land could be achieved.'*

When the Land Tenure Maps produced by the LAMP study (2004) were overlaid with GMB's Geohazard Maps and cross-referenced with Manila Observatory's Risk

Maps, there are clear indications that most of the untenured people, and often the poor ones, are found in highly vulnerable areas, both in urban and rural settings.

3.2 Existing and Evolving Land Tenure and Land Administration Issues

Land tenure emergency work designed for prevention and mitigation

In land tenure emergency work designed for prevention and mitigation, the major issues facing the Philippines include: (i) the formalization of land rights or the issuance of titles in areas considered highly vulnerable to disasters (ii) the lack of an appropriate land use and development policy (iii) the existence of dense human settlements in vulnerable areas (iv) uncontrolled development in high risk zones.

The absence of comprehensive spatial information prior to land titling results in the issuance of titles to properties located in vulnerable areas. In the case of the residents of Albay, several titles were issued along the flanks of Mount Mayon; some of these were even located within the six kilometers declared as a permanent danger zone by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) (Noble, personal communication, 2007). This was also the case after the Ginsaugon landslide tragedy: an entire barangay was almost completely wiped out when the slopes of a hill collapsed after hours of continuous heavy rains. In this case, the land was declared alienable and disposable and hence subject to private property. The absence of comprehensive hazard maps for all types of hazards results in a misguided land classification system as well as a misguided land use and development policy.

The Philippines has yet to establish a comprehensive national land-use code. The code is supposed to provide the framework for the allocation of lands for various uses in the light of the country's requirements for industrialization, urban and human settlements, agricultural and fisheries modernization, environmental protection, and other uses. At best, land-use planning that directly impacts on land tenure systems is localized, and normally prepared by LGUs following the guidelines of the Housing and Land Use Regulatory Board (HLURB)[7]. The key problem is that localized planning does not consider the broader requirements of the Philippines' growing population and long-term socio-economic development. In addition, the importance of hazard information has only recently been considered in land-use and disaster management planning processes, as a major response to Ormoc City's tragic flashflood in 1991. The preparation of geohazard maps for the entire Philippines to inform land-use planning remains to be completed, aside from the fact that different national government agencies (NAMRIA, MGS, PHIVOLCS, PAGASA) have been involved in this exercise. The production of such maps is hindered by two problems, which Delfin (2006) identified as (i) the use of different scales and geographic information systems (GIS) by government agencies, making data integration more difficult (ii) the lack of accurate political boundaries in many of the country's maps.

The presence of dense settlements in vulnerable areas is partly a function of the weak enforcement of land-use policies, partly a result of uncontrolled urban growth, and partly due to a lack of access by rural landholders to land resources. Uneven investments which favour the highly-developed regions, burgeoning population growth, and a lack of livelihood opportunities in rural areas, only attract additional people out of the provinces. These conditions bring about an artificial scarcity of land and the densification of human settlements in urban areas, which force many people to inhabit drainage systems, easements, areas under bridges, and even coastal areas which are highly vulnerable to and contribute to hazards, because they prevent the free flow of water and present the occupants with higher levels of risk. The Payatas tragedy (see page 7) provides an illustrative case of a disaster waiting to happen, due to the high concentration of poor squatters in the biggest open dumpsite in Metro Manila. In rural areas, uneven distribution of land encourages informal occupation of public lands and an upsurge in seasonal farm labour on large privately-owned lands[8]. Meanwhile the absence of widespread land tenure instruments over open-access areas leads to unsustainable land uses and degradation in critical watersheds, danger zones, protected areas and marginal lands susceptible to high degrees of erosion. Several efforts have been made to estimate the population in the uplands to complete the process, but these have not quite been successful.

Properties located in high-risk zones have only recently been identified due to the late development of hazard

[7] Fernandez, *et al.*, (no date) found that the Comprehensive Land Use Plans required by HLURB for each city and municipality in Metro Manila have not been compiled.

