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Cycles of Destruction and Reconstruction: Responding to Disasters in Asia

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1.1 Introduction – Disasters in Asia

Over the past decade Asia has been hit by a number of large-scale natural disasters, propelling the region into the global news cycle and making it the center of massive emergency humanitarian operations and reconstruction projects. The 2004 Indian Ocean tsunami, Cyclone Nargis and the Sichuan earthquake in 2008, the 2011 Tohoku earthquake and tsunami, and the 2015 Nepal earthquake have reinforced Asia's status as the most disaster prone region of the world. As discussed throughout this book, these destructive events have ushered in new forms of emergency response and reconstruction projects. In this opening chapter, I provide some broader historical perspectives on the occurrence of major disasters in South, East, and Southeast Asia from 1950 to the present, and the measures put in place to respond to them. Detailed summaries of this material, gathered from a wide range of sources, are included in appendices at the end of the chapter. Additionally, I highlight some of the conversations related to disasters and hazards occurring within academic and policy literature. While it is impossible to fully summarize such a large and diverse region, hopefully this introduction will serve as a useful table-setter for the chapters that follow, as well as a primer for readers unfamiliar with the subject.

Using data obtained from the EM-DAT International Disaster Database, I map out the frequency and damage toll of different forms of natural disasters for a number of countries to establish a baseline for the regular occurrence of disasters, and contextualize periodic mega-events.[1] I have focused on natural disasters such as earthquakes, floods, mass movements (landslides, mudslides, and avalanches), storms (including storm surges), tsunami, and volcanic eruptions, with over 3,000 events included in the data that follow. These constitute the majority of natural hazards in the region, and account for almost all of the fatalities and physical damage. As discussed in more detail below, there is a clear difference between the "normal" frequency of disasters on the list and the much larger events that require unusual measures to rebuild. I have focused attention on countries that have experienced the

Table 1.1. *Raw data for frequency and impact of hazards in the case study countries between 1950 and 2011*

Disaster type	Number of occurrences	Number of fatalities	Total cost of damage in USD
Earthquake	331	524,830	272,585,000,000
Flood	1,271	2,249,997	3,263,514,380
Mass movement (land slide, mud slide, etc.)	274	19,095	2,538,926,000
Storm and storm surge	1,224	875,460	158,195,341,000
Tsunami	22	249,060	222,101,900,000
Volcanic eruption	82	6,839	608,351,000
Total	3,204	3,925,281	659,293,032,380

Source: EM-DAT.

highest rates of disasters and have been involved in large-scale post-disaster reconstruction projects. For each country, I provide a brief discussion of the evolution of national disaster response mechanisms – commenting upon the systems and philosophies, as well as major points of legislation related to disaster response and mitigation. This provides a window into the capacity of nations to manage reconstruction, as well as insights into changing perspectives on post-disaster response in Asia.

Most discussions of disasters in Asia start with the reminder that Asia has more disasters than any region in the world. Given the extent of the geography, size of population, and large areas of environmental instability this should come as no surprise. However, it is also a potentially misleading statement as it homogenizes a huge and vastly diverse region. In order to better understand the history of post-disaster responses it is important to first look in greater detail at the distribution, scope, and extent of natural hazards and their impacts in the region. Regional aggregated data for Asia from 1950 to 2011 (Table 1.1 and Figure 1.1) show the distribution of events by type along three main data series: number of events recorded, number of fatalities, and estimated cost of damage.

It is particularly striking to see that by far the main types of disasters that affect Asia are storms and floods (78 percent by number of events and 79 percent by number of fatalities). While obvious to those dealing with hazards in the region, this has implications for the nature of post-disaster relief and reconstruction. Both of these types of events are part of cyclical weather and environmental patterns, and in some countries are a routine part of life. As will be discussed in more detail in the country profiles below, the "usual" disasters are punctuated by period mega-events, such as the Yellow River floods in China in 1957, the 2011 floods in Thailand, Cambodia, and Laos, and massive cyclones in Bangladesh, Japan, Taiwan, and Myanmar. While storms and floods are major events, highly destructive, and disrupt life for millions every year in the region, they rarely initiate

