This article explores the response of traditional societies in the face of natural hazards through the lens of the concept of resilience. Resilient societies are those able to overcome the damages brought by the occurrence of natural hazards, either through maintaining their pre-disaster social fabric, or through accepting marginal or larger change in order to survive. Citing the case of the 1991 Mt. Pinatubo eruption in the Philippines and its impact on the Aeta communities who have been living on the slopes of the volcano for centuries, it suggests that the capacity of resilience of traditional societies and the concurrent degree of cultural change rely on four factors, namely: the nature of the hazard, the pre-disaster socio-cultural context and capacity of resilience of the community, the geographical setting, and the rehabilitation policy set up by the authorities. These factors significantly vary in time and space, from one disaster to another. It is important to perceive their local variations to better anticipate the capability of traditional societies to overcome the damage brought by the occurrence of natural hazards and therefore predict eventual cultural change.
Introduction

Natural hazards are those natural phenomena that pose a threat to people, structures and economic assets. Natural hazards include earthquakes, volcanic eruptions, landslides, tsunamis, storms and cyclones, droughts, floods and storm surges among others. The response capacity of people in the face of natural hazards is defined by the concepts of vulnerability and resilience.

Early definitions of vulnerability mostly referred to the quantitative degree of potential loss in the event of the occurrence of a natural hazard (e.g., United Nations Department of Humanitarian Affairs 1992). The concept eventually evolved to encompass the wider social context in what is commonly called ‘social vulnerability’. Social vulnerability may be defined as the propensity of a society to suffer from damage in the event of the occurrence of a given hazard (D’Ercole 1994: 87-88). Vulnerability thus stresses the condition of a society which makes it possible for a hazard to become a disaster (Cannon 1994: 13). It basically depends on a large array of factors which interact in systemic (D’Ercole 1994) and causal directions (Watts and Bohle 1993; Wisner et al. 2004). These factors are demographic, social, cultural, economic and political in nature. It is further important to recognize that vulnerability reflects the daily conditions of society (Maskrey 1989; Wisner 1993). Disasters are therefore viewed as the extension of everyday hardships wherein the victims are marginalized in three ways: geographically because they live in marginal hazard-prone areas, socially because they are poor, and politically because their voice is disregarded (Wisner et al. 2004). Vulnerability further varies according to the nature of the hazard (Wisner 2004).

People’s capability of response in the face of natural hazards also relies on their capacity of resilience. This concept spread widely in the disaster literature in the 1990s and is still the object of a conceptual debate around its sense and application among social scientists (e.g., Klein et al. 2003). Pelling (2003: 48) views resilience as a component of vulnerability or the ability of an actor to cope with or adapt to hazard stress. In this regard, it basically includes the planned preparation and the spontaneous or premeditated adjustments undertaken in the face of natural hazards. Other scholars (Folke et al. 2002: 13) define resilience
as the “flip” (positive) side of vulnerability or the capacity to resist from damage and change in the event of the occurrence of a natural hazard. A third approach breaks away from the previous two to define resilience as the capacity of a system to absorb and recover from the occurrence of a hazardous event (Timmermann 1981: 21). Dovers and Handmer (1992: 270) further distinguish three levels of societal resilience and differentiate 1/ resilience through resistance to change; 2/ resilience through incremental change at the margins and 3/ resilience through openness and adaptability. The United Nations International Strategy for Disaster Reduction (United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction 2004) recently took over this differentiation in its definition of resilience as “the capacity of a system, community or society to resist or change in order that it may obtain an acceptable level of functioning and structure”. Following the same approach, Walker et al. (2004) differentiate four crucial aspects of resilience. The first aspect is the latitude or the maximum amount by which a system can be changed before losing its ability to recover. The next dimension is the resistance or the ease or difficulty of changing the system. The precariousness or how close the current state of the system is to a limit or “threshold” is also of importance. The final aspect is the panarchy or the cross-scale interactions and influences from states and dynamics at scales above and below.

Resilience differs from vulnerability by addressing the capability and the ways people deal with crises and disaster. On the other hand, vulnerability only encompasses the susceptibility of individuals to suffer from damage and thus to transform the occurrence of a natural hazard into a disaster. Both concepts may rely on the same factors (demographic, social, cultural, political, etc.) which may however vary on different scales. Resilient societies are able to overcome the damages brought by the occurrence of natural hazards, either through maintaining their pre-disaster social fabric, or through accepting marginal or larger change in order to survive. The concept of resilience is thus intimately linked to the concept of change. Post-disaster changes within the impacted society may be technological, economic, behavioral, social or cultural in nature. The latitude and resistance to change greatly depend on the type of society affected by the disaster. The following paragraphs explore the case of traditional societies.
Traditional Societies in the Face of Natural Hazards

Traditional societies, sometimes called folk, tribal, or primitive societies, are those groups characterized by their pre-industrial self-sufficient ways of either hunting/gathering or extensive agriculture type. These societies are further identified by the intimate relationship they nurture with their immediate natural environment and the slow level of cultural change they usually experience (Kottak 2003).

Many researchers have addressed the capacity of industrial societies to overcome the havoc wrought by the occurrence of natural hazards with more or less change in the social fabric (see Drabek 1986; Bates and Peacock 1986; Nigg and Tierney 1993 and Passerini 2000 for syntheses). Fewer scholars discussed the capability of traditional societies to cope with natural hazards. A review of the scarce literature further denotes a lack of consensus among social scientists. Three different theoretical frameworks may be distinguished from the available corpus of research materials.

