

# **Coping with Mother Nature: 'Households' Livelihood Security and Coping Strategies in a Situation of a Continuing Disaster in Tarlac, Philippines**

***Rosana Mula and  
Anke Niehof***  
***(Benguet State University La  
Trinidad and Wageningen  
Agricultural University)***

## **Introduction**

“ An outsider may see what is common in a given place but that may not be the most important thing to the people concerned”. (Verhelst 1992:9)

The most well-known disaster of international proportion that hit and affected most of the provinces of Luzon is the eruption of Mt. Pinatubo volcano in June 9 and 15, 1991. Waking up after 450 years of sleep, Mt. Pinatubo caused one of the most violent volcanic eruptions during the 21<sup>st</sup> Century. The volcano ejected an estimated 7 to 8 billion cubic meters of sand and ash. It claimed lives, properties, and resources not only when it erupted but continues to do so, which is why the disaster has been characterised as a “lingering disaster”. The enormous amount of ash Mt. Pinatubo ejected became lahar that turned into mudflows during the rainy season. Lahar flowed down all the regional drainage systems, most especially the rivers. It caused high sedimentation, which led to extensive annual flooding.

The eruption caused extensive damage to lives. A

government report cited that at least 1,180,132M people were affected by the calamity. This represents approximately 19 percent of the total population of Central Luzon. Of the cultural minorities, 7,841 Aeta families were affected. Damages to property are equally staggering. About 41,979 houses were completely destroyed, having been buried under tons of sand and ash whereas 70,257 houses were partially damaged. The actual cost of damage to public infrastructures is estimated at P 3.508 billion whereas damage to roads and bridges were estimated at P 1.525 billion. School and other public buildings and other facilities like telecommunications and electrical infrastructure were also among those damaged.

Moreover, 18,000 hectares of forest land were buried in ashfall. The advent of heavy rains following the eruption caused the ash to become heavy mud which then surged down to cover 8,968 hectares of low lying areas. At least 8 major river systems became clogged. Agricultural lands, which provide the main income for ninety percent of the residents were not spared. A total of 67,784 hectares of rice land were damaged. Aquaculture, another source livelihood in Central Luzon also suffered with about 7,129.89 hectares of fishponds, valued at P284.098 million were reported lost.

The total damaged caused by the disaster presents dim prospects for people's immediate recovery. The most harmful consequence of the disaster has been the emergence of the unanticipated new problems, which have compounded the misery of those in the affected regions.

The utmost concern of this study is to gain insights on how household cope in disaster situations, specifically the Mount Pinatubo volcanic eruption, whose effects may carry through an indefinite period. Being able to gain insights into the phenomenal nature of the disaster may yield important information relevant to understanding the behaviour of individuals in a household context.

The recognition of the unique nature of the disaster as continuous, therefore contributing to several second-generation problems of varying degree, necessitates multiple adaptations for the victims. The idea of looking at these adaptations from the household level is timely and relevant because of the intrinsic relationship that exists between households and food. To a large extent, food security becomes a major issue, which needs to be addressed by any household when it is jeopardised.

The household was used as a springboard for the analysis of the impact of the disaster because in a country like the Philippines, the family as a unit often does not coincide with the household, as is the case for nuclear family households in Western countries. Household has been the preferred term in developing societies because members of individual residential units all often embedded within strong networks of wider family kin and it therefore makes little sense to confine family to small domestic groups. In contrast to this, people in Northern countries often have less contact with relatives beyond the immediate household of their natal families and so the concept of family becomes prioritised in

a household setting.

### Research area

The province of Tarlac is the capital of the “melting pot” province of Central Luzon. It has a total land area of approximately 305,365 hectares divided into 18 towns. Government records further show that it has a total population of 895,708 in 1990. Most of the population consists of Ilocano migrants who gradually acquired land and pushed the Aetas, the earliest settlers in the area to the hinterlands. Tarlac is primarily an agricultural province. Rice, corn and sugarcane are its main crops. The province’s biggest livestock income source is poultry raising whereas fisheries and aquatic resources come next.

The province has a solid history of being a hacienda (a large farm managed through traditional system where the landlord-tenant/lessee relationship prevails). Spain’s colonisation by the beginning of the 17<sup>th</sup> Century brought about significant changes in the political, economic, and cultural life of Filipinos. The encomienda (a grant by Spanish crown; giving right of governance over a designated number of indios) system led to the birth of the hacienda.

Camiling, the area of the study is one of the 18 towns of Tarlac. It has a population of 13,517 households as of 1995 that are spread over 61 villages or barangays. The research was specifically carried out in the barangays of Florida, Lasong, Sinilian First, Sinilian Cacalibosoan, Sinilian Second, Sinilian Third Carael and Caniag. These villages were chosen as its residents were adversely affected as compared to the rest, these villages being near the river. These barangays all traversed by a ford which now looks like a river. The ford brings continuous lahar to the villagers.

### Conceptual framework of the study

Coping strategy is a concept that requires a system approach of the various elements involved in its development. In the analysis of these various facets, a holistic perspective, one of the key principles of systems thinking, must be taken. Systems thinking “recognises the idea of whole entity which exhibits properties as a single whole, properties which have no meaning in terms of the parts of the whole (Checkland and Scholes 1991).”

Food security is an integral element of household livelihood security. These are analogous concepts which need to be understood not only individually but also in relation to a supra-system such as the environment, of which the households are part and parcel. Processes of communication and control enable a specific system to adapt in response to environmental disturbances. The immediate recovery of victims and their environment in a disaster situation is the basic consideration in designing interventions. In the Mt. Pinatubo disaster, recovery interventions seem inappropriate. One possible reason why intervention failed to respond to the requirements of the situation is the continuous nature

of the disaster. The time perspective, in this case, is an important element not only in prediction of possible consequences, but also the preparation of stakeholder (Households and Research and Development Institutions). To reiterate, all these are better understood in a holistic viewpoint.

Household livelihood security required investigating the interactions of the various building blocks relevant to this research work. There are three more aspects, which require further discussion: disaster as a problem situation, the element of time, and indicators of change brought about by the disaster.

### Disaster presents a problem situation

The United Nations Disaster Relief Organization as cited by Smith (1996:5) defined disaster as “an event, concentrated in time and space, in which a community undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfilment of all or some of the essential functions of the society is prevented.”

A disaster’s effect may be direct or indirect, tangible or intangible. In this research, the Mt. Pinatubo eruption is a disaster fraught with discontinuities both in the natural and socio-cultural environments of victims. While assessing the most visible consequences of the disaster such as destruction of farm lots and loss of property, concern for the consequences of the disruption in the social environment is equally important. Mitchell (1990) pointed out that the human dimension of disasters is often neglected in favour of the physical resilience of structures. There may also be indirect effects, which could emerge later and be much more difficult to contend with, as in the case of my study sites. The Mt. Pinatubo disaster is a “slowly developing” type of disaster (Albala-Bertrand 1993:1434) affecting agricultural activity little by little in a cumulative rather than in an instantaneous way. There may be more important and longer lasting indirect (flow) effects than a “sudden disaster.”

There are also some gains resulting from disaster events. Usually, these are obscured by the impact or magnitude of the disaster on life and property. In most cases, these positive effects are manifested over a long-term basis. Changes in a farming system, for instance, may have positive growth effects. The same is true with capital inflow that can be realised with migration, where workers’ remittances can be accelerated.

In disaster events, vulnerability and predictability are key issues. There is a strong correlation between the two. When the resources of a household are at risk, it is difficult for the household to protect itself or recover. Thus, a household becomes vulnerable.

Even the way in which knowledge is distributed among household members may make it difficult to manage the disaster situation. Planners and activists need prompt and clear information about such constraints to develop ways to

improve access to the necessary resources. Bohle (1993) suggests that the notion of vulnerability should encompass all the effects of marginalisation.

In the case under study, the lack of predictability is an element, which aggravates the victims' despondence. At times, lessons and insights gained from past experience become inapplicable. Since disasters do not happen often, once they strike the degree of emotional instability among the victims is high. Predictability is a relevant issue because it explains certain behaviours of coping. The context and type of past experiences result in differences in the interpretation of any given situation (Scoones and Thompson 1993). It might be that strategies borne out of the past experience with similar or even the same type of crisis situations becomes a poor guide for problem solving in the present situation (Barnett 1993). In other words, one has to reckon not only with the strategies per se, but also with the processes involved in developing the said strategies. Familiarity of a situation and accumulation of experience can be objectified in the here and now through some form of symbolism (Berger and Luckman 1971).

### The element of time

Time is an essential element in the understanding of human behaviour especially in abnormal situations. Time, in this study, has a bearing on the situation of uncertainty. The Mt. Pinatubo disaster is not one, which strikes once, after which people start to rebuild their lives. Its nature presents a continuous threat to the environment. Coping becomes difficult because the amount of lahar carried away by rain each year is unpredictable. The effects of the Mt. Pinatubo disaster are multiple and intertwined, rendering the households extremely vulnerable.

This explains why the time element is given serious consideration in this study. Time in this study has a fourfold meaning. Historical time includes demographic changes. Seasonal time can include changes in agriculturally-related activities. Life course may take the form of the change in intra-household dynamics. Daily time includes allocation of labour. Though emphases vary, these variables allow us to understand the process of coping and allow us to put a disaster recovery scheme, either originating from within or through outside intervention into proper perspective.

