Component Four

Extreme Events and Disasters

COMPONENT FOUR

EXTREME EVENTS AND DISASTERS

An extreme event is one that is rare within its statistical reference distribution at a particular location while disaster is often described as a result of exposure to an extreme event *(UN FDES, 2013)*. There are two subcomponents: Subcomponent 4.1: Natural Extreme Events and Disasters; and Subcomponent 4.2: Technological Disasters. The former organizes statistics on the frequency and intensity of extreme events and disasters deriving from natural phenomena and their impact on human lives. The latter, on the other hand, organizes statistics on extreme events resulting from human intent, negligence or error, or faulty or failed technological applications.

This component compiles statistics on the occurrence of extreme events and disasters and their impacts on human well-being and the infrastructure of the human subsystem. The source of basic data for the core set of statistics was obtained from the National Disaster Risk Reduction and Management Council (NDRRMC), a government agency created in 2010 through the Philippine Disaster Risk Reduction and Management Act of 2010 or Republic Act No. 10121. Its mandate is to develop and implement disaster risk reduction programs that are incorporated in the development plans of various levels of government. The classification for the natural extreme events and disasters in this publication followed the definitions and typologies of disasters by the Centre for Research on the Epidemiology of Disasters (CRED). The classification for the technological disasters was based on the guidelines of the NDRRMC. The NDRRMC also uses the term “human induced disasters” in their reports instead of technological disasters and hence, the term was adopted in this publication.

The environment statistics on Extreme Events and Disasters have links to environmental accounts as described in the System of Environmental-Economic Accounting – Central Framework (2012 SEEA-CF), particularly on the type of natural extreme events and disasters, economic losses due to and effects of natural extreme events and disasters on the integrity of ecosystems. Component Four is also related to the Sendai Framework for Disaster Risk Reduction 2015-2030, a non-binding agreement which affirms that the state has the primary role to reduce disaster risk and that responsibility should also be shared to other stakeholders including the local government *(Sendai Framework for Disaster Risk Reduction)*.

Moreover, Component Four has several links to the Sustainable Development Goals (SDGs) such as: Goal 1: End poverty in all its forms everywhere; Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture; Goal 11: Make cities and human settlement inclusive, safe, resilient and sustainable; and, Goal 13: Take urgent action to combat climate change and its impact *(Sustainable Development Knowledge Platform)*.

The CPES 2016 compiled all four core statistics prescribed by the FDES as well as three Tier 2 and one Tier 3 statistics.

4.1 Natural Extreme Events and Disasters

Statistics on natural extreme events and disasters are important to policy makers, analysts and civil society not only to assess the impact of an ongoing disaster, but also to monitor the frequency, intensity and impact of disasters over time *(FDES 2013)*. The topics under this subcomponent are the occurrence and the impact of natural extreme events and disasters.

4.1.1 Occurrence of Natural Extreme Events and Disasters

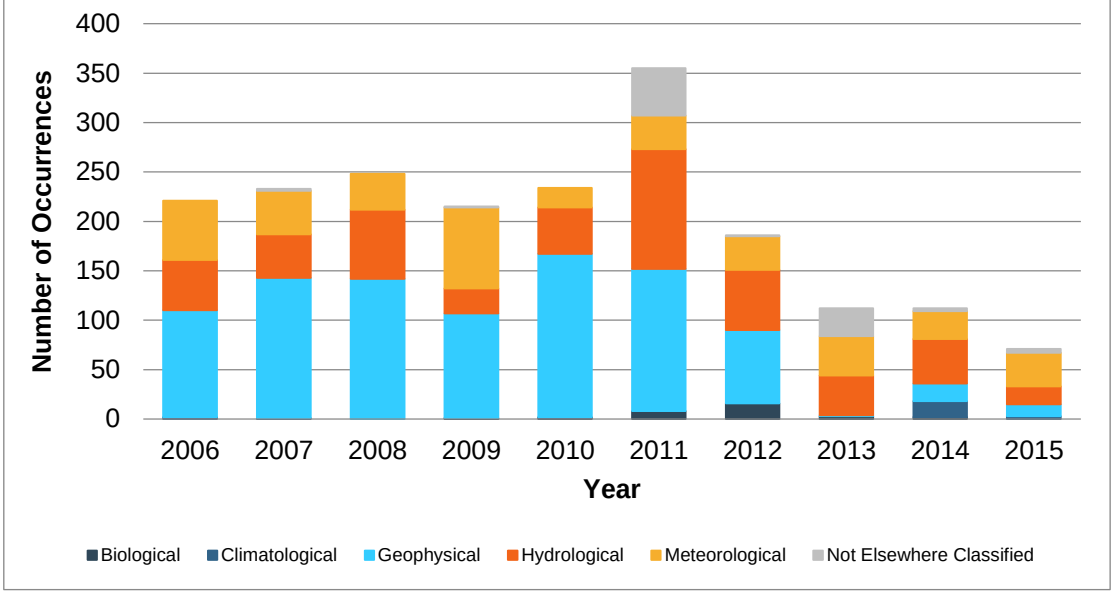
The core statistics included in this topic are *type of natural extreme event and disaster*, and *location*. According to the CRED Emergency Events Database (CRED EM-DAT), natural disasters are classified into five subgroups, namely: geophysical, climatological, meteorological, hydrological, and biological disasters. Geophysical disasters are events originating from the solid earth. Climatological disasters are events caused by long-lived processes in the spectrum from intra-seasonal to multi-decadal climate variability. Meteorological disasters are events caused by short-lived processes in the spectrum from minutes to days. Hydrological disasters are events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind setup. Lastly, biological disasters are events caused by the exposure of living organisms to germs and toxic substances.