The first and dominant framework regards traditional environment-dependent societies as fragile and unable to cope on their own with large-scale fast-onset natural hazards. Destruction of the environment due to extreme natural phenomena deprives these societies of their main resources and pushes them to rely on external resources in order to recover. Natural hazards are therefore viewed as a powerful vector of socio-cultural change (Burton 1972; Burton, Kates, and White 1993; Dynes 1976; Kates 1971; Kates et al. 1973; Mileti, Drabek, and Haas 1975). Such an argument largely emanates from the “top-down” technocratic and western logic characterizing the dominant paradigm in the hazard and disaster literature. The proponents of this approach find justification for promoting a transfer of experience, knowledge and technology from industrialized countries to developing nations in the poor capacity of traditional societies to respond to natural hazards. This view takes advantage of the results of several studies conducted following the 1943 to 1952 eruption of Paricutín volcano in Mexico (Nolan 1979; Nolan and Nolan 1993), the 1951 eruption of Mt. Lamington in Papua New Guinea (Belshaw 1951; Keesing 1952; Ingleby 1966; Schwimmer 1977), the 1961-1962 eruption of the volcano of Tristan de Cunha,
in the South Atlantic (Blair 1964; Munch 1964, 1970; Lewis, Roberts, and Edwards 1972), the 1968 eruption of the volcano of Nila in Maluku (Pannell 1999) and the 1994 eruption of Mt. Rabaul in Papua New Guinea (To Waninara 2000).

On the other hand, the second theoretical framework sees traditional societies as capable of recovering on their own from the impact of natural phenomena. The environmental modifications resulting from the occurrence of natural hazards forced these societies to make slight adjustments without modifying the fundamentals of their social organization (Sjoberg 1962; Torry 1978a, 1979). This framework emerged from the growing anthropological literature on hazards and disasters during the 1960s and 1970s (see Torry 1979 and Oliver-Smith 1996 for syntheses). The arguments of this approach have greatly contributed to challenging the aforementioned dominant and technocratic paradigm on disaster management by pointing out the perverse effects of emergency measures and other technological adjustments set up by western governments. For the proponents of this approach, if there is temporarily an incapacity of traditional societies to overcome the consequences of natural hazards occurrence, it is due to the foreign relief aid that disrupts indigenous resilience systems rather than to the intrinsic incapability of affected societies (Waddell 1975, 1983; Torry 1978b, Cijffers 1987, Ali 1992). The radical approach is fed by the work of Spillius (1957), eventually revisited by Torry (1978a) and Boehm (1996), on the small island of Tikopia (Solomon islands), which was devastated by two typhoons and a subsequent famine between 1952 and 1953; the documentation of Schneider (1957) on the island of Yap regularly swept by tropical storms; the monumental study of Oliver-Smith (1977, 1979a, b, c, 1992) about the Quechua Indians of Yungay following the total destruction of their town by a debris avalanche triggered by the 1970 Peruvian earthquake; the researches of Lewis (1981, 1999), Hurell (1984) and Rogers (1981) among the people of Tonga in the face of typhoons and following the restless activity of Niuafo’ou volcano in 1946; the comparative study of Holland and VanArsdale (1986) in Indonesia and Peru among communities affected by flash floods; and the investigation of Zaman (e.g. 1989, 1994, 1999; Haque and Zaman, 1994) among Bangladeshi
communities recurrently affected by floods, and Cijffers (1987) in
the Cook Islands regularly struck by hurricanes.

Finally, the third approach regarding the responses of traditional
societies in the face of natural hazards defends an intermediate
viewpoint. It argues that the occurrence of natural hazards rather
acts as a catalyst for ongoing cultural changes among traditional
societies increasingly pressured by the industrial world (Blong 1984;
Bates and Peacock, 1986; Oliver-Smith 1996). This phenomenon
has been observed among several Tarascan Indian communities
following the eruption of Paricutín volcano in Mexico between 1943
and 1952 (Rees 1970; Nolan 1979; Nolan and Nolan 1993), among
Guatemalan Mayas after the 1976 earthquake (Bates 1982; Cuny
1983; Hoover and Bates 1985), and among Yemeni highlanders
following the 1982 earthquake (Leslie 1987).

The foregoing frameworks are all driven primarily by the concept of
vulnerability or the susceptibility of traditional societies to experience
disaster following the occurrence of natural hazards. They do not
address cultural change as a way of coping with the havoc wrought
by the disaster. In this paper, we aim to tackle the capacity of response
of traditional societies in the face of natural hazard through the lens of
the concept of resilience. Our discussion will be based on the case of
the 1991 eruption of Mt. Pinatubo volcano in the Philippines and its
impact on the Aeta communities. To assess the Aetas’ resilience will
first require evaluating if the eruption brought about some changes in
the folk culture. A critical review of the factors that affected resilience
in the Mt. Pinatubo case will eventually lead to the advancing of an
alternative approach to the response of traditional societies in the face
of the occurrence of natural hazards.

**The 1991 Mt. Pinatubo Eruption and the Aetas**

The Aetas are one of the many ethnic minorities occupying
the mountains of the Philippine islands. They are found on the
flanks of Mt. Pinatubo which towers at the apex of the provinces
of Pampanga, Tarlac and Zambales on the main island of Luzon
(Figure 1). Considered by some as the direct descendants of the
populations that first inhabited the archipelago during the Pleistocene
Period (Headland and Reid 1989), the Aetas’ small height, very dark complexion, and curly hair easily distinguish them from the majority of Filipinos who are taller and are characterized by brown skin and straight hair. The approximately 50,000 Aetas counted on the slopes of Mt. Pinatubo in 1999 depend for their livelihood on cultivating root crops and other vegetables, hunting and fishing, and also on gathering plants and wild fruits that abound in their surroundings (Barrato and Benaning 1978; Garvan 1964; Reed 1904; Shimizu 1989). The following paragraphs particularly focus on the communities located within the 200km²-Pasig and Sacobia River Basins on the eastern flank of Mt. Pinatubo, in the immediate vicinity of the former Clark American facilities (Clark Air Base – CAB) (Figure 2).

