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Working Paper

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What Is to Be Done with Disasters? A Literature Survey on Disaster Study and Response

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The SMERU Research Institute
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ABSTRACT

The images of devastation and the stories of misery in Aceh during and after the December 2004 tsunami, which had dominated the national and international media for weeks, confronted us with our weaknesses in times of disaster. This lead us to the fact that although disasters are as old as the history of mankind, we are still struggling with the question: *what is to be done with disasters?* This paper is a small part of the struggle. As a literature survey, it aims to provide a systematic overview on various important issues and debates on efforts in understanding and managing disaster. This paper is organized in two parts. The first part deals with the various theoretical aspects of disaster study such as definitional debates of disaster, classification of calamities, and some themes (risk, vulnerability, ageing, gender) that are important in understanding disasters. The second part examines various aspects of efforts in managing disasters. It discusses themes such as the components of disaster management and the way it has been done at different levels and in different countries.

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LIST OF ABREVIATIONS

ACDM : ASEAN Committee on Disaster Management
ADPC : Asian Disaster Preparedness Center
ADPC : Asian Disaster Preparedness Center
ADRC : Asian Disaster Reduction Center
AEGDM : ASEAN Expert Group on Disaster Management
APBD : Anggaran Pendapatan dan Belanja Daerah/regional/local budget
APBN : Anggaran Pendapatan dan Belanja Negera/national budget
ARPDM : ASEAN Regional Programme on Disaster Management
ARPDM : ASEAN Regional Program on Disaster Management
ASEAN : Association of Southeast Asian Nations
Bakornas PBP : Badan Koordinasi Nasional Penanggulangan Bencana dan Penanganan Pengungsi (The Nation Coordination Board for Disaster Management)
CDPP : Calamities and Disaster Preparedness Plan
DRC : Disaster Relief Center
DSWD : Department of Social Work and Development
ECHO : European Community Humanitarian Office
FAO : Food and Agriculture Organization
FEMA : The Federal Emergency Management Agency
GIS : Geographic Information System
IFRC : International Federation of the Red Cross
IRC : International Rescue Committee
ISDR : International Strategy for Disaster Reduction
LGU : local government units
MSF : Medecins Sans Frontieres
NDCC : National Disaster Coordinating Council
NFIP : The National Flood Insurance Program
NGO : nongovernment organization
OCD : Office if Civil Defence
OCHA : Office for the Coordination of Humanitarian Affairs
PNRC : Philippine National Red Cross
RCS : Red Cross Societies
satkorlak PBP : *satuan koordinasi pelaksana penanggulangan bencana dan penanganan pengungsi*/ coordinating implementation unit for disaster management
satlak : *satuan pelaksana*/implementing unit
SIPBI : The Indonesian Disaster Management Information System
UNDP : United Nations Development Programme
UNDRO : United Nations Disaster Relief Office
UNESCO : United Nations Educational, Scientific and Cultural Organization
UNHCR : United Nations on High Commissioner for Refugees
UNICEF : United Nations Children's Fund
WB : World Bank
WFP : World Food Programme
WHO/PAHO : World Health Organization/Pan American Health Organization
WMO : World Meteorological Organization

PART I. STUDYING DISASTERS

1. UNDERSTANDING CALAMITIES

Experiences, observations, and interpretations of calamities are as old as humanity's endeavours to survive. Inquiries on aspects of calamities and societies under stress have also been taken for decades. Throughout the twentieth century the studies of disasters have developed extensively in various terms such as the themes and geographical areas covered, theoretical frameworks used, varieties of academic disciplines involved, activities conducted, and results published. Research groups and individual researchers from different disciplines, nongovernmental humanitarian organizations, and activists from different interest groups as well as governmental institutions from different countries are among other elements which have ensured the further development of disaster studies.

Nevertheless, the efforts to study, mitigate, respond to, and recover from calamities are often still hindered by a lack of coherency in the disaster field. As will be discussed later, the scientific community is still divided in dealing with disaster as an object of inquiry. For instance, some researchers concentrate on the environmental aspects of disaster, while others look at the social aspects of it. In addition, it is often complicated to communicate their work to each other because different studies use different theoretical tools. Seemingly simple questions such as "what is a disaster?" will therefore lead to rich theoretical debates and contestations.

These theoretical debates and contestations are inseparable from the policies, programs, actions, and activism in the disaster field. Either implicitly or explicitly, the theoretical frameworks underlie the practical activities. We need to be aware about how calamities are perceived in certain policies, programs or actions in order to understand (and be critical about) why they do what they do. If we want to join the disaster field then it is crucial to clarify our own perception on calamities, since this perception will be one of the frames in setting up our work.

From the point of view of social science, disasters have been investigated for more than eight decades. Throughout this period, various themes and concepts have emerged and led to on-going debates. Until recently, social scientists in the field of disaster were still unable to reach consensus on the definition of disaster. Why is it difficult to reach definitional consensus of disaster? According to Oliver-Smith (1999:19), this is caused by the *external variability* and *internal complexity* of disaster.

Box 1. Definitions of Disasters

1. "The term disaster constitutes a set of family resemblances rather than conforming to a minimum list of definitional criteria. The concept has 'blurred edges,' as Wittgenstein says, but the inexactness of a definition hardly makes it unusable" (Oliver-Smith 1999: 20).
2. "Disaster is a severe, relatively sudden, and unexpected disruption of normal structural arrangements within a social system over which the system has no firm control" (Barton 1974 as cited in Nashreen 2004: 1).
3. "Disaster is also viewed as a mental construct imposed upon experience. This is because to understand disaster, knowing the number of deaths, value of property destroyed, or the decrease in per capita income is not sufficient. The symbolic component requires knowledge of the sense of vulnerability, the adequacy of available explanation, and the society's imagery of death and destruction" (Barkun 1977 as cited in Nashreen 2004: 1).
4. "A disaster occurs when a significant number of vulnerable people experience a hazard and suffer severe damage and/or disruption of their livelihood system in such a way that recovery is unlikely without external aid" (Blaikie et al 1994: 21).
5. "A crisis situation that outstrips the capacity of a society to cope with" (Anderson and Woodrow 1993: 133).
6. "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" (United Nations Disaster Relief Office/UNDRO as cited in McGuire 2003: slide 17)
7. A serious disruption of the functioning of community or a society causing widespread human, material, economic, or environmental losses which exceed the ability of the affected community or society to cope using its own resources (International Strategy for Disaster Reduction/ISDR 2004).

In his view, external variability of disaster refers to

(1) the wide range of physical agents which can trigger calamities. For example: a sudden and catastrophic movement of a part of the Earth's surface (earthquake), extreme high waves which are caused by rapid displacement of water in a lake or the sea on a massive scale (tsunami), or the decline in the quality of an environment (pollution), etcetera.; and

(2) the various impacts of such calamities, ranging from immediate destruction and death because of an earthquake to gradual deterioration of life condition and destitution in a famine.

Consequently, external variability alone has already made it difficult for analysts "… to establish a set of common definitional characteristics that can encompass the vast array of phenomena that generate and occur in disaster" (Oliver- Smith 1999: 20).

Internal complexity of disaster refers to different perceptions, interpretations, experiences, needs and goals of the actors involved in, and affected by, a crisis situation. These differences intersect in the theoretical and practical aspects of the disaster field and cause fragmentation, which can lead to miscommunication, in coordination or conflicting ideas and interests.

In this section, four definitional debates of disaster will be discussed below.

(1) *Objectivity–subjectivity debate*

Is disaster an objectively identifiable phenomenon (a set of physical impacts) or a subjective, socially constructed process (a set of socially constructed perceptions)? Description of a disaster usually includes the material loss and casualties. For some analysts and practitioners, these physical impacts, which can be identified and calculated, are the main parts of the definition of disaster. But others have said that the impact of a disaster is a relative matter, which depends on the interpretation of each affected group. For example, the material losses in New Orleans, which were caused by hurricane Katrina, could be objectively identified. Different groups (for example, the poor and the better off) will, however, experience the (material) loss differently according to their subjective interpretation. At this point, as was mentioned above, some experts emphasize the objective physical impacts and others emphasize the subjective interpretations of affected groups.

(2) *The natural environmental–social location debate*

Are disasters located in the natural environment or in society? Is an earthquake in an unpopulated area a disaster, or does it become a disaster only if it affects the (human) population? In this debate, some experts focus on physical agents (e.g., earthquake, hurricane, etc.) in their definition of disaster and explain "why a disaster takes place?",[1] while others explain "what a disaster does?" and thus, focus on community perceptions and response including organizational involvement in defining a disaster.

(4) *Nonroutine–socially embedded debate*

Are disasters "nonroutine" or socially embedded phenomena? Disasters are often portrayed as unusual, destabilizing, causing disruption, and beyond people's ordinary, routine, daily realities. Nevertheless, for those who live in areas which are regularly exposed to geophysical extremes (earthquake, hurricane, flood, drought, etc.) measures to deal with calamities are embedded in their day-to-day life. These at-risk communities adapt the architecture of their houses, the agricultural system, and the arrangement of their social security systems, or even relocate their settlement according to the risks that they run in their natural environment. In this case, the risk of hazards is considered to be "an aspect of the environment with which local cultures will reach permanent accommodation so that 'a culture of disaster' develops" (Bankhoff 2003: 159).

(5) *Event–process debate*

Is disaster a physical event or more a function of ongoing social orders, human-environment relations and historical structural processes? Initially, disasters are

[1]This is also called "hazard paradigm".

> regarded as an abnormal, hazardous, geophysical, or meteorological event. According to this perspective, disaster has a limited temporal existence, an identifiable beginning and end. Disasters are also regarded as events by those primarily interested in human behavior. This perspective emphasizes people's responses towards radically or long term changing environmental conditions. The inquiry will focus on what people do in the series of stages such as: preparedness, mitigation, relief, and recovery. Here too, the responses are regarded as having limited temporal existence and an identifiable beginning and cessation.

Nevertheless, more and more social scientists (especially geographers and anthropologists), share the idea that disasters are not merely events, but are "… considered to be primarily about process in which hazardous events represent moments of catharsis along a continuum whose origins lie buried in the past and the outcomes extend into the future. It is the pre- disaster conditions that mainly affect a society's ability to cope with hazard …" (Bankhoff 2003:157).

In addition to those definitional debates, disasters are also approached differently in various studies. Bankoff (2003) categorized three approaches according to three disciplines in social science.

