CHAPTER 2

2011: NATURAL DISASTERS REVIEWED

We will begin this chapter by exploring some of the overall disaster statistics in 2011 in comparison with recent years. We will then take a brief look at some of the disasters that occurred in 2011 outside the developed world and will examine the ongoing relief and reconstruction efforts following the two 2010 mega-disasters, the floods in Pakistan and the earthquake in Haiti. The third section of this chapter looks at the imperfect science of measuring economic damage caused by disasters, followed by a fourth section, which will analyze trends in international disaster response, looking at developments related to international disaster response law and some of the debates and developments surrounding the humanitarian cluster system. Last but not least, we will review international humanitarian disaster funding for 2011 to see how well (or how poorly) disaster responses were funded in the past year.

Chocò department, Pacific Coast of Colombia. The inhabitants of the community of Chambacú carry food parcels delivered by the International Committee of the Red Cross (ICRC) and the Colombian Red Cross.
Photo: © ICRC/Jacques Gay Crosier

Section 1

Disaster Statistics and Trends in 2011

With 302 disasters recorded in EM-DAT, 2011 saw the lowest number of disasters since the beginning of the millennium.[153] The number of disasters was almost 20 percent below the average annual figure of 384 natural disasters from 2001-2010. Beyond simply counting the number of disasters in a given year, there are of course various ways to measure the impact of disasters, including the number of deaths, the number of people affected, and economic losses.

According to most statistical indicators, 2011 was a below average year in terms of the impact of natural disasters. While there were almost 30,000 disaster fatalities (not including the Horn of Africa drought and famine), this figure is well below the average annual figure in the past decade. There were 206 million disaster-affected persons in 2011, which is about ten percent below the ten-year average. The main statistical outlier in 2011 is disaster damage; because of a spate of major disasters in the rich world, all historic records were shattered with estimates of total losses ranging between $366 billion (EM-DAT) and $380 billion (Munich Re) for disaster damage in 2011 (see Tables 9 and 19).

Table 9 Natural Disasters World-Wide, 2000-2011

	2000-2009 avg.[154]	2009[155]	2010[156]	2011[157]
Number of recorded disasters	392	335	385[158]	302
Fatalities	78,087	10,655	297,000	29,782
Persons affected (millions)	227	119	217	206
Damage ($ billions)	89.3	41.3	123.9	366

153 EM-DAT: The OFDA/CRED International Disaster Database, “2011 disasters in numbers,” Université catholique de Louvain - Brussels – Belgium, 18 January 2011, www.emdat.be

154 EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be

155 Centre for Research on the Epidemiology of Disasters, *Annual Disaster Statistical Review 2009: The Numbers and Trends,* 2010, http://cred.be/sites/default/files/ADSR_2009.pdf

156 Debarati Guha-Sapir et al., *Annual Disaster Statistical Review 2010: The Numbers and Trends,* Centre for Research on the Epidemiology of Disasters, May 2011.

157 Debarati Guha-Sapir, “Disasters in Numbers 2011,” CRED-UNISDR Press Conference, Geneva, 18 January 2012, CRED Université catholique de Louvain - Brussels – Belgium, www.emdat.be

158 In our *Review of Natural Disasters in 2010* we reported 373 natural disasters and 208 million affected persons, based on data extrapolated from EM-DAT in January 2011. EM-DAT in May 2011 put the final tally of disasters for 2010 to 385 disasters and 217 million affected persons, which, as we try to use the latest data available, we have used in this review.

It should be noted that EM-DAT statistics do not include the casualty figures from the drought and famine in Somalia, which according to a study by Save the Children and Oxfam were estimated at 50,000 to 100,000 deaths in 2011.[159] If those figures are excluded, the casualty numbers for 2011 are almost ten times lower than in 2010, where the Haitian earthquake alone killed more than 200,000 persons. If we include the Somalia estimates in the equation, we see that 2011 might actually lie above the 2001-2009 average of 78,087 casualties, making 2011 one of the more deadly years in terms of natural disasters.

Table 10 Top 10 Natural Disasters in 2011 by Fatalities[160]

Country	Disaster	Month	Fatalities
Japan	Earthquake/tsunami	March	19,846
Philippines	Tropical storm	December	1,430
Brazil	Flood	January	900
Thailand	Flood	Aug.-Dec.	813
Turkey	Earthquake	October	604
Pakistan	Flood	Aug.-Nov.	509
United States	Storm	April	350
Cambodia	Flood	Aug.-Nov.	247
China, P. Rep	Flood	June	239
India	Flood	Aug.-Oct.	204
Total Number of Global Fatalities Caused by Natural Disasters			**29,782**

If we look at the disasters with the most casualties (see Table 10), the list is topped by the Japan Tohoku earthquake and tsunami, followed by tropical storm Washi in the Philippines, and by floods and mudslides in Brazil. Overall, eight of the ten most deadly disasters of 2011 took place in Asia, with four out of five countries with the highest numbers of disasters in 2011 also located in Asia. The Philippines had 33 recorded disasters in 2011, China had 21, the United States had 19, India had eleven, Indonesia had eleven and Mexico had ten.[161]

While the international disaster database has not yet provided a final breakdown of the 206 million disaster-affected persons in 2011, some of the disasters that affected the most people in 2011 were the drought and famine on the Horn of Africa, major floods in China in June and September, the floods in Southeast Asia, as well as renewed flooding in Pakistan. Each of these disasters affected more than five million persons.[162]

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159 Save the Children and Oxfam, "A Dangerous Delay, The cost of late response to early warnings, in the 2011 drought in the Horn of Africa," *Joint Agency Briefing Paper*, 18 January 2012, https://www.oxfam.org/en/policy/dangerous-delay

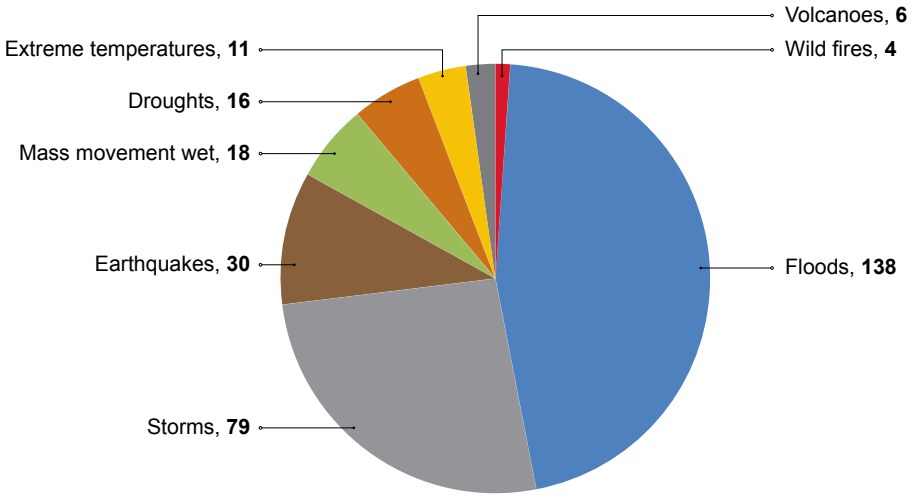
160 Guha-Sapir, "Disasters in Numbers 2011," *op. cit.*

161 EM-DAT: The OFDA/CRED International Disaster Database, "2011 disasters in numbers," Université catholique de Louvain - Brussels – Belgium, 18 January 2011, www.emdat.be

162 *Ibid.*

In 2011, EM-DAT registered 138 floods, 79 storms, 30 earthquakes (this category includes tsunamis), 18 wet mass movements,[163] 16 droughts, eleven extreme temperature events, four wild fires, and six volcanic eruptions.[164] Compared to the ten-year average, only earthquakes were more frequent, with 30 occurring in 2011 compared to the average for the decade of 28. Volcanic eruptions and drought disasters were in line with the average, while all other disaster categories were below average. Wildfires were down by two-thirds (4/12), extreme temperatures[165] were down by 50 percent (11/22), storms were down to 76 percent of the average (79/104), and floods were down to approximately 79 percent of the ten year average (138/175).

Graph 2: Frequency of Natural Disasters in 2011



Climatological and hydro-meteorological disasters

According to EM-DAT statistics, 266 out of the 302 recorded disasters (88 percent) in 2011 were climatological or hydro-meteorological disasters. The 138 floods reported in 2011 affected more than 106 million people and killed more than 5,200. This is almost exactly the same as the average number of people affected every year by floods during the 2001-2010 period and slightly below the annual average mortality rate from floods.[166] As mentioned above, floods were the most frequent disaster in 2011 (as they were in 2010), accounting for over 45 percent of total disasters recorded by EM-DAT.

[163] EM-DAT distinguishes between two kinds of hydrological disasters, “Flood” and “Mass Movement (wet)”. Mass Movement (wet) includes avalanches, landslides, rockfalls and subsidence, EM-DAT, “Classification,” http://www.emdat.be/classification

[164] EM-DAT: “2011 disasters in numbers,” *op. cit.*

[165] According to EM-DAT, extreme temperatures can either be heat waves, cold waves or extreme winter conditions. See. EM-DAT, “Classification,” http://www.emdat.be/classification

[166] EM-DAT: The OFDA/CRED International Disaster Database, “2011 disasters in numbers,” Université catholique de Louvain - Brussels – Belgium, 18 January 2011, www.emdat.be

2011 was a relatively benign year for storms, with 79 storms recorded as disasters. In comparison, an average of 104 storms was reported during the 2001–2010 period. And although 33 million people were affected by storms in 2011, they caused 3,076 casualties, far fewer than the average of 17,236 per year over the last decade.

Table 11 Comparing Hydrological Disasters 2001-2010 to 2011[167]

	Mass Movements (wet)[168]	Floods	Storms
Recorded disasters, 2011	18	138	79
Average number of recorded disasters, 2001-2010	20	175	104
2011 fatalities	314	5,202	3,076
Average number of fatalities, 2001-2010	1,002	5,614	17,236
Number affected, 2011 (millions)	0.01	106.4	33.9
Average number affected, 2001-2010 (millions)	0.38	106.3	39.0

Let us now take a brief look at some of the major areas facing tropical storm hazards: the Atlantic, West Pacific, East Pacific, Indian Ocean and South Pacific. The 2011 Atlantic hurricane season was slightly below average in terms of both hurricanes and major hurricanes. Seven hurricanes formed, of which three reached major hurricane strength, while the average since 1995 was eight hurricanes, of which four were considered to be of major strength. Meanwhile 2011 brought a total of 19 tropical storms, well above the 1995-2010 average of 15 storms. In fact, 2011 tied for the third highest number of tropical storms on record, only trailing 1993, which had 21 and 2005, with 28.[169] The most prominent Atlantic hurricane of 2011 was Irene, which we have already discussed in detail in Chapter 1.

The Eastern Pacific hurricane season saw a below average number of eleven storms, but all but one of those storms reached hurricane strength, the highest proportion of hurricanes in a single season. Six of the eleven storms became major hurricanes, double the average number. The deadliest weather system that hit the Eastern Pacific never in fact reached tropical storm strength, but made landfall in Central America as Tropical Depression 12-E on 10 October. Its heavy rains caused landslides and floods, affecting almost two million people and killing more than 100 in El Salvador, Guatemala, Honduras, Nicaragua, Panama, Costa Rica and parts of Mexico.[170]

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167 *Ibid.*

168 EM-DAT distinguishes between two kinds of hydrological disasters, “Flood” and “Mass Movement (wet)”. Mass Movement (wet) includes avalanches, landslides, rockfalls and subsidence, See at: EM-DAT, “Classification,” http://www.emdat.be/classification

169 Rick Knabb, ”2011 Atlantic Hurricane Season in Review,” *The Weather Channel*, 29 November 2011, http://www.weather.com/weather/hurricanecentral/article/recap-2011-hurricane-season_2011-11-29

170 Jeff Masters, “A strange 2011 Eastern Pacific hurricane season,” *Weather Underground,* 23 November 2011, http://www.wunderground.com/blog/JeffMasters/comment.html?entrynum=1992, see also: IFRC, “Over 1.9 million affected by severe flooding in Central America as the IFRC

The Western Pacific typhoon season was also below the long-term average with a total of 20 named storms – a figure 23 percent below the 25-year average. Of the 20 named storms, ten typhoons formed, which is 37 percent below the 25-year average of 16.[171] While the season was below average in numbers, the Philippines experienced a particularly devastating season with four storms making landfall (in addition to one near landfall). Typhoon Nesat in September and tropical storm Washi in December cost many lives and caused wide-spread destruction.