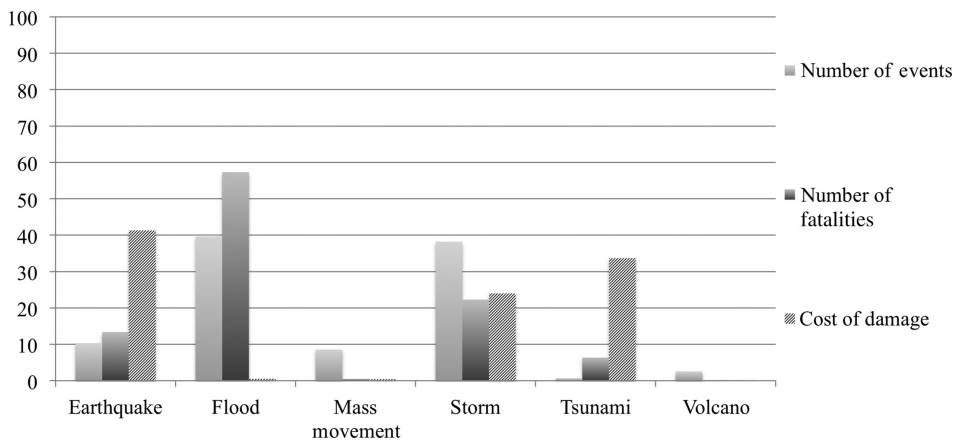
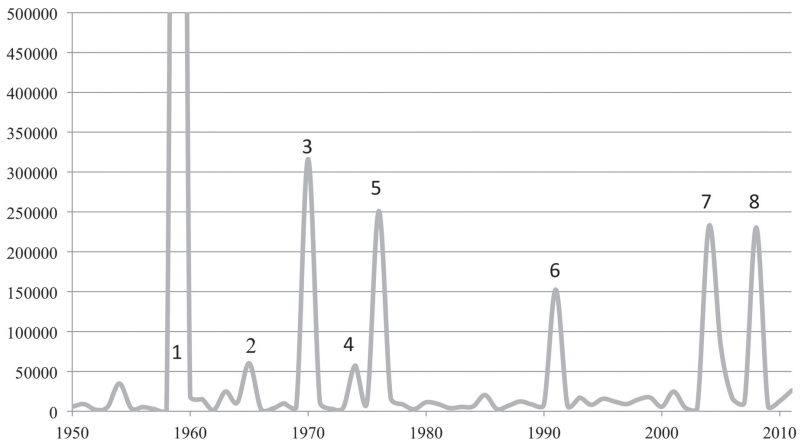


Figure 1.1. The frequency of natural hazards from 1950 to 2011 for the case study countries by percentage of number of events, number of fatalities, and estimated cost of the damage caused in USD.

large-scale reconstruction projects. Most of the major post-disaster reconstruction projects, as detailed throughout this book, are the result of earthquakes and tsunami, which represent only 11 percent of the recorded events and 20 percent of the recorded fatalities, and yet cause 75 percent of the total cost of damage. When looking through the data, it is clear that much of the total cost of damage is the result of a relatively small set of extremely powerful disasters, such as the 1976 Tangshan, 1995 Kobe, 2005 Kashmir, and 2008 Sichuan earthquakes, the 2004 Indian Ocean tsunami, and the 2011 Tohoku earthquake and tsunami.