The victims of the Mt. Pinatubo are in a continuous state of shock. In this case, affected people will have to draw upon their store of experiences to respond. As explained by Flaherty and Meer (1994), the amount of experience that is at the individual's disposal to draw upon for response to an event is determined by habitual conduct and loss of memory over time. This, in essence, means that former habits are no longer appropriate in the face of a new situation. Habitual conduct enables the individual to act on the basis of automatic processing, but in unusual situations like disasters, the individual "must revert back to a more

conscious control" (Aschraft 1981). Dealing with a particular situation becomes easy when: (1) an individual is engaged in habitual conduct; (2) the individual has a low degree of emotional concern for understanding the situation; (3) there is low cognitive involvement with self and situation, and 4) there is abnormally low stimulus complexity brought on by the absence of need for attention to self and situation. Thus, in the situation caused by the Mt. Pinatubo disaster, recovery is not within view and coping is difficult because habits are rendered inappropriate, the social relations are disrupted, and the concern for mere survival prevails.

### Indicators of change brought by the disaster

Two of the indicators, which can show the change brought by the disaster over time, are referred to in this study as the natural resource base and the socio-cultural resource base. Resources can be defined as the "means to satisfy a system's (household's) demands". These will determine the livelihood security of households to a large extent. Resources can be tangible or intangible.

The natural resource base (Chambers and Conway 1992; Ross et al. 1994) refers to the tangible resources of people, specifically their land. Before the onset of the Mt. Pinatubo disaster, some of the more common indicators of the natural resource base were: land size, meaning the bigger farm one has, the more secure one's household is; rice as a major crop, meaning the greater harvest, the more secure one's livelihood; the availability of irrigation, meaning the greater the harvest. The areas for rice farming were those closest to dikes, rivers, and its tributaries because of the assurance of irrigation. This has changed with the outbreak of the disaster, since the areas, which used to be prime are now the areas most damaged by the debris from the eruption. Household with areas along the waterways no longer considered it to be an advantageous location. This research tried to look at how households define livelihood security now that their natural resource base has been adversely affected, and what coping strategies have been developed in this changed situation.

While the study of the effects of the disaster was initially focused on the biophysical component, its impact on livelihood security demonstrates a need to go beyond such types of analysis. People's perception and attitudes towards the worth of an environment can also be considered as a resource according to Campilan (1995).

At the same time, the consequences of discontinuity in the natural resource base impinge upon socio-cultural resource base of the community. This comprises the intangible resources which include social relations. This brings us back to Cheal's concept on the moral economy of household as discussed earlier. Since kinship network provides social security, its contribution to the functioning of the household is too important to be ignored.

Swift (1986) claims that livelihood includes social bonds which may provide buffers in times of hardship. Crisis situa-

tions have indeed become arenas where relationships are created, destroyed or enhanced. As Harris (1990:50-51) argues, relationships emerge not from the universal existence of social entities (groups and institutions) but from universal attributes of social structures like power and resources. The aspect of relationship is critical in the understanding of the dynamic of support. Support can be in the form of intangible assets like claims (legitimate demands and appeals for material or other practical support). For instance, the case of the elderly people in the household. Their role at times can be that of maintaining feelings of security and continuity in a situation of a dramatic change in family or household conditions (Moussourou 1994). Basically, security is about the means to survive and avoiding destitution (Shepherd 1992:2-5).

### Data collection and analysis

This research explored the impact of the disaster on people's livelihood and people's perceptions of this impact through various forms of empirical inquiry. As McCubbin et al (1980) emphasise, systematic research on the impact of disasters should include not only indicators of inherent hardships, but also people's perception of the event as an indicator of inherent hardship. In this case, we are dealing with a continuing disaster, which implies the issue of the time element. The continuing nature of the disaster suggests a manner of inquiry whereby the past and present nature of resources are examined. This, in turn determines variations in perceptions and concepts which are significant in constructing and understanding rules of behaviour (Engberg 1990; Castillo 1995).

The etic (outsider) and emic (insider) points of view (Harris 1968) are considered in this research. The outsider's view provides a baseline information on the general assessment of the disaster. It cannot address issues like the perception of the disaster's effects on the eyes of the people involved, nor can it shed light on the relationships between variables involved in coping processes. Thus, there is a need for the participant's perspective in order to ascertain the processes of coping and perceptions. The most appropriate way to achieve this is to combine the survey method with qualitative methods of data collection (Scrimshaw 1990).

This study was done in three stages. The orientation phase enabled the researcher to establish familiarity and rapport in the study area. The household survey was conducted to cover all aspects household living conditions focusing particularly on changes brought by the disaster. Hence, two time dimensions namely "before" and "after" the disaster were applied.

The Mt. Pinatubo disaster started in June 1991. The data for the time category of "before" refer to the last cropping season in the calendar year 1990. Data for the time category of "after" are drawn from the following period: 1) during the height of the disaster, 2) two to three years after the disaster

(1992-95) and 3) during flood and drought periods. These time parameters yielded comparative data (both qualitative and quantitative) significant in determining the dimensions of the disaster as well as the household's state of living. One complete farm cycle encompassing the wet and dry seasons served as the basis of observations. Respondents were asked for a detailed recollection of events and experiences during these periods.

The general household survey had a total of 370 respondents. These were selected from a list of 529 affected households obtained from the Department of Agriculture, Camiling, Tarlac.

Phase 3 is the conduct of case studies. The results of the household survey determined the criteria for selecting case respondents and issues to investigate further. The case study approach was resorted to provide an emic perspective in the study.

A case subject matrix was the guide in selecting case respondents. For the columns, three types of farm zones which critically affect the livelihood of communities were identified. These were determined according to the proximity of farms to the river. The categories are as follows: farms adjacent to or near the river, farms where lahar was deposited, and farms where secondary lahar flows occurs and, as result, usually submerged in water. For the rows, the availability of resources, specifically entitlement to land was the most important consideration. The types of household are tenant household; landowner household and works on his own farm; landlord household.

There were instances that two cases were studied in one cell because they differed in some aspect. For example, two cases were done in Case A though these are from different barangays. Other households were taken because of additional considerations. These include a landless farmer who is a farm worker, a female-headed household, an elderly household, and a household with authority. In total, 26 households were selected.

The results of the household survey were entered into a data base. A data analysis scheme was formulated using several statistical measurements. The chi-square test was used to determine associations between qualitative or categorised variables. The McNemar test, used to check for significant changes, was applied to the "before and after" aspect of the research design.

The case studies data analysis was calculated by hand, using key questions and key words as tools for analysis. Additional qualitative data were categorised and attached to various topics for illustrative purposes and to enhance the understanding of the other data.

### Profile of the affected households Livelihood

The majority of the household heads have been farming for between 10-29 years. The highest number of years operating own farm was between 20-29 years. Generally, the

respondents have adequate farming experience.

While many of the respondents take responsibility for most of the farm activities, the management of the household and farming activities still follows the pluralistic manner of decision making, in which the elders (mostly parents), other adult members, and the respondents themselves participate. There are, however, instances where a more patriarchal mode of decision making predominates.

### Household size

The average household size prior to the disaster was 5.25, with the highest number of members within the range 4-6. However, after the disaster, the average size was 4.77. Nearly 74% of the respondents claimed that their households had three or four more members before the disaster, most of them having four to six members. A similar trend is observed after the disaster, where 82.7 had more than three members. As a consequence of the disaster, the household size significantly decreased. One reason for this is migration. The more able members sought employment elsewhere. At the height of the disaster between 1991-1993, when most claimed nothing could be done with their farms, some 101 household members migrated in search for an income elsewhere.

The disaster did not have any significant effect on the dependency ratio as shown by the values of 45.86 before and 44.17 after, which can be explained by high migration rate. A closer look at the data shows a minimal increase in the number of household members with ages 15-64 and 65 above after the disaster.

For the majority, going out of the village for job opportunities meant moving the younger members to the care of other households. Older members 65 and above, in spite of their age, maintained their own households. There is, however, no clear cut boundary indicating whether these households can be treated as separate households.

### Sources of livelihood

The total number of household members earning income consisted of about 1,034 before the disaster and 943 after the disaster. Farming appeared to be based on a combination of the following activities as a source of income: rice production, livestock raising, and fish culture. There are also a large number of household members who derived their income from rendering domestic services. Others do construction work, working as storekeepers, and a small percentage work as employees of government and private entities. The frequency distributions do not differ much. Apparently, households were inclined to fall back on the type of income activities they had before the disaster. Specifically, they focused on how to regain the former productivity of their farm lots.

### Kinship and residence rules

To determine how kinship and residence rules were af-

ected, the homestead in the study site was considered. The homestead shows the nature of kinship relationships in the communities. In one homestead, two or more residential units can be seen. A Peterson (1993) and Berner and Koff (1995) found in their studies of kinship structure in the Philippines, proximity to kin is an important consideration in establishing domicile. More often than not, from whom and where support can be drawn during problem situations is a major factor in determining the location of the dwelling. This is best captured in some of the statements heard during the focus group interviews and case visits like:

Parents-to-son: "Should you decide to build your own house, there is enough space here and your father could even help you."