In this publication, natural disasters were presented according to the five CRED EM-DAT classifications and a Not Elsewhere Classified (NEC) category. Data on location, however, were reported only for events classified by the NDRRMC as major disasters. The list of major events and their location can be found in Table 4.7 Major Natural Extreme Events and Disasters.

Figure 4.1 shows the annual total number of occurrences of natural extreme events and disasters by type from 2006 to 2015. From 2006 to 2011, the number of natural extreme events and disasters fluctuated, with an observed decrease in number from 2012 to 2015. The highest number of incidents was observed in 2011 with 355 events categorized as follows: 144 geophysical; 121 hydrological; 48 not elsewhere classified; 34 meteorological; and 8 biological. On the other hand, the year 2015 had the least number of incidents observed (71 events). Likewise 2015 is the only year in the series with less than one hundred natural events and disasters.

On the average, geophysical, hydrological, and meteorological disasters had the highest percentages relative to the total number of natural disasters, at 40 percent; 27 percent; and 24 percent, respectively. Meanwhile, biological disasters had the least average of two percent.

Figure 4.1 Number of Occurrences of Natural Extreme Events and Disasters by Type from 2006 to 2015



Source: National Disaster Risk Reduction and Management Council

4.1.2 Impact of Natural Extreme Events and Disasters

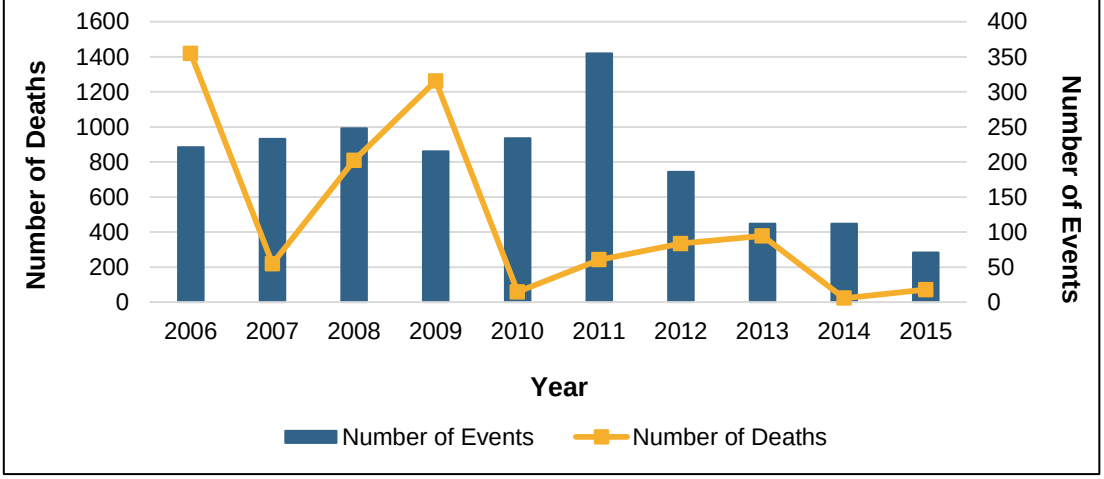
There are two core statistics under this topic, *number of people killed* and *economic loss due to natural extreme events and disasters*. According to FDES 2013, the impact in terms of damage and losses makes it possible to estimate the impact of disasters on economic growth, the population's living conditions and environmental conditions in the region. Economic loss is measured in terms of currency and can be seen in damages to buildings and transportation networks, loss of revenue for businesses, and loss of crops, among other material indicators. In the Philippines, the NDRRMC organizes the economic loss data into three categories: Infrastructure, Agriculture, and Private and Communication.