Figure 1: Areas Affected by the 1991 Eruption of Mt Pinatubo and Location of the Study Area (After Data from PHIVOLCS and Mount Pinatubo Commission).
The Aetas were the first to feel the precursory signs of the volcano’s restlessness during the first days of April 1991; they responded by immediately warning the Philippine Institute of Volcanology and Seismology (PHIVOLCS) (Lubos na Alyansa ng mga Katutubong Ayta ng Sambales 1991; Tayag et al. 1996). This abnormal volcanic activity intensified until June 1991. The eruptive paroxysm materialized on June 12 and June 15. On these particular dates, the volcano spewed some 5 to 7 km$^3$ of pyroclastic materials that buried many Aeta villages located on the slopes of Mt. Pinatubo. Since 15 June 1991, destructive lahars (volcanic debris flows), triggered by typhoon-associated downpours, tropical monsoon rains and lake break outs, have flowed down the flanks and foothills of the volcano affecting anew a large number of these Aeta settlements (Pinatubo Volcano Observatory 1991; Umbal 1997; Wolfe 1992).
In April 1991, with the initial signs of restlessness by the volcano, almost all of the Aeta communities were already evacuated (Banzon-Bautista and Tadem 1993). However, an unknown number of Aetas who refused to leave their homes perished during the eruption. According to oral accounts, a score of Aetas found shelter in caves that had eventually been buried by pyroclastic flows (Shimizu 2001). At first, the Aetas who chose to evacuate were relocated in some major surrounding towns (Tarlac City, Capas, Bamban, Mabalacat, Angeles City, Porac, etc.). Eventually, with the paroxysm of the eruption on June 15 that affected even the town inhabitants, the authorities had to once again transfer many Aeta families toward evacuation centers that were much farther (e.g., provinces of Bulacan, Nueva Ecija and Manila) from their villages. Inside overcrowded school buildings, gymnasiums, churches or tent camps, nutrition problems and diseases (pneumonia, measles…) quickly spread and left a heavy death toll among Aeta children (Lapitan 1992; Magpantay 1992; Magpantay et al. 1992; Sawada 1992).

Faced with the impossibility of sending the Aetas back to their former villages which had already been buried under meters of volcanic deposits, the Philippine government had to plan a permanent resettlement program. By June 1991, the authorities created the Task Force Mt. Pinatubo, which was replaced in 1992 by the Mount Pinatubo Commission (MPC), an intergovernmental structure under the authority of the President of the Philippines. The task force then had created eleven upland resettlement centers intended primarily for the Aetas (Task Force Mount Pinatubo 1991). The Aetas from the Pasig and Sacobia river basins were mainly distributed on four sites (Villa Maria, Kalangitan, Dueg, and Maynang). Dueg, the most remote, is about 100km away from the native villages. In each of the centers, a lot measuring 150m² together with traditional housing materials (bamboo, palm leaves…) was allocated for each family. In 1995, more solid building materials (‘GI sheets’, lumber…) were provided (Tariman 1999). Some Aetas of the Clark Air Base vicinity were resettled in a lowland relocation site, Madapdap (municipality of Mabalacat), with 7,000 lowland families from the neighboring ‘Kapampangan’ ethno-linguistic group who were affected by the lahars from the Pasig-Potrero and Sacobia Rivers. Each family was
awarded a 94m² lot with a concrete house equipped with sanitary installations (Tariman 1999). There were also two resettlement centers (Doña Josefa and Pinaltakan) implemented by NGOs at Palayan City (province of Nueva Ecija) where the Pinatubo Aetas rubbed shoulders with other upland ethno-linguistic groups (Dumagats and Bagos) from the Sierra Madre mountain range. Other resettlement attempts in more remote places such as the island of Palawan failed because of unsuitable conditions that pushed the Aetas back to Central Luzon (Gaillard and Leone 2000).

**Methodology**

The following discussion relies on extensive field work conducted in the basin of the Pasig and Sacobia rivers between July 1999 and June 2000 and completed by additional field explorations between June and September 2001. The lack of reliable census data for the study area compelled the researcher to abandon the sampling survey and instead opt for open interviews with selected key informants. Sixteen villages were visited. Only three occupied settlements were avoided: one because of security concerns and the two others because of their inaccessibility. The four neighboring resettlement sites (Villa Maria, Kalangitan, Maynang and Madapdap) were also part of the study. Key informants were not limited to community leaders and included other members (both men and women) of the communities visited. Interviews were conducted in the Kapampangan language spoken by almost all the Aetas. Local guides sometimes served as interpreters in the local Aeta Mag-Aantsi dialect. Questions sought to assess the pre-eruption lifestyle, the response of the victims to the disaster, notably their journey up to their present settlement, and the present way of life. Community leaders further provided approximate population figures for their village. All the respondents were cooperative and were willing to share their experience.

In addition to the survey among the Aeta settlements, interviews were conducted with stakeholders of the Mt. Pinatubo disaster management. Those include the Mt. Pinatubo Commission (MPC), other government agencies (National Commission for Indigenous People, Department of Social Welfare and Development, Department
of Environment and Natural Resources, Department of Public Works and Highways, Department of Health, Department of Agriculture, Department of Education), local government units (LGUs) and non-government organizations (NGOs). These interviews were aimed at assessing the role of the authorities in the shaping of the observations made on the field. A large amount of useful primary written documents was also collected from these visits to institutions.

Field work was completed by the collection of secondary written documents such as journal publications, conference proceedings, and relevant press clippings from regional and national newspapers. Both primary and secondary written materials provided information mostly on the disaster management policy. Very few sources discussed the response of the populations.

From Uplands to Foothills: The Inevitable Redistribution of the Population

In 1990, about 1,200 to 1,300 Aeta families (approximately 7,000 individuals) were occupying the Pasig and Sacobia basins on both the upper slopes and the lower foothills of Mt. Pinatubo (National Statistics Office 1990; Tadem 1993). After the awakening of the volcano in 1991, both the unsuitability of the upper flanks of the mountain and the resettlement policy implemented by the Philippine government led to a general redistribution of the Aeta population of the Pasig and Sacobia river basins. Figure 2 shows that the present upper limit of Aeta settlements matches the lower limit of the 1991 pyroclastic deposits and the 20cm-isopach of ash fall. All the Aeta communities located on the upper flanks of Mt. Pinatubo prior to the eruption had to abandon their small villages which had been buried under these thick and hot pyroclastic and ashfall deposits preventing the immediate reoccupation of the settlements. Most of these Aetas have been relocated in the government resettlement sites, either on the lower slopes of the volcano or on the foothills (Figures 1 and 2). Today, these resettlement sites are the biggest Aeta settlements. Kalangitan, the biggest relocation center is inhabited by 385 families. These resettlement sites host Aeta communities from both the upper and lower flanks of Mt. Pinatubo. The lack of land suitable for cultivation
and the inadequate housing in resettlement sites has however led many Aeta families native to the lower slopes of Mt. Pinatubo to return to their old villages and till their abandoned fields (Gaillard and Leone 2000; Macatol 1998, 2000; Macatol and Reser 1999-2000; Seitz 1998, 2000; Shimizu 1992). With the exception of Villa Maria, the population of other resettlement centers, like Maynang and Palayan City, has greatly decreased during the last few years. Other Aetas native to the upper slopes of Mt. Pinatubo and who chose to leave the resettlement sites have tried to rebuild their villages on more suitable sites (e.g., Calapi, San Martin, Burug) or near the relocation centers (e.g., Inararo). Worth noting is that other Aetas maintain residences in resettlement sites and at the same time tend their fields near their former villages. This practice is very prevalent in Villa Maria. It is now also being practiced in Maynang, prompting the service of daily or weekly shuttles to and from their original villages. Finally, ten years after the eruption, several families still live in evacuation centers that were intended for temporary purposes. At Planas, for example, tents have been replaced by bamboo huts and other sturdier structures.