Daughter-to-woman: "We would like to live close to you then the children can be taken care of while we are in the field."

Elderly woman: "It is happier to live in a place where you are close to a few relatives (referring to children, brothers or sisters) because then, you will not have problems visiting each other. You can always run to them in times of problems, even in small problems like having no salt or sugar for the day, and because the feeling is different when you are near them."

From the above example, we can see how the concept of a local kin group operates. There is a clear desire to live near or close to relatives. As Kikuchi (1989) explained, most Filipino parents expect their children to have a post-marital residence near them. The desire for residential proximity correspondingly means reciprocal relations in terms of material assistance and care. In these barangays, the cluster settlement pattern and the preference for residence within the same locality is reinforced by the limited available lands. The Central Luzon area, as reported by Kikuchi (1991), is a relatively densely populated region where, also because of lack of alternatives, post-marital residence on the family's land prevails.

The local concept referred to as 'kabag-gian' (its literal translation meaning 'part of the body'), means a relationship emanating from common descent. This can explain the clustering of several households of consanguine kin in one area. However, the concept is not strictly enforced in my study area. The term 'kabag-gian' transcends descent. Sometimes, because of the strong bond that can develop between individuals, one can be referred to as 'kabag-gian.' When this happens, it legitimises the establishment of residence in the area where you are considered as kabag-gian without being related. Another concept that accounts for the formation of kinship grouping is that of kindred. Relationships emanating from kindred are referred to as affilial associations (Kikuchi 1989). Two individuals can become close with each other though they may not have a common ancestor. But because both have a relative in common, this paved the way for a genial relationship, which can even

progress to a relationship labelled as kabag-gian. I have observed in many households, including those involved in the case study analysis, how individuals found their way in the community or in a homestead of someone else because of this affilial association. In one case, for instance, the elderly couple, specifically the man (A), considers a male neighbour (B) as kabag-gian because of a genial relationship that stemmed from having a relative (C) common to both sides. C is related to A as an uncle and B is related to C as a cousin. B was raised by C and this is the main reason for the integration of B to other consanguine relatives of C.

The average homestead is 0.11 hectares. The majority of households have a residential area (space occupied by the house structure) of less than 0.10 hectares. More than two thirds (71.40 percent) have titles to their residential area, 23.24 percent have their dwelling sites within their landlord's area, and 5.41 percent are holders of the certificate of land titles. The total homestead area decreased with the disaster. The slight but insignificant decrease in the homestead area is apparently the result of erosion. A part of the settlement gets carried away by the rampaging river each time the rain comes.

When just looking at some homesteads, one can see the extent of the disaster's damage. In Florida, for instance, the homesteads look very dry, with very fine soil particles (finer than sand), and so compact that it looks as though on top is a layer of cement. The only vegetation seen is drought resistant plant like cactus, fortune plants, and some species of euphorbiaceae. On the higher elevation of the villages where lahar could not get through, a more diversified vegetation can be seen like vegetables, some decorative plants, and trees like papaya, coconut, anonas, and mango as well as bananas.

In the centre of Florida, there are at least two house structures in one homestead. The inner sitio (cluster of houses in the barangay) has four house structures in a homestead. The style of all the houses is the same; built on poles with thatch roofs and the walls and floors made of bamboo slats. The inside is almost without any partition so that the sleeping, cooking, and living areas are all contiguous. In most cases, the toilet facilities are temporary latrines (dug out) built at a close distance to the houses. As explained earlier in this section, the occupants of the different units are mostly bilaterally related. A unit may be occupied by the older folks, often with one of their grandsons or granddaughters, and the rests are occupied by married children and their own families. There are also cases where relatives by affinity and kabag-gian build their house units in the same compound. Along the village road of the seven sites, except Florida, the housing condition is marked by significant differences in size and in make. The majority of the houses are larger and have mostly galvanised iron roofing and are constructed of a combination of wood or concrete materials. Changes in the material resource-base.

### The farm

The eastern side of the study area is utilised for vegetable growing. The western side is where rice and corn are cultivated. With the advent of the disaster, the ecosystem of the area was significantly affected. It is estimated that about 10 feet of lahar was deposited on both sides of the river. The vegetable growing area was affected and even houses were covered by lahar. For some time (1991-1993), these areas were left idle. The western side, on the other hand, have minimal niches for rice and vegetable growing. Now, this side serves more as a fishing ground because the area tends to be flooded. Most of the farmers install traps and cages of various types, especially during the wet season, as the river overflows and fish are carried along by the current of the river.

A highly significant decrease in rice and corn area due to the disaster is evident (Table 1). There was a change from 1.76 to 1.42 hectares, which is much lower than the estimated rice farm area of 1.9 hectares in Central Luzon (USAID, 1993).

A majority (55.72 percent) of them have parcels which are titled, 30.41 and 13.87 percent are share tenants and certificate holders, respectively. However, based on my observations and informal talks with local people, a different picture emerged. Those who claimed to have titles to their ricefields have CLTs instead. The certificate of land title (CLT) is a document issued by the Department of Agrarian Reform (DAR). It is a form signifying ownership but very different from the land title because the holder have no rights (in principle) to transfer/mortgage/or sell it until the amortisation has been fully paid to a commissioned bank (in this case, the Land Bank of the Philippines). However, it appears that many CLT-holders have violated the rules of the programme. A number of them have mortgaged their CLTs to either their neighbours or relatives

through informal agreements, legitimised by an intermediary of a respectable background in the community. In most cases, this is the barangay captain. At the height of the disaster (between 1991-1993), many unjustly claimed to have lost their CLT, especially in Florida. It was seen as their only way out of debt. There were so many things to attend to like dwellings which needed to be repaired or completely rebuilt, farm lots which needed more fertilisers or seeds to make them more productive, and day-to-day needs such as food and other basic necessities.

A parallel farming system in the area is called bangkag. It is a piece of land with very good soil fertility which is suitable for the production of vegetables. Perennials and annuals are also common sights in the bangkag. Bangkag are clearings made by households, near the Table 1 Land resources.

Forested area, often across the river (especially in Florida) but out of reach of water even if the river overflows. There are also those which they refer to as bangkag on the eastern side of the river but these areas usually form part of their homestead. In most cases, these are also fenced with bam-

boo stakes in order to prevent stray ruminants. Some have bangkag purposely for grazing and sometimes (specifically during the rainy season) where the household can do cut and carry of grass for their animals.

With the disaster, farmers all the more strive to maintain the bangkag. The only problem they are faced with now is their inability to set access to this resource during the rainy season. The river poses a big threat when it overflows because it can flood the entire community of Florida, some parts of Carael, and almost all the ricefields. When this happens, no one attempts to cross the river to check on the situation or gather food and grass.

### Cropping system

#### Cropping calendar

The calendar of activities in rice farming is marked by a highly significant difference as a result of the disaster (Figure 1). Of the eleven farm operations, weeding is the only activity not affected as shown by the z-value of 0.37. This is one farming operation that can be performed at any time throughout the growing season. With the change in the schedule of seedbed preparation, the succeeding activities were affected. Rice cultivation after the Mt. Pinatubo disaster has become difficult. Any delay or postponement of the activities in the cultivation cycle leaves the crop vulnerable to consequential damages.

For instance, with delayed transplanting followed by heavy rains, there is the danger of drowning the newly transplanted rice. This is exactly what happened in August 1997 when heavy monsoon rains that lasted for two weeks submerged all the standing crops, especially rice, washed away fertilisers, as well as eroded farm lots, especially those which are along the river banks.

### Yield of rice and corn

Rice and corn are the two major crops of the area. The effect of the disaster on their rice and corn production is highly significant. In the three year period, when farmers were not able to farm, a tremendous decrease in production was observed. Rice yields were reduced significantly from an average of 3545.22 kilograms to 1775.80 kilograms per hectare. In the study area, the average rice production before the disaster was higher than that of the neighbouring province of Pampanga, which was reported at 2500 kilograms per hectare (USAID 1993). This was largely because of the availability of irrigation as provided by the water of the river.

Among those who take the risk and grow a second crop, many are not able to market their grains because of its inferior quality. More often than not, a very thin layer of lahar sticks to the grains and makes milling difficult. Most all grain

buyers do not like these grains because, even if they

succeed in milling them, there is discoloration referred to as 'amarillo' (literally meaning 'yellow') because the locals are not able to dry the grains properly. This results in a tremendous decline in price.

Corn yields, on the other hand, decreased but not significantly. Because the crop is normally cultivated after rice (during the months of October to November), with very minimal rainfall, the crop is unlikely to be much affected by lahar.