- Geographers: Understand disasters as the product of natural phenomena such as land slide, tidal waves, flood, etcetera. Nature is, therefore, seen as having the principal active role, while human systems are its passive agents. This approach assesses population as to whether they are "at risk", which is determined by the degree of hazard and their level of vulnerability.
- Sociologists: On the other hand, sociologists focus almost exclusively on the structures, functions, and activities of formal organizations and the impact of disasters upon them and generally give the environment only a minor role. They pay special attention to new or emergent groups that arise as a consequence of crisis situations. The main issue here is whether the unit of analysis should be the social psychology of the individual or the social organization of the group.
- Anthropologists: Use a more holistic approach. They view disasters as integral parts of both the environmental and human system. They are the result of a process that involves a destructive agent and a vulnerable population. The unit of analysis is community, town, region or localized ethnic enclave. The focus of the study is primarily on the developments that make populations vulnerable and the practices they have evolved to cope with the disadvantageous conditions.

Natural hazards do happen regularly in many places, but when do we speak of a disaster? When does a problematic situation—such as floods which occur every wet season in many neighborhoods of Jakarta—become a disaster? Frerks et al (1999: 7–9) explained three kinds of criteria to establish the thresholds of disaster.

> A first set of criteria considers a situation disastrous when external assistance is needed to cope with it … many countries have centuries of experience dealing with disaster and, until today, most effects of disasters are addressed by local means. One trend in disaster management stipulates that we only speak of a disaster when the local capacity to deal with it falls short and external help is needed. One may argue, however, that this criterion denies the experience of people that are undergoing a disaster but managing to cope with it.

> A second set of criteria to establish the threshold of disaster is more institutional and formal. These imply that an emergency has to be declared formally by the authorities of particular country or by international relief organizations. The disadvantage of such an institutional criterion is that some regimes simply do not declare an emergency irrespectively of the condition on the ground. This is because of consideration of international prestige or because they want to continue repression or killing of their opponent unnoticed by the world at large.

Moreover, it will be complicated if the authority of the stricken country refuses to formally declare an emergency while the international relief organizations do.

> [The third set of criteria] … is a quantitative criterion to establish whether there is an emergency or not. In this case, the number of victims (deaths, injured, evacuated) or total damage caused is used to determine whether an event can be called a disaster. Quantitative criteria, however, vary by country and by organization. Quantification depends on the quality of the sources, the reporting, and the analysis, as well as the possibility of access to disaster areas. In many situations it is difficult to acquire a reliable picture as the population is at drift, lines of communication have been destroyed, and contacts made impossible. Most empirical situations are characterized by instability, chaos, fluidity, and transition so that observers may find it difficult to put such conditions in categories amenable to public policy.

Although they are still debatable, these three criteria can be used to distinguish between problematic and disastrous or emergency situations. There is, however, no absolute and universal set of criteria to determine whether a disaster will occur or not in a country. What is important is to apply these criteria in ways (and combinations) that can prevent postponed actions and delayed relief so that unnecessary losses (both human lives and properties) can be avoided.

2. CLASSIFYING CALAMITIES

It has been discussed formerly that calamities are many and varied. We therefore need to have a more systematic categorization of the term. The categorization can be established as follows:

(1) According to the *nature* of the hazardous event:

- Natural disasters: geological hazards (e.g., earthquakes, tsunamis/seismic sea waves, volcanic eruptions, mud flows), atmospheric hazards (hurricanes, tropical cyclones or typhoons, tornadoes), hydrological hazards (e.g., river or coastal floods)
- Man-made or human induced disasters (e.g., heavy environmental pollution, industrial and technological disasters, traffic accidents, epidemics, fires)
- Armed conflict related disasters (e.g., war, genocide, social violence)

(2) According to the *duration* of the hazardous event:

- Acute disasters: rapid-onset event with immediate destruction and death (volcanoes eruptions, earthquakes, tsunamis, floods, hurricanes). These types of disasters— especially if they are also major ones—usually elicit empathy more easily and, therefore, attract a quick response and support. Moreover, its

"suddenness" commonly attracts media attention (it is a good 'breaking news' item) so that it is more likely to get adequate coverage.

- Chronic disasters: slow-onset process with impacts not perceived or experienced physically for a longer period (drought, famines, environmental breakdowns, pollution, toxic exposures). Frerks et al (1999: 10) wrote that "Slow-onset disasters are also referred as 'creeping' or 'lingering' disasters". In contrast to earthquakes, for example, famines develop slowly and do not cause immediate deaths. In principle this provides the opportunity to take timely measures in the field of preparedness, prevention, and mitigation. Reality, however, tells us a different story. A problem is that it may remain ambiguous for a long time as to whether the situation will really turn into a disaster. As observed by author Field: "the dividing line, if there is one, between famine and nonfamine is so blurred, that on the margins, the existence of famine is a matter of interpretation" (Field 1993: 264). This affects a timely and pro-active response enormously. The aid therefore, arrives far too often after the worst is over.

(3) According to the *extent of impact* (the potential of the disaster to cause damage to human life and property):

- Major disasters, which have wider impacts and higher intensity of damage (tsunami, earthquake, volcanic eruptions, pandemic).
- Minor disasters, which have localized impacts and less intense damage (e.g., fire accidents, landslides, avalanches).

Although it is useful to have this categorization in mind to understand calamities, in reality most disasters are much more complex and overlapping. They have multiple triggers and impacts. Famine, for example, can be related to several causes such as public policy failures, economic processes, inequality, food availability, drought, or war. In addition, different types of disasters may reinforce one another. The earthquake in Pakistan (October 2005), might be followed by an epidemic because of long-term harsh living conditions, lack of sanitary facilities and health services.

3. CONNECTING CALAMITIES TO SOME IMPORTANT THEMES

Disaster risks

Disaster risk refers to "the expected numbers of lives lost, persons injured, property damaged and economic activity disrupted due to a particular natural phenomenon" (UNDRO 1991 as cited in Frerks 1999: 11), or, "the magnitude of probable future damage and loss associated with the occurrence of hazards of natural and anthropogenic origin" (Lavell 2005).

People perceive and assess risk differently, within the range of opportunities available to them. This difference is influenced or even determined by various factors such as gender, age (life stage), socioeconomic position, ethnicity, traditions, etcetera. Therefore in the perception and assessment of risk, cultural and social aspects are very important. It is assumed that "… societies selectively choose risks for attention. This reflects prevailing images and representations, values and beliefs about social institutions, nature and moral behaviour." (Frerks 1999: 11).

The acknowledgement of the importance of the cultural aspect allows us to understand what might be erroneously seen as "fatalistic attitudes" of some communities in facing a crisis or disastrous situation. In his study on cultures of disaster in the Philippines, Bankoff (2002) argued that in the principle of *bahala na*, which is usually understood as simply fatalism ("leave it to fate"), there is a sense of risk-taking. "*Bahala* is also about courage and daring and a sense of finely calculated assessment of the odds".

The social aspect of risk perception and assessment includes differences according to the position in the power relationship. Studies have demonstrated contradictive or even conflicting perceptions and assessments of risk between local populations and authorities. Medical experts and authorities held contradictory views to the local population on the radiological effects on health in and around the atoll of Mururoa (some 1,000 km from Tahiti) where the French had conducted nuclear-weapon tests. "Where the experts denied that there was any risk or health effect, the population felt at risk and experienced all types of health problems" (Frerks et al 1999: 12, see also http://www-ns.iaea.org/appraisals/mura-fang.htm). In the Indonesian context, Laksono's study on perceptions of the hazards of Mount Merapi showed the conflict between local communities' perceptions which are colored by tradition and custom and the government's assessment which is determined by economic and political considerations. He argued that "The real point of this comparison is that all such evaluations are ultimately subjective to some extent, the particular bias varying from case to case depending upon who makes the evaluation and for what purpose. … Because of the differences in power between a national government and a tiny village, it more often happens that the latter is made aware of its subjectivity than the former" (Laksono 1988: 197).

Vulnerability to disaster

In the disaster field, the vulnerability approach has, since the 1980s, challenged the dominance of the technical approach and intervention which focuses on predicting hazards and modifying their impacts.

> Terry Cannon persuasively argues that while hazards are natural, disasters are not. Social processes generate unequal exposure to risk by making some people more prone to disaster than others, and these inequalities are largely a function of the power relations operative in every society. Critical to discerning the nature of disasters, then, is an appreciation of the ways in which human systems place people at risk in relation to each other and to their environment—a relationship that can best be understood in terms of an individual's, a household's, a community's, or a society's *vulnerability*. (Hilhorst and Bankoff 2004: 2)

Thus, vulnerability to disaster is "the extent to which an individual, community, sub-group, structure, service or geographic area is likely to be damaged or disrupted by the impact of disaster hazard" (Kotze and Holloway 1996 as cited in Frerks et al 1999: 13).

In order to understand the concept of vulnerability to disasters, we need to pay attention to several issues: First, vulnerability, "… is not a property of social groups or individual, but it is embedded in complex social relation and processes" (Hilhorst and Bankoff 2004: 5), and therefore it is specific. This view discourages the attempt to establish a general

chart of vulnerability which can be applied to anybody, anywhere. In analyzing vulnerability to disasters we need to establish the processes within different levels. Here, the specific local or regional context is very important.

Second, vulnerability to disaster is dynamic and fluid. It reflects changing social, cultural, political and economic conditions over the course of time. As noted by Hilhorst and Bankoff (2004: 6): "Vulnerability changes through time in unpredictable ways and in varying directions: increasing, accelerating, oscillating, concentrating or diffusing. It varies with the interplay of three different time frames: long-term, short-term and cyclical change."

Third, "Vulnerability is not just concerned with the present or the future but is equally, and intimately, a product of the past. … History reveals that vulnerability may be centuries in the making: societies and destructive agents are mutually constituted and embedded in natural and social systems as unfolding processes over time" (Hilhorst and Bankoff 2004: 3–4). Consequently, the lack of an adequate historical perspective on the roots and causes of disasters often hinders the effort to adequately analyze the construction known as vulnerability to disaster.

Fourth, vulnerability is especially about people, namely their perceptions and knowledge. People's ideas on the roots of (their) vulnerability to disaster determine the solutions they chose.

Three different approaches towards the roots and causes of vulnerability and types of solutions can be distinguished:

(1) The approach that views vulnerability in terms of the risk of (physical) exposure to hazardous conditions takes as its starting point the idea that nature and natural hazards are the causes of people's vulnerability, although it acknowledges that not all people are equally susceptible to harm by the same hazards. The measurement of this vulnerability usually emphasizes factors such as the intensity, magnitude, rapidity of onset, duration and frequency of hazardous events, which are reflected in the amount of damage. In other words, people's vulnerability is seen as determined by their proximity to the threats (Heijmans 2001: 2). This approach typically offers technological mitigation strategies, such as (better) systems and equipment to monitor fire and seismic activity, to forecast weather, to control water, etcetera.