All the Aeta settlements are nowadays concentrated on the lower flanks of Mt. Pinatubo in the immediate proximity of lowland villages and towns occupied by Kapampangan people, the dominant ethnic group of the southwestern part of the Central Plain of Luzon (Figure 2). Henceforth, there are no more Aeta communities left isolated on the upper flanks of Mt. Pinatubo. All have established regular contacts with lowlanders.

**Increasing Interactions with Lowlanders**

The closer geographic proximity between Aeta people and their lowland neighbors, induced by the downhill redistribution of the population following the 1991 Mt. Pinatubo eruption, has increased the interactions between the two communities. These interactions are economic and social, as well as political.

Until Mt. Pinatubo erupted in 1991, regular economic interactions between Aetas and lowlanders were limited to the communities located on the lower slopes of the volcano. Many Aetas of the villages situated near the former Clark Air Base were both agriculturists and employed...
by the US Air Force as watchmen, jungle survival instructors, and
janitors while others earned their living by scavenging the garbage of
the US servicemen in the area or by gathering scrap materials left by the
Americans during their training (Cunanl 1982-83; Gaabucayan 1978;
Simbulan 1983). The Aetas living in villages farther away from Clark
Air Base used to sell or swap their products for rice, coffee, or sugar in
the public markets of the surrounding towns at least once a week. Aeta
communities living on the highest slopes of Mt. Pinatubo lived almost
exclusively on tilling different rootcrops, hunting, fishing and gathering
tropical fruits without regular contact with lowlanders and other
ethno-linguistic groups. Noteworthy is that despite these significant
differences in their way of life, upland and lowland communities can
still be regarded as a single ethnic group on the basis of their common
physical features, language, traditional beliefs and inter-individual
relationship based on a great sense of ‘communalness’ (Barrato and
Benaning 1978; Brosius 1983; Fox 1952; Shimizu 1989). The downhill
redistribution of the population following the 1991 eruption has deeply
modified the economic landscape by making all the Aetas dependent
on the lowland market to earn their living. Interviews conducted in the
Pasig and Sacobia river basins in 1999 and 2000 show that, at present,
there are no more isolated communities and all the Aetas have thus
learnt to sell their produce directly in the public markets of surrounding
towns without being deceived by Kapampangans who used to act as
middlemen. Besides the traditional public markets, the former Clark Air
Base converted into a vast industrial, tourist and commercial complex,
Clark Special Economic Zone (CSEZ), has become another fruitful
commercial outlet for the Aetas. The Aetas are now all selling fruits
(bananas, papayas...), vegetables (banana tree hearts...), rootcrops
(taro, cassava...) and souvenir items (flutes, bows, blowpipes...) to
local and foreign tourists visiting the Duty-Free shops of Clark Special
Economic Zone. These economic interactions between Aetas and their
surrounding communities, especially with Kapampangans, now take
place on an almost daily basis and hence concern all the Aeta people.

Social interactions between Aetas and their lowland neighbors
began as soon as they rubbed shoulders together inside the overcrowded
evacuation centers that hosted the victims of the eruption of Mt.
Pinatubo in June 1991. Most of the Aetas interviewed who never
previously lived beyond the domains of their respective communities on the upper flanks of the volcano discovered for the first time the socio-cultural way of life of the lowlands. Aetas also admitted that they experienced cohabitation difficulties and discrimination from non-Aetas who had to scamper for the much needed attention of the authorities. This situation inside the evacuation centers lasted only for a few months. Nonetheless social contacts between Aetas and lowland neighbors continued. The redistribution of the population downhill and the subsequent closer geographic proximity have resulted in permanent social interactions. For example, the closer distance to school facilities and the support of government and non-government organizations have led many young Aetas to now share school benches with lowland children. Moreover, these interactions are daily and long-lasting, and concern the young generation that is supposed to be the most permeable to cultural change. Data from the National Commission on Indigenous Peoples (NCIP) show that the literacy rate among the Aeta people has thus risen from 4 per cent of the population in 1990 to 30 per cent in 2000. Presently, most of the youth study until they reach the age of 12 (elementary school). Moreover, literacy programs for adults are being provided by the National Commission on Indigenous Peoples and other NGOs, especially within the resettlement centers.

Finally, there are increasing political interactions between Aetas and surrounding lowland communities. Most of these contacts have been conveyed by the increasing density of population on the lower slopes of the volcano as a result of the coming-in of former uphill communities. The competition for land has become intense, involving long-time downhill Aeta communities, former uphill Aetas, lowland Kapampangans whose high population growth rate pushes them toward the lower slopes of the mountain, and the developers of Clark Special Economic Zone who try to expand the area intended for economic development. The numerous territorial conflicts which have emerged following the eruption of Mt. Pinatubo are symptomatic of the increasing pressure put on the land (Gaillard 2002). These conflicts have pressed the Aetas to engage in delicate political negotiations with their lowland neighbors as well as with government administrations. The Aetas coming from the upper slopes
of the volcano who were interviewed as part of this study admitted
that they were unused to such transactions. They further claimed
that numerous Kapampangans took advantage of the ignorance of
some Aetas on the real land-valuations, managing to buy lands from
the latter at very low prices and use unjust leases.