Cyclone activity was also below average in the Indian Ocean and Southern Pacific with a total of 26 named storms (from which 12 cyclones formed), 20 percent below the 25-year average of 32. The strongest storm of the region was Cyclone Yasi which hit Australia and became the second costliest tropical storm ever to hit the country. Other major cyclones in the region were Cyclone Wilma affecting both Tonga and New Zealand in late January, and Cyclone Bingiza which made landfall in Madagascar in February 2011. In South Asia, the biggest storm was Cyclone Thane, which made landfall in southern India in late December.[172]

La Niña, climate change and extreme weather events

Global weather patterns in early 2011 were heavily influenced by the 2010/11 La Niña episode, which was near record levels from September 2010 through the end of April 2011 and which lasted until summer 2011. La Niña is characterized by unusually cool ocean surface temperatures in the central and eastern tropical Pacific. La Niña is the opposite of El Niño, which is characterized by unusually warm ocean surface temperatures. Both La Niña and El Niño disrupt the large-scale ocean-atmospheric circulation patterns in the tropics and have important consequences for weather and climate around the globe. The 2010/2011 La Niña led to disastrously wet conditions in parts of northern and eastern Australia, Indonesia, Southeast Asia, and portions of northern South America such as Colombia in late 2010 and/or early 2011.[173] La Niña was also seen as largely responsible for the drought in the Horn of Africa.[174] After a brief period of neutral conditions in summer 2011 a new but weaker La Niña episode began, which is predicted to reach peak intensity in late 2011 or early 2012.[175] The following graphics show some of the typical effects of La Niña episodes.

launches emergency appeals," 28 October 2011, http://www.reliefweb.int/node/455836

171 Impact Forecasting, "Annual Global Climate and Catastrophe Report," Chicago: Aon Benfield, 2011, p. 22.

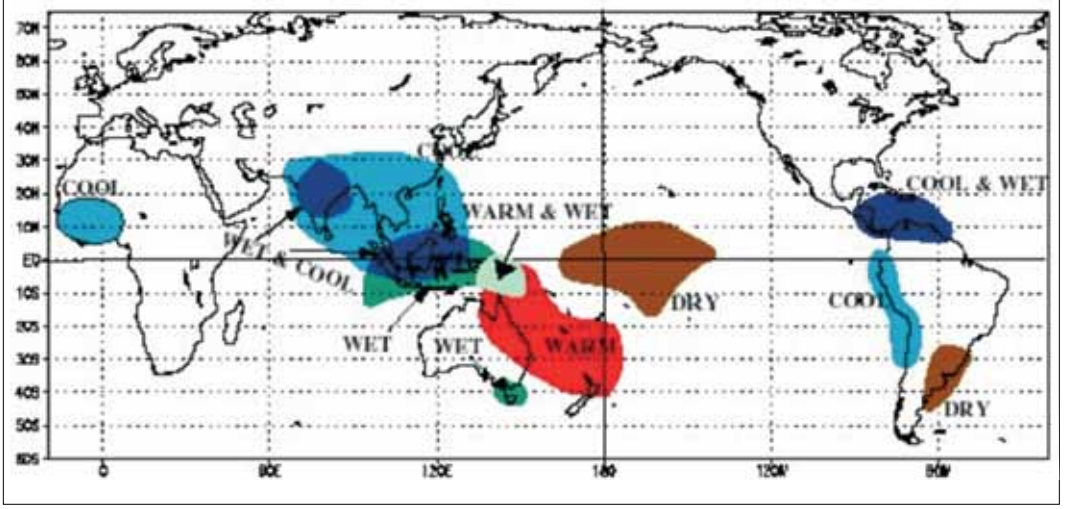
172 *Ibid.*, p. 23.

173 World Meteorological Organization, "El Niño/La Niña Update," 23 May 2011.

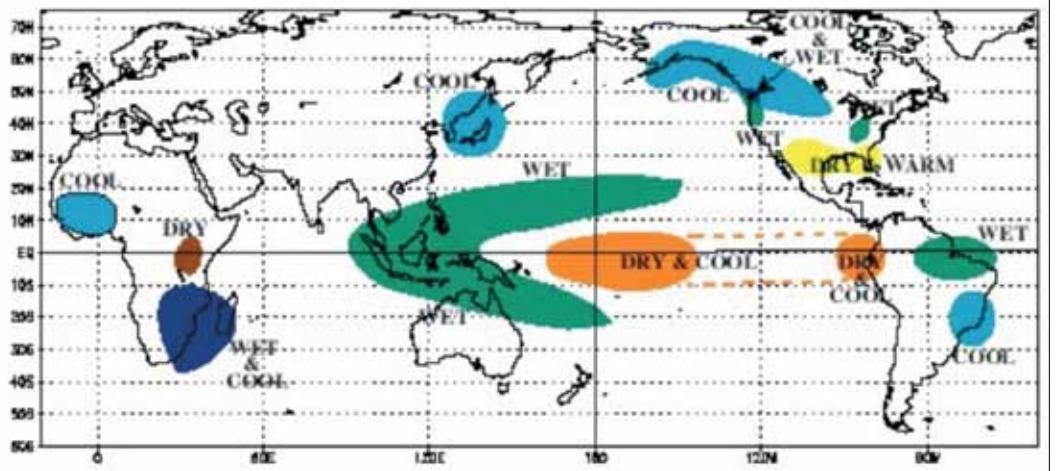
174 IRIN, "East Africa,"La Niña-induced drought 'to affect millions'," 18 February 2011, http://www.irinnews.org/report.aspx?ReportId=91966

175 World Meteorological Organization, *"El Niño/La Niña Update,"* 17 November 2011.

Graph 3: Typical Influence of La Niña, June-August[176]
Cold Episode relationships, June-August



Graph 4: Typical Influence of La Niña, December-February[177]
Cold Episode relationships, December-February



[176] The International Research Institute for Climate and Society, "Schematic Effects of ENSO, Typical Influence of La Nina," 16 August 2007, http://iri.columbia.edu/climate/ENSO/globalimpact/temp_precip/region_lanina.html

[177] *Ibid*.

In the run-up to the COP 17 Durban climate change summit in December 2011, the Intergovernmental Panel on Climate Change (IPCC) published a special report on *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)*, highlighting some of the latest scientific evidence on the nexus between climate change and extreme events.[178]

The report is cautious in warning that there is little data available about extreme events, given the fact that they only occur rarely and it is thus difficult to identify long-term changes in their frequency and severity. It finds that it is very likely that there has been an overall decrease in the number of cold days and nights and an overall increase in the number of warm days and night for most land areas since 1950. It qualifies a statistically significant increase of extreme precipitation events in some regions as well as a likely poleward shift in the main extra-tropical storm tracks. It also states with medium confidence that some regions, particularly Southern Europe and Western Africa, have experienced more intense and longer droughts while in some regions droughts have become less frequent, less intense or shorter.

The report further states that there is evidence that some extremes have changed as a result of anthropogenic influences, including increases in atmospheric concentrations of greenhouse gases. It is likely that anthropogenic influences have led to warming of extreme daily minimum and maximum temperatures on the global scale. There is medium confidence that anthropogenic influences have contributed to intensification of extreme precipitation on the global scale. It is likely that there has been an anthropogenic influence on increasing extreme coastal high water due to increase in mean sea level."[179] However, the report underlines that the attribution of single extreme events to anthropogenic climate change is challenging.

Looking forward, the report predicts a high probability for a rise in the length, frequency and/or intensity of warm spells, or heat waves over most land areas. It also predicts an increase in heavy precipitation and a rise in the percentage of heavy rainfalls among total rainfall as likely within the 21st century. In terms of tropical cyclones it suggests a rise in average storm speeds is likely (although it might not occur in all ocean basins), while storm frequencies will likely decrease or remain stable. Changes in rainfall and temperature imply possible changes in floods but projections are at this point only of low confidence both because the evidence is limited and the causes of regional alterations are often complex. Rising sea levels on the other hand make it very likely that extreme coastal high waters will occur in the future. The report also points out that there is high confidence that changes

[178] Intergovernmental Panel on Climate Change (IPCC), "Summary for Policymakers," in *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation,* eds. Field et al., A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change, 2012.

[179] IPCC, *op. cit.,* p. 7.

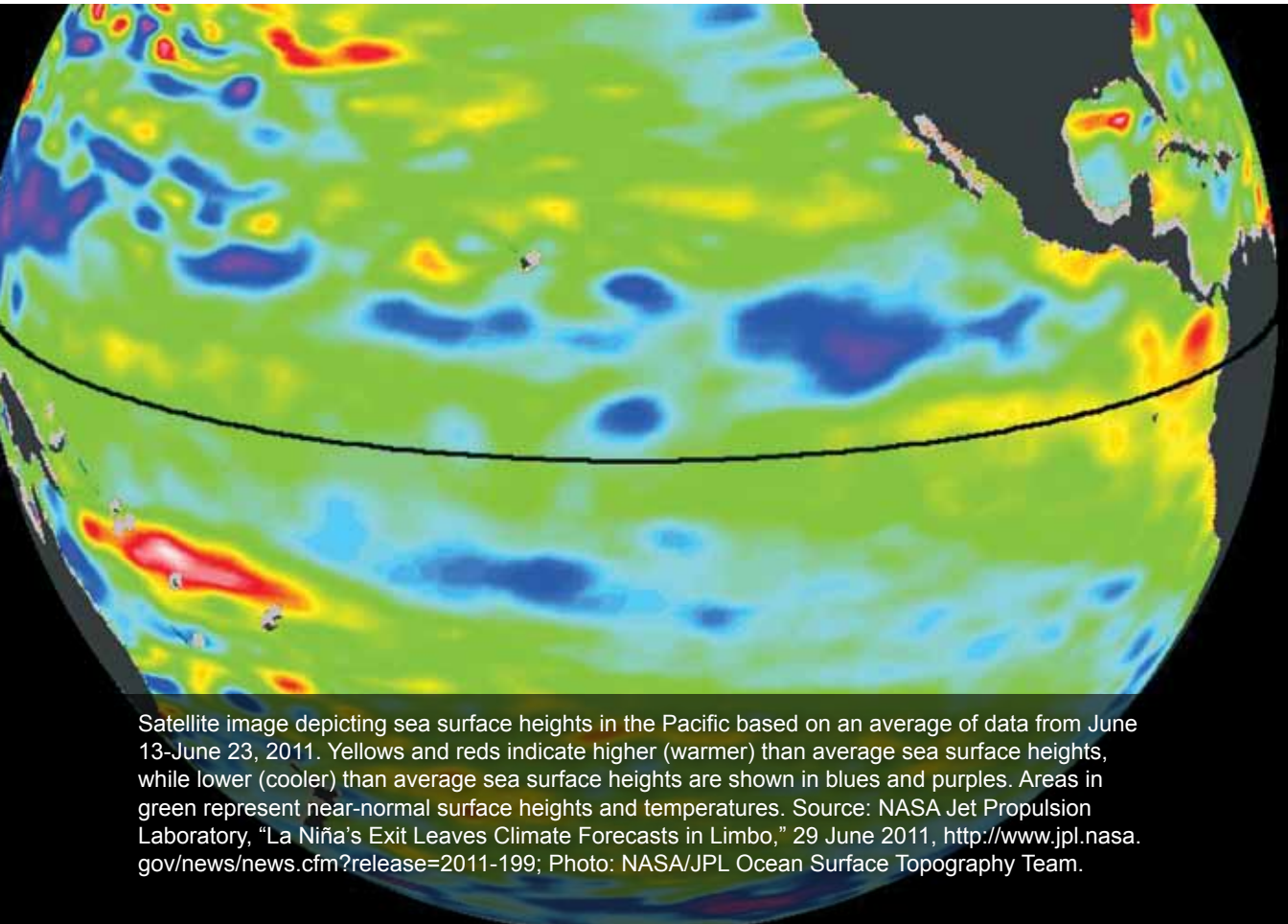
in heat waves, glacial retreat and/or permafrost degradation will affect high mountain phenomena such as slope instabilities, wet mass movements and glacial lake outburst floods. There is also high confidence that changes in heavy precipitation will affect landslides in some regions.[180]

According to the World Meteorological Organization, the warmest 13 years of average global temperatures have all occurred in the 15 years since 1997, contributing to more frequent extreme weather events. 2011 was predicted to be the tenth hottest year on record and the hottest year ever during a La Niña episode, during which global temperatures are on average cooler than in non-La Niña years.[181] There is no conclusive scientific evidence about the interrelationship between El Niño/La Niña episodes and climate change, but there are hypotheses that more frequent occurrence of those phenomena could be connected to globally warming temperatures.[182]

[180] IPCC, *op. cit.,* p. 11-12.