From 2006 to 2015, a total of 4,815 deaths due to natural disasters and extreme events were recorded 75 percent due to meteorological disasters. Destructive tropical cyclones, a meteorological disaster subtype, claimed the most lives with a total of 3,072 individuals. The least number of only one death recorded was due to climatological disaster.

The year 2006 recorded the most number of deaths at 1,418 individuals with 1,168 were to meteorological, 186 were due to geophysical and 64 due to hydrological. On the other hand, the year 2014 had the lowest number of deaths recorded of 23 individuals.

Figure 4.2 illustrates the number of natural extreme events and disasters versus the number of deaths from 2006 to 2015. Although 2011 recorded the most number of natural disasters, the highest number of deaths was recorded in 2006, the year when Typhoon Milenyo hit Luzon and Visayas in September, and when Typhoon Reming affected Luzon in November. This was followed by 2009, the year when Tropical Storm Ondoy and Typhoon Pepeng hit the country in September.

Figure 4.2 Number of Incidents and Deaths due to Natural Extreme Events and Disasters from 2006 to 2015

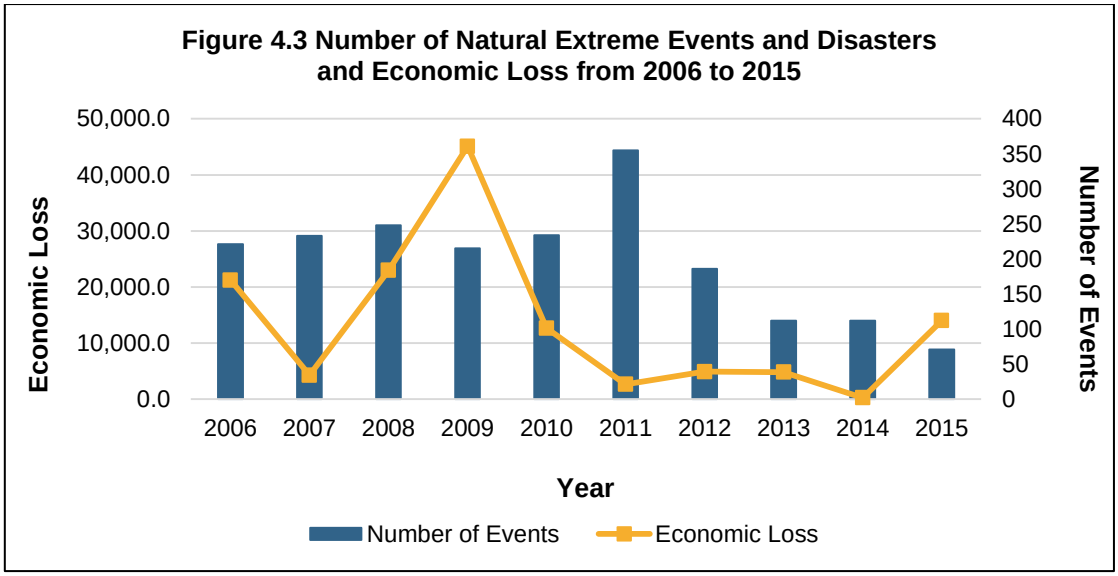


Source: National Disaster Risk Reduction and Management Council

As shown in Figure 4.3 from 2006 to 2015, the total economic loss due to natural disasters was almost Php 133 billion. The largest economic loss recorded was in 2009 at a level of Php 45 billion. In the same year, there were 14 meteorological disasters considered as major disaster events, including Tropical Storm Ondoy and Typhoon Pepeng. The least economic loss was recorded in 2014 at Php 262.3 million.