### Rice and corn inputs

In a study made by Huijsman (1986), the decision to use a particular input is based on several factors. While it can not

be ascertained whether the application of the input will have positive results, farmers try to base their decisions on two considerations, namely the environment (specifically the farming situation) and their own capabilities. These are fairly reasonable bases for farmers' decisions to use or adjust the levels of any input. However, in situations like a disaster such as the Mt. Pinatubo eruption, where the environment is

**Table 1**  
**Land resources**

Ricefield Area (hectare)	Before		After		Probability
	Frequenc y	Percentag e	Frequenc y	Percentag e	
0.01 - 0.70	69	18.6	70	18.9	
0.71 - 1.40	109	29.4	106	28.6	
1.41 - 2.10	87	23.5	85	23.0	
2.11 - 2.80	31	8.4	30	8.1	
2.81 - 3.50	32	8.6	32	8.6	
3.51 - 4.20	13	3.5	13	3.5	
4.21 - 4.90	3	1.1	3	1.1	
4.91 - 5.60	6	1.6	6	1.6	
5.61 and Above	6	1.6	6	1.6	
No Response	14	3.8	20	5.4	
Total	370	100.0	370	100.0	
	Before	After	Differenc e	t-value	
Mean	1.76	1.42	-0.34	-18.22**	0.00

ns - Not Significant

\*\* - Highly Significant

so adversely affected and unpredictable with its effects beyond the grasp of their knowledge system, farmers resort to what I call automatic processing of events. In the case of an event that alters the soil, more fertiliser is needed to make it productive because fertilisers are known to improve fertility. Over time, farmers realise the need to adjust or even completely modify their systems. This is the kind of scenario farmers of my study went through. There is an element of experimentation in the process.

Since the farmers were unable to cultivate in the manner they were used to, they experimented with a variety of measures. When the layer of deposited lahar was too thick, full or temporary abandonment of their plots, mortgaging or selling were some of their options. Others persevered to scrape the lahar; some applied more fertilisers with the hope that productivity could be regained while others diversified and went into aquaculture. In short, they experimented with their own farming system.

Regarding rice inputs, there is a highly significant difference in the cost of seed fertiliser inputs after the disaster. Farmers opted to adopt direct seeding, which requires more seeds and is thus more costly.

The reduction in the amount of rodenticide seems to be the only advantage of lahar in these farming villages. Respondents claimed that there is a significant reduction in the rat population with the occurrence of the disaster. This is due to one or a combination of the following reasons: the fallow period (three years of no planting) which rendered the rodents no source of food, the change of temperature in the environment, and the prolonged flooding.

The overall total cost of rice inputs is significantly higher after the disaster, largely because of more inputs used and due to price increases from the time the disaster took place in

1991 onward, there were several price increases of commodities including the farm inputs. This exacerbated the situation of farmers.

The various inputs for corn were not significantly affected by the disaster. The amount and cost of essential inputs in pre and post-disaster are more or less the same. Since the crop is less exposed to the major fallout of the disaster, specifically mudflows, inputs and their corresponding costs did not differ. Thus, this production system did not undergo a major change.

The change from transplanting to direct seeding in rice farming also accounted for an increase in labour input. Various farm operations, namely seedbed and land preparation, pulling and hauling, and rodent control was significantly affected by the disaster in terms of the households' members' contribution. Under the category of exchange person days, the farm operations significantly affected were land preparation and transplanting. The disaster's effect on hired person days was significant in seedbed preparation, pulling and hauling, transplanting, harvesting, and drying activities.

The overall effect of the disaster on labour input (household, exchange, and hired person days) is highly significant as revealed by the computed t-values at .01 and .05 level of significance.

The data likewise reveal that rice farming is basically a household enterprise, before as well after the Mt. Pinatubo disaster. The major source of labour comes from household members. Hired labour comes next. Because the tedious and numerous activities of rice cultivation make it impossible for an average household size of about five to perform all these functions, farmers also draw upon exchange person days. The vestiges of the Filipino tradition, 'bayanihan' meaning shared work among other members of the community is still

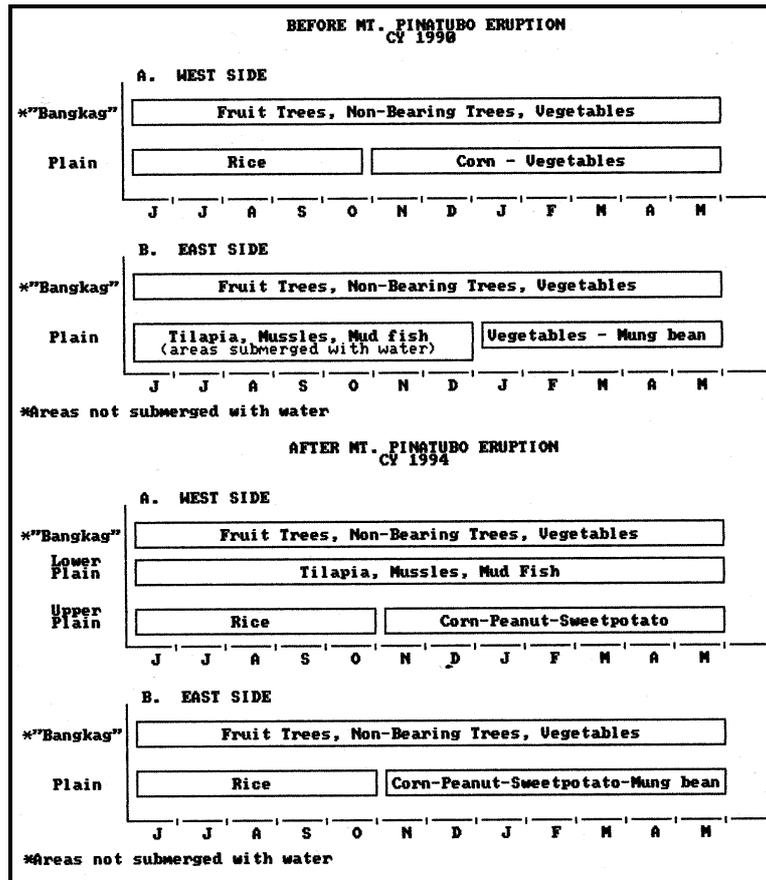


Figure 1 Cropping calendar before and after the disaster

one of the best coping in times of requests for more hands, like in farming, house construction, dike construction and maintenance, etc.

The average number of person days of women's contribution to rice farming increased from 17.82 to 19.20 days, although this is not a significant increase. As observed during my stay in the area, the immense attention to various farm operations like transplanting, weeding, and temporary barrier construction at river banks, which used to be the men's domain, have also become part and parcel of the women's activity.

### Fish culture system

Fish production in the Philippines has grown considerably since the 1970s. Besides commercial fishing, the so called municipal fisheries (piskerya) and sustenance fishing have been a steady source of income among people who have access to productive rivers. Among the twelve regions, Central Luzon had the largest area of freshwater ponds. In Camiling, particularly in the eight villages where my research is located, production of fresh water fish is as equally important as their rice production system. As one of my respondents said "no awanen diay kulos, ado ka da kami ti maawanan ti pagbiag na", meaning "without the river, many of us will loss our source of life." The use of the term 'pagbiag', in this case, means two things: as 'food' in the idea that food is needed to live, and 'livelihood', because the river can be their source of income. The three fish culture systems practised in the study area are inland fishing (piskerya), sustenance fishing, and fishpond culture. For inland fishing, special parts of the river are designated and a fee to the municipality has to be paid.

Fishpond culture is not new in the study area. In the eight villages, only about sixteen ponds were in operation prior to the disaster. These ponds were properly maintained, mostly for commercial reasons. After the disaster, only eight out of the sixteen were kept in operation, and some farmers abandoned the idea of pond fishing. They said that ponds had become too difficult to maintain because you need to dredge almost yearly and this costs a lot of money.

However, towards the end of 1993 and 1994, about 20 percent of those whose rice farms were affected by the disaster converted their farms into fishponds. Seeing no potential in rice farming, the idea of fishponds promised a better livelihood.

Even the municipal fishponds have not been attended to. A key informant said that this was because the local government had other priorities related to the disaster: such as sandbagging and bulldozing lahar which had accumulated on the farms. Thus, sustenance fishing activities prevailed all the more.

The chi-square test to determine if a significant effect was caused by the disaster on the fish culture activity of the respondents shows a highly significant result. The chi-square

value of 48.08 indicates a highly significant effect.

Accounts from most of those who were interviewed claim that fish supplies were never a problem in these parts of Camiling prior to the disaster. Those who maintain fishponds for commercial purposes claim that once their ponds are inundated, especially during the monsoon months, they can be assured of an abundant harvest and a variety of fish. One area of about 200 square meters can produce at least three to four kilograms per day. According to a farmer who just started a pond in Sinilian 2<sup>nd</sup> in 1994, one of the problems he encountered in starting such a livelihood is the annual fee of about P3000 to P 5000. While this amount can be easily paid during an excellent harvest, at times this obligation becomes a burden. During his three years of operation, 1997 was a bad year because of continuous rain, which brought more lahar that made his pond shallow resulting in a poor harvest.

There is also a decline in their catch among those having various fish traps in the river. One is lucky if a single fish trap can catch a kilo over two weeks as compared to a catch of a kilo or more in three or four days prior to the disaster. An expert from the Department of Agriculture said that heavy siltation of ash can reduce the effective water depths. It can restrict the drainage of water in and out of the pond. The water quality is also affected. A high water turbidity, for instance, prohibits the production of phytoplanktons. This in turn affects the nutrition of fish population. This can result in a marked reduction of the value of sustenance fishery, eventually causing a decline in the traditional protein source of the communities. Increased silt deposition also tends to smother the habitat of the bottom-dwelling clams and snails in the river mouths. Many mothers and school-age children depended on gathering fresh water shells as their source of cash. Thus, the disaster rendered them without a source of cash.