[181] Christian Science Monitor, "Climate change: 2011 temperatures the hottest ever during La Nina," 29 November 2011, http://www.csmonitor.com/Science/2011/1129/Climate-change-2011-temperatures-the-hottest-ever-during-La-Nina

[182] National Oceanic and Atmospheric Administration, "Global Warming: Frequently Asked Questions," http://www.ncdc.noaa.gov/oa/climate/globalwarming.html



Satellite image depicting sea surface heights in the Pacific based on an average of data from June 13-June 23, 2011. Yellows and reds indicate higher (warmer) than average sea surface heights, while lower (cooler) than average sea surface heights are shown in blues and purples. Areas in green represent near-normal surface heights and temperatures. Source: NASA Jet Propulsion Laboratory, "La Niña's Exit Leaves Climate Forecasts in Limbo," 29 June 2011, http://www.jpl.nasa.gov/news/news.cfm?release=2011-199; Photo: NASA/JPL Ocean Surface Topography Team.

Section 2

A Brief Look at Some Major Disasters in 2011[183]

That many rich developed countries were hit hard by natural disasters in 2011 does not mean that there were no disasters in less wealthy and developing countries. In this section we therefore look at some of the major disasters in 2011 that occurred in countries other than those described in the first chapter of this *Review*.

Brazil: floods and landslides

Table 12 Brazil, Floods and Landslides, January 2011

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
202.4 million/5	84	8/54

Disaster statistics	
Fatalities	900[184]
Displaced	14,000[185]
Est. damage ($ billions)	13[186]

Brazil suffered one of its worst ever natural disasters in early 2011, when mudslides and floods in the south of the country, near Rio de Janeiro, killed 900 persons. With media and experts blaming state and municipal authorities for failing to invest in disaster prevention and urban planning, Brazil's President Dilma Rousseff promised federal government support for the affected areas, but also strongly emphasized the need for disaster prevention and affordable housing for poor people.[187] After the landslides, authorities urged residents in at-risk zones to abandon their homes, even as 14,000 people were housed in shelters

[183] Disaster data in this section are taken from UN, government and/or news sources as well as from EM-DAT. Sources are indicated in the footnotes. For population data we use the CIA World Factbook: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2119rank.html, for the Human Development Index UNDP data: http://hdr.undp.org/en/statistics/ and for the GDP ranking IMF data we use IMF's World Economic Outlook Database, available at www.imf.org

[184] Guha-Sapir, "Disasters in Numbers 2011," *op. cit.*

[185] Agence France Presse (AFP), "Residents moved from Brazil disaster zone," 19 January 2011, http://reliefweb.int/node/381519

[186] Several articles use $13 billion as the estimated damage number without indicating where the projections come from. See for example: Jeff Masters, "At least 611 dead in Brazilian floods: Brazil's deadliest natural disaster in history," *Weather Underground,* 14 January 2011, http://www.wunderground.com/blog/JeffMasters/comment.html?entrynum=1727

[187] See: AlertNet, "Brazilian authorities under fire over flooding deaths," 17 January 2011, see also: Government of Brazil, "Brazil: Dilma promises federal aid to disaster area hit by rainfall and mudslides," 14 January 2011, http://reliefweb.int/node/380865

or were staying with relatives after the disaster.[188] At the end of January the government announced that it would build 6,000 houses to give for free to poor people made homeless by the floods and landslides, with another 2,000 houses donated by a consortium of construction companies. The government also provided $480 million in emergency funds for the affected areas.[189]

Sri Lanka: floods and landslides

Table 13 Sri Lanka, Floods and Landslides, January and February 2011

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
21.2 million/57	97	67/121

Disaster statistics[190]	**January 2011**	**February 2011**
Fatalities	44	18
Affected	1,100,000	1,200,000
Displaced	362,646	320,408
Est. damage ($ billions)		0.5 (Jan. and Feb.)

Heavy rains through mid-January 2011 caused heavy flooding and landslides in eastern, northern and north-central Sri Lanka, affecting approximately 1.1 million persons and displacing more than 300,000. Among those displaced by the flooding were many families in the Northern Province that had only recently returned after being displaced during the conflict between the government and the Tamil Tigers. The government mobilized more than 30,000 navy, police and air force personnel to provide aid to the affected provinces and on 10 January requested UN relief assistance.[191] Another bout of heavy rain at the end of January led to even more widespread flooding, affecting 1.2 million persons. On 15 February, the government established a Presidential Task Force on Flood Relief to monitor and coordinate the flood response.[192] The timing of the flood affected the critical harvest season from January to February and threatened the April planting season; this has had serious negative implications for livelihoods of affected populations.

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188 AFP, "Residents moved from Brazil disaster zone," 19 January 2011, http://reliefweb.int/node/381519

189 BBC, "Brazil floods: More than 500 dead," 14 January 2011, http://www.bbc.co.uk/news/world-latin-america-12187985

190 OCHA, "Sri Lanka: Monsoon Flood Update Situation Report No. 15," 25 February 2011, http://reliefweb.int/node/389819. Damage figures from: Radio France Internationale (RFI), "Sri Lanka estimates flood damage at 400 million Euros," 13 February 2011, http://www.english.rfi.fr/node/75269

191 BBC, "Battle to reach thousands of Sri Lanka flood victims," 13 January 2011, http://www.bbc.co.uk/news/world-south-asia-12179296

192 OCHA, "Sri Lanka Flash Appeal Revision March 2011," 25 March 2011, http://reliefweb.int/node/393459

With rains abating in early March, most displaced persons were able to return and humanitarian agencies began focusing on early recovery activities. According to the rapid flood assessment, 58 percent of the 246,888 households surveyed reported they had suffered both temporary loss of income during the peak of the floods, and longer-term livelihood loss.[193] Total flood damage was estimated at 400 million Euros ($527 million), with Sri Lanka's government spending 221 million Euros on urgent repair to 50,000 homes damaged by the flood.[194] The $50 million UN appeal was only 57 percent funded by the end of the year.

China: floods

Table 14 China, Floods, June and September 2011

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
1,336.7 million/1	101	2/90

Disaster statistics	**June[195]**	**September[196]**
Fatalities	175 (239)[197]	57
Affected	36,570,000	12,300,000
Est. damage ($ billions)	5.41	2.7

After months of drought in the center and north of the country, many regions of China were hit by heavy rains and flooding in the summer, with authorities claiming that almost 50 million persons were affected by floods in June and September. In June, torrential rains battered the Yangtze River's downstream provinces and several southwestern and southern provinces, affecting 36 million people and leaving 1.64 million displaced in 510 counties.[198] One major concern after the floods was rising food prices as agricultural production was heavily affected in many provinces.[199] In September, a week of heavy rain caused floods affecting Sichuan, Henan and Shaanxi provinces in the south-west, center and north of China, with the flooding in Sichuan expected to be the worst since records began. The September floods affected 12.3 million persons, forced over a million persons from their homes, killed at least 57 per-

193 UN OCHA, "Sri Lanka: Monsoon Flood Update Situation Report No. 16," 17 March 2011, http://reliefweb.int/node/393050

194 RFI, "Sri Lanka estimates flood damage at 400 million euros," 13 February 2011, http://www.english.rfi.fr/node/75269

195 Xinhua News, "Death toll reaches 175 in south China flooding since early June," 20 June 2011, http://news.xinhuanet.com/english2010/china/2011-06/20/c_13940085.htm

196 BBC, "China floods: Dozens killed after days of rain," 20 September 2011, http://www.bbc.co.uk/news/world-asia-pacific-14981928

197 EM-DAT estimates the number of fatalities at 239 while Xinhua News reports 175 casualties and 86 missing as of 20 June 2011.

198 Xinhua News, "Death toll reaches 175 in south China flooding since early June," *op. cit.*

199 The Guardian, "China floods bring steep food price rises," 19 June 2011.

sons, and damaged more than 120,000 houses.[200] Chinese authorities directed the relief operations in the disaster areas and did not request international assistance.

Thailand: floods

Table 15 Thailand, Floods, August 2011 – January 2012

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
66.7 million/20	103	24/89

Disaster statistics	
Fatalities	813[201]
Affected	13,000,000[202]
Est. damage ($ billions)	40

In the wake of tropical storm Nock Ten in late July, and with heavy monsoon rains soaking the country, wide scale flooding began in Thailand's northern and north-eastern provinces. The water slowly began making its way through the Central Plains towards the capital of Bangkok in the following months. Ongoing heavy monsoon rains led the country to declare a third of its provinces as disaster areas by mid-October, affecting millions and bringing large parts of the Thai economy to a halt. By mid-October flood waters reached the city of Bangkok and the government acknowledged that it would not be able to protect all districts of the capital city because of the huge amounts of water. To save the inner city and densely populated areas of the capital, authorities diverted water to surrounding areas.[203] High seasonal tides blocked the water from flowing into the sea and worsened the flood situation in late October. At the height of the disaster, 65 of the country's 77 provinces were affected by the floods.[204]

The floods imposed enormous costs on Thailand's economy, entirely inundating some of the country's main industrial zones. Internationally, supply chains for several major car manufacturers as well as computer production were heavily impacted as Thailand has become an important producer of car parts and produces 25 percent of global computer hard drives. More than 40 percent of the Thai electronic capacity was damaged by the floods. There was also a severe decline in tourists visiting the country, hurting one of the country's major service industries. The floods also severely impacted rice production in several provinces.[205]

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200 BBC, "China floods: Dozens killed after days of rain," 20 September 2011, http://www.bbc.co.uk/news/world-asia-pacific-14981928

201 Debarati Guha-Sapir, "Disasters in Numbers 2011," *op. cit.*

202 Xinhua News, "Thai floods slash tourism income by 1.1 bln U.S. dollars," 17 November 2011, http://news.xinhuanet.com/english2010/world/2011-11/17/c_131253563.htm

203 AFP, "Thai PM says floods in parts of Bangkok inevitable," 20 October 2011, http://reliefweb.int/node/454117

204 AFP, "Thai floods death toll tops 800," 31 December 2011, http://reliefweb.int/node/467850

205 Bangkok Post, "Floods: Losses to Thailand's economy?" 4 November 2011, http://www.

By late 2011 most of the water had receded although in early 2012 several provinces in southern Thailand were still experiencing flooding. With the floods receding, the government promised major investment ($11 billion) in flood prevention and water infrastructure. Plans under consideration include huge artificial waterways north of Bangkok to divert water to the east and west of the city, the establishment of a new water management body for the city to better coordinate the response, planting of trees along waterways and the building of new reservoirs and dams.[206]

Thailand was not the only country in the region hit by floods in 2011. Next to Thailand, the heaviest hit was Cambodia, which also saw large parts of the country inundated, 247 persons killed and millions affected by floods from August to November.[207]

Turkey: earthquake

Table 16 Turkey, Earthquake, 23 October 2011

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
78.8 million/17	92	17/62

Disaster statistics		
Fatalities[208]	604	
Injured	4,152	
Collapsed buildings	2,309	
Damaged buildings[209]	Severely damaged: 11,847	Moderately damaged: 17,923

A 7.2 magnitude earthquake struck eastern Turkey on 23 October in the predominantly Kurdish area in and near the town of Van. The quake killed 604 persons, injured more than 4,000 and destroyed or damaged several thousand buildings. Initially, the Turkish government declined offers of international assistance, opting instead to rely on its own emergency management systems to respond to the effects of the earthquake. However, as the need for shelter increased, and criticism of the initially slow relief distribution mounted, the government formally requested assistance on 25 October.[210] An aid campaign launched by the Turkish government raised $67 million (including a $50 million donation from Saudi

bangkokpost.com/learning/learning-from-news/264786/floods-losses-to-thailand-economy