Most economic losses from years 2006 to 2015 were attributed to meteorological disasters, incurring a total of more than Php 96 billion or about 56 percent of the total losses during the ten-year period. On the other hand, the smallest economic loss is due to biological disasters at Php 140 thousand (one percent). For years 2014 and 2015, the largest economic loss was due to climatological disasters at 72 percent and 93 percent respectively.

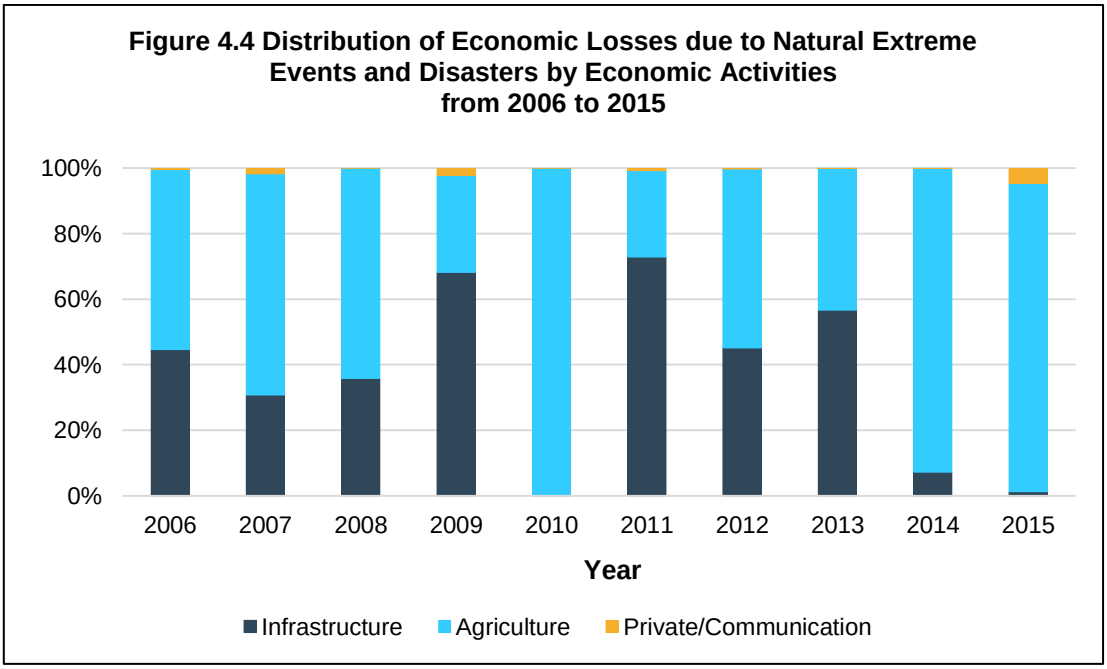
Figure 4.3 shows the number of natural extreme events and disasters versus economic loss from 2006 to 2015. In 2009, while a decrease in the number of disasters was observed, there was an increase in economic losses. As noted earlier, Tropical Storm Ondoy happened in 2009, incurring over Php 10 billion losses. On the contrary, while 2011 posted the most number of events with 355 disasters, a relatively lower economic loss of around Php 2 billion was recorded. The lowest number of natural disasters during the ten-year period was in 2015 with economic losses showing a sudden increase. In the same year, almost all parts of the country were affected by the El Niño starting July 2015 *(NDRRMC)*.



Source: National Disaster Risk Reduction and Management Council

Among the three categories, the highest loss incurred over the ten year period was attributed to the agricultural sector with a total of about Php 74 billion or 56 percent of the total losses. This was followed by the infrastructure sector with a total of about Php 57 billion or 43 percent of the total losses. The least economic loss observed was from the private and/or communication sector with only one billion pesos or one percent.

As seen in Figure 4.4, losses in the agricultural sector was highest in year 2010 with more than Php 12 billion or about 99.7 percent of the losses for that year. For years 2014 and 2015, agricultural sector suffered the biggest losses among the three categories.



Source: National Disaster Risk Reduction and Management Council

4.2 Human Induced Disasters

Statistics on human induced disasters are important to policy makers, analysts and civil society to identify the immediate and potential impacts, to understand who is ultimately responsible and to assess and mitigate future risks. Records of global technological disasters show increasing frequency and impact on humans, the infrastructure and the environment. Based on the FDES 2013, there are two topics under this subcomponent, namely: Occurrence and Impact of technological disasters. Although there are no core statistics under this subcomponent, the report of the NDRRMC covers data on the number of human induced disasters, their types, number of deaths and economic loss and location. Location data for this publication is specific where major events happened.