(2) The approach that views vulnerability as a social construction focuses on structural factors which make individuals or groups of people susceptible to harm by external shocks (e.g., geophysical extremes, epidemic diseases). In this approach, factors such as inequality (based on gender, economic position, age, or race), marginalization, poverty, access to social protection and security, etc. generate, shape or exacerbate people's vulnerability. These structural factors, which can enable or constrain people to avoid, mitigate and cope with hazards, existed before the hazardous events take place. They can, therefore, be seen from an *ex ante* perspective as predisposing factors. From an *ex post* perspective, these structural factors are inseparable from the outcomes, in the sense that they can enable or constrain people in their recovery. This approach usually suggests mitigation strategies that advocate longer term transformations of socio-political-economic

structures, such as poverty alleviation, social security schemes, or gender empowerment (Webb and Harinarayan 1999: 292; Benda-Beckmann and Benda-Beckmann 1994: 23; Brooks 2003: 4).

(3) The approach that points out the high protection and mitigation costs as crucial contributions to people's vulnerability. In this view, the degree of vulnerability is determined by the ability to pay the protection and mitigation costs. Consequently, the poorest are the most vulnerable. This approach brings to the fore financial solutions to reduce people's vulnerability, such as various forms of insurance, financial assistance to build up assets, calamity funds, etcetera. (cf. Heijmans 2001: 2; Boyce 2000: 257–8).

It is important to underline that these approaches to causes of vulnerability are not mutually exclusive and not always explicitly stated in the analysis. In fact, many studies pay attention to a combination of issues that have been highlighted by these views (for example, Waite 2000; Heijmans 2004; Webb and Harinarayan 1999). Nevertheless, the interplay of structural factors and agency is crucial in the analysis of many recent studies of vulnerability (Delor and Hubert 2000; Watts and Bohle 1993; Wisner 1993).

The intertwinement of risk, vulnerability, and disaster

In some studies (Blaikie et al 2004; Frerks et al 1999; Asian Disaster Reduction Center/ADRC), natural phenomena such as earthquakes, floods or landslides are referred as "hazards" which might occur without automatically resulting in disasters. For example, a tornado that takes place in an unpopulated desert would not necessarily trigger a disaster because it does not affect (human) population and properties. In this view "A disaster occurs actually at the interface of hazards and vulnerability" (Frerks et al 1999: 11).

In the disaster field, therefore, the concepts of "risk", "vulnerability," and "disaster" are often perceived as closely related. In their book *At Risk*, "Blaikie et al argue that hazards, vulnerability and risk are all uniquely intertwined in the development of death and destruction from disasters" (Cyr 2005). Frerks et al (1999: 11) similarly noted that "The risk that a disaster evolves, is the outcome of the combination of such a phenomenon with the vulnerability of the population, communities, households, or individuals that are affected."

The intertwinement of those concepts has been explained in formulas such as:

Disaster = Risk + Vulnerability

(Blaikie et al 2004)

Disaster risk = *function* (hazard, exposure, vulnerability)

(Asian Disaster Reduction Center)

4. CONNECTING CALAMITIES TO SPECIFIC SOCIAL GROUPS

As was discussed above, recent research concerning crisis and disaster raises the question whether crisis is "an objectively identifiable phenomenon or a subjective, socially constructed process." This debate puts emphasis on the subjectivity of crisis that brings to the fore "the multiple perspectives of different affected groups" (Oliver-Smith 1999). The experience of hardship in a crisis situation is understood as a relative matter that corresponds to the heterogeneity of the affected. Accordingly, disaster risk and vulnerability to disaster are differentially distributed between and within societies. Efforts to survive, then, are performed within constraints and opportunities or exclusion and inclusion processes, according to the intersection of various lines of social differentiation such as gender, ethnicity, citizenship status, economic position, and age. In this view, it is important to connect calamities to specific affected groups and it is challenging to analyze differential vulnerability and the capacity to cope among those who are afflicted.

A number of groups in the population are often seen as the most vulnerable namely, the frail elderly, children, the chronically ill, women (and girls), members of subordinated cultural and racial groups, undocumented residents, and the poor. These groups are regarded as deserving special attention because of their specific needs (limitations) which are determined by their specific (socioeconomic and cultural) position in the given society. This section will further discuss women (and girls) and the elderly as examples of "social groups with specific needs".

Women (and girls)

Fordham (2004: 176) argues that various researches demonstrated the importance of recognizing women's and girls' greater vulnerability in crisis situations. This vulnerability can be related to a number of issues:

(1) Women's limited opportunity and the gender division of labor

According to Fordham (2004: 176-177), "… women, as a group, have fewer opportunities than men, as a group, … They more frequently occupy a position of dependence on other persons for at least part of their subsistence." Moreover,

> The gendered division of labour in households and in the global economy makes most women less able than most men to control economic resources mitigating the effects of disasters. Their high levels of predisaster poverty, secondary status in the labour force, extensive informal sector, lack of land rights, and extensive domestic responsibilities clearly make them economically vulnerable long before a natural disaster occurs. (Enarson 2000: viii)

In many cultural contexts, patriarchal structural limitations even deny women's rights and their ability to pursue equality of opportunity. Gender stereotypes and gender related norms and values—for example, the rules and practices of seclusion of women in some South Asian countries—have substantially reduced women's work opportunity.

(2) Women's multiple burden

Even in a noncrisis situation, studies have revealed women's multiple burdens as care giver, producer and community actors. "They often have obligations to others that

compromise their ability to obtain what they need for themselves. Throughout the world, to varying degrees, women still occupy a (usually invisible) triple role: reproduction, production and community management/activism" (Fordham 2004: 177). These roles can make it harder for women to choose and protect their interests. In her report on 'Gender and Natural Disasters,' Enarson (2000: viii) identifies that in emergencies "women's workload increases dramatically." They often have to undertake income generating activities (either as a sole earner or as a co-earner), be involved in emergency response, carry out household duties, and have expanded responsibility for care.

(3) Women's overlooked particular needs and under-representation
With regards to the differentiation between the "public/men–private/women domain", it can be said that disaster mitigation, response and relief are often located in the "public domain". Those involved in these activities are mostly men. Consequently, the male-dominated, official disaster management might overlook women's particular needs (Fordham 1998). In cultural contexts where it is considered inappropriate or even shameful for women to be in public spheres without a chaperone, being out alone in a relief or rescue center—among many strangers—can cause fear and stigma. In addition, in this kind of environment, women and girls may face greater risk of sexual harassment.

As Fordham (2004: 177) noted:

> Male disaster practitioners typically have little awareness of women's particular sanitary and privacy needs, for example, and gender-blind decisions on the siting of latrines and washing facilities in relief camps can increase women's anxiety, add to their work load and increase the risk of sexual harassment and violence … Despite their often widespread presence in lower status positions, women are under-represented in positions of power and responsibility on pre-and postdisaster decision-making committees and organizations. … Thus, women are potentially vulnerable throughout the disaster process.

Ariyabandu (2000: 4) mentioned cases where women and female children in particular were more vulnerable to extreme events in comparison to men.

> [In Bangladesh] work opportunities for women in many areas are virtually nonexistent. Therefore when hit by disasters and displaced, for survival many families are forced to take beggars bowl … The situation is worst for women who do not have a male relative in the family (husband, a brother or a grown up son). There are numerous accounts of single women affected by disasters whose children are never sent to school but for begging for family survival. The factors related to restricted mobility do not allow or encourage women to move to unknown destinations on their own in search of employment. Being illiterate, the skills women possess too are limited and basic.

Elderly

In ageing studies, the elderly are often defined as those who are 65 years and older. This group is far from homogenous, and therefore can be expected to have a wide range of reactions to emergencies and various needs for assistance. Experts in disaster relief, however, regard the elderly as a vulnerable group that should receive special attention.

Older people's vulnerability to disasters can be caused by their decreased physical and mental capacities such as:

(1) Sensory deprivation

Older person's sense of smell, touch, vision, and hearing are likely to be less acute than that of the general population causing potential difficulties in emergencies. A diminished sense of smell could make an older person less likely to identify spoiled food. A hearing loss may cause an older person not to hear what is said in the noisy environment of Disaster Relief Center/DRC.

(2) Delayed response

Some older persons may respond slowly to calls for disaster relief for reasons including age-related slowing of cognitive and motor activity, difficulties in comprehending radio or television broadcast under difficult listening conditions, and impaired psycho-motor ability caused by medications.

(3) Chronic illness and dietary considerations

Arthritis may prevent an elder from standing in line. Medications can cause confusion or a greater susceptibility to problems such as dehydration. Memory disorder can cause communication problems, as can neglect of special dietary considerations. Emergency food rations, for example, need to be low in sodium for the many older adults who suffer from hypertension.

(4) Multiple loss effect

"…many seniors have lost of their spouse, income, home and/or physical capabilities. The compounding effect may make disaster recovery difficult. Intense attachment to specific items of property often adds to their tensions." (Oriol 1999: 26)

(5) Hyper/hypothermia

Extremes of heat or cold have marked effects upon older persons. This becomes critical in disasters that close down furnaces or air conditioners. "… Persons seventy-five years or older are five times more likely to die of hypothermia than those under that age." (Oriol 1999: 27)

PART II. MANAGING DISASTERS

5. DISASTER MANAGEMENT

Disasters mostly bring misery and loss. These are things that nobody wishes to be confronted with. Hazardous agents (e.g. earthquake, tsunami, volcanic eruption, etc.) therefore have to be assessed and counteracted, vulnerabilities to hazards have to be reduced, emergencies have to be responded to and damages have to be recovered. In other words, disasters have to be managed, as we want to avoid or mitigate misery and losses.

Nevertheless, managing disasters is as complex as understanding disasters themselves. "[It] requires a comprehensive approach that accounts for the causes of a society's vulnerability to disaster. Not only must a comprehensive strategy be articulated, the political and economic will must be created to sustain the new policies" (Freeman et al 2003: 1). According to ISDR (2004: n.p.), disaster (risk) management is:

> The systemic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies, and coping capacities of the society and communities to lessen the impact of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and nonstructural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

6. COMPONENTS OF DISASTER MANAGEMENT

In the literature, the important components of disaster management are classified into two phases namely, the pre- and postdisaster phases. Freeman et al (2003)[2] argued that a comprehensive disaster management plan should consist of six components:

6.1 Predisaster Component

Risk Identification, includes activities such as:

- Hazards assessment, which "identifies the probable location and severity of dangerous natural phenomena and the likelihood of their occurring within a specific time period in a given area." (Freeman et al 2003: 1). This assessment will rely on (and be influenced by) the availability of scientific information such as "geologic, geomorphic and soil maps; climate and hydrological data; and topographic maps, aerial photographs, and satellite imagery." The assessment also needs historical information in the form of written reports or oral accounts of long-term inhabitants of particular hazard-prone areas. In order to maximize the use of the available information, a successful assessment has to be backed-up by scientific teams trained to evaluate the data.