206 Jonah Fisher, "Flood-proofing Bangkok could force canal dwellers out," BBC News, 25 January 2012, http://www.bbc.co.uk/news/world-asia-pacific-16713875

207 Debarati Guha-Sapir, "Disasters in Numbers 2011," *op. cit.*

208 USAID, "USAID/DCHA Turkey Earthquake Fact Sheet #1 - FY 2012," 3 November 2011, http://reliefweb.int/node/457087

209 IFRC, "Emergency appeal and operation update, Turkey: Van Earthquake," 1 November 2011.

210 USAID, "USAID/DCHA Turkey Earthquake Fact Sheet #1 - FY 2012," 3 November 2011, see also: Reuters, "Quake rescuers save baby, Turkey requests aid," 25 October 2011, http://www.reuters.com/article/2011/10/25/us-turkey-quake-idUSTRE79M10Z20111025

Arabia) by early November.[211] A 5.7 magnitude aftershock on 9 November led to the collapse of several hotels, killing 12.[212]

Given that winter was quickly approaching, winterized tents, clothes and blankets for people who had lost their houses as well as the early provision of temporary shelter were the main humanitarian needs following the earthquake. By mid-January, the government had provided 18,000 containers to be used by affected persons who lost their housing during the earthquake, with over 50,000 more containers in the pipeline. The government planned to temporarily relocate 180,000 disaster victims to container cities, with the first permanent houses for disaster victims to be ready by August 2012.[213]

Colombia: floods, landslides

Table 17 Colombia, Floods, Landslides, April 2010-June 2011, September-December 2011

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
44.7 million/30	87	28/77

Disaster statistics	April 2010 – June 2011	September – December 2011
Fatalities	486	181
Affected	4,000,858	914,280
Est. damage ($ billions)	5.3	n/a

In 2010 and early 2011, Colombia was battered by severe rainfall connected to one of the strongest La Niña episodes in the last century. The rains led to massive floods, causing almost 500 fatalities and affecting more than four million people from April 2010 until June 2011.[214] Economic losses were estimated to be over $5 billion.[215] The Colombian people and government mobilized substantial funds for disaster relief and recovery, with the government creating the "Colombia Humanitaria" framework for flood relief. Although there were positive aspects of the new mechanism – such as national ownership and the leveraging of private resources – the system was widely criticized. By largely replacing the existing disaster response system with a new one during an emergency, the response was slow and thousands of flood victims were left to survive on their own. Some areas affected by the floods were also areas where people had been displaced by conflict. In Colombia, those displaced by conflict

[211] Government of Turkey, "Van earthquake press release," 3 November 2011, http://reliefweb.int/node/457169

[212] AlertNet, "Turkish police fire tear gas in quake city," 10 November 2011, http://www.trust.org/alertnet/news/turkish-police-fire-tear-gas-in-quake-city/

[213] Government of Turkey, "Deployment of disaster victims to containers has being promptly continued," 19 January 2012, http://reliefweb.int/node/471405

[214] UN OCHA, "Colombia Inundaciones 2010, Informe de situación No. 40," 8 September 2011.

[215] Alice Thomas, *Surving Alone: Improving Assistance to Colombia's Flood Victims*, Refugees International, May 2011.

and by natural disasters fall under completely separate legal and institutional frameworks, meaning that while "protection of people internally displaced by conflict has gradually been informed by international human rights standards, those affected by natural disasters continue to be viewed as objects of care rather than rights-holders." [216]

While the rains were weaker in 2011 than the year before (when they were seven times heavier than average), they still caused floods and mudslides in both the spring and the autumn. UN OCHA reports that from September to shortly before the end of December, 914,280 persons were affected by the rains and 181 died as a result of the disaster.[217] *The Economist* notes with respect to the government program instigated after the 2010 floods to mitigate the effects of the next rainy season that only 400 of 4,250 public-works projects had been finished (with another 680 near completion) by the end of 2011.[218]

Philippines: storms

Table 18 Philippines, Typhoon Nesat and Tropical Storm Washi, September and December 2011

Country data		
Population/rank	**Human Development Index rank**	**GDP total/per person rank**
101.8 million/12	112	32/123

Disaster statistics	**Nesat, September**[219]	**Washi, December**[220]
Fatalities	85	1,268 (1,430)[221]
Affected	3,105,355	1,168,726
Evacuated	387,641	525,945[222]
Damaged houses	7,491	52,435
Est. property damage ($ billions)	0.36	0.04

[216] *Ibid.* pp. 11-13.

[217] UN OCHA, "Colombia Inundaciones 2011 Informe de situación No. 05," 30 December 2011, http://reliefweb.int/node/467806

[218] The Economist, "That damned Niña, Endless rain exacts a heavy toll," 10 December 2011, http://www.economist.com/node/21541419

[219] Republic of the Philippines, National Disaster Risk Reduction and Management Council (NDRRMC), "2011 top 10 Philippine Destructive Tropical Cyclones," last updated 6 January 2012, http://www.ndrrmc.gov.ph/index.php?option=com_content&view=article&id=413

[220] Republic of the Philippines, NDRRMC, "NDRRMC Update, SitRep No 47 re Effects of Tropical Storm "Sendong" (Washi) and Status of Emergency Operations," 26 January 2012.

[221] EM-DAT estimates the number of fatalities at 1,430 while the Government of the Philippines reports 1,268 casualties and 181 missing by 26 January 2012.

[222] Republic of the Philippines, NDRRMC, "2011 top 10 Philippine Destructive Tropical Cyclones," last updated 6 January 2012, http://www.ndrrmc.gov.ph/index.php?option=com_content&view=article&id=413

As noted earlier in this chapter, the Philippines was the country with the highest number of disasters in 2011. Two of the most devastating disasters were Typhoon Nesat and Tropical Storm Washi.

Typhoon Nesat, known locally as Pedring, made landfall in Aurora and Isabela provinces in northeastern Philippines on 27 September, causing the evacuation of tens of thousands of persons as well as the suspension of all school classes in Manila and other affected areas. The storm caused widespread flooding, killing 85 persons, damaging more than 7,000 houses and affecting more than three million persons.[223] Authorities were also concerned about widespread damage to corn crops in the affected area. Nesat was followed shortly afterwards by Typhoon Nalgae (Quiel), which traced its path along the track of Nesat, compounding the devastating impact on northern and central Luzon.[224]

Tropical Storm Washi, known locally as Sendong, swept through the southern province of Mindanao between 15 and 18 December 2011, triggering flash floods and landslides in many municipalities in the regions, including the two major cities of Cagayan de Oro and Iligan. The storm killed more than 1,200 persons, damaged more than 13,000 houses and devastated many communities. As many as 400,000 persons were reported to have fled their homes in the aftermath of the disasters, with 23,000 remaining in evacuation centers by the end of January.[225] Experts noted that the storms' heavy toll was caused by people being asleep when the storm hit and also by the fact that in that part of the country people were not used to storms. Deforestation of watersheds was also seen as a factor which intensified the effects of the heavy rains.[226] With support from aid organizations, the government launched a large-scale relief operation, providing assistance to almost half a million persons. While emergency relief operations for the many displaced persons were still ongoing in late January, the government was determining areas in the affected towns that were unsafe for return due to the high risk of future disasters and was contemplating resettlement options for the inhabitants of those areas.

How are reconstruction efforts progressing in last year's disaster areas?

In our 2010 *Review*, we focused on the earthquake in Haiti and the floods in Pakistan. In this section we examine the recovery efforts in these two disasters a year later. The story is not an encouraging one.

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223 *Ibid.*

224 OCHA, "Typhoon Nelgae and Nesat, Situation Report No. 3," 4 October 2011, http://reliefweb.int/node/450632

225 OCHA, "Tropical Storm Washi, Situation Report No. 15," 27 January 2012.

226 People & Planet, "Philippine floods: a disaster waiting to happen," 30 December 2011, http://www.peopleandplanet.net/?lid=30189&section=33&topic=27

Haiti Camp Residents Relocated to Prepare for Tropical Storm.
Photo: UN Photo/Logan AbassiDormino

Haiti: Still in the Emergency Phase?

It is normal after a major disaster for reconstruction to take several years, but the pace of recovery in Haiti has been slower than in other major post-disaster areas. It is probably fair to say that with more than 519,000 Haitians still living in tents and under tarpaulins in more than 750 camps, the emergency phase of the disaster has not yet ended.[227] Over ten thousand people have been evicted from camps, many with no place to go, and up to 120,000 of the remaining IDPs are threatened by eviction.[228] With the Haitian government only slowly gaining a foothold after the contested and drawn out election process in late 2010 and early 2011, a reconstruction master plan is still missing. While housing repair and reconstruction projects have begun in several areas, most international actors have focused on the construction of temporary housing, in part because land and property issues were easier to overcome for temporary dwellings than for permanent housing.[229]

Data from the UN shelter cluster show that more than 128,000 families or approximately half a million people had found at least temporary housing by January 2012, with 100,604

[227] Haiti E-Shelter/CCCM Cluster, IOM, "Displacement Tracking Matrix, v2.0 update," 30 November 2011.
[228] Oxfam International, "Haiti - The Slow Road to Reconstruction, Two years after the earthquake," 10 January 2012, http://www.oxfam.org/en/policy/haiti-slow-road-reconstruction
[229] IFRC, "Thousands of families face short- and long-term challenges after Typhoon Washi," 22 December 2011.

T-shelters constructed (61,241 in 2011), 13,578 houses repaired, 6,725 rental subsidies given, 4,769 houses reconstructed and 2,386 emergency shelters provided.[230] As temporary shelter construction is based on a neighborhood approach, the large number of constructed T-shelters has not brought many solutions for the displaced persons, with only 22 percent of the T-shelters going to IDPs. One of the main problems of finding durable housing solutions for the hundreds of thousands of displaced in Haiti's tent cities is that 77 percent of IDPs still living in camps by late 2011 in Haiti were tenants – rather than owners – before the earthquake.[231] With a severe lack of available rental properties as a result of the earthquake, even the distribution of rental subsidies cannot provide sufficient solutions for most of them. Funding has become more scarce in the second year after the earthquake and many humanitarian actors have transitioned towards reconstruction, resulting in growing gaps in service provision to IDPs in 2011.[232]

Next to the displacement crisis, the cholera crisis also set back the recovery efforts. By November 2011, almost half a million cholera cases had been reported and more than 6,000 persons had died from cholera.[233] Efforts to prevent the further spread of cholera used important resources, which might have otherwise been used for reconstruction. With investigations showing that the outbreak of the cholera epidemic was most likely connected to the MINUSTAH peacekeeping mission, the epidemic soured relations between the Haitian population and the peacekeeping mission.[234]

Haiti's new government under President Martelly and Prime Minister Conille has made ambitious promises, including free primary education, economic development and IDP resettlement, but political infighting with parliament delayed the confirmation of the prime minister and his cabinet until autumn. This took time that could have been used for making important reconstruction decisions. On the upside, the year has witnessed the beginning of several major projects such as a training hospital, a multimillion dollar industrial park on Haiti's northwest coast and a program to stimulate agricultural production. On the downside, the end of the mandate of the Interim Haiti Recovery Commission in October (by which time it had approved over 100 projects worth $3.2 billion) and the failure to either prolong the mandate or to create the originally planned successor to the IHRC, the Authority for the Development of Haiti, seemed to be a bad omen for prospects of coordinated reconstruction in 2012.[235] Given these difficulties, donors' inertia is understandable, but it

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230 Giovanni Cassani, Haiti E-Shelter and CCCM Cluster, Presentation at E-Shelter & Camp Coordination and Camp Management Cluster Interaction meeting, draft version, 12 January 2011.