[8] As observed in the Ormoc City landslide tragedy, according to the DENR records, 'nearly 100 percent of the immediate water-shed of Ormoc, an area of 4500 hectares, is owned by six sugar-planting families …' (Severino, 1992; Danguilan-Vitug, 1993) and most of the affected families were farm workers and tenants on these plantations.

maps. In some cases, this discovery would not have been possible without the disaster, as in the case of the 1999 landslide tragedy in Cherry Hills Subdivision located in the mountainous Antipolo City, east of Metro Manila. From this experience, in the context of land tenure and disaster prevention, there is a necessity for the completion of hazard mapping. This will help to guide the future development of land regulations that can be formulated for and strictly enforced in the whole country.

Emergency operations phase

In an emergency operations phase, interviews with government and non-government organizations and some affected families reveal that less attention is given to land tenure issues, as compared with ensuring minimal casualties and supporting relief operations. Government agencies are mandated to assess immediately the impacts of the damage (Presidential Decree 1566 issued in June 1978, which is the current legal basis of disaster management arrangements in the Philippines). However, no assessment has been made as regards the condition of the survey and records infrastructure post-disaster, and the land tenure status of affected households. There are no reports on the damages to survey controls, parcel boundary marks and land records held by the government agencies, all of which are important in determining the support that affected people may require for their rehabilitation. As regards the affected families, no systematic information is gathered on the value and size of the affected properties, their locations and the corresponding land tenures. Reports are more focused on damage to government properties that require funding for repair and/or reconstruction. Estimates of the effects on private property have mainly considered damaged houses and related structures. At best, resettlement sites with free core houses and some basic facilities are set up for all affected families, regardless of their previous land tenure status. These weaknesses affect the ability of the government and other organizations to plan for the recovery, relocation, or rehabilitation of affected communities and households following disasters.

Recovery and preparedness phase

During the recovery and preparedness phase, the key issue is the absence of any support for land tenure issues particularly as they relate to poor, vulnerable and food-insecure households following disasters. No clear public policies exist to facilitate the recovery and rehabilitation of affected lands and other related properties. At present, affected families are left on their own to locate their properties, restore boundary marks, reconstitute lost records, and/or reestablish farmlands. Support for disasters is limited to immediate relief and finding relocation sites for those affected (World Bank and NDCC, no date).

For those who have the means, perhaps the major impediments to returning to their property are the lack of awareness of the procedures involved in surveys and title reconstitution, and a lack of access to records. Studies by LAMP have highlighted the lack of transparency in the land administration system and the high cost of land transactions, thereby forcing owners to stay out of the formal system or secure the services of third parties who are familiar with the procedures. The latter contributes to the added high real cost of land transactions. In this situation the existing government programme directed at supporting the needs of disaster-affected families does not help to address such problems. Each client is treated equally, regardless of whether they are victims of disasters or not (Cledera, personal communication, 2007).

For poor households with no secure tenure, the main impediment is returning to the property, or finding a suitable place to live and practice their livelihood following the disaster. Life in resettlement sites has proven to be difficult for these untenured families because most of the sites do not include agricultural lands for farming and other livelihood activities. Moreover, the standards set for determining appropriate resettlement sites mainly concern themselves with the idea that resettlement areas should be at a lower risk to natural hazards. For example, in Legazpi City the victims of Typhoon Reming have been housed in dwellings of about 12 m^2 each in size, with no farmlands (Asupardo, personal communication, 2007).

Perhaps the communities and families affected by the Mount Pinatubo eruption could be considered more privileged, given the legislated government appropriation of PhP 10.0 billion for recovery and rehabilitation programmes after that event. However, this could be attributed to the enormous extent of the damage caused by the eruption, and the corresponding media coverage, which may have prompted the government to allocate such a huge amount of money. Housing units were developed and equipped with individual titles. Nevertheless, as experienced by other affected communities elsewhere, the settlement sites were bereft of farmland and places of employment were far from the new settlements. Some farming households resorted to returning to their original properties, others found new farms on their own, and still others – such as the Aeta people – returned to their ancestral domains and adapted their farming and hunting practices. It has

become apparent that poor, vulnerable and food-insecure households demonstrate high risk-taking behaviour, because the advantages of disaster-prone areas – open access, low costs (e.g. transport), proximity to employment – are perceived to outweigh the risks.