**Non-Aeta Socio-Cultural Inputs in the Aeta Culture (see Table 1)**

The redistribution of the population on the lower slopes of the
mountain and the following increasing economical, social and political
interactions between Aetas and non-Aetas had some socio-cultural
implications. These interactions progressively compelled the Aetas to
adopt cultural elements from their lowland neighbors. Differentiation
has yet to be made between the communities coming from the upper
flanks of the volcano and those which have been on the foothills of the
mountain for a long time. Among the latter, acculturation was already
ongoing long before the eruption. The communities which were
located around the former Clark Air Base, in Angeles or Mabalacat,
have been deeply influenced by their daily contacts with the Americans
(Dale 1985). Those located farther away from the base, in Porac or
Bamban, were less acculturated though not spared by their weekly
contact with their lowland neighbors (Mendoza 1982). Therefore, the
input of non-Aeta cultural elements due indirectly to the 1991 Mt.
Pinatubo eruption is more apparent among the communities formerly
settled on the upper slopes of the volcano.

The first cultural change concerns the settlement pattern. Before the
eruption, Rice (1973: 256) and Brosius (1983: 134) described clusters
of two-three to five-fifteen houses as typical settlements of the upper
flanks of Mt. Pinatubo. On the lower slopes, settlements were larger,
especially for the villages in the vicinity of Clark Air Base (Sapang
Bato, Marcos Village). The redistribution of the population downhill
subsequent to the eruption and the concurrent increasing density of
population have led to a generalization of large settlements. This is
evident in the resettlement sites but also in most of the villages located
in the basins of the Pasig and Sacobia rivers visited during field work
conducted as part of this study. Today, most of the Aetas coming from
uphill live in settlements which number several tens of houses.
Table 1. Main Non-Aeta Cultural Inputs in the Aeta’s Culture Following the 1991 Eruption of Mt. Pinatubo and the Subsequent Redistribution of the Population.

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Settlement pattern</td>
<td>Uphill communities</td>
<td>Foothill communities</td>
</tr>
<tr>
<td></td>
<td>Small cluster</td>
<td>Varied</td>
</tr>
<tr>
<td>Religious belief</td>
<td><em>Apo Namalyari / Anitos</em></td>
<td><em>Both animist and Christian</em></td>
</tr>
<tr>
<td>Medicine</td>
<td>Plants / Manganito</td>
<td>Plants / Manganito / Chemical drugs</td>
</tr>
<tr>
<td>Social leadership</td>
<td><em>Apo</em></td>
<td><em>Apo</em></td>
</tr>
<tr>
<td>Territory demarcation</td>
<td>No discrete boundaries</td>
<td>No discrete boundaries / Western concept of ownership</td>
</tr>
<tr>
<td>Language / dialect</td>
<td>Mag-Aantsi</td>
<td>Mag-Aantsi / Kapampangan</td>
</tr>
<tr>
<td>Housing material</td>
<td>Indigenous</td>
<td>Indigenous</td>
</tr>
<tr>
<td>Diet</td>
<td>Tubers / Fruits</td>
<td>Tubers / Fruits / Canned and fast foods</td>
</tr>
<tr>
<td>Clothing</td>
<td><em>Lubay</em> / Indigenous dresses</td>
<td>Indigenous dresses / Western labels</td>
</tr>
<tr>
<td>Christmas habits</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
The second element of cultural change is the religious beliefs of the Aetas. Before the 1991 eruption of Mt. Pinatubo, Aetas, especially those who used to live uphill, traditionally believed in a number of supernatural beings called ‘Anito’ (good spirit) or ‘Kamana’ (malicious spirit). The universal creator, or ‘Apo Namalyari’, was supposed to live at the heart of Mt. Pinatubo (Fox 1952; Lubos na Alyansa ng mga Katutubong Ayta ng Sambales 1991; Shimizu 1989). On the lower slopes of the mountain, the number of Aetas getting Christianized by Catholic or Protestant missions was increasing long before the eruption but most of them still kept Apo Namalyari and the Anitos at the core of their beliefs. Due to their redeployment on easily accessible foothills following the eruption, all the Aetas eventually became easy prey to a number of religious organizations and sects that mushroomed in their present villages and used disaster relief as a facade for evangelization. The ‘kindness’ of the missionaries served as a powerful argument to lead a large number of Aetas from the Pasig and Sacobia river basins to become active members of mainstream religions. At present, key informants acknowledge that Apo Namalyari is assimilated to Jesus Christ or the representative of God on earth. In the same way, the Anitos are compared to the Holy Spirit.

Since 1991, there have been modifications in their traditional medicine as well. These have been brought about both by the redistribution of the population as well as the extinction of many plant species following the eruption (Madulid 1992). Indeed, Aetas were recognized for their expertise in the chemical properties of plants (Fox 1952). They were also known for their traditional way of curing sicknesses through ‘manganito’ séances where they used to seek assistance from the spirits (Shimizu 1983, 1989). Only in the vicinity of Clark Air Base did the Aetas benefit from free health care offered by the US Air Force in exchange for the former’s services in improving their GI’s jungle survival skills. New religious beliefs and the depletion of many natural drugs pushed the Aetas to adopt modern medical treatments provided by the government and other civic-oriented groups (Ignacio and Perlas 1994; Alvarez-Castillo 1997) which benefit from the easier access to the Aeta settlements. Moreover, there are now only a few Aetas who still practice manganitos séances which were once intended to cure the most serious sicknesses.
This integration of the two (animist and non-Aeta or lowland) cultures is also very much visible in the novel social references of the Aetas. The village chieftain of the Aetas at present is much different from those of the communities before the eruption, who then had the appellate ‘Apo’ because of his seniority (Jocano 1998). The researcher’s interviews indicate that for a chieftain of the clan to be able to retain a moral influence on the community (especially at Porac), the ‘captain’ or ‘tribal chieftain’, is usually chosen on the strength of his political influence exogenously, rather than because of his age. This exerts a new administrative role. It is indeed viewed as the representative of the State within the village and, thus, is in contact with the different local authorities (mayor, governor, congressman/woman…) and the main institutions. The provincial government of Tarlac has even established a parallel consultative political system for the Aetas. This includes a ‘Tribal Chieftain’ at the level of the village, a ‘Tribal Mayor’ at the municipal level, and a ‘Tribal Governor’ at the provincial level. This hierarchy was largely shaped by concerns about dealing with political matters. Before the eruption, Brosius (1983: 136) furthermore asserted that uphill Aeta communities did not claim discrete and bounded territories. Only near Clark Air Base and the Sacobia river basin, where former First Lady Imelda Marcos implemented an integrated development project, were Aetas used to western land ownership rights (Sacobia Development Authority 1985; Tadem 1993). The demographic pressure induced by the redistribution of the population and the continual encroachment of non-Aetas on their lands pushed all the Aetas to noticeably modify their relation to their territory and to now claim their own territorial units (‘barangays’—the smallest Philippine administrative unit—or ‘ancestral domains’—established as part of the Indigenous Peoples Rights Act of 1997), to be administered exclusively by and for themselves (Gaillard 2002).