[2] Freeman's report is the main source of the discussion on disaster management components in this paper.

- Vulnerability studies, which aim to estimate "the physical, social, and economic consequences that result from the occurrence of a natural phenomenon of given severity" (Freeman et al 2003: 2) There are three vulnerability needs to be examined; namely, (1) physical vulnerability that refers to the impact of particular hazards on buildings, infrastructure, and agriculture; (2) social vulnerability that refers to the impact of particular hazards on vulnerable groups such as the poor, women, children, elderly, etcetera. An examination of social vulnerability is concerned with issues such as public awareness of risk, the ability of groups/communities to deal with calamities and institutional structures that can help them; and (3) economic vulnerabilities that refers to the impact of hazards on economic assets and processes.

- Risk analysis, which "integrates information from hazards assessment and vulnerability studies in the form of an estimate of the probabilities of expected loss for a given hazardous event." (Freeman et al 2003: 3) This kind of analysis is usually costly and time consuming. In the United States and Europe, the private sector (insurance companies) has invested in the efforts of risk modelling. The private sector will, however, only come out with this kind of initiative if there is a guarantee that the investment can lead to the development of insurance markets. In (developing) countries where the insurance markets are still limited, risk identification studies can be conducted with support from international partnerships. This kind of support has also been provided to Latin America and the Caribbean.

Mitigation, "refers to policies and activities that reduce an area's vulnerability to damage from future disasters." (Freeman et al 2003: 4–6) Mitigation includes two types of measures, namely:

- Structural mitigation measures aim to reduce the impact of hazards on people and buildings by using engineering and technical measures such as dams, dykes, special design of transportation systems, soil analysis. This type of mitigation, however, is not always free of problems. The structural flood mitigation in Vietnam shows that the project only provides short-term protection and in the long term it even makes the problems worse. In this case, the flood control system has exacerbated rather than reduced the extent of flooding as the sediment deposit in river channels has raised the height of the river channel and strained the dykes' systems. In addition, over-confidence in structural mitigation measures can give people a false sense of security.

- Nonstructural mitigation measures are "nonengineered activities that reduce the intensity of hazard or vulnerability to hazards." (Freeman et al 2003: 6) These measures include activities such as land use planning, building codes, public education and training, etcetera. and are generally less costly than the structural ones, therefore they are particularly appropriate for countries with less financial capacity. In addition, the successful nonstructural mitigation measures are often those that are well integrated into development programs.

Risk Transfer, refers to the involvement of insurance companies in financing the high costs of recovery and rehabilitation after a disaster occurrence. The use of insurer as the primary risk transfer tool has advantages such as it encourages loss reduction measures, it allows the spreading of risk between parties and reduces the variance of risk for each

person. It is also well known, however, that insurance programs are an important component of the risk management strategy only in wealthier countries. In poorer countries, the role of insurance is very limited in covering the (material) losses caused by disasters. It cannot be expected that this situation will change soon as in the poorer countries there is also a lack of demand for calamities insurance.

Preparedness, "involves building an emergency response and management capability before a disaster occurs." (Freeman et al 2003: 9) Disaster preparedness includes various activities such as: (1) training programs for response personnel; (2) exercises and drills of emergency plans; (3) education programs to inform citizens; (4) hazard detection and warning systems; (5) identification of evacuation routes and shelters; (6) maintenance of emergency supplies and communications systems; (7) establishment of procedures for notifying and mobilizing key personnel; and (8) individual household measures such as clearing some spaces in a house (e.g. the attic) to make room for belongings in case of a flood.

It is important to note that, unlike the mitigation component that is usually a product of national policies, preparedness projects often work on a smaller scale. They focus more on the actions and practices of organizations and individuals. One of the inherent problems in applying and maintaining disaster preparedness is related to the fact that these are *ex ante* activities. They have to be carried out for events that probably will occur but might not. In the case where many years have passed since the last disastrous event, and the sense of crisis has decreased, disaster preparedness will be more difficult to be maintained. Consequently, outdated plans and warning systems are not unusual. In order to deal with this, it is important to conduct continued public awareness programs using broadcasting agencies, school activities, community programs, advertising in popular events, organizing workshops, etcetera.

6.2 Postdisaster Components

Emergency Response, "refers to actions taken immediately before, during, and after the onset of a major disaster or large-scale emergency to minimize the loss of life and harm to people and their property and enhance the effectiveness of recovery." (Freeman et al 2003: 10–11) This component includes activities such as: (1) hazard detection and warning; (2) evacuation of threatened populations; (3) constructing shelters for victims; (4) providing emergency medical care; (5) conducting search and rescue operations; and (6) provision of emergency water or power supplies, etcetera. The quality of the emergency response is certainly influenced by the quality of the planning and training in the predisaster phase. In other words, appropriate disaster preparedness will lead to an adequate emergency response.

Reconstruction and Rehabilitation, "refers to programs that provide longer-term assistance for people who have suffered injuries or losses due to a major disaster. The objective is to facilitate the return of these communities to their predisaster condition." (Freeman et al 2003: 10–11) This component includes activities such as: (1) repairing and reconstructing houses, public buildings, community facilities and other important infrastructures; and (2) providing livelihood protection throughout the recovery process. Ideally, mitigation measures are integrated in reconstruction and rehabilitation programs and activities in order to prevent recreating initially vulnerable conditions.

7. ACTORS IN DISASTER MANAGEMENT

In the following subsections, disaster management will be distinguished and discussed at three different levels (national, local and international levels). This is a "vertical" point of view where policies, programs, actions and actors are placed within three scales of geo-political entities. This paper uses the geo-political categorization because disaster management in various countries is commonly structured and organized according to it.

Hilhorst (2004: 52–66) examined disaster management from a "horizontal" perspective, and differentiated this field into three social domains that represent different notions, discourses, and experiences in the disaster field:

(1) The domain of science and disaster management with scientists and managers as main actors
(2) The domain of disaster governance with bureaucrats and politicians as main actors
(3) The domain of local responses with local producers and vulnerable people as main actors

The various categories show that disaster management involves a range of (institutional) actors who have their own mandates, expertises and instruments. They include:

(1) The affected communities (victims, vulnerable groups, profiteers, and combatants)
(2) Central government (ministries, politicians, and bureaucracies)
(3) Local governments (governmental institutions, politicians, and bureaucracies)
(4) Local and national organizations (nongovernment organizations), religious groups, etc)
(5) International organizations (humanitarian/relief agencies)
(6) International communities (bilateral and multilateral co-operations, United Nations)
(7) Host communities that receive refugees or displaced people
(8) The media

At the international level, the major organizations in disaster managements include the following ones as shown in Table 1.

Table 1. Major Organization in Disaster Management

Organizations		Activities
Asian Disaster Preparedness Center	**ADPC**	Capacity building for preparedness Mitigation and response through training Technical assistance Research and information
European Community Humanitarian Office	**ECHO**	Humanitarian aid Disaster Preparedness Programme (DIP-ECHO), including human resource development, institutional strengthening, and low cost technology projects
Office for the Coordination of Humanitarian Affairs	**OCHA**	Coordination of international emergency response Policy development Early response and prevention
Food and Agriculture Organization	**FAO**	Global information and early warning System for food and agriculture Preventive and mitigating activities in agriculture Preparedness measures and food stocking Sustainable rehabilitation of rural production system
United Nations Development Programme	**UNDP**	Rehabilitation and preventive activities Capacity building, training and planning
United Nations Educational, Scientific and Cultural Organization	**UNESCO**	Promotion and mobilization of scientific knowledge Technical assistance in monitoring and early warning systems Information, training and dissemination International mobile warning system for volcanic eruptions International tsunami warning
World Bank	**WB**	Disaster management facility
World Food Programme	**WFP**	Food emergency aid Early warning and preventive measures
World Health Organization/ Pan American Health Organization	**WHO/ PAHO**	Health care, water and sanitation Research, documentation, communication, and international cooperation Disaster documentation center
World Meteorological Organization	**WMO**	Collection, analysis, and transmission of meteorological and hydrological data Research, training, and communication

Source: Frerks et al (1999: 56)

In the practice of disaster management, these categories/actors (both the "vertical" as well as the "horizontal" ones) are intertwined. In doing the work, each actor is unavoidably influenced or even limited by other actors in the scene. The providers of humanitarian assistance for example, have to deal with the needs of the affected population, the policies and political decisions of the central and local governments, the activities of other relief agencies and the work of the media. Although this

intertwinement is unavoidable and vital, it is not always advantageous for the quality of disaster management. From reports and media coverage we have also learned about conflicting interests and mandates, miscommunication, problems in coordination and even distrust among the actors in the disaster management scene, which hampered the provision of help and support.

Box 2. The International History of Relief

The international history of relief starts when, after the Battle of Solferino in 1859, the first Societies of the Red Cross were established by Henry Dunant. In 1864, the first Geneva Convention, a multilateral agreement on the Red Cross, announced the start of humanitarian law and practice. In 1922, the Red Cross Societies established the IFRC (International Federation of the Red Cross) later called IFRC-RCS (IFRC and Red Crescent Societies). Until today, this organization has a special mandate and status on the basis of international law.

Immediately after the second World War, in 1946, the UN's Children's Fund (UNICEF) was founded. In 1963, FAO's World Food Programme (WFP) was established and by 1972 the UN established UNDRO (UN Disaster Relief Office) in order to co-ordinate the efforts of disaster relief. Presently, 16 different UN agencies have a mandate allowing them to work in emergency situation.

The first international NGOs concerned with relief originate from the end of the 19th century, usually with a focus on war-torn Europe. Following the second World War the scope and number of religious and charitable bodies involved in "overseas" aid work started to grow. This was exacerbated since the early 1980s, when due to the problems with relief management many disaster relief donor agencies were willing to shift their resources from governments to NGOs. This was, among others, related to the fact that according to their mandates, government donor agencies should coordinate closely with recipient governments, which often led to problems. Many of the governments involved were shown to divert the food aid or other resources towards supporting their own military forces or political allies. NGOs had the advantage that they could work in situations where international agencies could not justify their presence.