231 *Ibid.*

232 Oxfam International, "Haiti – The Slow Road to Reconstruction," *op. cit.*

233 WHO, "Health Cluster Bulletin, Cholera and Post-Earthquake Response in Haiti," 7 November 2011.

234 Reuters, "U.N. peacekeepers likely caused Haiti cholera," 30 June 2011, http://www.reuters.com/article/2011/06/30/us-haiti-cholera-idUSTRE75T4O220110630

235 Oxfam International, "Haiti – The Slow Road to Reconstruction," *op. cit.*, p. 8.

certainly has also contributed to the slow speed of reconstruction in Haiti, with donors only disbursing 52.88 percent of the $4.5 billion pledged for 2010-11.[236]

The prospects for 2012 are mixed. On the one hand the Martelly/Conille government has begun initiatives to resettle IDPs from several camps, recently announcing the start of a resettlement project for approximately 20,000 IDPs housed in the vicinity of the destroyed presidential palace.[237] But this is only a fraction of remaining IDPs. Without a master plan for reconstruction which deals with some of the contentious land and property rights issues, and without additional funding, by November 2012 there could still be more than 350,000 persons living in camps in the earthquake-affected areas.[238] Almost three years after the earthquake, this number seems shockingly high. And while some government agencies have performed well in the emergency phase, many Haitian state institutions lack capacity and/or are underfunded. Thousands of NGOs are working on projects which are mostly well-intentioned, but are often not well-coordinated. And some presidential initiatives, such as the plan to reconstitute the Haitian army, seem to only distract attention from the huge remaining reconstruction challenges.

Still, with some gentle signs of progress, the cholera epidemic slowing down, half of the rubble cleared and good intentions abounding, there should be fewer excuses if reconstruction is not well on the way by this time next year.

Pakistan flooding: A double hit

As might be expected given the scale of Pakistan's flooding in 2010, recovery was slow in 2011. The 2010 floods, as reported in last year's *Annual Review,* affected over 20 million people and covered a fifth of the country's territory.[239] In terms of the government's response to the 2010 floods there was both popular and expert concern with the slow pace of rebuilding and particularly with the fact that embankments, dams and other water control infrastructure were not being repaired sufficiently quickly to protect against future floods.[240] Nor did reconstruction of housing keep pace with the needs of the population. Refugees International reports that some nine million people who lost their homes in the 2010 floods lacked secure shelter even as the 2011 monsoon season approached.[241]

It turned out that these fears were well-founded as the 2011 summer monsoon rains were again heavier-than-usual and caused renewed widespread flooding in Pakistan. Even

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236 Office of the Special Envoy for Haiti, "Assistance Tracker," accessed 19 January 2012, http://www.haitispecialenvoy.org/assistance-tracker/

237 Reuters, "Haiti Marks Two Years After Catastrophic Quake," 12 January 2012, http://www.reuters.com/article/2012/01/12/us-haiti-quake-anniversary-idUSTRE80B0BS20120112

238 Cassani, *op. cit.*

239 Ferris and Petz, *op. cit.,* p. 23.

240 Alice Thomas, "Pakistan: Flood Survivors Still Struggling to Recover," *Refugees International*, 31 August 2011, http://www.refugeesinternational.org/node/4944

241 *Ibid.*

though they were more limited in scope than the previous year, primarily affecting the provinces of Sindh and Balochistan, the 2011 floods affected over five million people and demonstrate the particular impact of recurrent disasters.

But first a word about recovery from the 2010 floods. The transition from relief to early recovery did not work very smoothly. Although the Pakistani government decided several months in advance that the disaster relief phase would end on 31 January 2011, humanitarian agencies were surprised when this decision was implemented in all but five districts. The camps for IDPs were closed and food assistance was discontinued. This came as a surprise because the humanitarian agencies were conscious that many people affected by the floods still lacked housing, food, medical services, and access to clean water and sanitation. But it also came as a surprise because the assistance structures intended to facilitate the transition from relief to long-term development were not yet in place. The Early Recovery Cluster, as it is called, had not yet completed its plans for the transition and, in fact, the final Strategic Early Recovery Action Plan was not released until 15 April 2011. Even then, the early recovery plan did not receive sufficient support from donors. It is true that the transition from relief to development rarely runs smoothly, but in Pakistan, the situation was particularly acute because of the exposure of the population to the effects of further hazards.

A year after the 2010 floods, Refugees International found that 5.6 million people in flood-affected areas were food insecure and "alarmingly high numbers" were malnourished. Of even more concern was the fact that some nine million people were still in need of permanent shelter. Hundreds of thousands of people still lived in tents or in various types of temporary shelters rather than the more permanent – and safer – one-room shelters that had been agreed on. There were many criticisms of shelter reconstruction in the aftermath of the Pakistani floods (such criticisms are unfortunately not unusual in post-disaster settings.) It took time to agree on a standard housing model; once agreed, agencies were slow to commit to building the structures, and even among those who had committed to construct housing, progress was slow. There were also difficulties in distribution of new housing. As in other post-disaster situations, permanent housing tended to be given to those who either owned their property or had secure property rights, rather than to the most vulnerable members of the society.

This was the backdrop against which the 2011 floods occurred. Rajiv Sinha of the Indian Institute of Technology in Kanpur links the recurrent flooding to climate change, arguing that all of the climate change models predict that the distribution of monsoon rains will become more uneven in the future. "Total rainfall stays the same, but it comes in shorter more intense bursts." [242] In August 2010, more than half of the normal monsoon rain fell in only one week. Typically it is spread over three months and rivers such as those in the vast

[242] Ishann Tharoor, "Pakistan's Floods: Déjà vu, All Over Again," *Time Magazine*, 14 September 2011, http://globalspin.blogs.time.com/2011/09/14/pakistans-floods-deja-vu-all-over-again/#ixzz1l3Nu1UgF

Indus River system just could not cope with that quantity of water in a short period.[243] Once again in late summer 2011, the heavier-than-usual monsoon rains flooded the Indus Valley.

As of October 2011, a joint UN-Pakistani government assessment mission found that the 2011 floods affected more than five million people in Sindh and Balochistan. Nearly 800,000 houses were damaged; 41 percent of them were completely destroyed.[244] Millions of hectares of agricultural land lay under water and hundreds of villages were completely submerged. Over 500 people died.[245] 4.3 million people – 84 percent of the affected population – were found to be food-insecure in Sindh and Balochistan (although it should be noted that even without the flooding, Sindh had the highest food insecurity rate in Pakistan at 72 percent). Acute respiratory infections were on the rise and the survey indicated that flood-affected people are at risk of vector-borne diseases such as malaria and dengue. As usual, a critical issue was access to safe drinking water and sanitation facilities. According to the WHO, up to 87 percent of water sources tested were unfit for drinking. The loss of livelihoods and the flooding of agricultural land meant that there was an urgent need for agricultural inputs so that flood-affected communities could begin farming once again. By the end of the year, humanitarian actors were distributing winterization items for people in the flood-affected areas. While some 450,000 households had received assistance, 43 percent of affected households had not received any assistance at all.[246]

In sum, as a result of a second year of extreme flooding, many flood-affected people in Sindh and Balochistan have become more vulnerable due to damage to infrastructure and lack of livelihood opportunities.[247] The floods also may have political consequences; when a government is seen to be responding inadequately to a national emergency, its legitimacy may be called into question. The Pakistani government faces numerous pressures, including insurgent activity, troubled civilian-military relationships and strained ties with the United States. In the 2010 flooding, there were popular protests against the government for failing to deliver relief quickly and many observers contrasted the generally efficient response by the Pakistani military with the slower response of civilian authorities.[248] In 2011, there were again political critiques of the government's response, particularly its seeming inability to prepare for the crisis and difficulties in mobilizing international assistance.[249]

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243 *Ibid.*

244 OCHA, "Pakistan Monsoon 2011, Situation Report No. 15," 9 December 2011.

245 Guha-Sapir et al., "Annual Disaster Statistical Review 2010," *op. cit.*

246 OCHA, "Situation Report No. 15," *op. cit.*

247 OCHA, "Situation Report No. 15," *op. cit.*

248 The Telegraph, "Pakistan floods: flood stirs anger at government as death toll hits 1,200," 2 August 2010, http://www.telegraph.co.uk/news/worldnews/asia/pakistan/7922152/Pakistan-floods-flood-stirs-anger-at-government-as-death-toll-hits-1200.html. Also see: Resilience Science, "How resilient is the Pakistan government to floods?" 17 August 2010, http://rs.resalliance.org/2010/08/17/how-resilient-is-the-pakistan-government-to-floods/

249 Zulfiqar Ali, "Flood survivors suffer in KP as govt fails to mobilise donors," *Dawn*, 26 July 2011, http://www.dawn.com/2011/07/25/flood-survivors-suffer-in-kp-as-govt-fails-to-mobilise-donors.html

Saint Louis, Missouri - Destroyed homes after tornadoes, Saint Louis area on Friday April 22, 2011.
Photo: © R. Gino Santa Maria | Dreamstime.com

Section 3

Estimating Economic Costs of Natural Disasters: An Imperfect Science

This was a year of extraordinary economic losses due to natural disasters. Munich Re, one of the largest reinsurers in the world, estimates the economic losses of natural disasters in 2011 at $380 billion – the largest sum ever, breaking the previous record from 2005 of $262 billion (in constant 2011 dollars).[250] As noted elsewhere in this study, this was due to several large-scale disasters in developed countries as well as to the flooding in Thailand.[251] But measuring the economic impact of disasters is complicated. This section looks at the way economic costs are calculated, considers why the costs of disasters are increasing, examines the different economic impacts of disasters in rich and poor countries, and makes some observations on the cost of prevention versus response.

Table 19 Top 5 Natural Disasters by Cost of Disaster Damage, 2011[252]

Country/ Region	Disaster	Date	Overall losses ($ billions)	Insured losses ($ billions)
Japan	Earthquake, tsunami	3 March	210	35-40
Thailand	Floods, Landslides	1 Sep – 15 Nov	40	10
New Zealand	Earthquake	22 Feb	16	13
USA	Severe storms/ Tornadoes	22 – 28 April	15	7.3
USA, Caribbean	Hurricane Irene	22 August – 2 Sep	15	7
Total			**380**	**105**

The economic impact of disasters is increasing for several reasons: there are, first of all, simply more people on earth and they are increasingly living in cities where built structures tend to be more expensive. As the *Economist* points out, "economic activity is being concentrated in disaster-prone places: on tropical coasts and river deltas, near forests and along earthquake fault lines."[253] A 2010 World Bank study led by Apurva Sanghi estimated

250 If an insurance company does not wish to bear the full risk of their potential liabilities they can get insurance themselves from a reinsurer.

251 Munich Re, "The five largest natural catastrophes of 2011," Geo Risks Research, NatCatSERVICE, January 2012, http://www.munichre.com/en/media_relations/press_releases/2012/2012_01_04_press_release.aspx

252 *Ibid.*

253 The Economist, "Counting the cost of calamities," 14 January 2012, http://www.economist.com/node/21542755

that between 2000 and 2050 urban populations exposed to tropical cyclones or earthquakes will more than double, rising from 680 million in 2000 to 1.5 billion in 2050.[254]

Different kinds of disasters produce different kinds of economic impact. Sudden-onset disasters primarily damage productive capital, including infrastructure, and may destroy means of production. Slow-onset disasters are typically more extensive in their impact and may be more destructive in the longer term as they erode rates of savings, investment and domestic demand as well as undermining productive capacity.[255]

Measuring the economic impacts of disasters

The disaster damage figures in this review are based on both EM-DAT and Munich Re NatCatService data because Munich Re's dataset is more detailed in terms of damage figures than the EM-DAT dataset. For example, in 2010, EM-DAT only provides damage estimates for fewer than 20 percent of the natural disasters in its database.[256] Meanwhile, EM-DATs database allows broader access to data which makes long-year comparability easier. EM-DAT describes "estimated damage" as: "The economic impact of a disaster usually consists of direct (e.g. damage to infrastructure, crops, housing) and indirect (e.g. loss of revenues, unemployment, market destabilization) consequences on the local economy."[257]

Insurance companies obviously have a strong interest in calculating the economic losses which they cover and have developed methodologies to estimate total economic losses, including those not insured. For example, Munich Re, a reinsurance company, explains its methodology in determining disaster damage as follows:

> In the case of roughly one-third of all loss events, reliable data on economic losses are provided by governments, statistical offices, the World Bank and development banks. These are entered in the database by Munich Re after close scrutiny and verification of their plausibility. If suitably verified data concerning the economic losses are not available, we take as our basis the figures concerning the insured losses, extrapolate these via the insurance density of the affected region and determine the amount of loss with the aid of specially developed algorithms. These loss estimates take account of the type of event, as well as the risk exposure of the region affected. Among other things, this includes information on the structure of affluence in the country affected, as well as details concerning damaged industrial plants, infrastructure and supply systems. Even if an insured loss has not been

254 Apurva Sanghi et al., *Natural Hazards UnNatural Disasters, op. cit.*

255 Mark Pelling, Alpaslan Ozerdem and Sultan Barkat, "The macro-economic impact of disasters," *Progress in Development Studies*, vol. 2, no. 4 (2001), p. 285.