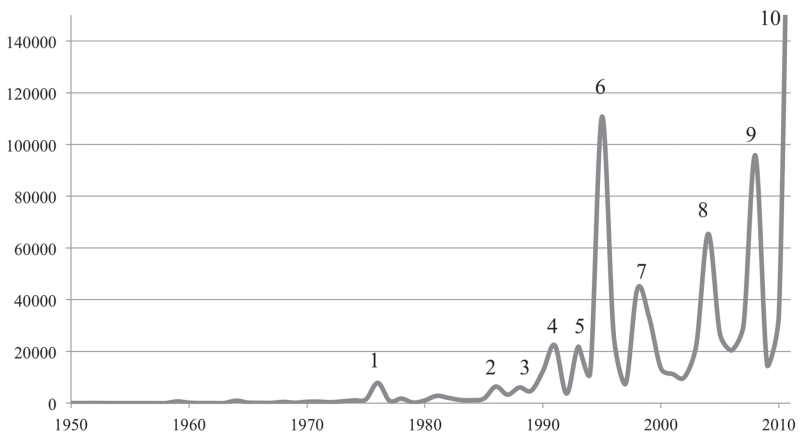
The distribution of events over time in Asia by number of fatalities shows a fairly consistent baseline of deaths that is typically under 20,000 per year, with massive deadly events occurring around once a decade. The latter are generally large earthquakes, cyclones, and the 2004 and 2011 tsunamis (Figure 1.2). There is not always a strong correlation between the death toll and the financial cost of a disaster (Figure 1.3). This has important implications as disasters with high rates of fatalities are more likely to generate larger and better funded humanitarian responses – especially in terms of international assistance. This can be seen in the funding allocated for the 2004 tsunami, which exceeded the actual cost of the damage for the event, whereas funding for the 2010 floods in Pakistan, which caused extensive displacement and hardship, received only a fraction of the attention and funding.

It is not surprising that China has a large percentage of Asia's disasters by number of events, number of fatalities, and cost of damage, but it is important to note that the number of fatalities is greatly inflated by the Yellow River floods, which caused approximately 2,000,000 deaths in a single event. If these are removed, there would be a more even spread of the percentage of fatalities in Bangladesh, India, and Indonesia, which would fall in line with the overall number of events



1	1959	Yellow River flood – China
2	1965	Two cyclones – Bangladesh
3	1970	Cyclone – Bangladesh
4	1974	Flood – Bangladesh & Earthquake China
5	1976	Earthquake – China (Tangshan)
6	1991	Cyclone – Bangladesh
7	2004	Indian Ocean tsunami
8	2008	Earthquake – China (Wenchuan) & Cyclone Myanmar (Nargis)

Figure 1.2. Distribution of recorded hazard caused fatalities for all case study countries showing the events that caused the greatest loss of human life.



1	1976	Earthquake China
2	1986	Cyclone Japan & Flood China
3	1989	Flood China
4	1991	Cyclones Bangladesh, China and Japan
5	1993	Floods China & India
6	1995	Earthquake Japan & Flood China
7	1998	Floods China & Bangladesh
8	2004	Indian Ocean Tsunami, Cyclone Japan & Earthquake Japan
9	2008	Earthquake China & Cyclone Myanmar
10	2011	Earthquake & Tsunami Japan

Figure 1.3. Distribution of recorded costs of damages for all case study countries showing the events that were most expensive in terms of monetary value of damage (in millions of USD).

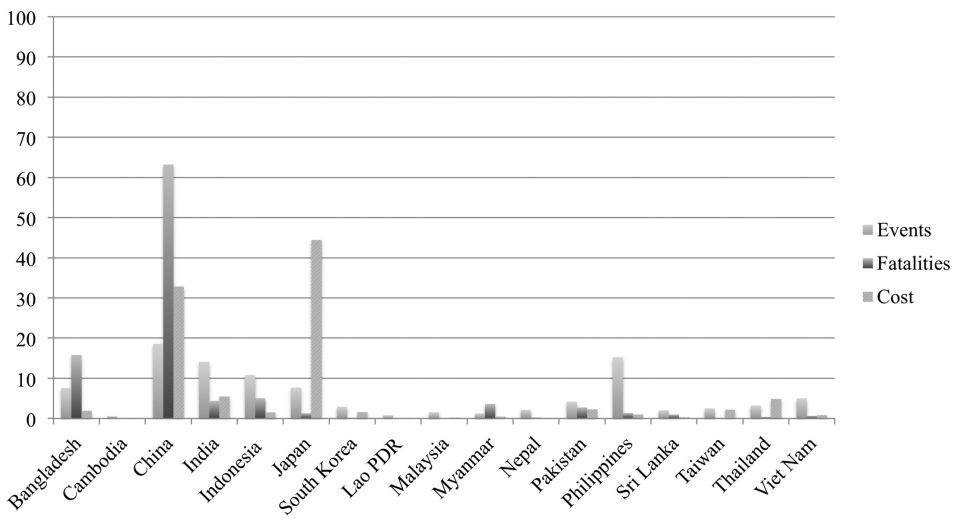


Figure 1.4. Chart showing the percentage of disasters by number of events, number of fatalities, and estimated cost of damage for the seventeen case study countries.