The next non-Aeta cultural input in the Aeta culture is the language of the lowlanders. Before 1991, the Aetas of the upper flanks of Mt. Pinatubo interviewed for this study used to communicate exclusively using their native tongue Aeta Mag-Aantsi, an Aeta dialect close to the Sambal language. Usage of the Kapampangan lowland language was limited to the lower slopes of Mt. Pinatubo where regular contacts
occurred between Aetas and Kapampangans. Today it is widespread among all the Aetas of the Pasig and Sacobia river basins. Following their relocation downhill and their subsequent schooling, the young Aetas had to speak the language of the lowlanders to communicate with their classmates. It is thus common nowadays to hear Aeta Mag-Aantsi children speaking Kapampangan when playing in their backyards. The Kapampangan language also spread among the adults. Those interviewed admitted that they use the Kapampangan language due to the increasing political and economic interactions with Kapampangan people who do not speak Aeta Mag-Aantsi.

Observations during field work and interviews with key informants show that the western material culture has now also penetrated communities that would have been most unlikely prior to 1991, owing to their remoteness from the lowland populations. Lowland house materials are now rapidly spreading among the Aeta settlements. The ready-to-use diagonal-oriented ‘sawaling (light wall material made of waived bamboo) Tagalog’ (from the dominant ethno-linguistic group of the Philippines) and other modern construction materials (cement, ‘GI-sheet’)… are gaining ground on the traditional and robust square-oriented ‘sawaling Aeta’. Canned and ‘fast foods’, which former uphill villagers discovered for the first time in the evacuation centers in 1991, are also quickly becoming the favorite delicacies of most of the Aetas in lieu of tubers and fruits. The traditional ‘lubay’ (G-strings) and other native dresses, which uphill Aetas were regularly wearing before 1991, are progressively being replaced by pants with international labels. Drinking (notably gin) has now also become prevalent among all Aetas. Influenced by the new commercial markets, traditional craftworks and utensils (bows and arrows, blowguns, flutes, baskets…) are now being transformed into folkloric items for sale to tourists visiting Clark Special Economic Zone. For the Aetas from the vicinity of the former American military facilities who were used to western clothing and food regularly distributed by the servicemen, changes were much less radical and limited to a larger proportion of western housing material.

Another consequence of the increasing social contacts with lowland neighbors is the Aeta children’s quest for little Christmas cash gifts (Aguinaldo) during the month of December, a widespread
custom among non-Aeta children in the Philippines. For that reason, Aeta children now roam the streets of Porac, Angeles City and San Fernando in the hopes of receiving a small Christmas donation from lowlanders (Sicat 2001).

Other fundamentals of the Aeta social organization have however undergone less change. The most important is the ‘communalness’ of the Aetas recognized long before 1991 and considered as the center of the social and economic life (Barrato and Benaning 1978; Brosius 1983; Fox 1952; Shimizu 1989). Indeed, the Aetas are, among all the other Negritos of the Philippines, the only group to focus towards a core which is the grouping of two to five families. In this regard, it is particularly important to note that this peculiarity has survived the eruption. Interviews with key informants indeed indicate that groups of two to three Aeta households still co-exploit swiddens, share food and journey together to the public markets for economic transactions. Similarly, Aeta families are still nucleated around a husband, his wife and their children as they were before the eruption of Mt. Pinatubo (Brosius 1983; Shimizu 1989). Furthermore, the survey conducted in the Pasig and Sacobia river basins indicate that the Aetas have retained the strong identity attachment to their village mentioned by Shimizu (1989). It is very evident in the gathering of families from the same villages inside the resettlement sites. These clusters are always named in respect to the community of origin.

The 1991 Mt. Pinatubo eruption brought undeniable but differentiated changes in the Aeta society. On the other hand, there are some fundamentals of the Aeta social system which have survived the consequences of the disasters. Is it sufficient to assert that the Aetas have been resilient in the face of the occurrence of a powerful natural hazard?

**Aeta Resilience in the Face of the Mt. Pinatubo Eruption**

Changes in the Aeta society following the 1991 eruption of Mt. Pinatubo have been brought by the increasing interactions with lowland neighbors brought by the spatial redistribution of the population on the foothills of the volcano. Changes have therefore concerned the components of the Aeta social fabric exposed to these interactions. On
the other hand, some of the fundamentals pertaining to relationships within the society, notably the sense of ‘communalness’, have been less affected and have survived the eruption and its consequences. Henceforth, the Aeta social system has not disappeared following the disaster. It has rather adapted to new environmental, social, economic and political environments while maintaining a stable core. This viewpoint is further reinforced by the perseverance of the Aetas to claim their own ethnic identity, as manifested by their massive abandon of the resettlement centers. Thus, if resilient societies are those that are able to overcome the damages brought by the occurrence of natural hazards, either through maintaining their pre-disaster social fabric, or through accepting marginal or larger change in order to survive, then the Mt. Pinabuto Aetas of the Pasig and Sacobia river basins have been resilient. However, a distinction has to be made between pre-1991 uphill and downhill communities. It is quite evident that the eruption of Mt. Pinatubo and the subsequent redistribution of the population brought major and abrupt changes in the way of life of former uphill Aeta communities. Increased interactions with Kapampangan people progressively led these communities to adopt lowland cultural references. They also reoriented their economic activities toward the market demand in the lowlands and no longer rely exclusively on environmental resources (Table 1). Aetas from the upper flanks of Mt. Pinatubo thus became resilient through openness and adaptability. The latitude of the social fabric was wide and permeable enough to easily accept large changes but did not allow the loss of some fundamentals of the Aeta society such as the sense of ‘communalness’. Indeed, the system was already in a state of precariousness induced by increasing pressure from lowland groups.

