

## NATURAL DISASTERS AND EARLY WARNING IN THE CONTEXT OF HUMAN SECURITY

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### Summary

This chapter focuses on the impacts of natural phenomena such as earthquakes and hurricanes or typhoons in terms of fatalities and injuries. In particular, it frames such impacts in the context of human insecurity. Through a comparison of outcomes associated to natural events in developed and developing countries, the document puts forth the notion that developed countries are finding ways to enhance human security, manifested through the minimization of fatalities. Data on fatalities associated with earthquakes, hurricanes and storms spanning the last decades are analyzed in this context, and the notion of early warning is introduced as an example of a measure which can enhance human security in developing countries.

### 1. Introduction

Societies around the world live in an environment which is permanently conditioned by social, technological, and natural factors. The evolution of humanity has been made possible through the control and manipulation of the natural environment. The transformation of raw materials found in nature has allowed mankind to control basic resources such as water, food, and energy; to erect cities, to establish chains of communications spanning land, air, sea, and space; and to diversify wealth and power of selected groups at the expense of other groups or through the control of vital resources and processes. As centuries have gone by, segments of the natural environment have been transformed into a “built” environment of concrete and other technological materials in cities and towns worldwide. In addition, population growth in all regions of the world is leading to the expansion of the agricultural frontier and to the growth of cities into megacities.

However, despite improvements in public health, social events such as wars, riots, and civil unrest, as well as natural events such as earthquakes, tsunamis, floods, and

eruptions are taking a heavy toll on some segments of the population, either in terms of people killed or injured, or in terms of economic losses and damage or destruction of the built environment and livelihoods. Recent social events in some countries of the Middle East, Central America, Africa, and Asia have culminated in vast numbers of fatalities as a result of weak governance or divergent points of view on how to approach and manage critical issues. In contrast, nearly a quarter of a million people lost their lives during the recent Dec. 26, 2004 as a consequence of a very rare, but extremely large tsunami which impacted many countries at once.

While in the case of social and political conflicts fatalities and losses could be avoided, in the case of natural events the lack of knowledge or experience regarding some events like the tsunami, the lack of awareness concerning the destructive power of such events to inflict casualties and losses and the lack in funding to enhance knowledge concerning these events and their impacts are inhibiting such a reduction in losses. But regardless of where such natural phenomena manifest themselves, an emerging conclusion is that developed nations are finding ways to minimize impacts, whereas developing nations continue to experience grave losses in comparison.

If the frequency and magnitude of extreme environmental events such as typhoons or hurricanes and floods continues to grow in future decades as envisioned by the Climate Change community, extreme measures need to be put in place to control the impact of such phenomena, starting with fatalities and injuries provoked by such events. In the context of disaster preparedness, early warning is one such measure that targets precisely the saving of human lives and the minimization of injuries.

## **2. Fatalities, injuries, and human security**

Throughout the centuries people have been involved in social and political conflicts of different kinds and extents. While some of these conflicts are resolved through peaceful agreements, in other cases declared and un-declared wars erupt and cause losses of many kinds, including fatalities and economic losses. While the first and second world wars lasted less than a decade each, the cold war between the United States and the Soviet Union lasted for several decades, also creating havoc in developing countries throughout Asia, Africa, and Latin America. And while rich nations continued to develop throughout this cold war, poor countries which became the battle front in this conflict spent financial resources in military products and wasted decades, stagnating national and local economies, derailing trends in development, and enhancing the gap between developing and developed countries.

In addition to such social and political conflicts, the International Strategy for Disaster Reduction ISDR [2005, WCDR: Review of the Yokohama Strategy and Plan of Action for a Safer World, 6]; the Center for Epidemiology of Disasters CRED [2004, p. 13] and the German re-insurance company Munich-Re [2006, p. 7,8] have been pointing out the fact that the frequency and magnitude of natural events has been on the rise in recent decades, particularly those associated to hydro-meteorological phenomena. Typical impacts caused by such phenomena span fatalities and injuries; damage and destruction of private and public property; economic and social losses, as well as direct and indirect impacts on the environment.

To explain the causes the fatalities provoked by natural or social events one must look into the notion of insecurities, particularly human insecurity. As Brauch (2005) points out, researchers and policy makers speak about securities of different types: national security, public security, social security, food security, environmental security, human security, etc. Fatalities associated to natural disasters would be related to public or human security; whereas wars between countries are related to national security. As stated by the Institute for Environment and Human Security of the United Nations University UNU-EHS (2005, p. 3), “the concept of human security focuses on threats that endanger the lives and livelihoods of individuals and communities”. Considering the seven dimensions of human insecurity (UNU-EHS, 2005, p. 22), fatalities and injuries could be classified under the dimension of personal insecurity.

Along these lines it is important to recognize several aspects associated to fatalities and injuries when comparing the impacts caused by natural phenomena and those caused by political events associated to national security:

- In the case of wars people are fully in control of the event, whereas in the case of natural disasters, people are not in control at all.
- In the case of wars people are killing people explicitly, whereas in the case of natural disasters, no people are killing people explicitly, although it must be recognized that people are exposing themselves to such phenomena incorporating vulnerabilities that lead to fatalities and injuries.
- In relation to financial investments, there is no doubt that major investments are made in research, development, and acquisition of destructive weapons, including those of mass destruction, to provoke fatalities or injuries, whereas modest investments are made to understand the dynamics of natural phenomena and to minimize the impact of natural events on communities.

While the discussion regarding social and political issues associated with national security is out of the span of this document, table 1 presents a comparison of several factors related to wars and natural phenomena.