> … Besides, nongovernmental organisations were considered more efficient and participation-oriented than (international) government agencies. This shifting interest of donor governments gave impetus to mushrooming of national and local NGOs. New international NGOs emerged in reaction to the practice of older NGOs. An example of these is Médecins Sans Frontiéres, that explicitly combines relief work with advocacy concerns. Some of the international NGOs have grown in scope where they can be found at almost all disaster situations in the developing world. These include Medecins Sans Frontieres (MSF), Oxfam, Save the Children Fund, CARE, CONCERN, and International Rescue Committee (IRC). (Frerks et al 1999: 54-57)

8. DISASTER MANAGEMENT AT THE NATIONAL LEVEL

The Asian Development Bank provides an example of a National Disaster Organizational Structure with important features as follows:

(1) The structure is centered at a National Disaster Council. This body gets the mandate from the cabinet and maintains networks and cooperation with international assistance.

(2) To implement its tasks, the National Disaster Council has an operational body, namely the National Disaster Management Office.

(3) The National Disaster Council has three divisions with specific tasks; namely, preparedness/mitigation division, response division, and recovery division.

(4) The preparedness/mitigation division works with:
- Government departments/ NGOs
- Provincial disaster committees
- Local government committees.

The work of this division is especially conducted in communities.

(5) The response division works with:
- Operation control group
- National emergency operations center
- Government departments/NGOs
- Provincial disaster committees
- Local government committees

The work of this division is mainly in the disaster areas.

(6) The recovery division works with:
- Technical advisory team
- Government departments/ NGOs
- Provincial disaster committees

The major work of this division is designing and implementing recovery programs.

This structure depends on the national government. "There is, however, disagreement in the literature regarding the advisability of depending on national government as the appropriate foundation for a comprehensive program," because "…focusing natural disaster policy through existing government systems enhances narrow power structures and draws away from local concerns and initiatives" (Freeman et al 2003: i). Proponents of this view prefer community-based projects and programs that are developed by NGOs. Although this way cannot guarantee the quality of risk management, it is closer to affected people (thus more likely to capture their needs) and can directly empower the local populations (Freeman et al 2003).

Beside the necessity to find a suitable structure, an effective design of a national disaster management system also needs to have:

(1) An explicit and appropriate national strategy

Each country has it own specific circumstance that is determined by some factors such as of the sociopolitical situation; the geographical condition including the types of hazards the country faces; the nature of institutional arrangements of the disaster system (e.g., the composition of the parties involved), etcetera. In this regard, each country needs to develop strategies that are appropriate for its specific circumstances. In order to achieve this, the involvement of various stakeholders, who can bring to the fore different perspectives and expertise, is necessary. Nevertheless, it is important to recognize that this development might take a longer time (of "trial and error") than a few conferences or workshops, because an appropriate national strategy for disaster management is also a result of learned lessons.

(2) Key actors cooperation and coordination

As mentioned before, disaster management consists of various actors who are intertwined with each other. Instead of a "messy" one, the intertwinement needs to be articulated in cooperation and coordination. Learning from different national disaster systems, Freeman et al (2003: 27–28) argued that:

> The most successful systems take advantage of existing government structures and involve national, provincial, local, and community government as well as ministries and other institutions. Essential institutional players are ministries (such as the ministries of finance, health, and education), organizations (such as military units and civil defence), regional and local government entities, NGOs (such as the Red Cross), international aid and finance organizations, private sector actors, and local communities. The key to the success of these systems is the interaction between the coordinating bodies and institutional players.

It is also emphasized that "It is essential to understand the values, goals, and objectives of the relevant stakeholders in a national system and recognize that they may conflict with each other. The challenge is to construct a program that is viewed as more desirable than the status quo for these key interested parties" (Freeman et al 2003).

(3) Political sustainability

A disaster management system will be politically sustainable when:

- It is well integrated with overall development goals.
- It is supported by legislation which provides a formal basis for preparedness, mitigation and recovery actions; formulates major responsibilities in legal form; provides protection for government (bodies), organizations and individuals in conducting their tasks during the process of managing disasters.
- It is supported by continued public awareness of disaster risks, particularly during and through periods when there are few disaster events.
- The actors in charge (institutions and individuals) are accountable for their responsibilities in different phases of disaster management.

(4) Financial sustainability

In order to function effectively, a national disaster management system should have financial resources for at least three major expenditures; namely, the ongoing operation of a national system, the implementation of mitigation measures and the

postdisaster reconstruction. Therefore, it is crucial to have sufficient financial resources; or in other words, to be financially sustainable. Two methods can be applied to ensure financial support for a National Disaster Management System:

- Committing to a long-term financing contract with reinsurance companies, investors or international institutions.
- Responding to pressure from the finance community.

(5) Well-functioning information system

The importance of information flows is increasingly acknowledged in the disaster management sector. World Disaster Report 2005 examines various aspects of information collection and dissemination during different phases of disaster. According to the report,

> Information is a vital form of aid in itself—but this is not sufficiently recognised among humanitarian organizations. Disaster-affected people need information as much as water, food, medicine or shelter. Information can saves lives, livelihoods, and resources. It may be the only form of disaster preparedness the most vulnerable can afford. Yet aid organizations focus mainly on gathering information for themselves and not enough on exchanging information with the people they aim to support.

Information flow between aid givers and receivers during and after a disastrous event is, however, only a part of the information need in an emergency situation. An effective national disaster management system should have well-functioning information systems and networks before, during, and after disasters take place.

According to Rego (2001: 1–2)

> The information needs of disaster managers fall into two distinct, but closely related, categories of activities:
>
> - *Predisaster activities*: analysis and research (to improve the existing knowledge base), risk assessment, prevention, mitigation, and preparedness; and
> - *Postdisaster activities*: response, rehabilitation, and reconstruction.
>
> Accordingly, there are two categories of disaster-related data:
>
> - Predisaster *baseline data* about the country and risk; and
> - Postdisaster *real time* data about the impact of a disaster and the resources available to combat it.
>
> Key elements of a disaster management information system would be a data base of:
>
> - Hazard assessment mapping
> - Vulnerability assessment
> - Demographic distribution
> - Infrastructure, lifelines, and critical facilities
> - Logistics and transportation routes
> - Human and material response and resources
> - Communication facilities

Box 3. Disaster Management Information System in the Philippines: An Example

"The National Disaster Coordinating Council (NDCC) is the highest policy making body in disaster management in the Philippines. In 2000 NDCC has started installing an Emergency Management Information System that will link up all their regional centres electronically and make available vital information to the public through the internet. The new system will have four components:

1. Emergency Reporting and Monitoring
2. Emergency Logistics Management
3. Emergency Fund Management
4. Geographic Information System

The Advanced Geographic Information Display System has been established at the Philippines National Disaster Management Center in Camp Aguinaldo, Manila. It is linked to all member organizations of the NDCC as well as the regional offices of the cffice of civil defence which form the secretariat of the regional disaster coordinating councils. The integrated data base comprises spatial information comprising Digitized Maps, Aerial Photos, Satelite Data while the nonspatial data on display covers History of Disasters, Demographic Database, Response Teams and Directory of Key Contacts and Resources. NDCC is also assessing the existing system for early warning to identify areas for upgrading and enhancement." (Rego 2001: 5–6)

In addition, as Rego (2001: 1) stated:

> The ability of leaders and administrators to make sound disaster management decisions—to analyse risks and decide upon appropriate counter measures—can be greatly enhanced by the cross-sectoral integration of information. For example, to understand the full short and long-term implication of floods and to plan accordingly requires the analysis of combined data on meteorology, topography, soil characteristics, vegetation, hydrology, settlements, infrastructure, transportation, population, socioeconomics and material resources. This information comes from many different sources and at present it is difficult in most countries to bring it all together.

9. DISASTER MANAGEMENT AT THE LOCAL LEVEL

Although the social, economic, political, and emotional impacts of major disasters can be nation-wide, disastrous events are mostly local in their impact. Indonesia certainly was "hurt" by the tsunami in December 2004, but the actual devastating event happened in the province of Aceh, where most major disaster response and recovery activities took place. Consequently, the locality of the emergency and the ways to deal with it are unavoidable and crucial.

Many countries have designed their disaster management systems at national level, however, there is a growing awareness that comprehensive disaster management systems should not only depend on central authorities. The system should be strengthened by integrated involvement of local actors and capacities (knowledge, expertise, resources, networks, etc.). In many cases, local communities have organized committees to respond

to emergencies because—in the first place—people rely on themselves and their community to survive. "It has been estimated that no more than 10 percent of survival in emergencies can be attributed to external sources of relief aid" (Hilhorst 2004: 62). With regard to this, it is important to examine the necessities and possibilities of increasing the involvement and participation of local actors in the national effort to manage disasters.

9.1 Local Knowledge

Recognition of the important role of local actors and capacities in coping with emergencies leads us to the issues of local knowledge. Studies (Bankoff 2003; Blaikie et al 1994) shows that people—especially those who inhabit disaster-prone areas—have developed extensive knowledge and practices on how to cope with disasters. This type of knowledge and practices are often labelled as "local" (and thus, regarded as different from the nonlocal, modern scientific knowledge). For some researchers and practitioners, local knowledge is information stock that can be of use for disaster management. For some others, local knowledge is regarded more as a source of political and economic empowerment of local/affected people. There is something true in both views; a comprehensive disaster management plan should have the flexibility to adopt knowledge and practices developed by communities at risk, especially if the involvement of the local community is considered important.

9.2 The Potential Local Actors

For a comprehensive Disaster Management System, the involvement of a wide range of local actors is needed. These actors are:

- Local government and its administration units.
- The community: affected population or population at risk, community leaders, community-based organizations.
- Local representatives of different sectors, both the public administration (e.g., health, education, transport, environment, and public works) and the private sector (technical and educational institutes, firms, the media).
- Local emergency response organization (e.g., emergency committees, fire-fighters, Red Cross, brigades, NGOs, etc.) (Bollin et al 2003).

Box 4. Construction of Local Disaster Management in the Philippines: An Example

"In the 1970s, policy principles were established to encourage each local government to take responsibility for its own security with respect to disaster response and the assignment of function to all public agencies at different government levels. Presidential Decree 1566 of 1978 set the basis of the disaster response organization and of the National Plan for Community Preparedness.

Structurally, the executive branch of government at each level is responsible for the different activities related to prevention, mitigation, preparedness, response, and reconstruction. The national government has the function of supporting local governments in cases of emergency. Each state agency must use its own resources to fulfil its responsibilities in its area of authority and to support the localities. Although this is very new and has weaknesses, the localities must include resources in their annual budgets for mitigation and preparedness activities. However, by law each locality must also earmark 5% of its regular resources each year for the Local Calamity Fund, which has the exclusive goal of responding to postdisaster situations that arise in its territory. The Local Funds are managed by the local governments. In addition, they are subsidized by the central government through the National Calamity Fund.