On the other hand, the communities formerly situated at the foothills of the mountain and near the old Clark Air Base underwent fewer changes. Among these communities, acculturation was already ongoing before the eruption, which acted as an accelerator of the trend through further cultural adjustments and diversification of economic activities (Table 1). Therefore, Aeta communities from the lower slopes of Mt. Pinatubo have been resilient through incremental and marginal change due to a narrower gap or latitude between lowland and upland cultures.
The differential capacity of responses of the Aeta communities and the amplitude of the cultural change did not lie exclusively in the pre-disaster social fabric. It has been influenced by the context of the disaster. For the past two decades, considerable attention has been given to this question in the hazard and disaster literature (e.g., Wisner et al. 2004; Cannon 1994; Hewitt 1983, 1997; Lavell 1997; Maskrey 1993; Susman, O’Keefe, and Wisner 1983). Natural hazards such as volcanic eruptions, earthquakes, landslides, typhoons or floods have different inherent characteristics such as diverse speed of onset, temporal spacing and magnitude. Moreover, they occur in very different geographical, social, political and cultural contexts that contribute to shape the responses and adjustments of the victims. It is therefore important to break away from universal patterns of response to natural hazards as those mentioned in the first section of this paper. It rather seems that the capacity of resilience of traditional societies in the face of natural hazards and related cultural changes are commanded by an intricate interrelation of several factors that vary in time and space, from one event to another. These factors are physical, socio-cultural, geographical and political in nature. The following section illustrates each of them as a new approach to the capability of traditional societies to overcome the damage brought by the occurrence of natural hazards. Worth mentioning is that this framework only applies to fast-onset and contemporary events like the 1991 Mt. Pinatubo eruption and thus excludes prehistoric and slow-onset hazards phenomena like droughts and climatic changes.

**Factors of Resilience of Traditional Societies in Facing the Occurrence of Natural Hazards**

Based on the Aetas’ experience following the 1991 Mt. Pinatubo eruption, it is possible to identify several interdependent factors that affect the capacity of resilience of traditional societies in the face of the occurrence of natural hazards. These factors may be gathered into four groups (Figure 3).

First is the nature of the hazard. The magnitude and the temporal spacing of the event played a great role in shaping the long-term consequences of the Mt. Pinatubo eruption on the Aeta communities.
In the Philippines, several authors have demonstrated the ability of environment-dependent ethnic groups to cope with natural hazards in a quite efficient way (Blolong 1996; Heijmans 2001; Insauriga 1999; Philippine Institute of Volcanology and Seismology et al. 1998). However, most of the indigenous adaptations are in dealing with recurrent, usually seasonal, events like typhoons and floods. The magnitude of the Mt. Pinatubo eruption was far greater. Moreover, despite the vague existence of an oral memory of a previous eruption (Gaillard et al. 2005), the Aetas had to deal with a phenomenon they did not know.

**Figure 3: Factors of Resilience among Traditional Societies in Facing the Occurrence of Natural Hazards.**

The extent of damage also played a crucial role in the acculturation of uphill Aeta communities following the eruption of Mt. Pinatubo. Most of the Aeta villages were buried under several meters of hot pyroclastic and ash fall deposits preventing the immediate reoccupation of the upper slopes of the volcano. This is another major difference from phenomena like typhoons or floods that allow post-disaster reoccupation of the stricken area. Relocation downhill following the eruption of Mt. Pinatubo was a must and no other alternatives were left for the Aetas.
The second factor affecting the capacity of resilience of traditional societies is the intrinsic social condition of the particular group exposed to a given hazard. It seems that the capability of traditional societies to overcome disasters particularly depends on the pre-disaster level of acculturation, the relationships between the affected group and its neighbors, the diversity of pre-disaster livelihood, the cultural attachment to the devastated site, the size of the community affected and the age and the conservatism of the traditional leaders. It is obvious that the deepest socio-cultural changes occurred among those communities which were the least acculturated before the eruption, whereas the most acculturated communities in 1990 only made small adjustments to the new environmental and socio-economic contexts. The capacity of resilience therefore seems to be directly linked to the pre-disaster level of acculturation. The more traditional the community before the occurrence of the hazard, the more prone it is to cultural change.

Closely related is the amplitude of pre-disaster socio-cultural differences between the affected ethnic group and its neighbors, as well as the intensity of inter-group interactions. It seems that the larger the gap and the slighter the interactions, the more permeable is the community and the deeper the cultural changes. Aetas from the upper slopes of the volcano, who discovered the way of life of the lowlanders during their stay in the evacuation centers, were the most prone to cultural change. Conversely, changes were much slighter among the communities from the foothills of the mountain which had long been interacting with neighboring groups.

This study also confirmed that the communities which were most prone to cultural changes were those with no diversification of livelihoods. Uphill communities exclusively dependent on agriculture for their living were rendered helpless by the destruction of their fields by volumes of pyroclastic deposits. On the other hand, the communities situated near the former Clark Air Base which used to rely on several sources of livelihood turned out to be more capable of further diversifying their activities after the disaster.

The extent to which a community is affected seems to have a direct link with the capacity of resilience and post-disaster cultural change as well. If the whole community is hit by a natural hazard,
resistance to cultural changes seems unlikely. The Mt. Pinatubo eruption spared no Aeta community. All were affected and all the Aetas experienced life in the evacuation and resettlement centers, where contacts with the lowlanders first took place for those from the uphill communities. The absence of intact villages, which would have taken care of the Aeta traditions, did not allow a retreat to a preserved socio-cultural environment.