they experienced (Figure 1.4). As one of the most developed countries in Asia, Japan ranks high in terms of cost of damage, most of which was caused by the 1995 Kobe earthquake and the 2011 Tohoku earthquake and tsunami.

1.3 Southeast Asia

1.3.1 Cambodia

Cambodia has suffered relatively low levels of destruction from natural events (although it has experienced significant amounts of destruction from human disasters, including conflict and civil war – the legacies of which are still prevalent throughout the country). Cambodia has a steady rate of up to two significant events per year, with larger and more destructive events every five years or so. The country has experienced eighteen major events since 1950, causing over 1,400 fatalities and costing just under one billion USD (see Appendix A, Table A.1). As shown in Figure 1.5, floods are overwhelmingly the most destructive event in Cambodia, given its large low-lying areas and annual fluctuations of the Mekong River and Tonle Sap Lake (see Chapter 12, this volume for a detailed discussion of the response to the 2011 floods). While it is rare for Cambodia to experience massive loss of life, floods affect hundreds of thousands of people and devastate agricultural production. This is especially important as wet rice cultivation in Cambodia is contingent upon a very complex and delicate system of water flow and provides food for the country, as well as being an important export source (Arias et al. 2012). Much of the conversation within both academic and development policy

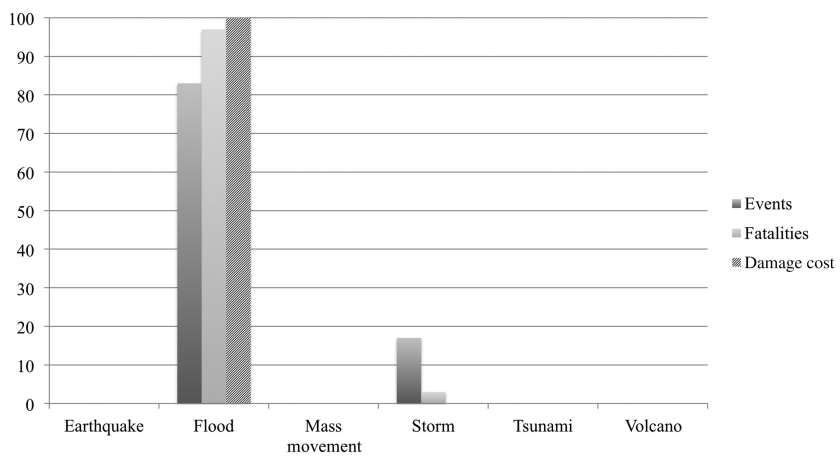


Figure 1.5. Impact of different hazard type for Cambodia between 1950 and 2011 by percentage of hazard occurrence, fatalities, and damage cost in USD.

circles related to Cambodia deals with the impact of flooding, climate change, and human modification of natural water flows for rice cultivation and fisheries (Sneddon 2007; Okazumi et al. 2014).

In 1995, Cambodia established the National Committee for Disaster Management (NCDM) to oversee disaster response and management, and to coordinate government agencies, military, first responders, and international non-governmental organizations (INGOs). While it mostly addressed practical aspects of providing relief, it also formally introduced concepts of hazard mitigation into the Cambodian legal apparatus. This was followed by several government decrees to clarify disaster response jurisdiction and plans of action for all levels of government (Appendix A, Table A.2). After Cambodia signed the Hyogo Framework in 2005, it issued a number of decrees to promote hazard mitigation at national and local levels. The *Draft Law on Disaster Management* – a comprehensive framework for expanding hazard mitigation measures and strengthening disaster response was finally passed in 2015 – in part due to the response to the 2011 floods.