256 Elizabeth Ferris and Daniel Petz, *A Year of Living Dangerously, A Review of Natural Disasters in 2010*, Brookings-LSE Project on Internal Displacement, 2011.

257 EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, "Glossary", www.emdat.be.

> incurred, Munich Re can still determine the overall losses. To this end, a realistic picture of the loss is drawn up by experts on the basis of the type of event, the nature of the region affected, its population density and information on damage to buildings and infrastructure, as well as injuries, and then use this to arrive at the overall losses.[258]

In comparison with reinsurance companies such as Munich Re, it is often difficult to uncover the methodologies used by governments, insurance companies, development agencies, researchers, and others collecting data on the impact of disasters. A first major problem with economic loss figures is the lack of consistency in methodology and of lack of transparency in explaining the methods used.[259] A second problem is that disaster loss figures are generally based on government reports and thus will reflect different methodologies and capacities of governmental data collection instruments. For example, one would expect more reliable loss estimates from the government of Australia than from the government of Togo. While calculating the loss of physical infrastructure – buildings, roads, factories – is relatively straightforward, a third problem is that there seem to be different ways of calculating the knock-on effects of disasters. Some refer to direct losses (e.g. loss of physical infrastructure), indirect losses (e.g. manufacturing affected by loss of power, labor and communications) and secondary impacts (as when, for example, disasters increase demand for building materials and skilled labor).[260]

Disasters can cause demand for building materials, food, energy and water to increase at the same time that damage to infrastructure causes domestic production to fall; damages to infrastructure such as transportation, marketing and communications reduces the ability of goods to circulate; demands for skilled workers, particularly in construction, can lead wages and prices to increase.[261] After the 1995 Kobe earthquake in Japan, for example, production failures led to a loss of 4,500 jobs – the knock-on effects included lost household earnings.[262] In 2012, Japan reported its first trade deficit since 1980, due largely to the economic effects of the earthquake/tsunami.[263]

The long-term impact of disasters may be difficult to measure. For example, there may be difficulties in estimating such consequences as the decline in property values that sometimes occurs in an area affected by a disaster. The economic consequences of a disaster may be felt far from the area where the disaster occurs, as when European tour operators are affected by the loss of a popular vacation destination due to a disaster.

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258 Munich-Re, "NatCatSERVICE Natural catastrophe know-how for risk management and research," 2011.

259 Pelling et al., *op. cit.,* p. 284.

260 *Ibid.,* p. 288-290.

261 *Ibid.,* p. 290.

262 *Ibid.,* p. 291.

263 The Guardian, "Japan reports first trade deficit in 32 years after tsunami," 25 January 2012, http://www.guardian.co.uk/world/2012/jan/25/japan-first-trade-deficit-12-years-tsunami?newsfeed=true

There are also long-term costs in terms of education and health. The World Bank found that the temporary withdrawal of children from school after disasters affect their communities sometimes becomes permanent, noting that children withdrawn from schools during droughts in Central Mexico between 1998 and 2000 were about 30 percent less likely to resume their studies afterwards than children in other areas.[264] These are long-term costs as is malnutrition, which often affects populations after a disaster and leaves people less able to work and more susceptible to disease. Other health costs may include decreased earning potential of people who sustain permanent injuries or disabilities from the disaster and for their family members who care for them.

Looking beyond the immediate material losses generated by disasters can yield some surprising results. For example Sutter and Simmons calculate that the monetary value of injuries sustained by tornadoes is much less than the cost of time lost to tornado warnings. In fact, this loss of time accounts for 65 percent of the economic cost of tornadoes over an extended period in the US. But even this does not include the cost of social impacts, such as when, for example, a tornado destroys the only grocery store in town and people have to drive an hour further to shop.[265]

In looking at the issue of economic loss, there is not a consistent use of terminology throughout the sector. Terms such as economic damage, loss, and impact are used interchangeably in various documents, including official ones. EM-DAT uses the term "estimated damage" while NatCat's data is labeled as "overall losses." Okuyama and Sahnin, two World Bank economists, suggest the following terms: "damages" to refer to damages to stocks, which include physical and human capitals; "losses" as business interruptions, such as production and/or consumption, caused by damages and which can be considered as first-order losses; "higher-order effects", which take into account the system-wide impact based on first-order losses through inter-industry relationships; and "total impacts" as the total of flow impacts, adding losses and higher-order effects.[266] Kevin Kliesen also includes differences between the market effect (e.g. loss of income due to disaster-caused destruction) and non-market effects (e.g. loss of leisure time due to a longer commute as a result of the disaster).[267] Even when the various types of costs are separated, there may be problems with both double-counting and underestimation of damage and losses. For example, if a hospital is destroyed in an earthquake, adding the lost social benefit (due to reduced access to care) with the cost of reconstruction (as a crude proxy for the lost value of the asset) would double count the output losses.[268]

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[264] Sanghi et al., *op. cit.*, p. 44.

[265] Daniel Sutter and Kevin M. Simmons, "The Socioeconomic Impact of Tornadoes," in William Kern (edi.), *The Economics of Natural and Unnatural Disasters,* W.E. Upjohn Institute for Employment Research, 2010, pp. 104-106.

[266] Yasuhide Okuyama and Sebnem Sahin, *Impact Estimation of Disasters: A Global Aggregate for 1960 to 2007*, World Bank Policy Research Working Paper Series, no. 4963, June 2009, p. 11.

[267] Kevin L. Kliesen, "The Economics of Natural Disasters," Regional Economist, April 1994, p. 15.

[268] Sanghi et al., *op. cit.*, p. 58.

A recent World Bank study explains that damage assessments are tricky because they are often conducted as a basis for compensation and questions whether it is valuable to try to comprehensively value damage to private property at all.[269] The study goes on to note the difficulties in measuring damage with the following example:

> Consider estimating the value of physical damage when Cyclone Sidr knocks down a thatched hut in Bangladesh (for which there is neither a rental nor a property market). Is the damage what the farmer had spent in materials with or without the (foregone) value of his time in building it? This 'acquisition cost' (what it cost the farmer) could differ substantially from 'replacement cost' (what it would now cost to rebuild the hut) or from the conceptual asset value of the structure (what the lost structure could have fetched in exchange).[270]

An additional difficulty in estimating economic loss is that there is a reported tendency to overestimate the economic losses in the immediate aftermath of a disaster. Buildings that may appear totally destroyed may turn out later to be repairable. Sometimes this tendency to overestimate damages is the result of media pressure to make a disaster appear more catastrophic in order to generate news interest. And sometimes there are pressures on local officials to "overestimate their losses in order to maximize their political leverage over federal assistance dollars."[271]

Yet another factor complicating economic cost assessments is that while disasters usually result in economic loss, there also may be positive economic effects, as when more productive technologies replace outdated ones.[272] Other economic gains may result from the reconstruction process itself. Thus in the US on average, aggregate local employment falls by 3.4 percent following a flood event, but in a study of Florida, income increased by 4.35 percent in directly affected areas as a result of decreasing labor supply and a simultaneous increase in post-hurricane labor demand, particularly in construction.[273] In other words, the economic costs of a disaster need to be offset by contributions which post-disaster reconstruction brings to the country, including in many cases foreign disaster assistance.

The question of calculating the economic impact of disasters is an extraordinarily complex one – particularly for non-economists.[274] The work of the World Bank is shedding some

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269 *Ibid.,* p. 43.

270 *Ibid.,* p. 59.

271 Kliesen, *op. cit.*

272 Derek Kellenberg and A. Mushfiq Mobarak, "The Economics of Natural Disasters," *Annual Review of Resource Economics*, vol. 3, no. 1., 297-312., October 2011, p. 302, resource.annualreviews.org

273 *Ibid.,* p. 303.

274 Humanitarian and development actors often attempt to assess damages by looking at specific sectors, such as agriculture and tourism as economic sectors; housing education and health as social sectors; and energy, water supply and transportation as infrastructure sectors. See for example: Australian Agency for International Development (AUSAID), "Economic Impact of Natural Disasters on Development in the Pacific, vol. 2, Economic Assessment Tools," May 2005,

light on these complexities, and efforts by reinsurance companies to share their data with the broader community are to be commended. But it would be even more helpful if those involved could either agree on a common methodology or share the details of the methodology they use so that researchers could determine the extent to which the resulting data are comparable. For now, the question of assessing the economic costs of natural disasters remains a highly imperfect science. What we do know is that economic costs include more than the loss of physical assets, that the economic costs of disasters can be felt for a very long time, and that the economic costs of disasters are expected to increase in the future.

Who's most affected by economic losses from disasters?

Perhaps surprisingly, the economies most vulnerable to disasters are not the most undeveloped.[275] Undeveloped economies are overwhelmingly agricultural and semi-subsistence in structure; for example, while they may be severely affected by drought, once the rains return, they generally recover quickly. Intermediate economies with some diversification appear more secure but tend to have greater direct, indirect and secondary impacts. Okuyama and Sahin find that there is an inverted U-shaped curve in terms of the economic impact of disasters with poor countries and rich countries less affected by disasters than middle income countries. In a nutshell, poor countries have less to lose and rich ones are better able to cope.[276]

The economic impact of disasters depends on a number of factors, starting with the resources of a country or community. As Kellenberg and Mobarak point out, "low-income countries that suffer from frequent disasters are at risk of becoming stuck in a poverty trap. They continually replace damaged capital with capital similar to what existed before the disaster in order to resume prior levels of productivity as quickly as possible. This, however, limits the possibility of future increases in productivity."[277]

Developed countries have many advantages in prevention, mitigation, response and recovery: they can design and enforce building codes, develop early warning systems, provide effective disaster relief when a disaster occurs. Moreover, people living in developed countries have more access to insurance. But the relationship is not completely straightforward; people with higher incomes not only have more expensive homes (and thus more to lose) but they may also be living in areas more vulnerable to disasters – for example on coastlines or near forests which are susceptible to wildfires.

The type of economy influences the impact of a disaster. For example, small and poorly diversified economies whose productive assets are spatially concentrated are highly vulnerable to economic loss from disasters. For example, Antigua is small and dependent on

http://www.ausaid.gov.au/publications/pdf/impact_pacific_tools.pdf

275 Pelling et al., *op. cit.,* p. 293.

276 Okuyama and Sahin, *op. cit.*, p. 7.

277 Kellenberg and Mobarak, *op. cit.,* p. 303.

agriculture and tourism – two economic sectors that are particularly vulnerable to disasters. In 1995 Hurricane Luis caused $330 million in direct damage to Antigua – equivalent to 66 percent of the country's GDP – precisely because of its impact on agriculture and tourism.[278]

Disasters impact development. For example, "Hurricane Mitch is said to have set back development in Nicaragua by 20 years."[279] And, as mentioned above, the long-term impact of children missing out on education and suffering long-term health effects can impede a country's development efforts. But development itself can lead to destruction of natural barriers, such as mangrove forests, which provide some protection from the effects of natural hazards. For example, many have commented that the damage to New Orleans from Hurricane Katrina was at least partly due to the clearing of the marshes south of the city which had provided a buffer from the Gulf of Mexico.[280] Moreover, the growth of cities increases the demand for water; taking water from the ground can increase vulnerability to flooding. The *Economist* cites the case of Jakarta – a city whose population has more than doubled since 1980 to 24 million, and is projected to increase to 35 million by 2020. "Land that once absorbed overflow from the city's 13 rivers has been developed, and is now subsiding; 40 percent of the city is now below sea level."[281]

Within countries affected by disasters, not everyone is affected equally. There are always at least a few winners as well as many losers. For example, farmers whose crops have not been affected by a disaster can get higher prices for their food after a disaster.[282] Reconstruction efforts can inject considerable resources into the community, generating new employment opportunities, albeit often only for the short term. At the same time, relief and recovery spending can displace maintenance of infrastructure, increasing risk of future deaths and loss in future disasters.[283]