Some of the most common species of freshwater fish in the area are Tilapia sp. (tilapia or pla-pla), Mugli sp. (banak), Glossogobius sp. (biya), Therapon sp. (ayungin), Clarias sp. (hito), Trichogaster sp. (gurami), a variety of mollusks (clams and snails), and crustaceans (shrimps and crabs).

Among those who have pond culture, the disaster did not significantly affect the size of the pond. As said, the problem is the heavy siltation and the inevitable dredging which is difficult and costly. The yield and frequency of harvests were highly affected. The frequency of harvest from a daily basis before the disaster changed to two or four times per week. The average harvest of 11.97 kilograms before the disaster dropped to about 8.39 kilograms.

### Livestock system

Tending livestock particularly native goats, swine, and chickens is another source of additional income. The water buffalo is a very important resource among households because the most arduous parts of farming like land preparation and hauling are done with the help of this animal. Lend-

ing out the buffalo to another farmer at no cost, except for its maintenance (letting it wallow in mud to rest after work or keeping it in under the shed at night), is common. Taking care of someone else's calf of a buffalo or cow is another form of building up resources for households. When the calf is full grown, it is sold and whatever profit is made, will be shared by the owner and the tender according to previous arrangements. In other cases, the tender takes care of the animal until it gives birth. When it gives birth to two calves, one goes to each and if there is just one, this usually goes first to the owner and the succeeding calf will be for the tender.

Livestock raising was lucrative until the Mt. Pinatubo's disaster. The livestock population was significantly affected. At the height of the disaster, the rampaging river took the lives of goats, cows and buffaloes. The water submerged most of the pig pens, causing the animals to drown. To date, the community is faced with inadequate pasture areas because most of these areas are often submerged in water, according to 73 percent of the respondents. Even if one opts for cut-and-carry, this is quite difficult because the only possible area to do this is across the river. The river is impossible to cross during the rainy season. It was also observed that more pests and diseases have threatened their livestock.

### **Other assets**

Another aspect to scale households' economic management and capability is the state of other assets beside land. As shown in the preceding section, the assessed value of assets like dwelling units and farm sheds were significantly affected by the disaster. Lahar was deposited not only on the farms but also inside the houses. In August 1997, when there was a strong typhoon with rains lasting for almost two weeks, lahar at about a knee-high depth entered most houses in Florida for the sixth time. Hence, the value of whatever assets left from the previous years continuously depreciated and their functionality decreased. It can also be noted that the number of non-functional durable assets by which are meant assets that are not used at that time because they are in need of repair, increased. This was the case with some ploughs and water pumps. I was told that when these implements become covered with lahar, rusting is enhanced and they become difficult to repair.

Household appliances were usually saved. The disaster did not have a significant impact on the quantity and state of these wares because they can be moved during floods. Having the chance to be there during the peak of the wet season, the household with which I stayed had almost all its things on the top of the dining table, or on raised planks.

### **Community resources at households' disposal**

The river is the hub of socio-economic life in the study area. For a farming livelihood, it is the source of irrigation.

Some very important social interactions also take place in what I would describe as river gabs. Among women doing their laundry in the river, all sorts of information is revealed and disclosed, like a family in town needing a domestic helper and a woman in the crowd recommending her daughter for the job. Among some men who were installing an irrigation pump, the gathering was also a form of relaxation cum socialising. In between working, they drink at least a bottle of gin. Among the children, while some are helping their mothers with the laundry, they take this chance to swim and play.

People of the study area have the basic amenities like having their own barangay hall where they can hold meetings and where visitors can be accommodated. For the period that I was gathering my data, I stayed in the barangay hall of Florida and Sinilian 2nd. During my case study analysis, I stayed with a few households and maintained the hall as my main post. The barangay hall is the place where information can be disseminated, and where the village pharmacy is located.

Most children have access to primary education, including a nursery school ran and managed by a cadre with some college experience and or some instances, a fresh graduate with a bachelor's degree. In Sinilian 2nd, there is a big vocational high school attended by students from all eight barangays.

A registered midwife is present in almost every barangay. She most often is the source of medical advice and support in times of emergencies. In some villages, medical doctors come on a quarterly basis.

Agricultural technicians are rarely seen in these areas, although they claim to be doing their monthly visits in their field of assignments when asked about their programmes. Florida gets to be visited by some technical people of the TSCA, based near the town of Camiling and Department of Environment and Natural Resources (DENR) provincial office, because of a project they have on pilot testing of some multiple tree species.

Florida, is also blessed with a private citizen who has 'adopted' the community and gives each year support in kind. There are several small retail stores almost every few meters where basic commodities are sold and hawkers sell vegetables, slices of meat, and some dried, smoked, or fresh fish.

Water source especially for cooking and drinking, is not much of a problem because of the availability of communal water pumps. It is only during the rainy season that some can not use these wells because of contamination. In fact, after the disaster, some of these can no longer be used for domestic purposes at all. In Sinilian 2nd, the domestic water is known to be slimy and with a distinct odour. I considered this not unfit for domestic use, but the people told me that they are used to it and experience no major problems. There are water shortages in Carael, especially during summertime.

The water pumps run dry and the people have to walk quite a distance to get water for home use.

Access to other resources like big markets, milling centres, etc. does not pose any problem because of available transportation and a manageable road network. The extent of communication network came as a surprise to me. Besides meetings where people source out their information, the better-off families have portable radios and even private antennas. Towards the end of 1996, every barangay captain was given a mobile phone. While I believed that this was intended for the municipality and province to easily contact the officials, it was instead used for personal purposes, like contacting or receiving calls from relatives abroad and in the cities. A few times, I used it also to contact my assistants and my home, even if the reception was not so good. By the end of 1997, however, they were no longer switched on for problems like collecting personal accounts and having to do errands. People become aware of the added cost for electricity.

The study area is peaceful except for minor troubles like drunkenness. Petty gambling is a common sight, especially after lunch. The penchant for gambling as a form of past time is part of the Filipino way of life. In a book entitled "The Past Time of the Filipinos" (Buckland 1912), the author vividly describes how "gambling offers nothing more or less than a pleasant means of whiling time. It rarely ever sinks to the level of a vice. The only moral objection one could raise against the practice is that those playing might be more profitably employing their time. One contending from the standpoint of the Filipino might put the query, and with reason, too: What is to be done with the time when people can't read and are so tired that they can't work? In a country where there is so little with which to divert one's self, what is one to do?" The same questions I dare pose, looking at the situation of the study area where the people have poor education.

In my own view of the situation in these eight barangays, taking into account the situation of the people under stress, with hardly any options for other diversions, gambling is not a flagrant evil. Like Buckland, I would rather see three or four men or women engaged in a quiet game of cards exerting their intellects in the struggles to get the best of every other one present, than to see the same men in their own home smoking and spitting out of the window or women smoking or gossiping. This seems to be what everybody is doing. Even the most industrious men in the villages could be seen at times engaged in some card games.

A very important resource that was indirectly disrupted by the disaster is credit availability. Since most farmers are basically subsistence farmers, except in Sinilian 2nd, access to credit is indispensable for their farming livelihood, because the realisation of the latter is dependent upon the availability of cash and other inputs. Various types of credit institutions exist, such as informal credit in the form of farm inputs from

a patron, credit from millers and grain buyers, credit from wealthy neighbours or relatives and formal credit from cooperatives, NGOs, and banks. According to a key informant, credit repayments owed to formal institutions are rarely completed, especially during the past five years after the disaster struck in 1991. Credit made available from informal sources, which still prevails as their dominant source of credit, has also not been repaid. This is all because of poor harvests. When asked how they can regain back the trust and confidence of their creditors, I was told stories about paying in small amounts (cash or dried grains). Surprisingly, the farmers attend first to whatever obligations they have to informal sources than those from the bank or NGO's. Loosing one's face (being called 'balasubas' in the dialect, not paying in due time) is what most of the people can not afford, even if it means loosing the CLT. Thus, they take every chance they have to pay back their informal creditors, no matter how small the amount is. The high priority accorded to informal obligations does not only have to do with loosing face, but also with the fear that neighbours, patrons, etc., loose confidence and you become alienated in the community. Alienation does exist (bad credit standing) with formal institutions, but it is on such level that it can still be managed. Once you manage to convince your guarantor (who can vouch for your character when applying for a loan, like a well-off neighbour or relative), you still have the chance of regaining the confidence of the bank. In other words, loosing one's face because of not paying back is an aspect of the personalised face-to-face relationship that must be protected.

The availment of loans was not significantly affected by the disaster. The change in proportion of borrowers to non-borrowers is not significant as shown by the z-value of 1.95. However, the proportion of respondents who changed their reasons for borrowing is highly significant, with probability value of 0.027. Of the twenty respondents who borrowed previously before for household needs and education, five used the loan for farming activities like rental of machine for deep ploughing. Such behaviour among households in crisis is anchored on the belief that the potential for income and livelihood improvement has a better chance when the loan is invested in farming rather than in other household needs or education.