1.3.2 Indonesia

Given its largely equatorial location, Indonesia is spared the massive storms that affect its neighbors to the north. However, it is highly prone to flooding, mass movements, earthquakes, volcanoes, and tsunami (Figure 1.6). Almost half of the damage by cost has been caused by earthquakes – mainly the 2006 Yogyakarta and 2009 Padang earthquakes, which caused extensive damage to the built environment and initiated large reconstruction programs (Macrae & Hodgkins, Chapter 10, this volume). While there have been at least eleven events since 1950 that have resulted in more than 1,000 fatalities, the 2004 Indian Ocean tsunami, which devastated

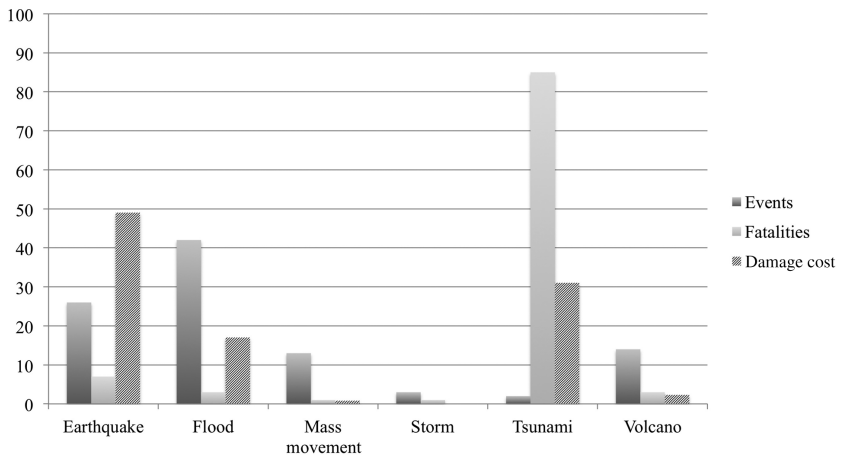


Figure 1.6. Impact of different hazard type for Indonesia between 1950 and 2011 by percentage of hazard occurrence, fatalities, and damage cost in USD.

the Aceh province in northern Sumatra, dominates the overall death toll, with an estimated 165,000 fatalities (Appendix A, Table A.3).

With a huge population living in environmentally unstable areas, Indonesia is perhaps the most vulnerable country in Asia to future disasters, with a high likelihood of mega-disasters that cause massive damage and loss of life. Jakarta and other large coastal cities are increasingly vulnerable to floods and inundation – especially as Jakarta is experiencing a high rate of annual subsidence, to the point where large areas of the city might be uninhabitable in 30–50 years (Marfai et al. 2015; Ward et al. 2011.). Studies have shown that Padang, a city of close to a million inhabitants on the western coast of Sumatra, is likely to be hit by a powerful tsunami, which would result in catastrophic numbers of dead and the near complete destruction of the entire city (Borrero et al. 2006). Research following the 2004 tsunami uncovered geological and archeological evidence for a previous destructive tsunami that hit the Aceh coast, suggesting that such events have a long history of recurrence (Monecke et al. 2008; Sieh et al. 2015). This is especially important as the post-tsunami reconstruction, led by the international humanitarian system, rebuilt mostly within areas inundated by the 2004 tsunami, and are therefore vulnerable to future tsunami.

The 2004 tsunami was a turning point for disaster response and mitigation, prompting changes in Indonesia and throughout the region. Additionally, the large and highly international reconstruction process has been comparatively well studied by practitioners and academics, producing a robust body of literature on post-disaster reconstruction (Clarke et al. 2010; Daly et al. 2012; Leitmann 2007), housing (Daly & Brassard 2011; Steinberg 2007), livelihoods (McCarthy 2014; Regnier et al. 2008), gender (Jauhola 2013), law (Feener 2013), governance (Thorburn & Rochelle 2014), and disaster risk reduction (Kennedy et al. 2008), to name a few.