The National Plan establishes the mechanisms of coordination and horizontal and vertical integration between the various state agencies at the different levels and the private sector and civil society. At each territorial level, there is a Disaster Coordination Council, presided over by the respective head of the territorial government, with the objective of advising that government and guaranteeing institutional coordination.

In the local environment, civil society organizations participate in the planning processes and in operational aspects. Many local projects are carried out by community organizations or by NGOs. Economic protection measures, such as insurance, have been delegated to the private sector and NGOs, and structural mitigation measures are the responsibility of engineering and architectural organizations." (Bollin et al 2003: 10)

Each of these potential actors has different expertises, functions, resources, responsibilities, and interests. The crucial thing, therefore, will be to coordinate them in order to achieve common goals. The specificity of each actor should be carefully considered because it is the basis for determining function and assigning tasks of particular actors in disaster management. Nevertheless, the potential local actors do not always have the motivation to participate in disaster management. A combination of incentives provision, public awareness campaign, provision of technical assistance, and supervision might help to increase interest.

10. DISASTER MANAGEMENT AT THE INTERNATIONAL LEVEL: THE CASE OF ASEAN

The Southeast Asia region has been exposed to different kinds of hazards for centuries. Communities in this region have a long history of coping with these hazards. Floods are the major hazard in Cambodia, the Lao PDR, and Vietnam during the monsoon season. Indonesia and the Philippines are situated in the Pacific Ring of Fire and are periodically hit by earthquakes and volcano eruptions. Over the past twenty years, natural and man-made disasters in the Southeast Asian countries have been more and more influenced by social processes such as rapid urbanization, demographic changes, and intensification of human activities in many aspects. The calamities have a great impact in terms of casualties, economic loss and disturbed activities. In many cases, the afflicted country could not deal with the disastrous situation on its own. Disaster occurrences urge international solidarity and cooperation, therefore disaster management at the international level is often inseparable from similar efforts at the national and local level. This is especially the case in a disaster-prone region such as Southeast Asia.

10.1 The ASEAN Committee on Disaster Management (ACDM)

In 1971 disaster management experts in the ASEAN Region formed the ASEAN Expert Group on Disaster Management (AEGDM) and met every two years. Five years later, the issue of regional cooperation in the field of disaster management was adopted as one of ASEAN's objectives and principles stipulated in the declaration of ASEAN Concord-1. This was further operationalized into the ASEAN Declaration on Mutual Assistance on Natural Disaster in June 1976.

The 12th Meeting of the ASEAN Expert Group on Disaster Management (AEGDM), held on 16–18 September 2002 in Hanoi, Vietnam, agreed to restructure the AEGDM into an ASEAN Committee on Disaster Management (ACDM). To intensify ASEAN cooperation in disaster management, the Committee also decided to meet annually instead of once every two years. In the process, the ACDM has also been supported by the United Nations High Commissioner for Refugees (UNHCR).

The members of ACDM are:
1) Brunei Darussalam Fire Services Department
2) Cambodia National Committee for Disaster Management
3) Indonesia National Coordination Board for Natural Disaster Management
4) Lao PDR National Disaster Management Office
5) Myanmar Ministry of Social Welfare, Relief, and Resettlement
6) Philippines National Coordinating Council
7) Malaysia National Security Division
8) Singapore Civil Defence Force
9) Vietnam Dyke Management

The ACDM has a wide range of activities that cover various disaster management components (mitigation, preparedness, response, recovery, and rehabilitation). These activities are among others:

- Exchanging views on strategic and emerging issues involving disaster management and relief activities in the ASEAN Region.
- Formulating and implementing the ASEAN Regional Program on Disaster Management (ARPDM) that outlines regional strategies, priority areas, and activities on disaster management.
- Providing assistance in securing financial support and seeking funding for ASEAN activities in disaster management.
- Promoting the sharing of information and resources on disaster management.
- Collaborating with ASEAN's Dialogue Partners; regional, international, and multilateral agencies; NGOs and the private sector in advancing the objectives of ASEAN cooperation in disaster management.
- Strengthening capacities in the areas of priority concern and in accordance with the needs of member countries.
- Advancing the active involvement and participation of various stakeholders in disaster management including the UN agencies, international organizations, NGOs, and communities.
- Facilitating the coordination and distribution of medical supplies, services, and relief assistance when needed.
- Promoting effective integration of programmes and activities with other relevant ASEAN bodies.
- Supporting advocacy, public education, and awareness programs.
- Providing advice to the ASEAN Standing Committee on matters relating to disaster management.

These activities focus on the following various categories of disasters:

- Natural Disasters such as earthquake, aftershock, flood, flash flood, dam collapse, heat wave, typhoons, storms, hailstorm surges, thunderstorm, tropical storm, insect/animal infestation, landslide, tidal wave (tsunami), volcanic eruption, etcetera.
- Man-made disasters such as structural collapse, mine collapse or cave-in, air disasters, industrial technology accident, chemical, nuclear, mine and other types of explosions, pollution, acid rain, chemical, atmospheric and oil pollution as well as various types of fires (for example forest/grassland fires), etcetera.

10.2 The ASEAN Regional Programme on Disaster Management (ARPDM)

Additionally, in the Hanoi meeting, the ASEAN Regional Program on Disaster Management (ARPDM) was endorsed. This program was formulated with the assistance of the Asian Disaster Preparedness Center (ADPC).[3]

The ARPDM is a comprehensive program that would help ASEAN anticipate and forecast possible disasters, improve the readiness of the region in terms of disaster awareness and response preparedness, and plan to mitigate hazard impacts. The program has five objectives, namely

[3]Asian Disaster Preparedness Center (ADPC) is a nonprofit organization supporting the advancement of safer communities and sustainable development, through implementing programs and projects that reduce the impact of disasters upon countries and communities in Asia and the Pacific. ADPC is based in Bangkok, Thailand.

- Establishing cooperation among Member Countries (in the forms of joint projects, collaborative research, and networking).
- Strengthening capacity building in areas of priority concern of member countries and to promote human resources development in disaster management in accordance with the needs of member countries.
- Sharing of information, expertise, best practices, and resources.
- Engaging external partnerships (government organizations, NGOs, community and international organizations).
- Promoting advocacy, public education, and awareness programs related to disaster management.

Not every country will be involved in every project as a precondition for its inclusion in the ARPDM. Some projects may involve only certain countries that are close in proximity or affected by common hazards. In addition, programs at the national level would be opened up for participation by other ASEAN Member Countries.

11. RESPONDING AND MANAGING DISASTER IN DIFFERENT COUNTRIES: WHAT ARE THE LESSONS LEARNED?

In previous subsections, we learn about components of disaster management and important issues related to the application of disaster management at different level. In this subsection, the application will be examined in a specific context of disaster occurrence in four countries namely, the Philippines, the United States, the Netherlands, and Indonesia.

11.1 The Philippines

The Disaster Management System

The National Civil Defence Administration, which was founded in 1954, is a formal government organization to provide basic assistance in times of national emergency in the Philippines. Subsequently, various institutions were established to provide early warning of impending hazards and to coordinate different government institutions in time of calamities. In 1970, the Office of the President established an interdepartmental planning group to coordinate various efforts related to disaster management and to construct a comprehensive relief structure at all levels of government, from the national to the municipal level. The planning group is called the Calamities and Disaster Preparedness Plan (CDPP).

> Once disaster has occurred or in the process of occurring, the principal body charged with disaster management under the provisions of the CDPP is the National Disaster Coordinating Council (NDCC) established in 1978 by Presidential Decree No. 1566. Its membership is primarily composed of the chief executives of those 14 government departments most involved in handling emergency situations together with representatives from the Office of the President, the Armed Forces, and the Philippine National Red Cross. The Administrator of the Office of Civil Defence (OCD) constitutes its executive officer and that agency assumes the main coordinating role for all disaster-related activities. The NDCC has wide-ranging powers and duties including

> the decision to declare a state of calamity in any area of the country and to evaluate the stand-by resources in localities to be used for emergency relief. It generally adopts a 'multi-hazard, multi-agency' approach to emergency management: liaising with the Department of Social Welfare and Development (DSWD) and the Philippine National Red Cross (PNRC) to provide immediate welfare services such as food, housing and clothing; with the Department of Health about measures to prevent or control the outbreak of disease; and with local government units (LGUs) established a network of disaster coordinating councils that can be activated in emergency situations all the way down to the municipal level. The emphasis is on the development of self-reliance among LGUs whose officers-in-charge are mandated to organise disaster operation centres. In reality, though, relatively few of these bodies have prescribed contingency plans or operational procedures beyond the simple doling out of relief goods… (Bankoff 2003: 85)

The huge costs of disaster management measures (prevention, relief, response and rehabilitation) are met by putting a specific amount of money annually into a Calamity Fund. In times of emergency, the NDCC will request the Office of the President to provide required sums from this fund. During the period of 1985 to 1991:

> In all, a total of P14.4 billion (US$576 million) was set aside in the national budgets for disaster management …when losses to agriculture and infrastructure alone amounted to P58.18 (US$2.33 billion) and preventative measures, especially the diversion of lava flows, ran into many billion more. Local government is also expected to reserve 2 per cent, later increased to 5 per cent of their annual budget for disaster preparedness… (Bankoff 2003: 86–87)

Lessons Learned from Eruption of Mount Pinatubo: Experiences in Evacuation Centers

The Philippines is particularly exposed to various natural hazards such as typhoons, floods, earthquakes, and volcanic eruptions.

> In June 1991, the second largest volcanic eruption of the twentieth century took place on the island of Luzon in the Philippines, a mere 90 kilometers (55 miles) northwest of the capital city Manila. Up to 800 people were killed and 100,000 became homeless following the eruptions, which climaxed with nine hours of eruption on June 15, 1991 … The human impacts of the disaster are staggering. In addition to the up to 800 people who lost their lives, there was almost one half of a billion dollars in property and economic damage. The economy of central Luzon was horribly disrupted. In 1991, the volcano destroyed 4,979 homes and damaged another 70,257. (Rosenberg 2001: n.p.)

Although there were evacuees who could be taken into the homes of relatives or friends, a substantial number of those who fled the volcanic eruption had to be sheltered in evacuation centers and later in makeshift houses.

Jimenez (1993) studied stress and coping in evacuation centers in the town of Conception after the 1991 Mt Pinatubo eruption. This study showed that rebuilding daily life in evacuation centers is a complex process both for the evacuees as well as for the service providers. Many of the evacuation centers were school rooms. Initially, one room was limited to housing eight families. But relatives, friends or people from the same neighborhood often preferred to stay together. Mostly, the evacuees did not complain

about the overcrowding, but they had difficulty in getting a good night's sleep because of the constant noise, various smells, and movement of others in the room.