While there was no change in their credit sources, a significant change in the mode of payment for their loans is apparent. Of those who were paying immediately after harvest, a significant number changed to instalment payments after the disaster. This is not strange given the uncertainty of having a good harvest.

Generally, access to other resources like big markets, milling centres, etc. does not pose any problem because of available transportation and manageable road network.

### Proximity to the river as a determinant of the livelihood condition

To a farmer, a river can be the source of irrigation for his crops. To a pastoralist, a river which allows the growth of vegetation along its banks gives life sustaining food and fodder during dry seasons for his herds. To some, a river is an important channel for commerce. To many communities, a river can be their source of food and drinking water, and the water can be used for other domestic purposes like washing. While rivers provide benefits to mankind, they also bring misery like catastrophic floods which can destroy crops, livestock, homes, and even take lives.

The significance of the river as a resource in the community, and to households is immense and critical to this research. The water of the river allows the fulfilment of life sustaining activities, specifically farming. However, it can also give rise to devastating impacts both in the abiotic and the socio-economic realm.

The study area is traversed by the Tarlac river where several fords emanate from this water system. With the disaster, most of these fords merged thereby increasing the diameter of water system. The change in river route led to the erosion of several hectares of farm lands and for many, the deposition of thick lahar making farming almost impossible. From the account of one of the respondents, proximity of the farm lot to the river was more disadvantageous now after the onset of the disaster.

Junior's own farm of 0.5 hectare and one hectare as a tenant were severely affected by lahar. Because these were situated very close to the river, they were partly eroded by the strong current of mudflow, and the enormous volume caused a serious dilap (flood). It was estimated that about ten to seventeen feet of lahar was deposited on his farm. All the standing crops were destroyed. For that year (1991) there was no harvest at all. The succeeding years was as difficult as ever for them. Each year, the farm became smaller because of erosion and a considerable amount of lahar was added. Junior had to abandon these farms. He attempted to farm his 0.5 hectare only in 1995. He managed to grow rice but had to spend a lot to cultivate with a rented rotavator instead of a buffalo-drawn plough which he normally used. He had to buy more fertiliser because the physical structure was completely altered. The nature of the soil after the disaster was one that becomes compact when wet because lahar is so fine and water drainage is so slow and was water-logged. On the other hand, when it was dry, the top layer was like concrete. Junior's rice plants did not grow well in this type of soil. In fact, they were stunted, having very few panicles. Even if the monsoon rains were not so heavy in 1995, the rice grains he harvested were not all good; aside from not being full, the grains were difficult to mill because of lahar sticking to the husk.

It was unavoidable for most of the farmers in the area not to do one of the following with their farm lots: full

abandonment, mortgaged, and/or sold. Others made use of the opportunity to purchase or mortgage farm lots, as they were cheap. As one of the respondents said: "In due time damaged lands can be productive again. These may not be suitable for farming now, but may be useful for my children." Although the continuing nature of the disaster makes economic recovery difficult, for those who have fluid assets it is an opportunity to build a new livelihood. Its benefits may not accrue to them directly but to other members of the households. In other words, while the disaster situation affected household's livelihood and survival so much, some regarded the land (considered damaged or useless by some) as useful and productive in due time. What is perceived as useful or not, in this case, depends on how one views a particular object.

### *Victims' articulation of self-help*

The enormous damage in the households' natural resource base upon which their livelihood is based pushed them to explore various forms of mitigating the impact of the disaster. Households, while in the process of facing the day-to-day demands of their disrupted condition, are constantly honing these mechanisms. With slight adjustments to whatever pool of mechanisms and resources these households have, people develop strategies in response to their present circumstances and the possible challenges posed by the unstable situation.

A close look at the physical condition of the area provides a good starting point when assessing the coping strategies of the households. Realising the remarkable damage to their ecosystem, their level of consciousness of what resources can be maintained or modified becomes important. Household's articulation of self-help in a crisis situation in this case is based upon their store of past experiences. When former habits are no longer appropriate in the face of a new situation like a disaster, the individual "must revert back to a more conscious control" (Ashcraft 1981). The element of predictability is a relevant issue because it explains certain behaviours of coping. For instance, a certain amount of experimentation took place among the households. They tried to rehabilitate their damaged farms through the application of other inputs like fertilisers and other chemicals. When these input did not improve rice production, households diversified their work activities and sought new sources of food.

The highly significant change caused by the disaster in the calendar of activities in rice farming led the farmers to modify their rice farming system. The most significant change in their rice farming activity is the shift from transplanting to direct seeding. There are hardly anyone in lahar-laden rice fields where transplanting is still practised. With the disaster, farm areas are threatened by immediate flooding even with little rain. This prompted farmers to switch to direct seeding instead of the usual transplanting method. With the high

labour cost that goes hand in hand with transplanting and with very uncertain production, farmers realised the merits of direct seeding. While it is argued that more seeds are required with direct seeding, farmers claimed that the amount spent on labour cost is comparatively lower.

It is apparent that the idea of diversifying economic activities and/or seeking new sources of food and income as one of the ways to cope with the situation has potential only when the other elements are carefully considered. Yield-wise, sweetpotato is a remarkable crop for the lahar-laden fields. Several studies have proven the root crop's versatility to grow in all types of agroecological niches. It is said that there is a market for sweetpotato, and that sweetpotato can achieve the twin goals of food security and poverty alleviation (Campilan 1998). Apparently, the market did not work for these farmers, which led them into more problems. From the food systems perspective, there is the need to examine the entire food production-utilisation chain and view whatever change as a process covering pre-, main and post-production phases (Campilan 1998:4). Likewise, we see from these two experiences the strong preference for rice as a priority crop, not only because of it being the staple food. Crop attributes are considered as well; rice is not as perishable as sweetpotato.

Traditional forms of activities are the most viable and perhaps most stable form of coping households can depend on during crisis situations. Several studies have proven this. The dependence on local resources becomes their major coping strategy especially among small farmers (Scoones 1992). In this study, the intensive utilisation of the bangkag by every household allows not only the provision of food on the table but also of additional income. This type of farming system has a diverse production strategy which includes the cultivation of annuals, perennials, and even raising of livestock. In some way, the bangkag functions also as a ready reserve for drawing out or meeting the needs of the household. This is true in the case of raising small livestock like goats and pigs because these can be easily sold for cash.

Agarwal (1991) reported that forest play a critical role in enabling poor rural households some of their basic needs. In most cases, forests are utilised for swidden cultivation. However, in this study, the forest becomes an indirect source of income. The abundance of bamboo, for instance, which can become a raw material for furniture making, provides a source for some income. Access to this forest product, however, was affected by the disaster. Among privately-owned forest areas where households were allowed to harvest of bamboo, some owners imposed straightforward restrictions. According to one owner, the frequency of harvesting these trees by some users has become so regular that even those which are not mature are cut. There are instances where owners could not even harvest what they need themselves. As a consequence of this disaster, where scarcity of assets comes to the fore among village societies,

there can be erosion of traditional mechanism of social security or a restriction of the 'collective rights' of subsistence.

The forests have also been the source of food to many households. During the height of the disaster, when food aid from the government hardly met the requirements of households, they resorted to indigenous crops like wild bittermelon and passion fruit, rootcrops like buga and karrot, and bamboo shoots. Some of the indigenous crops like karrot, despite their abundance, were not utilised much because they are difficult to prepare. Toxic substances must first be removed by soaking for several days, then squeezing and thorough washing must be done before it can be cooked.

Fresh water fish production is as important as rice production. The livelihood of the people revolves around the presence of the river. It not only provides irrigation but also other life forms for the communities' food security. The prevalence of fishpond culture was not significant in this study sites because every household had access to the river. There was no strict regulation against anyone who wished to install fish traps in the river except for the municipal fishponds, which were bidden each year. There was always supply of aquatic resources (fish and shells) for the entire community until the outbreak of the disaster in 1991. The sustainability of this declined because of the high deposition of lahar. The river became shallower and sudden surges of lahar caused erosion of rice fields. The worst thing was the occurrence of flooding when lahar was deposited in the prime areas for rice growing. The disaster brought about a complex tapestry of problems to almost all the households. As mentioned earlier, the ecosystem of the area changed. The western side where rice, corn, vegetables were cultivated, are now often submerged with water. Since farming is no longer possible in this part of the community, the area is utilised now as a fishing ground.

During times of long inundation, households install various forms of fish traps. It was observed that even when some parts of the western area dried up, farmers do not attempt to farm these because of the very poor soil structure. Thus, households with financial capability turn their areas into fishponds. One of the drawbacks to the poor adoption of fishpond culture is the high input requirement, from land preparation to dredging. The latter becomes a very difficult operation, especially when inundation occurs where lahar is deposited in the pond. Hence, more and more of the community opts for fish traps because these do not entail so much cost. Traps are often made by them with the bamboo being available in the area. However, there is hardly any income realised from having fish traps. Most of the catch is basically for home consumption.