And then there's the cost of prevention

A major disaster, particularly when it's well-covered in the media, generally leads to an outpouring of response, both domestically and internationally. This desire to respond to people suffering from the effects of a natural hazard is perhaps universal. But there is less human interest in supporting measures to reduce the risk of catastrophic loss from disasters and usually less political will than to contribute to emergency response. To cite one of many examples, in 2002, Mozambique, anticipating major floods, "asked donors for $2.7 million to prepare and got only half the amount, but $100 million were received in emer-

278 Pelling et al., *op. cit.,* pp 285-286.
279 M. Day, "Nicaragua needs a break," in *World Disasters Report*, IFRC, 2000.
280 The Brookings Institution Metropolitan Policy Program, *New Orleans After the Storm: Lessons from the Past, a Plan for the Future*, October 2005, p. 26.
281 The Economist, "Counting the cost of calamities," 14 January 2012.
282 Okuyama and Sahin, *op. cit.*, p. 12.
283 *Ibid.,* p. 122.

gency assistance following the floods, with another $450 million pledged for rehabilitation and reconstruction."[284]

While around 20 percent of humanitarian aid is now spent on responding to disasters, only 0.7 percent is spent on preventive measures to mitigate their possible consequences.[285] Although disaster risk reduction should be an integral part of development funding, less than half of one percent of development funding is directed toward disaster risk reduction.[286] And yet there is increasing awareness of the need for preventive measures. While the international decade on disaster risk reduction is generally considered to have been a failure, the International Strategy on Disaster Risk Reduction, launched in the aftermath of the Kobe earthquake, has generated some very positive momentum. For example, the United Kingdom's Department for International Development (DFID) has pledged that whenever it provides over £500,000 of humanitarian aid, 10 percent of the funding will be used for preparedness and future mitigation.[287]

Governments are of course the ones primarily responsible for keeping their people safe by adopting risk reduction measures and as noted above, developed countries generally are able to adopt and implement risk reduction policies. Perhaps the stellar example of a country which has taken this cause to heart is the Netherlands. Much of the country lies below sea level, increasing its vulnerability to flooding and storms, but over the centuries the Dutch have developed physical barriers and water management systems to protect the country from the effects of natural hazards.[288]

It seems obvious that governments of countries where there is a low risk of disasters will invest less in disaster risk reduction measures than countries where the risk is higher. But what this means is that often countries with a low probability of being affected by a disaster can actually suffer greater damages than countries with a high risk of being affected.[289]

Finally, it's important to mention the role of insurance in reducing the risk of the consequences of natural disasters. In developed countries, people may be required to have insurance against natural hazards, such as flooding. Sometimes governments subsidize this insurance, as the US does in the case of flood insurance – allowing and perhaps even encouraging people to build and re-build homes in areas prone to disasters. But if not required, many people choose not to purchase insurance policies if the premiums are too high, choosing instead to take the risk. Sometimes too, they may bet that in accord with

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284 Sanghi et al., *op. cit.*, p. 19.

285 *Ibid.,* p. 9.

286 UNISDR, "Equal priority is needed to strengthen policies on disaster response and prevention says European Commissioner," 14 June 2011, http://www.unisdr.org/archive/20473

287 Adele Harmer, Glyn Taylor, Katherine Haver, Abby Stoddard and Paul Harvey, *Thematic CAP for National Disaster Preparedness. Feasibility study*, Humanitarian Outcomes, December 2009, p. 8.

288 See: The Economist, "Counting the cost of calamities," 14 January 2012, for a fuller description of the Dutch policies.

289 Kellenberg and Mobarak, *op. cit.,* p. 305.

past experiences, governmental assistance after a disaster will cover much of the cost of rebuilding.

There are various international and regional mechanisms designed to pool disaster risks, such as the World Bank's Catastrophe Risk Deferred Drawdown Option and the Caribbean Catastrophe Risk Insurance Facility.[290] Finally, there are some promising initiatives in countries where disasters are common to introduce social insurance schemes for the very poor.[291]

Given global trends of urbanization and increasing wealth, the economic impacts of future natural disasters will certainly be higher than they are today. And yet the models used to estimate damages – at least the models publicly available – seem incomplete and inconsistent. Closer collaboration between the insurance and re-insurance industries and development/humanitarian actors is one area where productive synergies could result from simply sharing information about the ways economic assessments are currently conducted and could lead to concrete recommendations to ensure that such assessments yield results which are comparable.

[290] Okuyama and Sahin, *op. cit.*, p. 16.

[291] See for example: Clemence, Raghuram, Alok, Anupama, Mangesh, Priya, Rupalee, Javed (CIRM), *Financing Disaster Management in India: Possible Innovations,* http://microinsurancemap.com/mri/docs/reports/innovative_disaster_financing_mechanism_for_india_leveraging_market_capital.pdf. See also: Margaret Arnold, "The Role of Risk Transfer and Insurance in Disaster Risk Reduction and Climate Change Adaptation," *Policy Brief for Commission on Climate Change and Development,* 2008, http://www.ccdcommission.org/Filer/pdf/pb_risk_transfer.pdf. Also see reports of new microinsurance plans where premiums are as low as 10 cents per day: Allianz Group, "Pioneering Disaster Insurance for Some of India's Poorest," 11 March 2008, https://www.allianz.com/en/press/news/commitment_news/community/news_2008-03-11-2.html

November 3, 2011 – Bangkok, Thailand: Flood victims receiving aid.
Photo: © Charnsitr | Dreamstime.com

Section 4

Trends in the Field of International Disaster Response

Legal developments

While there is a well-established body of international law for people affected by conflict (international humanitarian law, refugee law), the normative framework for disaster response is much more primitive. Of course, it is well recognized that it is the responsibility of national governments to protect and assist those affected by natural disasters within their territory. The right to receive humanitarian assistance has been affirmed in documents such as the Guiding Principles on Internal Displacement and is implicit in the recognized rights of people to food, shelter, and medical care.[292] But, perhaps in part because of growing awareness of natural disasters, in recent years there have been several – largely parallel – initiatives to develop international law on this issue.

The International Law Commission (ILC) is presently engaged in drafting legal text which may serve as a basis for the development of binding international law on natural disaster response. At its 58th session, in 2006, the Commission identified the topic "Protection of persons in the event of disasters" for inclusion in its long-term programme of work, and in 2007 the Commission appointed Eduardo Valencia-Ospina as Special Rapporteur for the topic. In 2008, the Special Rapporteur put forward a preliminary report on the issue which traced the evolution of the protection of persons in the event of disasters and the Secretariat presented an overview of existing legal instruments and texts applicable to various aspects of disaster prevention and relief assistance. Since then, the Commission has drafted 12 articles (Articles 1 to 5 adopted in 2010, and articles 6 to 11 adopted in 2011) for an eventual legal instrument on disasters.[293]

In 2011, the ILC addressed the issue of the responsibility of the affected state to seek assistance where its national response capacity is exceeded; the duty of the affected state not to arbitrarily withhold its consent to external assistance; and the right to offer assistance from the international community. The Commission drafted an Article (12) on these issues to be part of an eventual normative framework on protection of persons in the event of disaster. This article affirms the principle of national sovereignty and the view that offering assistance is a practical manifestation of solidarity. But the Commission was unable to agree on the article and it was referred to the Commission's drafting committee, which due to lack

[292] David Fisher, *Law and Legal Issues in International Disaster Response: A Desk Study – Summary Version*, IFRC 2007, p. 10.

[293] International Law Commission, "Chapter IX, Protection of persons in the event of disasters," Sixty-third session, last updated 16 December 2010, http://untreaty.un.org/ilc/sessions/63/63sess.htm and http://untreaty.un.org/ilc/reports/2011/english/chp9.pdf

of time was unable to complete work on this. In particular, there were concerns that more clarity was needed on the issue of the circumstances in which an affected state could reject offers of assistance. Concerns were expressed that the "right" to offer assistance shouldn't apply to non-governmental organizations and that more clarity was needed on differences between offers of assistance by non-affected states and by intergovernmental organizations. There was also discussion about whether the Responsibility to Protect (R2P) concept should apply in cases of natural disasters – an issue which was also discussed by the Commission in its 2009 session. Again, the Commission agreed that R2P should not be applied to natural disasters.

While the International Law Commission will continue its work in the coming years to draft international law on protection in natural disasters, another important ongoing initiative in 2011 was the work of the International Federation of Red Cross and Red Crescent Societies (IFRC) to develop and promote more effective regulatory frameworks to facilitate the actions of international responders, and to operationalize the responsibility of affected state governments to oversee and coordinate the work of these responders.[294]

In 2001, the IFRC began a program of research and consultations about the regulatory problems in international disaster response operations and the strengths and weaknesses of relevant legal frameworks at the global, regional and national levels. This work culminated six years later in the development of the *Guidelines for the Domestic Facilitation and Regulation of International Disaster Relief and Initial Recovery Assistance* (also known as the IDRL Guidelines), which were unanimously adopted by the state parties to the Geneva Conventions in November 2007.[295] These non-binding guidelines seek to assist governments to prepare their own rules to avoid common problem areas.

In 2011, the 31st International Conference of the Red Cross and Red Cross assessed progress in the use of the IDRL Guidelines, noting that nine countries had adopted new rules or laws consistent with their recommendations and approximately a dozen more were currently considering draft legislation. The Conference also welcomed the efforts of the IFRC, UN OCHA and the Inter-Parliamentary Union to develop a pilot "model act" to help states implement the IDRL Guidelines. Consultations on the model act will continue in 2012, with a view to finalization at the end of the year.

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294 See for example: IFRC's Disaster Law Programme, http://www.ifrc.org/en/what-we-do/idrl/

295 IFRC, *Guidelines for the Domestic Facilitation and Regulation of International Disaster Relief and Initial Recovery Assistance,* 2007 (30IC/07/R4 annex), available at: www.ifrc.org. Since their adoption at the 30th International Conference of the Red Cross and Red Crescent in 2007, eight UN General Assembly resolutions have also encouraged states to make use of the IDRL Guidelines. The abbreviation IDRL was derived from the name of the IFRC's "International Disaster Response Laws, Rules and Principles Program," which has since been renamed the "Disaster Law Program."

In addition to IDRL, the Conference also focused on:

- Enhancing disaster risk reduction at the community level through legislation;
- Addressing regulatory barriers to the rapid and equitable provision of emergency and transitional shelter after disasters.

A third initiative on the legal front sought to address the relationship between natural disasters and climate change. Growing interest in this relationship was manifest on many fronts, but particularly at the Nansen Conference on Climate Change and Displacement in June 2011 – a Norwegian initiative.[296] There has been growing awareness of the possible gaps in the international system of those displaced – or likely to be displaced – as a result of climate change, including those uprooted by sudden-onset natural disasters. While most of those displaced by natural disasters remain within the borders of their own countries and are thus IDPs, there are cases where people flee to other countries to escape the effects of a natural disaster. As Volker Turk, Director of UNHCR's Division of International Protection, affirmed at the Nansen Conference in June 2011, "UNHCR stands ready to support States in developing a guiding framework or instrument in this area. It might take the form of a temporary or interim protection regime. There are indeed many examples of State practice of granting permission to remain or at the very least a stay of deportation to persons whose country of origin is hit by a natural disaster or other extreme event. These precedents support the view that such persons are in need of international protection, even if only temporarily."[297] There have also been efforts to develop binding treaties to protect those displaced by the effects of climate change.[298] However, most humanitarian experts note the difficulties in defining the groups of concern and the political challenges of getting any binding treaty accepted by national governments.[299]

Thus, on the legal front, there are initiatives to develop binding international law through the International Law Commission, efforts to develop concrete operational guidance for governments to respond to disasters through the IFRC, and increasing discussion about the need for new legal instruments to deal with the potential movement of people resulting from climate change. What all of these initiatives have in common is a recognition that the international normative framework needs to be strengthened. Governments need to get their laws and policies in order in case a disaster puts them in the position of being on the

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296 The conference was co-organized by the Norwegian Ministry of the Environment, Norwegian Ministry of Foreign Affairs, Norwegian Refugee Council and the Center for International Climate and Environmental Research – Oslo.