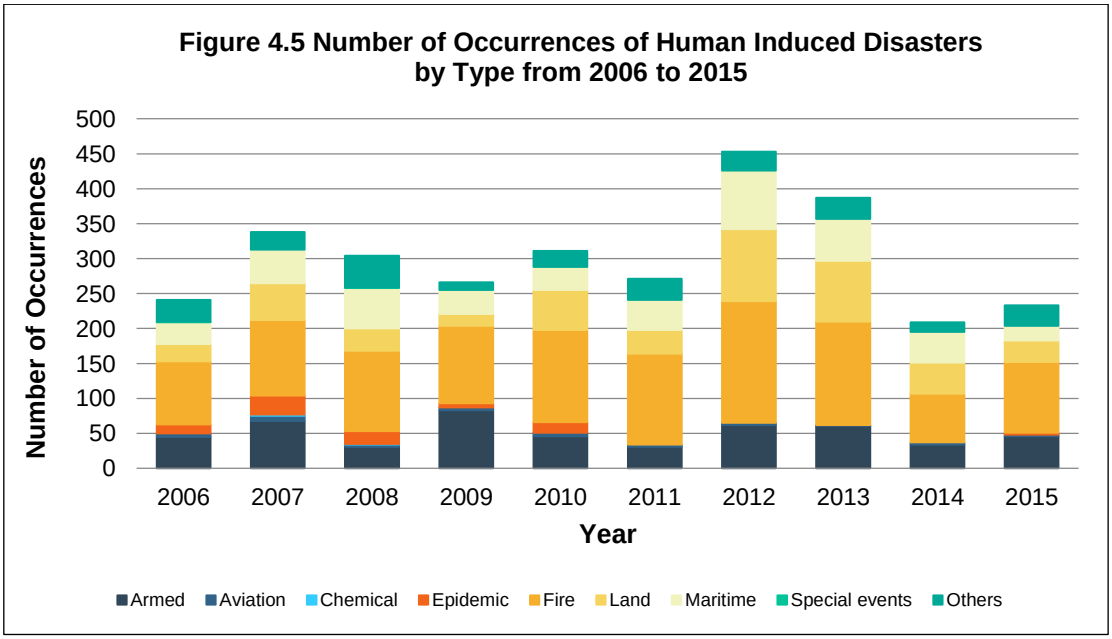
4.2.1 Occurrence of Technological Disasters

Technological disasters impact human lives, habitats and ecosystems in different ways, depending on the nature and intensity of the disaster. Their effects may be short term or may be of significant or unknown duration. In the case of technological disasters, there is sometimes no precedent for a given disaster. The full impact of such disasters cannot always be fully anticipated or measured *(FDES 2013)*. In this publication, the number of incidents and the type of human induced disasters were presented. The classification of disasters followed the guidelines from NDRRMC. These categories include Armed; Aviation; Chemical; Epidemic; Fire; Land; Maritime; and Special Events.

As seen in Figure 4.5, the number of human induced incidents fluctuated throughout the ten-year period. Overall, a total of 3,013 human induced incidents was recorded, mostly fire-related at 39 percent and the least, special events at 0.1 percent.

Moreover, the year 2012 had the highest number of incidents observed with a total of 453 events classified as follows: fire-related - 174, land-related - 103, maritime-related - 84, armed-related - 62, 27 others related, and aviation-related - 3. Meanwhile, the least number of human incidents was observed in the year 2014 with 209 events where most were fire-related (33 percent).

Figure 4.5 Number of Occurrences of Human Induced Disasters by Type from 2006 to 2015