Many of the centers were provided with electricity and water pumps, only a few had bathrooms and toilets. Maintaining cleanliness was, therefore, one of the problems in the centers.

> Committees were created to ensure cleanliness in the rooms, corridors, and grounds of the centers. The evacuees were constantly reminded to keep their surroundings clean through daily inspection by the principals or volunteers teachers, daily exhortations or reprimands over the sound system. Once a week, the rooms were also sprayed with insect repellants. The women admitted that the centers were cleaner because of the constant supervision of the teacher. (Jimenez 1993: 136)

Organizations among the evacuees were also established in the centers. The evacuees made a differentiation between center leaders (over-all leader and room leaders) and the political leaders (councilors, heads of the neighborhood, etc.). There were also various committees in the centers but the most familiar one is the committee dealing with cleanliness of the centers.

The goods they received were one of the important issues among the evacuees.

> … they compared the contents of the various packages (designated only by numbers) and identified their favorites. … In general, they agreed that the Red Cross gave more rice while the DSWD [Department of Social Work and Development – RM] had more plentiful viands, although they also recalled a time during the early days when the DSWD was generous with its rice allocation. The Red Cross allotted the same amount to every family, regardless of size, thus benefiting the smaller families. On the other hand, the DSWD gave an amount of goods which was proportionate to the family size … With the passage of time, the evacuees worried about the significant decrease in donations from NGOs and concerned individuals, leaving them virtually dependent on the allocations from the DSWD or the Red Cross. They voiced their apprehensions that distribution would eventually end. (Jimenez 1993: 138)

It is important to note that a clear pattern of day-to-day activities was soon established among the evacuees in the centers.

> As more time elapsed the men continued to leave the center every morning to search for jobs or to simply pass the time in their old *barangays*. The jobs they found in town included vending ice candy, buying and selling old bottles. Beyond the town or in other provinces, they could find short-term work contracts. In the mean time, the women cooked the meals, did the laundry, cleaned and looked after children. Many took laundry for pay, tended small *sari-sari* stores or sold cooked food within the centers … the children were integrated into the ongoing classes in town or the temporary classes established in their centers. It was the older children in high school and college whose studies suffered as their parents could no longer afford to send them to school. (Jimenez, 1993: 139)

It is reported that, in general, the evacuees did develop daily routines in the centers. But this was very different from their lives in their villages and neighborhoods. Despite the routine, evacuees complained that they did not have enough to do. Receiving relief goods was one of the few high points of daily life in the evacuation centers.

11.2 The United States

The Disaster Management System

The United States has comprehensive programs at the national level to manage disasters. In general, the major stakeholders to manage disaster in the United States are as follows:

- State and local governments
- Risk transfer instrument capital market for catastrophic loss protection
- Federal government agencies, including The Federal Emergency Management Agency (FEMA)
- Primary insurance companies
- Financial institutions
- Building sector

Nevertheless, in emergency situations, FEMA is responsible for the centralization and co-ordination of various disaster management components at the national level. FEMA is, therefore, one of the key institutions of disaster management in the US.

With the increase in prosperity and the standard of living in the US during the 1960s and 1970s, the impact of natural disasters was regarded as more burdensome. It was felt that the federal government should play a stronger and more coordinating role. Although the Department of Housing and Urban Development had an agency for disaster response and relief, more than 100 federal agencies also had responsibilities related to disaster assistance. The federal government therefore needed to play a stronger and coordinating role. The 1968 National Flood Insurance Act and the 1974 Disaster Relief Act have given a more important role to the federal government. In 1979, an Executive Order from President Jimmy Carter merged various separate disaster-related responsibilities and tasks into FEMA. This association included:

- The Federal Insurance Administration
- The National Fire Prevention and Control Administration
- The National Weather Service Community Preparedness Program
- The Federal Preparedness Agency of the General Services Administration
- The Federal Disaster Administration Activities from the Department of Housing and Urban Development.

In addition to its centralizing and coordinating tasks, FEMA has developed HAZUS, a multihazard tool with models for estimating potential losses from earthquake, wind, and flood hazards.

Besides the comprehensive programs to manage disasters, in the US there are loss-sharing programs that involve government and private market institutions. These programs are public/private insurance systems to finance recovery. The National Flood Insurance Program

(NFIP), for example, is based on insurance policies offered by the private sector, but the national government assumes the risks and automatically plays the role of reinsurer.

Lessons Learned from Hurricane Katrina: Powerful Country, Weak Disaster Response?

Unlike the tsunami in Aceh or the earthquake in Pakistan, Hurricane Katrina that hit New Orleans in August 2005 was a predicted natural hazard. Before Katrina arrived, the National Hurricane Center in Miami had predicted several other hurricanes that arrived in the same season: Arlene, Bret, Cindy, Dennis, etcetera. Experts even said that Hurricane Ivan, which also hit the same areas in September 2004 as a Category 4 storm, was a "wake-up call" for New Orleans. Nevertheless, the world witnessed disturbing images of completely devastated New Orleans and heated discussions on how and why the US was not as prepared as it could have been. Widespread looting, hungry refugees, corpses left on the street to decompose were regarded as "third world phenomena" in disaster situations, but this happened in New Orleans, in the US.

The disaster management practitioners of New Orleans saw how Katrina was approaching the city. Three days before the hurricane hit New Orleans, the Governor of Louisiana declared a state of emergency so that measures such as compulsory evacuation could be done easier. Nevertheless, concrete measures had not been taken yet. The Mayor of New Orleans, Ray Nagin, decided to announce an evacuation only 38 hours before Katrina came, while according to the guidelines of Louisiana State, evacuation should be decided 50 hours before a hurricane arrives. He urged the inhabitants of New Orleans to undertake the evacuation voluntarily. One day before the disastrous event occurred, when it was clear that Katrina would be a Category 4 or 5 storm, Mayor Nagin declared a compulsory evacuation. Most residents did leave the city. For those who decided to stay or were not able to leave the city, there were public shelters available including the Superdome football stadium. By Monday, 29 August 2005, Katrina made landfall as a Category 4 storm. One day later, 75 per cent of New Orleans was flooded, with some parts of the city under 6 meters of water. The devastating flood was especially caused by several levee breaches. Hurricane Katrina was catastrophic and the US was shocked by one of the deadliest natural disasters in the country's history.

There are critics on the way disaster management-related institutions responded to Hurricane Katrina. There was even mention of "Katrinagate" which would have a negative impact on the Bush Administration. Besides the fact that the evacuation announcement was rather late, the decision to enforce an evacuation was undermined in two ways:

> First, no provision appears to have been made for those without private transport and without resources. The flood of buses that came in to relocate who took shelter in public arenas should have come in before Katrina not after it. Second, the announcement that public shelters were available made the message to leave seem less convincing. People search for some way to discount a warning. (Scanlon 2005: n.p.)

The ways authorities handled the "looting" in New Orleans after the disaster occurred was also criticized:

> The problem in New Orleans, of course, was that those who survived often did not have the capacity to do what needed to be done. Many were trapped in their homes unable to help themselves let alone help others. Most—including those who sheltered in public facilities— were soon short of water, food, clothing and sanitary facilities. It was urgent that there be: a) a massive relief effort and b) a massive search and rescue effort to find those who were trapped and to help them … some of those who survived did do what they could to help themselves. Given their desperate need for liquid they found sources for fresh water and, where necessary, did what was needed to get that water. If that involved breaking into a store, that is what they did. They did the same thing when they needed food or diapers or fresh clothing. If the authorities wanted to prevent this they had the two options described above. They would have got the people out or they could have brought supplies in. Sadly, the authorities choose to view the situation in New Orleans after Katrina not as one involving desperate people urgently in need of assistance but as a situation requiring law and order. So the police—though reluctant at first—began to crack down on what they were being told was "looting" and the military arrived with a show of force. (Scanlon 2005)

Inadequate available public shelter is another point of criticism. The Superdome football stadium for example, did not meet the international standards as an evacuation center.

FEMA was seen as less than able to handle the emergency situation in New Orleans. Disaster management practitioners of the city complained that FEMA was not able to lead and coordinate the relief operation, although the agency had been in the disaster site for three days. Since its establishment during the Carter administration in 1979, this agency has faced various constraints, "It has been an agency torn by turf fights along program lines, overburdened with political appointees, … and perceived of by other agencies as claiming more power to coordinate the rest of the government than it had muscle or capability" (Perrow 2005: n.p.). The "poor" performance of FEMA in the Katrina disaster is also associated with the fact that since 2001 FEMA has undergone financial cuts to its disaster mitigation projects and that, in 2002, this agency was moved to the Department of Homeland Security with the priority of fighting terrorism. The National Guard troops that are supposed to support FEMA in relief operations had to come from all over the country. Officially, thousands of National Guard troops were stationed in Louisiana and Mississippi but most of them were in Iraq (NRC Handelsblad 3 September 2005).

Table 2. Katrina and Measures Taken by the Government: A Week-Long Overview

Date	Situations/ happenings related to Katrina	Measures taken in New Orleans
Friday August 26	Katrina was approaching the Gulf of Mexico as a Category 3 storm.	- The Governor of Louisiana announced emergency situation. - Mayor Nagin said that he was aware about the limited time for preparation, but he urged the inhabitants of New Orleans to prepare themselves for the hurricane.
Saturday August 27	The Hurricane Center warned that Katrina would reach the coast within 24 hours as a Category 4 storm.	- Mayor Nagin announced the voluntary evacuation. - President Bush declared Katrina an emergency situation and provided federal support to FEMA.
Sunday August 28	The Hurricane Center urged that measures to protect human life and property should be finished as soon as possible. The Center also warned that waves of more than 6 meteres could occur.	- Mayor Nagin called compulsory evacuation and announced there were public shelters available for those who decided to stay or were unable to leave the city. - President Bush categorized Katrina as a major disaster and decided to make extra funds available to help.
Monday August 29	Katrina struck New Orleans and most parts of the city were flooded.	- FEMA asked city authorities what kinds of help and assistance they needed. - The evacuees were not allowed to return to their homes for two days.
Tuesday August 30	Two levees broke, the "looting" started, hundreds of deaths were predicted. It was clear that people would need shelter for months.	- 7,500 National Guard troops were mobilized. - FEMA started to send medical teams, rescue helicopters and rescue boats.
Wednesday August 31	The casualties were expected to number in the thousands.	- The Pentagon sent extra rescue helicopters, military, food, and boats.
Thursday September 1	Relief workers found thousands of people still trapped in New Orleans Convention Center amid mounds of trash and human waste.	- The first food drops. - The Governor of Louisiana gave permission to the military to shoot people involved in looting. - Bush provided US$10.5 billion of relief funds.
Friday September 2	The flood was slowly decreasing.	- President Bush admitted that the quality of first emergency relief was "unacceptable".