Among women and children, the inundation is seen as an opportunity for the growth of fresh water shells. The inundated fields become then the source of income for housewives and the children during the week-ends. They leave their respective houses between 8:00-8:30 in the

morning and are soaked all day until 3:00-4:00 in the afternoon. The peak season for this is in the month of September. The maximum amount one can harvest is from eight to ten limon (20-25 kilograms); one limon is worth about P 15. In one day, approximately P 150 may be realised from gathering shells. For the housewife, this is enough for a day's purchase of two kilos of rice, a small bottle of cooking oil, and a small pack of instant coffee. For a high school student, this suffices for one week of daily school needs, especially transportation cost, if not utilised by the household.

Gathering shells is tough work. Getting completely soaked for almost seven hours under the scorching sun, bending, and feeling with your hands for the shells articulates an immense concern for the household's welfare, especially its food security. It also indicates the remarkable ability of women to use whatever resources they have at their disposal for managing a crisis situation.

### Human and social resources

The deprivation of resources among households in these communities has not led to economic uncertainty only. Households are affected in many ways. We see the household as a variable structure that is both an outcome and a determinant of broader social processes, as well as the site of separable and often competing interests, rights and responsibilities. The case presented below examines how households are embedded in a kinship network through which support is obtained.

### The more kin, the better

Following Smith's (1989) methodology, the storehouse of past relationships can be a black box to trace antecedents that can explain at how households operate. He referred to this as the 'genealogy of households.' In this research, this idea proved to be helpful as a means to understand the process of economic and social support.

#### *Case of Victor and Estela's network of kin*

Both Victor and Estela come from poor families. Estela's parents are both wage earners; the mother was a sewer in one of the garment factories and the father was a barber. The household she came from consisted of nine members, all of whom have very little education. Victor's household consisted of fifteen members. His parents' marriage was born of necessity. To escape being forced by the Japanese to become a 'comfort woman', Victor's mother married his father. In spite of this, the relationship worked out and bore thirteen children with Victor as the eldest child.

Having experienced difficult times under the Japanese rule somehow shaped each of the household members' threshold of endurance. Through patience and industriousness, most of Victor's siblings succeeded in improving their economic life through better education at his expense. Being the eldest, he had to stop going to school and worked full time with his father in the farm. His other brothers and sisters

proceeded with their education with full support from their parents and indirectly from Victor. The migration of his two brothers upon obtaining their degree to Mindoro, which at that time still an undeveloped province, worked out well and also benefited the other household members. Today the Reyes clan is one of the better-off families in the community.

Victor never regretted his sacrifices: "One good thing you do brings two-fold or more blessings", he claimed. He referred to the efforts he invested towards his other siblings. Now, he starts to reap the fruit of his labour through their assistance to his children's education. An enormous support for the college education of Victor's children is derived from two of his siblings represented by D and F (Figure 2). Maria, Victor's eldest child completed her college degree through the assistance of an uncle's daughter (D).

Now, she has a permanent job in an insurance company. Eric, the second child completed a two-year electrical course and is gainfully employed. Unfortunately, he had to stop temporarily because of a minor mishap and is now back home assisting in the farm. Nema, the third child completed two-years computer programming and extending assistance in the local government unit as a chairman of the barangay youth council. Meanwhile that Nema is unemployed, she will continue doing what she can with the local government but will not disregard to seek employment in due time because of her concern to help in the studies of her youngest sister. Nema's educational support primarily came from Victor and some assistance from her older siblings, especially Maria. Nema's honoraria from the local government helped a great deal with her own education. Ruel, the fourth, finished a six-month auto mechanic course. His short training was made possible by a government program through the National Manpower Youth Council (NMYC) offered for out of school youths. He is in Manila now working as a helper in one of the glass factories. Gemma, the fifth child, just completed secondary school and temporarily left for Manila. She is staying with one of her uncles (Victor's brother).

Apparently, the relationships created through descent of this household are well-established, which allows them to draw upon support of various nature. The means required for Victor's children's education, for instance, are provided by two of his brothers. When the household faced the Mt. Pinatubo crisis, coping was easy because of support obtained from kin. Occasional support in kind is also provided by two of his brothers (C and G). Victor's youngest sister Olympia, who recently got married, provided support when he had to start farming after the disaster. While Olympia was still single and working, she stayed in the household of her brother (C). She still does even after her marriage. According to Victor, the more kinship relationships one has, the better, because of more sources and alternatives for support.

An analysis of the relationship that exists between Vic-

tor and his siblings shows that the support he received may be described as a form of reciprocity with strong overtones of moral obligation. This is expressed in the concept of utang na loob (sense of indebtedness), a very strong Filipino value whereby one is expected to bestow the same or at least equal support to someone who helped at one point. Victor cannot be ignored by his siblings when availing or accessing their aid because of the good reputation he has with them. This reputation was shaped when Victor willingly sacrificed his own education in favour of his younger siblings. "Reputations are the means by which the moral identity of each individual gets built up, consolidated and modified over time, and gets carried from one situation to another" (Finch and Mason 1993:149). It is not surprising that Victor gets the attention of almost all his kin most especially his parents. Victor has a positive reputation shared by his kin group, which defined more or less his as well as his siblings' behaviour. Victor did not hesitate to request for their assistance because he is aware of himself as 'all giving and never hesitated to help others most especially his kin group.' His kin group particularly his brothers and sisters readily responded to Victor's requests because they know that

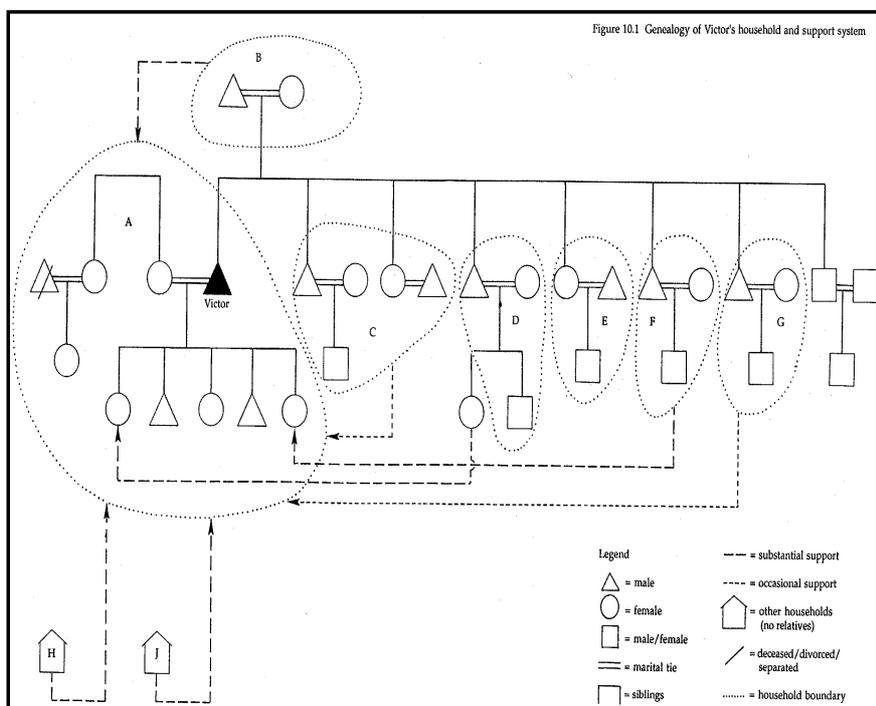
Victor deserves such favour. In short, reputation includes the elements of a shared image, and such image is stable over time, and this shared image matters because it affects how people behave towards each other. The same line of thinking explains the willingness of Victor's brothers and sisters to support their nieces and nephews. Their perseverance to finish school despite poverty and being away from their own family made a positive reputation to Victor's brothers and sisters. There are other considerations worth looking at in this kind of relationship; the vicious cycle of support and indebtedness and the degree to which household members participate in decision-making about these matters. We will look at these matters in the following parts of the

case.

One recurring question in this respect is: 'Does it automatically work that way with all relatives?' The type of relationship established remains a central issue. Therefore, it is necessary, as Harris (1990) suggested, identifying clearly the actual and types of relationships that exist among kin. As explained by Foster (1984), an aid relation needs to be strong for one to be able to request for assistance. Identifying the type and nature of relationships can not be done by survey interviews. Thus, this case is important to enable an in-depth analysis of social relationships.

**Case continued**

The reactions of Victor's children towards the arrangements on the financial support given by relatives are important. It appeared that, given the choice, the children, especially Maria, did not like to move away from home. She said about her experience of staying with her uncle's family: "It was different and difficult because you can not be yourself." The local term here is *maki bagay*, meaning something like you have to live according to their norms. She could not even leave during the semestral school breaks as she had to help her



and, besides, she lacked the money to spend. Estela, Victor's wife, did not like the arrangement of her daughter staying in her uncle's household, emphasising that she is a female. While it may not have been explicitly put that way, to get the financial support for her education, she had to stay with her uncle's household. And staying apparently implied a corresponding responsibility for the household chores, which at times could be more than anticipated. In spite of Maria's implicit objection as well as her mother's, the decision of the father prevailed.

The traditional view that the household economy is patriarchal in nature (Hartman 1981) characterises this case and holds true in almost all my cases with regards to matters of

household members' welfare. It is not surprising then that Victor's father played a significant role in influencing his children who are well-established to accord assistance in any way they can to Victor and his children. I was told that one word from Victor's father is enough for anyone of his children to take action.