Source: National Disaster Risk Reduction and Management Council

4.2.2 Impact of Technological Disasters

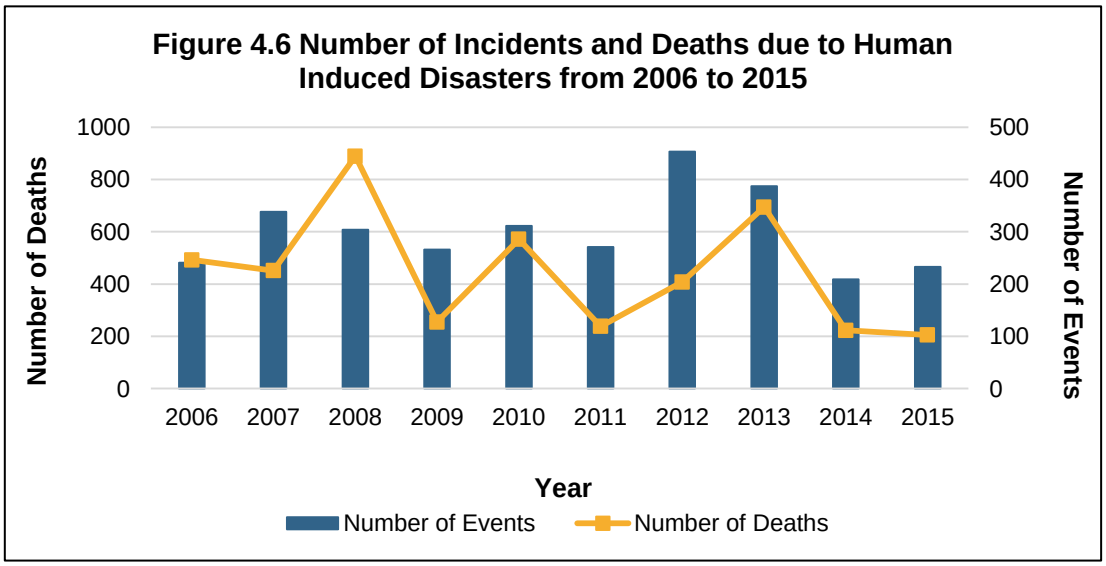
Human induced disasters may also affect the economy of a country. Economic loss may refer to damage to buildings and other economic assets, number of transportation networks affected, economic disruption or loss of revenue to commercial services, and utility disruption *(FDES 2013)*. In this publication, the number of people killed and the economic losses due to human induced disasters were presented under this topic.

For the ten-year period, a total of 4,426 deaths due to human induced incidents were recorded with 23 percent (1,028 events) classified under land disasters, including vehicular accidents and train mishaps, and another 23 percent (1,027) as maritime-related disasters. The Ultra Sports Complex Stampede, classified under special events, caused 71 deaths or 1.6 percent of all deaths due to human induced disasters.

The most number of deaths recorded was in 2008 with 889 individuals with 55 percent of the disasters recorded as maritime mishaps with 486 deaths. The least number of deaths was in 2015 with 205 individuals with most deaths (33 percent) as fire-related.

Figure 4.6 illustrates the number of human induced disasters versus the number of deaths from 2006 to 2015. Although 2012 had the most number of human induced disasters recorded, the highest number of deaths was observed in 2008. One of the major disasters for that year was the MV Princess of the Stars tragedy in June, off the coast of San Fernando, Romblon during the height of Typhoon Frank. This was followed in 2013, when an armed conflict between the forces of the Philippine Government and a faction of the Moro National Liberation Front in Zamboanga City occurred.

Figure 4.6 Number of Incidents and Deaths due to Human Induced Disasters from 2006 to 2015



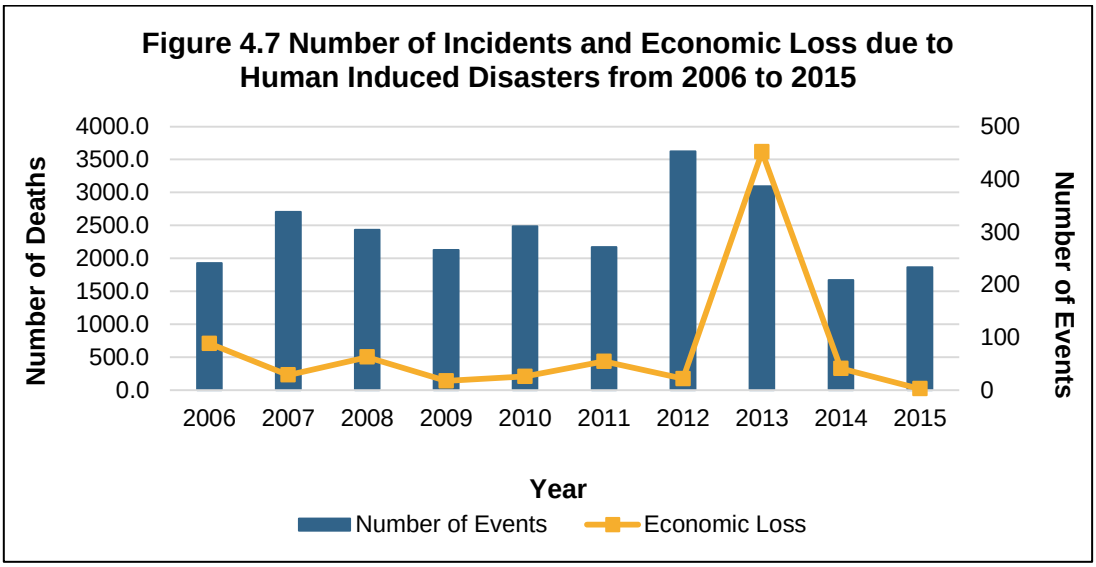
Source: National Disaster Risk Reduction and Management Council