Agriculture-dependent poor households are less able to cope with the loss of farms following disasters, because in economic terms, they lack the resources that would allow them to make more risk-averse choices. Natural disasters cause major disruptions in their ability to provide food for their families. Without alternative farmlands, families run the risk of hunger after the food supply from temporary shelters run out. Thus, they continue to be impoverished, making them more vulnerable to yet another disaster.

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■ 4. 4.CAPACITY FOR SUPPORTING LAND TENURE AND RELATED NATURAL RESOURCE ACCESS ISSUES IN THE POST-DISASTER PERIOD ■

4.1 National level capacity

The National Disaster Coordinating Committee (NDCC) – under the Office of Civil Defense of the Department of National Defense and through its member agencies prescribed in Presidential Decree 1566 – is responsible for carrying out disaster preparedness, mitigation, response and rehabilitation. However, its mandate does not cover assistance in resolving land tenure and related access issues concerning natural resources. At most, assistance is limited to providing resettlement sites for affected households and giving them support in the construction of dwellings and the issuance of titles over these properties. The support does not include providing farmlands for the families. Thus, marginalized farmers continue to live and work in the foothills of Mount Mayon, disregarding dangers from volcanic eruption and lahar flows, because this area provides them with the opportunity to produce food without secure land titles. It appears that people only obey evacuation orders when the highest level of alert is reached (Heijmans, 2001 as cited by World Bank, no date).

The search for cultivable land, therefore, rests with the affected family, considering that Government support does not include providing farmlands for the families. Once occupied, some people approach government agencies such as DENR to avail of their regular programmes for titling and tenure security. However, when a family is displaced, the chance of them securing a title in public land is nil, because one of the primary criteria for a title is proof of occupation for at least 30 years. There is no special programme designed to provide poor rural households who lost their farms after the disaster with secure tenure to farmlands.

Land-related government agencies, particularly LMS and NAMRIA under DENR, and RoD under the Department of Justice (DOJ), presently have no programme to support disaster-stricken communities in coping with land tenure and property issues (Gerochi, Noble, Cledera and Villanosa, personal communications, 2007). This is mainly because their programmes are all aligned with the approved budget, which does not take into consideration the need to respond to the requirements of disaster after-effects. In the case of the Mount Pinatubo eruption, for example, the DENR did not have funds to reestablish destroyed control points. While funds are available for cadastral surveys, these are allocated in support of titling, and are already earmarked for specific locations which are not necessarily disaster-affected areas.

In terms of responding to the needs of affected communities for the reconstitution of their land records, the DENR and RoD are in no better position to provide this support if their own files have also been damaged. The poor state of records, the absence of cadastral maps to support titles, the absence of records security systems, and the general lack of public understanding of procedures for title reconstitution, all contribute to the difficulty of supporting affected communities. Similarly and as noted earlier, these agencies do not have programmes directed at supporting the needs of affected families. Affected people have to take their own initiative to avail themselves of the services of

these agencies, and go through the normal process that other regular clients are subject to.

The budgets of disaster funds do not cover the expenses required by the agencies to reconstitute their records, reestablish control points, conduct cadastral surveys,[9] or provide land title reconstitution services for affected families. If the agencies were to provide this support they would have to submit themselves to the regular process of budget preparation and approval, and make a case for additional funding to better respond to the needs of affected families[10].

In order to provide better land administration services, the agencies would have to improve their records systems, enhance public understanding of the procedures, and streamline the processes to be more transparent and client-responsive. They would also have to develop more preventive approaches to be better placed to serve the needs of affected families in the event of disasters. These would include, among others: (i) providing for better security of records; creating backup copies: more systematic organization of records to improve access by the public; regular updating; improving consistency in records held by agencies (ii) identifying alternative areas for agricultural production for affected families (iii) relocating vulnerable communities to safer areas and providing secure tenure and farms. Improving awareness of land tenure and resource access issues is also important, so that these agencies and other humanitarian organizations can identify and implement more responsive programmes for marginalized and vulnerable households.