#### Case continued

As gleaned from Figure 2, household B (Victor's parents) has a substantial influence on all his children. The attainment of college degrees by his children is all that matters to Victor's father. The same was true for Victor. Maria's obtaining a college degree was the crowning glory after their difficult times. Maria felt the same way and her graduation also meant a big relief because she is now free to decide for herself. Upon completion, she left Mindoro and tried to get a job in her hometown. Now she extends financial help at home. "It might not be much", she said but she understood the plight of the other members of her family and even her aunt plus daughter who stayed with them. A strong feeling of indebtedness of Maria to her uncle is revealed in her statement: "I owe to my uncle my whole life for being able to finish my degree." This connotes that someday, she might be asked for favours, which she has to fulfil because this seems to be how their kinship system works. The assistance has become more of an obligation than voluntary action.

The integration of the household of, Estela's sister (a widow) and her daughter with Victor's household is illustrative of another aspect of household dynamics in relation to support. In separate interviews, Victor disclosed that Agueda and her daughter Sandra are treated as part of the household. Agueda expressed the same feeling. When Agueda's husband died, she was offered by her sister Estela and Victor to stay with them. For Agueda, this was not too difficult to accept because she had her own source of livelihood: a small retail store. Sandra, who is in the grade school at that time was old enough to manage herself and to take part in most domestic chores. At times, the latter can be a cause of friction among household members. In spite of the claim of a well-integrated relationship, some degree of social isolation exists, like being excluded from decision-making. Agueda is hardly solicited for her opinion in matters pertaining to the welfare of Victor's children. At times, opinion may be voiced, yet Victor has the final say. A possible explanation might be the strong patriarchal conception discussed above. Insofar as support is concerned, Victor's children consider the presence of their aunt and daughter in the household as a big advantage. She provides an array of support ranging from farm and domestic chores, words of advice, and financial contribution to some of their school needs.

Victor's younger girl has a different view on leaving temporarily. Gemma, for instance, decided for herself to leave for Manila, to stay with her aunt and look for a summer job. However, this was not easy, so she ended up being a domestic

help in her aunt's household in lieu of some cash. Even Ruel would also like to go. The mere mention of Manila and other big cities sounded very enticing. Both claimed that they would not like to be educated or stay in the province forever unless they are better-off economically. When their parents were asked to comment on this matter, both said that children nowadays have minds of their own. In some ways, the perception of Victor's disciplinary measures towards his children change largely because of the prevailing socio-economic situation in the community and success stories not only of his brothers and sisters but with most of those who left the community. As regards the sons, it seems that decisions can be in their own hands. According to Eric, there is not much opportunity for employment in the village so what is the point of staying especially now that the community is devastated by lahar. The land is almost barren especially during the dry season except for few patches cultivated by those who can afford mechanised irrigation. Men and women engage in petty gambling, and most youths are out of school. "Leave, earn and save some cash and maybe come back to start a small enterprise or buy prime farm lots and settle down, makes sense", he claimed. The idea, however, of staying with relatives is not favoured because you can not be yourself. "Each time, you are always reminded by them that if it were not for them (relatives), you are not what you are today and this simply irks me. As if I owe my entire life to these relatives", said one of Victor's sons.

Two of Victor's co-farmers (H and J) have been important for allowing him to earn more income. Victor farms 0.5 hectare from each of them on the basis of flexible arrangement. Unlike other share-croppers where a very rigid agreement prevails, Victor's decisions (i.e. where and how much seeds to buy) do not require the approval of the two landowners. Even the division of produce is left to Victor. For the previous years, his production had been very little and the landowners did not demand any share from it. The relationship that exists between these landowners is certainly build upon trust through years of loyalty and honesty with each other. Given this nature of the relationship, it is legitimate to solicit support. However, this is often not done as long as the relatives are still willing to help. All the more, the support may not be of the same nature compared to what Victor can demand from his relatives.

From the above story it can be concluded that the degree and nature of support are defined by whatever inputs invested in the relationship. A network of relationships exists, but this does not necessarily mean one can always have access to it, even in the most difficult times. To some extent, the commodification of the support system as a result of the nature of social relationship involved, emerges. In decision-making, social relations are kept in mind. Moreover, this case shows the traditional world-view of women's minor participation in the process. On the other hand, it brings out the changing perspective of women's capability to define

their own interests. This suggests therefore a cautious understanding that households are dynamic; with members' social relations metamorphosing as well as their objectives for creating these relations.

## Conclusion

### Coping strategies

The most distinct feature of the way households cope is the mobilisation of their resources and the alteration of their strategies. One is the modification of their cropping calendar. The most conspicuous change in their rice farming is the adoption of direct seeding instead of transplanting. Any delay or postponement in the cultivation cycle is tantamount to failure. Of the 11 major rice farm operations, weeding is the only activity not affected by the disaster.

Another strategy is the diversification of farm activities. Among those who were not able to farm rice, some tried the cultivation of other crops. The farmers tried the cultivation of sweetpotato but this failed, not because of agricultural-based problems but due to marketing problems. This example makes clear the need to examine the entire food production-utilisation chain and see change as a long process, covering pre-, main- and post-production phases (Campilan 1998:4). In this case, the government, specifically the Department of Agriculture and other active research and development institutions within the area such as the Tarlac State College of Agriculture, may be able to spearhead the provision of support for farming diversification.

This proves the need for developing a kind of intervention that is aimed at 'entitlement protection.' As disasters result in entitlement destruction, there must be deliberate ways to respond to risks posed by the situation, especially in the case of a continuing type of a disaster. Ironically, a great deal of logistical input, especially money, is expended on projects like dikes which, according to some experts, can pose more danger. For this reason, there must be realism and honesty in confronting the situation, especially on the part of the government.

The idea of adaptive strategies as a form of coping (Davies 1993) is articulated by the households in this study. While farmers are in the process of identifying their best bets for meeting the changed situation, the ways in which they respond may be referred to as mere coping mechanisms. With such adverse environment, which is fraught with effects beyond their knowledge system, farmers do what I would call automatic processing of events. Through time, these mechanisms are honed making them adaptive to their new or changing situation. This explains why households engage in a mixture of activities which, in effect, is a combination of coping and experimentation. Aware of the vulnerability brought about by the continuing disaster, households needed to deal with the variability of the problem situation. For instance, an adjustment made to their rice-farming system, such as direct seeding replacing transplanting to

sustain their livelihood, is a form of an adaptive strategy. The element of time is very important in this case. Moreover, these strategies to attain a secure livelihood do not always represent clear cut, mutually exclusive alternatives. According to Davies (1993:62), "genuine coping strategies must therefore be distinguished from insurance strategies (undertaken to minimise the risk of production failure) and recovery strategies (designed to facilitate bounce-back)."

The alteration of the natural resource base which led households to cope with this drastic change not only affects livelihood activities; social structure was affected as well because social networks were tapped as a means of dealing with the crisis situation. In effect, the manipulation of social relations and household membership has become a significant form of coping. Negotiations over work and other domestic responsibilities, and migration of household members were some of their available coping strategies. Young adults were forced to migrate. However, migration has several negative implications, like leaving young children under the care of relatives, depletion of household resources, and leaving elderly people on their own. Migration, though important as a means of coping, reduces strategic benefits of proximity. There were cases in this study to demonstrate that migration added to the resource base of the household of origin of the migrant, but also cases where distance led to loss of support.

Another coping strategy can be seen on the loose definition of household membership by the affected people. This provides a flexibility of arrangement. Support relationships are developed and sustained both within households and beyond household boundaries. Kinship relationship function as an important vehicle for obtaining and providing support across household boundaries, but proximity is an important vehicle for obtaining and providing support condition as well; neighbours can also be part of the support system of a household.

### The disaster and the time perspective

There are several typologies of disasters. In this case, we are dealing with a natural disaster of a peculiar kind. It is not a disaster that strikes once, after which rehabilitation can start, but one that is continuing. We have characterised the Mt. Pinatubo disaster as a "slowly developing" type of a disaster. The time perspective has played an important role in this study. There is not only the comparison between the situation before and after the disaster, but also the perspective of the future; this perspective is blurred by the unpredictability of the situation. This study shows the way people cope with this situation and the way they anticipate the future depend on several factors:

- The damage suffered as a consequence of the disaster which is partly determined by the location of the farm;
- The degree of vulnerability, i.e. what is left of the people's resources and assets, and what new resources can be

generated;

- The social support system the people are able to set up and sustain, building on traditional values; and
- Age and gender.

There are but continuities and discontinuities in the way people build up their livelihoods in the post-disaster era. They rely on their farming experience and existing skills and, at the same time, look for opportunities and new ways of generating income and providing food for their households. The cases show that young people tend to leave and do not believe in the future of the damaged area, while many older adults still believe in the possibility of rehabilitating their farms. While men in particular focus on the latter, women explore new options and try to use whatever they can to ameliorate the situation. They feel the responsibility for their household duties, can be too heavy a burden. The elderly people, in spite of their vulnerability, try to provide for themselves as long as they can and try to prevent just being on the receiving end of the support chain. In a nutshell, the study shows the resilience of people in the face of the disaster.

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