From 2006 to 2015, the total economic loss due to human induced disasters was almost Php 6.3 billion. As shown in Figure 4.7, 2013 had the highest recorded economic loss of more than Php 3.6 billion, and the only recorded amount in the series exceeding one billion pesos. Meanwhile, the least amount was recorded in 2015 at Php 19.4 million, as the only amount less than one hundred million pesos. The economic loss for the other years ranged from Php 138 million to Php 707 million.

Moreover, from 2006 to 2014, most economic losses were due to fire incidents. Particularly, in 2007 and 2014, all economic losses recorded were due to fire incidents. In 2015, however, armed conflict incurred all economic losses.

Most economic losses were due to armed-related incidents, especially in the year 2013 when the Zamboanga crisis occurred. It is also noted that no economic losses were recorded under the aviation, chemical, epidemic, land, and special events categories.

Figure 4.7 Number of Incidents and Economic Loss due to Human Induced Disasters from 2006 to 2015

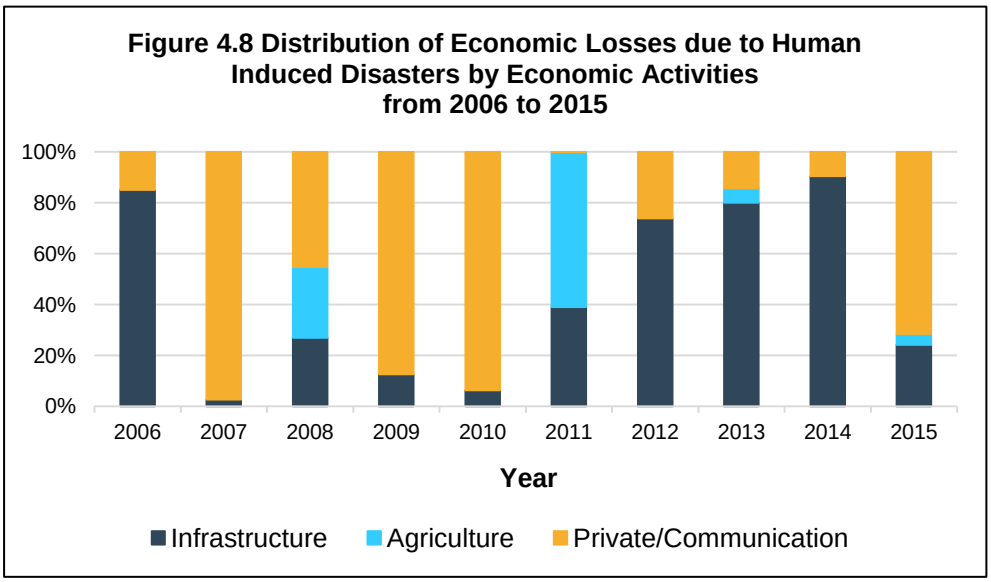


Source: National Disaster Risk Reduction and Management Council

With regards to sectors, infrastructure incurred the biggest economic loss due to human induced incidents at a total of Php 4.4 billion or 64 percent of the total economic loss across the series. This was followed by private/communication sector at approximately Php 1.8 billion or 27 percent of the total. Lastly, the agriculture sector had the least economic loss of about Php 643 million or 10 percent of the total.

In 2014, the infrastructure sector had the biggest share of 90 percent (Php 296 million) on the year's total economic loss while the private/communication sector has the biggest portion of 71 percent (Php 317 million) of the total economic loss in 2015.

Figure 4.8 Distribution of Economic Losses due to Human Induced Disasters by Economic Activities from 2006 to 2015



Source: National Disaster Risk Reduction and Management Council