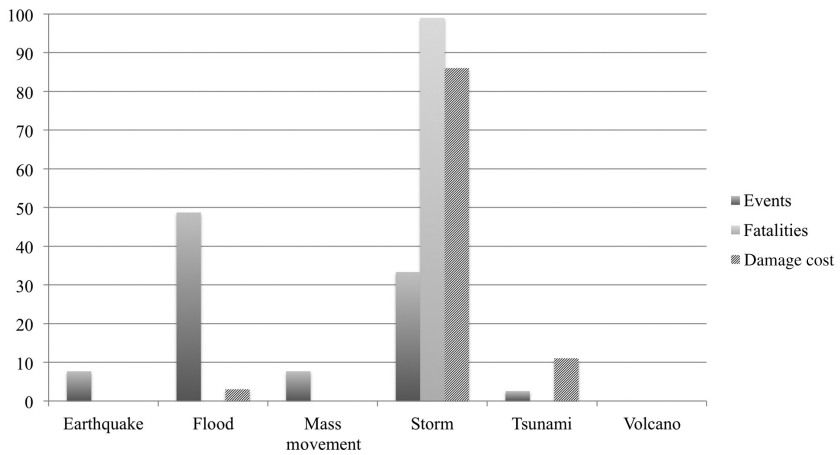


Figure 1.7. Impact of different hazard type for Myanmar between 1950 and 2011 by percentage of hazard occurrence, fatalities, and damage cost in USD.

Indonesia established the Advisory Board for Natural Disaster Management in 1966 to oversee emergency relief and aid. This was replaced by BAKORNAS – the National Natural Disaster Coordinating Board – in 1979, which loosely oversaw national-level disaster response and management. Indonesian disaster management institutions were, however, found lacking after the 2004 tsunami, as there was no national-level agency capable of coordinating the complex response. The government then established a reconstruction agency (*Badan Rehabilitasi dan Rekonstruksi*, BRR) that existed partly outside of the normal government administrative structure to oversee the reconstruction. This lack of capacity to effectively manage a large-scale disaster, coupled with the commitments to disaster risk reduction required by the Hyogo Framework, led to a number of important disaster response and mitigation measures (Appendix A, Table A.4), culminating in the creation of the Indonesian National Board for Disaster Management in 2008 to oversee disaster response, coordinate stakeholders, and design longer-term mitigation policies.

1.3.3 Myanmar

Since 1950, Myanmar has experienced earthquakes, floods, storms, and a tsunami (Figure 1.7). More than 90 percent of all fatalities and damage have been the result of regular cyclones that come off the Bay of Bengal. Since 1950 there have been at least eight recorded storms that have resulted in more than 100 fatalities, with a cyclone in 1968 and Cyclone Nargis in 2008 responsible for most of Myanmar's disaster fatalities (Appendix A, Table A.5).

Myanmar has had two major reconstruction efforts in recent years; following the 2004 tsunami that inundated parts of the Irrawaddy Delta and Cyclone Nargis,

which caused a massive humanitarian crisis (Hermann et al. 2009). In both cases, local resources and systems were completely overwhelmed and external assistance was needed and offered (Lateef 2009). However, the political situation in Myanmar complicated the issue, resulting in lengthy delays in providing aid following both events (Honda 2009; Seekins 2009). The hesitation of the government to engage with international parties was complicated by international criticism of Myanmar's human rights record, with some suggesting that the junta was violating human rights laws by not facilitating the entrance of aid organizations (Caballero-Anthony & Chng 2009; Haacke 2009; McLachlan-Bent & Langmore 2011). The response to Cyclone Nargis raised a number of practical and ethical questions about the jurisdiction of the international humanitarian community to intervene and draw upon the principle of "responsibility to protect."

Myanmar had little in terms of formal national-level disaster management capacity before signing the Hyogo Framework in 2005, after which the National Disaster Preparedness Central Committee (NDPCC) was formed. However, the lack of operational mechanisms, response capacity and resources, and protocol for engaging with the international community were exposed by Nargis in 2008. This was followed by a number of government directives related to post-Nargis recovery, as well as developing national and regional disaster management capabilities and hazard mitigation programs (Appendix A, Table A.6). Changes in the government in 2011 led to the creation of the Myanmar Disaster Preparedness Agency and Myanmar Disaster Preparedness Working Committee. Increasing political openness and collaboration with the international community in the years since Nargis has helped shore up institutional weaknesses in terms of disaster response. However, there has been a rapid expansion of all levels of disaster-related bodies, agencies, and committees from village to national government – creating an unwieldy administrative structure that might be problematic in the event of another major disaster.