	<i>Wars between countries</i>	<i>Natural Phenomena</i>
<b><i>Control of event</i></b>	Event fully controlled by human beings. Human beings dictate when it starts and when it finishes.	No control over natural event by human beings (earthquake, volcanic eruption, hurricane, tsunami, etc.).
<b><i>Cause of death</i></b>	People are ordered to kill people.	People expose themselves to natural events for various reasons.
	People are killed with weapons.	People are not killed with weapons.
	Civilians can be killed inside buildings which collapse.	Civilians can be killed inside buildings which collapse.
	Can be justified in relation to “national security”	Not linked to “national security”.
<b><i>Financial issues</i></b>	Major investments on weapons of mass destruction (research, development,	Limited investments to understand dynamics of

	acquisition)	natural phenomena.
<b><i>Relation to political issues</i></b>	Associated to political boundaries (nations, territories) or ideological beliefs.	Not associated to any political boundaries or ideological beliefs.
<b><i>Regrets</i></b>	Regrets over companions lost in the “field of battle”. No regrets for casualties suffered by the enemy.	All fatalities are regretted.

Table 1: Comparison between wars and natural phenomena

In the context of the natural environment, recent events such as the unusually active hurricane season in 2005, the European heat wave in 2003, and similar events could point out to a human insecurity associated with climate change. The destruction of vast forests in many regions of the world throughout the last centuries, enhanced use of petrol-based products in fuels and increasing toxic emissions from industries, typical byproducts of development schemes in developed and developing countries, are considered as the main sources for climate change. In this context it is interesting to note the role of humanity as a culprit in its responsibility for fuelling this process, but also as a victim. It may not be long before those who generate the problem will also become victims of their fate.

However, natural events associated to the geological dynamics of the planet escape the capacity of humanity to affect them or control them. Earthquakes, tsunamis, and volcanic eruptions are events which are generated deep within the crust of the earth, and yet, such events can wipe out entire cities or towns in a matter of seconds or in a very short time. Pompeii in Italy and Armero in Colombia shared the same fate associated to volcanic eruptions. While located in different continents, both towns were practically destroyed by violent volcanic eruptions, which provoked deaths. Earthquakes in China, Turkey, Iran, Central America, Mexico, and other countries have provoked some of the largest catastrophes in recent times.

Nevertheless, similar phenomena taking place in developed countries are pointing out to striking differences when it comes to fatalities and injuries. The ways of life currently employed by civil society; the schemes of development put in practice throughout the private and public sectors in developed nations; as well as resources allocated to natural disaster reduction are minimizing the number of people killed or injured. Such is not the case in developing countries. Whether it is the implementation and enforcement of land-use norms and building codes, the capacity to develop and put into action early warning systems, or the capacity to mobilize resources both before and after the disasters; the comparison in outcomes in terms of fatalities and injuries among developing and developed countries is pointing out to the efficacy of such schemes of development in minimizing such fatalities and injuries in developed nations. Table 2 presents data on fatalities associated to the 15 most recent earthquakes in various countries of the world as reported in the CRED database. The table presents data from developed nations such as the United States, Japan, and Italy; as well as from developing countries such as Iran, India, and Chile. Countries in the list were selected according to their location with respect to fault lines and tectonic plates. The last two rows in the table present the total number of fatalities associated with the 15 most recent events in every country, as well as the fatalities associated to the worse reported event in

the past century. The emerging picture when looking at this table is the fact that developed nations in general are able to minimize the number of fatalities. Recent earthquakes in the United States have provoked 143 fatalities. Italy follows a similar trend with 81 fatalities. Japan suffered major losses and fatalities during the 1995 earthquake, but such numbers remain very small when compared with fatalities associated to earthquakes in Iran, India or in other countries not cited explicitly, particularly China, where deaths associated to earthquakes have surpassed hundreds of thousands of people.

Unites States		Japan		Italy		Iran		India		Chile	
Year	Killed	Year	Killed	Year	Killed	Year	Killed	Year	Killed	Year	Killed
2003	2	2005	1	2003	0	2006	63	2005	1309	1997	8
2001	1	2005	0	2002	30	2006	0	2002	2	1995	3
2000	0	2004	40	2002	0	2006	0	2001	2005	1987	5
1994	60	2003	2	1998	0	2005	612	1999	100	1985	180
1994	0	2003	0	1997	14	2005	13	1997	43	1983	4
1993	2	2003	0	1990	19	2005	0	1993	9748	1971	85
1992	1	2001	2	1990	2	2005	0	1993	0	1966	4
1992	0	2000	1	1984	3	2004	35	1991	1500	1965	400
1992	0	2000	0	1984	1	2003	26796	1988	382	1963	280
1991	2	1995	5297	1984	0	2003	1	1988	2	1960	6000
1990	0	1995	0	1983	0	2003	0	1986	6	1960	570
1990	0	1994	5	1982	0	2003	0	1984	20	1958	0
1989	62	1994	2	1982	0	2003	0	1981	212	1953	12
1989	5	1993	239	1981	12	2002	227	1980	13	1953	3
1987	8	1993	2	1981	0	2002	2	1980	0	1949	35
<b>Total</b>	<b>143</b>		<b>5591</b>		<b>81</b>		<b>27749</b>		<b>33342</b>		<b>7589</b>
<b>(1906)</b>	<b>2000</b>	<b>(1923)</b>	<b>143,000</b>	<b>(1908)</b>	<b>75,000</b>	<b>(1990)</b>	<b>40,000</b>	<b>(2001)</b>	<b>20,005</b>	<b>(1939)</b>	<b>30,000</b>

\* Source: EM-DAT: The OFDA/CRED International Disaster Database;  
<www.em-dat.net - Université Catholique de Louvain - Brussels – Belgium>. Aug. 2006

Table 2: Fatalities associated to earthquakes in various countries\*  
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