Source: NRC Handelsblad, 3 September 2005.

11.3 Indonesia

Disaster Profile

Indonesia is well-known as an active tectonic region and it is located at the intersection of three tectonic plates, namely, (1) Eurasian plate in the north, (2) Australian-Indian plate in the south, and (3) Pacific plate in the east.

The plate movement generates convergent boundaries which form subduction zones. These zones are notorious for producing disastrous earthquakes because of intense geological activity. If these earthquakes occur under the ocean they can create tsunamis, such as the earthquake caused by subduction of the Indo-Australian Plate under the Eurasian Plate on 26 December 2004, that caused devastation in the areas around the Indian Ocean.

In addition, there are more than 500 volcanoes in Indonesia, 128 of which are active. This represents some 15% of the active volcanoes in the world. The most active volcano in Indonesia is Merapi, which is situated 20 kilometers to the north of Yogyakarta. This volcano has been observed continuously by means of telemetric equipment as well as field observation. Thus, volcanic eruption disasters can be mitigated very well. Many others are also closely monitored in order to minimize the impact of volcanic eruptions.

Other natural disasters which are generated or exacerbated by human activities are floods, landslides, drought, land/forest fires. These are believed to result from land or environmental degradation. In the monsoon season, Indonesia is threatened by floods and/or landslides and in the dry season (April–September), the country periodically has to face drought and various fires (forest, land, urban/building). Drought also can affect hydro-power supply due to significantly less water in many reservoirs.

Besides natural disasters, Indonesia, as an ethnically, religiously, and culturally-diverse nation, is also vulnerable to man-made and armed-conflict related disasters (ADRC 2004).

Table 3. Disaster Occurrences in 2002–2004

No.	Type of Disaster	Number of Occurrences	Victims		Economic Loss (Rupiah)	Property Damage (Unit)
			Number of Deaths	Number of Evacuees/ Refugees		
			2002			
1	Environmental Pollution	1	0	0	0	0
2	Fire	2	0	0	15,000,000	1
3	Social Conflict	19	258	2,000	0	0
4	Epidemic	2	29	0	0	0
5	Technological failures	1	1	0	0	0
6	Forest fire	3	0	0	0	0
7	Volcanic eruption	12	2	210,005	0	5
8	Tsunami	0	0	0	0	0
9	Earthquake	8	4	700	0	242
10	Typhoon	10	4	0	1,398,950,000	219
			2003			
1	Environmental Pollution	0	0	0	0	0
2	Fire	68	3	176	2,882,422,000	189
3	Social Conflict	0	0	0	0	0
4	Epidemic	1	24	0	0	0
5	Technological failures	0	0	0	0	0
6	Forest fire	0	0	0	0	0
7	Volcanic eruption	6	0	1,289	0	0
8	Tsunami	0	0	0	0	0
9	Earthquake	9	0	2,127	0	542
10	Typhoon	26	6	727	16,335,450,000	339
			2004			
1	Environmental Pollution	0	0	0	0	0
2	Fire	87	18	9,503	158,140,000,000	1,797
3	Social Conflict	5	52	11,585	33,000,000,000	400
4	Epidemic	19	251	0	0	0
5	Technological failures	1	4	0	0	0
6	Forest fire	9	0	0	0	0
7	Volcanic eruption	3	2	13,331	0	0
8	Tsunami	17	22,170	500	1,033,900,000	278
9	Earthquake	19	7,334	6,177	797,332,000,000	13,066
10	Typhoon	67	5,013	2,175	62,311,700,142	6,007

(Source: Bakornas PBP, www.bakornaspbp.go.id)

The Disaster Management System

The government body that is responsible for formulating policies and coordination of programs and activities in the field of disaster management in Indonesia is the Bakornas PBP (Badan Koordinasi Nasional Penanggulangan Bencana dan Penanganan Pengungsi/The National Coordination Board for Disaster Management). This is a nonstructural body established under the Abdurrahman Wahid administration, based on Presidential Decree No. 3 of 2001[4] and reports directly to the President of Indonesia. It is composed of:

1) Vice President of the Republic of Indonesia (Chairman)
2) Coordinating Minister for Peoples Welfare (Vice-chairman)
3) Minister of Internal Affairs (Member)
4) Minister of Social Affairs (Member)
5) Minister of Health (Member)
6) Minister of Public Works (Member)
7) Minister of Transportation (Member)
8) Minister of Finance (Member)
9) Commander-in-Chief of the Armed Forces (Member)
10) Head of National Police (Member)
11) Secretary of Vice President (Secretary)

The Bakornas PBP has three following main functions:

1) Formulating and deciding national disaster management policies and strategies.
2) Coordinating the implementation of disaster management activities before, during, and after disaster occurrence.
3) Providing guidance and supervision on efforts related to disaster management (preparedness, mitigation, response, rehabilitation, and reconstruction) and the handling of refugees.

In performing its functions, the Bakornas PBP is assisted by a secretarial body which has four deputies: Disaster Management, Internally Displaced Persons Management, Cooperation and People Participation, and Administration. The Bakornas PBP, which operates at the national level, is also supported by other bodies at the provincial level (*satuan koordinasi pelaksana* or *satkorlak* PBP) and at the district/municipal level (*satuan pelaksana*: *satlak* PBP). When a disaster occurs, reports from different parties (community leaders, including the head of the subdistrict (*camat*) disaster monitoring teams, will be first given to and handled by the *satlak* PBP. This means, the quality of disaster management (measures and staffs) at the district/municipal level can be crucial to the whole operation.

The main financial source of Bakornas PBP is from the national budget (APBN), while the *satkorlak* and *satlak* will be financed by the regional budget (Provincial APBD and APBD *Kabupaten/Kota*).

[4]This decree has been revised by the Presidential Decree No. 111/2001.

Information Systems and Networks

The Indonesian Disaster Management Information System (SIPBI) was developed by Bakornas PBP through the UNDP funded project on Strengthening Disaster Management In Indonesia. This information system has two aims; first, enhancing Bakornas PBP's decision-making capability and, second, increasing and ensuring the flow of reliable and up-to-date information on various disaster events requiring a disaster response. The scope of SIPBI components includes:

- The development of computer networking systems.
- The development of a database for disaster management.
- The development of Geographic Information System (GIS) for disaster management. The GIS component aims at developing risk maps at the national, provincial, and district level.

Under this project, SIPBI also develops a number of modules on forest fires, earthquake, tsunami, volcanic eruption, and social unrest (Rego 2001).

A nongovernmental organization that also works on information system and networks in the field of urban disaster management is Kompak. This forum, which is based in the Institute of Technology, Bandung, aims to consolidate various mitigation organizations, research institutes, and community based organizations in order to acquire a basis for common understanding and implementation of sustainable urban disaster mitigation. Additionally, Kompak also aims to enhance public awareness and preparedness through information dissemination, and building public and private networks. Kompak develops an internet based communication network and has a newsletter as the communication instrument among its members. The internet has two components: an intranet and extranet. The intranet can only be accessed by the members of Kompak and individuals in Bandung, while the extranet is accessible to the wider public (Rego 2001).

Other Indonesian (governmental and nongovernmental) institutions, which also have research programs and conduct activities in the field of disaster mitigation, include:

- Indonesian Society for Disaster Mitigation (Jakarta)
- Indonesian Forum for the Environment/Walhi
- UGM Center for Natural Disaster Studies (Yogyakarta)
- Indonesian Red Cross
- Indonesian Meteorological and Geophysical Agency (Jakarta)
- Directorate of Volcanology and Geological Hazard Mitigation (Bandung)
- Indonesian Association of Geologists

Lessons Learned From the Tsunami in Aceh: The Problems of Coordination

> The tsunami which devastated Aceh on 26 December 2004 left 164,000 people dead or missing and over 400,000 homeless. It rapidly became the most reported disaster in history as well as the most well-funded disaster response. Over 200 humanitarian organizations—plus 3,000 military troops from a dozen countries—arrived to offer aid.
>
> Local people came to each others' assistance first, despite enormous difficulties. Red Cross volunteers, helped by the army, removed bodies and distributed food and

water. Aid organizations familiar with the terrain—including Indonesian NGOs and the Red Cross—had the benefit of local knowledge. Even so, their baseline data was incomplete, while the government's information was considered outdated.

Neighboring countries were quick to respond. Language and culture proved no obstacle to their teams, which swiftly grasped the immediate need. Yet many international agencies brought in staff from Europe or America, when they could have exploited regional expertise.

Although international agencies were right in guessing that water, food, and shelter would be survivors' initial needs, they were wrong to assume these needs would not be covered, at least partially, by Indonesians themselves. Agencies did little to suppress the myth of disaster victims dependent on external aid to survive.

Collaboration between Indonesian and foreign troops was excellent, but less than good between the military and civilians. Initially, there were no civil-military coordination experts to persuade the military to share information or take aid workers on flights to assess needs. Nevertheless, most agreed that without the military, this would have been a major crisis.

As dramatic stories of suffering hit the headlines, more agencies poured in, expecting the worst. But aid workers arriving at Meulaboh, dubbed 'ground zero' of the western coast, on 4 January were surprised to find survivors being well cared for by the Indonesian army and authorities. A scramble for beneficiaries began. Some agencies jealously guarded their information to ensure their 'niche'. Within weeks, the 'humanitarian space' had become too small for all these actors. Coordination became difficult. Out of 2,000 agencies present in late January, only 46 submitted reports to UN coordinators. Joint needs assessments were rare. Language proved problematic, with UN meetings held in English and government meetings in Indonesian. Without knowing who was doing what and where, some communities were overwhelmed with aid while others were neglected.

At the root of coordination problems was one key factor: too much money. Nearly everyone could hire a helicopter or boat, make their own needs assessment and distributions, and 'fly the flag'. The classic situation, in which NGOs queue to become implementing partners of the UN, was reversed.

The highly 'visible' health sector attracted the most agencies: 22 health NGOs were operating in one area on the west coast. Ten international field hospitals were set up in Banda Aceh, none of which worked at full capacity. There were too many surgeons. One UN witness in Meulaboh saw "20 surgeons competing for a single patient". Yet midwives and nurses were in short supply. Women had to give birth without medical assistance, "an unacceptable risk," according to the UN.

For their needs assessments and aid distribution, most international agencies went through village heads. But a few organizations – concerned that local structures were too patriarchal – deployed female workers to assess women's specific needs. Out of earshot of men, Acehnese women asked for underwear, headscarves, sanitary protection, and the contraceptive pill, as well as complaining about sexual harassment (WDR 2005).

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