1.3.4 Philippines

The Philippines has the second highest number of disasters by event in Asia, with all six types represented, although the majority are storms and floods (Figure 1.8) (Benson 1997). Several major earthquakes have resulted in significant numbers of fatalities as discussed by Delias and Daly in Chapter 2. On average, there are about fifteen recorded events per year, with over eighty events resulting in at least 100 fatalities since 1950 (Appendix A, Table A.7). With the exception of the 1976 Moro earthquake, the 1990 Baguio earthquake, and the 1991 Mt. Pinatubo eruption, all of the other major destructive events have been storms or floods (Gaillard et al. 2008). The eruption of Mt. Pinatubo in 1991 caused significant damage, but accurate prediction by government agencies and subsequent massive evacuations

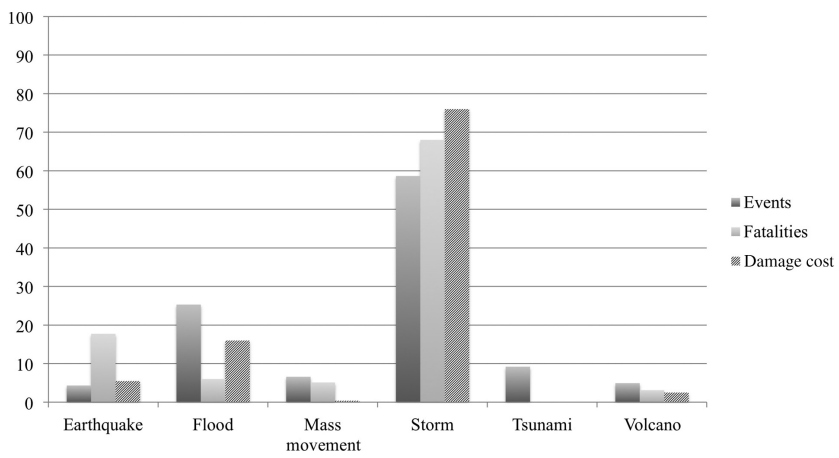


Figure 1.8. Impact of different hazard type for Philippines between 1950 and 2011 by percentage of hazard occurrence, fatalities, and damage cost in USD.

prevented potentially tens of thousands of deaths (Tayag & Punongbayan 1994). Each year the Philippines is hit by a number of typhoons and tropical storms, with periodic superstorms such as the 2014 Typhoon Haiyan that devastated the center of the archipelago (Lum & Margesson 2014). Given the number of disasters each year, and the relative predictability of many of the cyclical events, the Philippines has become an important case study for understanding community resilience and vulnerabilities (Gaillard 2015), as well as the intersection between poverty and hazards (Bankoff 2003, 1999).

There is an extensive body of scholarship on disasters in the Philippines focusing on a number of key themes that have regional and global significance. A number of scholars have studied the deep integration of hazards into the fabric of Filipino social and political life showing how disasters are a core part of identity for many in the Philippines (Bankoff 2002, 2003, 2004; Haas 1978). With a highly vocal and pluralistic network of civil society and community-based organizations, the role of community and engagement with local stakeholders has been a prominent focus in disaster responses (Abon et al. 2012; Allen 2006; Bankoff 2015; Bankoff & Hilhorst 2009; Delica 1993; Luna 2001). Finally, the Philippines has produced important scholarship on the intersection of disasters, risk, and faith – with this becoming increasingly pertinent given the expanding number of faith-based organizations responding to disasters.

The Philippines has a long history of administrative frameworks for responding to disasters, dating to the 1941 order that established the Civil Emergency Administration and National Emergency Commission. Specific protocols for disaster response evolved, arriving at the establishment of the National Disaster Coordinating Council in 1978 – the first national-level office to oversee disaster response (Appendix A, Table A.8). All of these laws and agencies focused upon