In the Mt. Pinatubo case, preservation of socio-cultural references was also hindered by the critical shift in leadership that followed the eruption. The “Ápo” or old wise man lost his prerogatives in preserving and transmitting the indigenous traditions because of his incapacity to deal with the new issues the Aetas had to cope with after their relocation downhill. Younger leaders are now emerging from among the different communities due to their ability to communicate with lowlanders. This phenomenon has been reinforced by the greater access of the youth to the educational system. This process is viewed as a needed evolution in the Aeta society. Nowadays, this has even compelled some communities to adopt young educated women as their leaders. The age and conservatism of the traditional leader before the disaster has thus shown to be a significant element affecting the capacity of resilience of traditional societies in the face of the occurrence of natural hazards.

The third factor is the geographic setting which is directly linked to the two previous points. The lack of space in a homeland-like environment for relocation without encroachment on other ethnic groups and cultures is of critical importance. The existence of available space is directly connected to the magnitude of the event and the extent of damage brought among the affected communities. In the case of the 1991 Mt. Pinatubo eruption, there was certainly no space available in a homeland-like environment for spontaneous relocation. The resettlement sites selected by the government encroached on lowlander territories and favored contacts between Aetas and their neighbors. Foothill sites where other Aeta communities spontaneously resettled also trespass on lowlanders’ lands. Moreover, attempts of the authorities to resettle Aetas in similar but not identical physical milieu (Palawan and the Sierra Madre of Luzon) have failed (Gaillard and Leone 2000).
The fourth and last factor affecting the capacity of resilience and cultural change among the Aeta communities is the post-disaster rehabilitation policy set up by the authorities. Some authors mentioned the insensitivity of disaster managers and their lack of cultural knowledge about the Aetas (Güss and Pangan 2004: 46). Others (e.g., Bennagen 1996: 60 and also Shimizu 1992: 2) have reported that some government officials were boasting of trying to ‘civilize’ the Aeta through the rehabilitation programs initiated in response to the disaster, especially through the resettlement policy and social programs (education, health…). This may be challenged. Major cultural changes among the Aeta communities did not occur by direct inputs of the government but rather as a progressive process due to geographic proximity which led to increasing interactions with external lowland culture. However, it is true that education within the resettlement centers contributed to enlarge the cultural references of the youth. The fact that many Aeta families are going back to the mountain further questions the role of the government in the acculturation process that has occurred among former uphill communities. It clearly demonstrates that the Aetas tend to meet their own needs without any assistance from the government or other NGOs (Bennagen 1996; Estacio Jr. 1996; Seitz 1998). Yet, if the authorities did not directly input lowland cultural references, they greatly participated in the relocation of the victims downhill and conditioned the redistribution of the population that occurred after the eruption. The close proximity at present between Aeta communities and their lowland neighbors greatly favor contacts of all sorts.

Furthermore, the fate of the Aeta communities cannot be detached from the national government policy toward ethnic and cultural minorities. At the time of the eruption, there were no specific governmental guidelines to protect and defend ethnic minority rights in the Philippines. It was only in 1997 that the Indigenous Peoples Rights Act (RA 8371) was legislated (Department of Environment and Natural Resources 1997). Therefore, it was most unlikely that the Philippine government took appropriate measures for the preservation of the Aeta culture in 1991.
Conclusions

The 1991 eruption of Mt. Pinatubo has implied a massive redeployment of the Aeta communities of the Pasig and Sacobia river basins toward the foothills of the volcano. This demographic redistribution has increased the geographic proximity between Aeta communities and their lowland neighbors and concurrently heightened the political and socio-economical relationships between Aetas and non-Aetas. More than ten years after the eruption, the level of cultural change induced by these increasing interactions has not been uniform. The less acculturated communities before the event are those who have undergone the highest level of cultural transformation. On the other hand, the eruption only acted as an accelerator of an on-going trend among the most acculturated communities before the eruption. Both uphill and foothill communities have however retained some fundamentals of the Aeta society, notably their sense of ‘communalness’. An increasing number of families further try to recover their pre-eruption way of life by leaving the resettlement centers or by going back to the upper slopes of the volcano when possible. Hence, Aeta communities have turned out to be resilient in the face of the Mt. Pinatubo eruption. Resiliency required a certain level of cultural change and adaptation to the new environmental, social, economic and political context. Former uphill Aetas resorted to larger changes in their social system than their counterparts long living on the lower slopes of the volcano who recovered through marginal changes.

This flexibility of the Aeta society in the face of changing contexts had already been noticed before the 1991 eruption of Mt. Pinatubo (e.g., Brosius 1983; Shimizu 1989). For instance, Shimizu (1989: 78) asserted that “the dynamism of Aeta social life hinges on the flexibility and durability of the Aeta social system”. Indeed, during their long history which may date back to the Pleistocene period, the Aetas have had to cope with major environmental and cultural disturbances, including several powerful eruptions of Mt. Pinatubo and earthquakes, climate changes, the arrival of the ‘Austronesian’ agriculturists, the coming of the Spaniards, and finally the establishment of American military bases on their territory. Yet, they have managed to retain...
specific cultural traits that still distinguish them from the majority of the Philippine ethno-linguistic groups today.

The capacity of resilience of the Aetas and the level of culture change that their society has undergone following the 1991 eruption of Mt. Pinatubo have been commanded by a complex set of interacting factors. These factors include the nature and magnitude of the hazard, the pre-disaster socio-cultural context, the geographical context and the rehabilitation policy set up by the authorities. It is evident that these factors vary somewhat in time and space, from one disaster to another. Even at the scale of the Mt. Pinatubo eruption and the Aeta people, conclusions drawn from the case study of the Pasig and Sacobia river basins can barely be generalized and extended to other flanks of the volcano (e.g., Seitz 2004). Given the great diversity of natural hazards and the multiplicity of their local geographical context of occurrence, the quest for a unique and universal theoretical framework assessing the capacity of resilience of traditional societies in facing the occurrence of natural hazards becomes secondary. More important is to perceive the local variations of the factors detailed in this paper to better anticipate the capability of traditional societies to overcome the damage brought by the occurrence of natural hazards and therefore predict eventual cultural change. This framework is in line with the new approach of hazards and disaster management programs which enhances a local consideration of the problems rather than being limited to a transfer of technology from industrialized to developing countries.

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