Non-governmental organizations based in Manila, such as the Institute of Church and Social Issues (ICSI) and the Citizens' Disaster Response Center (CDRC), recognize that land tenure issues are not given priority in current disaster emergency relief and rehabilitation programmes (Adem and Lanada, personal communications, 2007). However, CDRC undertakes ongoing activities with affected communities such as the community mapping of properties affected by disasters (in partnership with local NGOs and LGUs), to facilitate tracking down and locating the former properties of affected communities, and to help avoid disputes among neighbours (Lanada, personal communication, 2007).

4.2 Local level capacity

The NDCC structure is replicated at the local level – in each region, province, city, municipality and barangay. At the municipal level, the LGUs are expected to provide direct support for the needs of affected communities within their jurisdictions, with assistance from the field offices of national government agencies. Under the Local Government Code of 1991, the LGUs are required to set aside 5 percent of their estimated revenue from regular sources as a 'Calamity Fund'. This amount is used for relief, rehabilitation, reconstruction, and other works and services carried out during the budget year. But once again, this amount does not cover support for addressing land tenure and related natural resource access issues.

As part of the LGU mandate, land-use planning is undertaken by the municipal and provincial governments. However, this exercise is not always informed by risk assessment and hazard mapping. Very few LGUs – although Marikina City is an exceptional case – have active programmes to relocate communities vulnerable to hazards and informal settlers, and provide them with secure tenure in safer environments. Few cities and municipalities also have the capacity to prevent settlement in disaster-prone areas, particularly by informal settlers. Local land-use policies, rules and regulations, are seldom enforced, even when they exist. In some cases, LGUs allow the entry of informal settlers, as a deliberate vote-raising strategy, even in more high-risk areas (World Bank and NDCC, no date).

The performance of LGUs in disaster management is very diverse. They are expected to draw up risk management plans, but may not put them into practice, particularly in the 4th to 6th class LGUs. Where plans do exist, they focus largely on relief and rescue operations (World Bank and NDCC, no date). Given their existing fiscal situation and manpower capacity, it is difficult for many LGUs to incorporate land tenure and natural resource access issues in their disaster management plans, or in their local development plans. To date, very few LGUs have been successful in implementing disaster prevention or flood control measures, and in relocating highly-vulnerable households to safer environments[11].

[9] Funding for cadastral surveys after a disaster is allocated only for delineating the boundaries of properties in the resettlement sites, and not to relocate lost boundary marks on the original properties of affected households.

[10] For example, repeated requests by NAMRIA for funding to support the reestablishment of control points in Mount Pinatubo have not been successful. Such requests have only been approved in 2007 (Gerochi, personal communication, 2007).

[11] An excellent example is Marikina City, which used part of its development funds to implement high budget flood control measures, and to relocate hundreds of households from the banks of Marikina River to a safer resettlement site where most important socio-economic facilities and services were provided. The effects on families when the river swells during annual heavy rains are thereby minimized.

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Abbreviations and Acronyms

A and D	alienable and disposable
ADRC	Asian Disaster Response Center
CDRC	Citizens' Disaster Response Center
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DOJ	Department of Justice
GDP	Gross Domestic Product
GDRP	Gross Domestic Regional Product
GIS	geographic information system
HLURB	Housing and Land Use Regulatory Board
ICSI	Institute for Church and Social Issues
LAMP	Land Administration and Management Project
LGU	local government unit
LMB	Land Management Bureau
LMS	Land Management Services
MGB	Mines and Geosciences Bureau
NAMRIA	National Mapping and Resource Information Authority
NASA	Neighborhood Association for Shelter Assistance
NDCC	National Disaster Coordinating Council
NSCB	National Statistical Coordinating Board
OCD	Office of Civil Defense
PAGASA	Philippine Atmospheric and Geophysical and Astronomical Services Administration
PHILVOCS	Philippine Volcanology and Seismology
RoD	Register of Deeds
TOR	Terms of Reference