297 Volker Turk, "Climate Change and Displacement in the 21st Century," *Remarks at the Nansen Conference*, Oslo, 7 June 2011, pp. 5-6.

298 See for example: www.ccdpconvention.com; a summary of one treaty proposal can be found at: http://www.ccdpconvention.com/summary.html

299 See for example: Jane McAdam, "How to Address the Protection Gaps – Ways Forward," *The Nansen Conference: Climate Change and Displacement in the 21st Century*, Oslo, 5–7 June 2011.

receiving end of offers of aid. This is a challenge to both developed and developing countries and, in fact, some developing countries have much better systems in place to facilitate and regulate international disaster assistance than developed countries. Efforts to develop binding international laws are inevitably long-term efforts. The work of the International Law Commission, which in the past has developed important international conventions such as the 1958 Convention on the High Seas, may in time result in a treaty on protection of persons affected by natural disasters. It is striking though how this initiative is being carried out on a separate track from humanitarian actors. Thus, the ILC has formulated a different definition of disasters than that incorporated in the *Operational Guidelines on the Protection of Persons in Situations of Natural Disasters* and it is unclear what the ultimate intent is of the drafters of the ILC.[300] Will they be suggesting, for example, obligations on the part of states to receive and/or provide assistance? Will they suggest certain principles for protecting people in the event of disasters, and if so, will such principles be in line with those in the *Operational Guidelines?*

When the issue of climate change is introduced into the mix, the debate becomes even more complicated. At the present time, many people are talking about the need for a normative framework to apply to people displaced by the effects of climate change, but there is no consensus about the scale and timing of such displacement, how to determine the extent to which displacement can be attributed to climate change, or whether a new normative framework should be binding (as in the case of proposed conventions) or softer international law (perhaps modeled on the *Guiding Principles on Internal Displacement*), or simply left to individual states to negotiate.[301] Given these uncertainties, it should be easier to reach a consensus on laws about natural disasters – at least sudden-onset disasters – than the effects of climate change on displacement.

Operational developments

In addition to the growing discussion of the need for global normative frameworks and new laws and policies on the national level on natural disasters, there have been similar discussions on the operational level of disaster responders. There have been new and encouraging developments on the role of the affected state and increasing clarity on the role of the military. At the same time, efforts to delineate responsibilities of international actors in protecting people affected by natural disasters proved to be frustrating and inconclusive in 2011.

300 Brookings-Bern Project on Internal Displacement, *IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters*, January 2011, http://www.brookings.edu/reports/2011/0106_operational_guidelines_nd.aspx

301 OCHA, *Guiding Principles on Internal Displacement,* 1998, E/CN/4/1998/53/Add2, http://www.brookings.edu/projects/idp/gp_page.aspx

The affected state

Haiti certainly wasn't the only disaster-affected country to witness an influx of non-governmental organizations and civil society groups which complicated coordination mechanisms, but Haiti's experiences raised anew the question of the responsibility of the affected state to regulate the activities of disaster responders. As mentioned above, international disaster response law (IDRL) seeks to help states both facilitate international assistance and regulate the provision of such assistance. During the course of 2011, there was renewed focus on the role of the affected state – an issue which has received relatively little attention from either policy analysts at humanitarian organizations or academics.

Building on IFRC's work with IDRL, four organizations – IFRC, the Office for the Coordination of Humanitarian Affairs (OCHA), the International Council of Voluntary Agencies (ICVA) and the Swiss Development Corporation – convened an International Dialogue on Strengthening Partnership in Disaster Response: Bridging National and International Support. This meeting, held in October in Geneva, brought together more than 130 representatives from governments, regional organizations, the UN system, the International Red Cross and Red Crescent Movement, and non-governmental organizations to consider ways of improving their working relationships. Perhaps as important as the final outcome statement was the enhanced recognition given to the role of the affected state in managing disaster response.[302]

Reflecting the visibility of militaries in responding to the mega-disasters of 2010 – such as US military operations in Haiti and the leading role of the Pakistani military in flood response – there was a spate of activity around the role of military forces in natural disasters in 2011.[303] There seemed to be a clearer recognition that the military's role in disasters is different and less controversial than its role in conflict situations. As noted in the previous chapter, the role of the Japanese military in responding to the earthquake/tsunami as well as the mobilization of military and police in other developed countries, such as Australia, New Zealand and the US underscored that for developing and developed countries alike, military assets are often invaluable when disasters strike.

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[302] SDC, IFRC, ICVA and OCHA, *Statement of the Co-Convenors Identifying Elements for a Plan of Action,* International Dialogue on Strengthening Partnership in Disaster Response: Bridging National and International Support, Geneva, 25-26 October 2011, http://www.ifrc.org/PageFiles/90118/IDDR%20co-convenors%20statement%20EN.pdf. See for example the background papers commissioned for the dialogue: http://www.ifrc.org/en/what-we-do/idrl/international-dialogue-on-strengthening-partnership-in-disaster-response/; Also see: ALNAP, *The role of national governments in international humanitarian response to disasters*, Meeting Background Paper, 26th ALNAP Meeting in Kuala Lumpur, 16-17 November 2010, www.alnap.org/pool/files/26-meeting-background-paper.pdf

[303] See for example reports of meetings in the UK, Qatar, and Australia: British Red Cross, Foreign & Commonwealth Office, "Summary Note," *NGO-Military Contact Group Conference 2011, Civil-Military Relations in natural disasters*, 12 October 2011, http://reliefweb.int/sites/reliefweb.int/files/resources/Full_Report_3072.pdf; OCHA, "Humanitarian Issues: Effective civil-military partnerships are crucial in disaster response," 29 November 2011, http://www.unocha.org/top-stories/all-stories/humanitarian-issues-effective-civil-military-partnerships-are-crucial-disast

Clusters, clusters

In 2005, the Inter-Agency Standing Committee (IASC) agreed to implement a cluster system as a way of increasing accountability and effective responses to humanitarian emergencies by naming designated lead agencies to coordinate activities in a given area. Of the eleven clusters, only one lacks a designated lead agency (or co-lead) charged with coordinating response – the cluster on protection in natural disasters.

While UNHCR is the acknowledged lead of the global protection cluster (as well as the shelter and camp management clusters) in cases of conflict situations, UNHCR was initially reluctant to take on responsibility for leading the protection cluster's response in natural disasters. Indeed within the Global Protection Cluster Working Group, a task force was established on natural disasters under the leadership of the RSG on the Human Rights of Internally Displaced Persons and later the International Disaster Law Organization. Interestingly neither the RSG nor the International Disaster Law Organization is operational in the sense of having programs running in the field. The Task Force developed training materials for coordination of protection work in natural disasters. Having completed this work, the task force was disbanded in late 2011 and discussions about continuing the Global Protection Cluster's engagement with natural disasters were continuing.

While progress on this issue was elusive on the international level, on the country level, a clear process had to be established to determine, on a case-by-case basis, who would serve as lead agency for protection in the event of a natural disaster. This was essential because there is no agency automatically assigned to take the lead on protection through the cluster system but rather responsibility was to be determined through a consultative process. As originally formulated, when a natural disaster occurred, the Resident Coordinator was supposed to consult with the three agencies with protection mandates – UNICEF, UNHCR and OHCHR – to determine which body would take the lead responsibility for protection. As Roberta Cohen points out, in most cases UNICEF has assumed the lead but its protection role is limited.[304] It has received high marks in child protection, tracing families, helping separated children and preventing their exploitation in disasters. But other vulnerable groups, such as the elderly, the disabled, ethnic or religious minorities, or those with HIV/AIDS, have not received as strong a focus.[305] In Haiti, OHCHR served as cluster lead for protection (with UNICEF for child protection and UNFPA for gender-based violence) but came under criticism from other agencies for its lack of operational involvement.[306]

The ad hoc nature of this arrangement meant protection responses in natural disasters were not very predictable. Therefore, pressure mounted for UNICEF to take on this respon-

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[304] Roberta Cohen, "An institutional gap for disaster IDPs," *Forced Migration Review # 32*, April 2009, http://www.brookings.edu/articles/2009/0406_natural_disasters_cohen.aspx, p. 58.

[305] *Ibid.*, p. 59.

[306] Refugees International, "Haiti: From the Ground Up, Field Report," March 2010, available at: www.refugeesinternational.org

sibility, and when UNICEF declined, attention focused on UNHCR. UNHCR has often been involved in on-the-ground responses to natural disasters, but only in countries where it was in a position to offer assistance, as occurred after the 2004 tsunami, the 2005 earthquake in Pakistan, and the 2010 Haitian earthquake.[307] Recently, UNHCR has indicated a willingness to take a more active role in response to natural disasters, and has been actively engaged in the discussions around climate change-induced displacement. UN High Commissioner for Refugees, António Guterres, stated: "With our deep experience of protecting people, extensive worldwide presence and improved integration of emergency preparedness, UNHCR can bring to the protection cluster for persons displaced by natural disaster the predictable leadership and proven results required. As with our leadership of the protection cluster for those displaced forcibly by conflict, I view such leadership in natural disasters as a logical extension of our responsibilities."[308]

In March 2011 the UN Emergency Relief Coordinator, Valerie Amos, asked UNHCR to assume the lead agency role in protection in natural disasters for a pilot period of one year. Although intended to be limited in scope and application, this possibility led to considerable discussion within the humanitarian community and particularly governments who form part of UNHCR's governing body. At the 51st meeting of the UNHCR Standing Committee on 22 June, a number of governments expressed reservations about UNHCR taking on this role. Some feared that it would detract from UNHCR's core mandate of refugee protection. Others feared that it would give UNHCR an opportunity to become more involved in issues that were the legitimate territory of governments while some seemed to fear that this was mission creep which would require more funding for the agency. In any event UNHCR was left without a clear mandate to assume this leadership role and by the end of the year there were still questions about which UN agency would assume responsibility for coordination of protection work in the event of a natural disaster.

Leadership of the other clusters – in situations of natural disasters has proven less problematic than protection with IFRC responsible for shelter and IOM for camp management and coordination. But the difficulty in finding an agency willing to take on responsibility for protection in natural disasters and with the necessary support from its governing body is a serious shortcoming in international response. It is ironic that even as more attention is being devoted to natural disasters, more focus is placed on the affected state and more actors are involved in humanitarian response, the international community is unable to come up with a clear leadership structure. Perhaps it will take another mega-disaster with an uncoordinated international response for momentum and political will to develop to agree on a new lead agency.

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307 Bryan Deschamp et al., "Earth, wind and fire: A review of UNHCR's role in recent natural disasters," *UNHCR Policy Development and Evaluation Service*, PDES/2010/06, June 2010.

308 UNHCR, "High Commissioner's Opening Statement to 60th Session of Excom," Palais des Nations, Geneva, 28 September 2009, p. 5.

Humanitarian aid supplies loaded by Hawaii Air National Guard into a C-17 Globemaster III.
Photo: © Thinkstock.com

Section 5

Humanitarian Funding in 2011

International humanitarian disaster funding in 2011 was down to one fourth of its 2010 total

As mentioned in Chapter 1 of this review, Munich Re estimates natural disaster-related damages in 2011 at $380 billion, which is approximately the GDP of Austria (the 26th largest economy in the world in 2010).[309] This is almost double Munich Re's 2010 damage projections of $152 billion and significantly above the 10-year average of disaster-related damages from 2001-2010 of $113 billion.[310]

Humanitarian funding for natural disasters shot up significantly in 2010, primarily due to responses to the earthquake in Haiti and the floods in Pakistan, reaching $6.43 billion. With reported damages so far above average in 2011, common sense might lead us to expect a corresponding increase in international funding for disaster relief and recovery operations in 2011, but this did not happen. Actually, international humanitarian disaster funding saw a more than four-fold decrease in 2011 compared to 2010.[311]

The primary explanation for this counterintuitive development is the fact that most of the major disasters in 2011 happened in developed countries that did not request nor require large amounts of international disaster assistance, as they are able to generate or borrow sufficient funds for humanitarian relief operations and post-disaster reconstruction. They also require much less assistance from UN agencies and international non-government organizations who are usually the main actors through which humanitarian funding is channeled.

Still, 50 percent of international humanitarian natural disaster funding in 2011 went to Japan. Given the scale of destruction, those amounts represent gestures of solidarity, as they cover less than 0.35 percent of Japan's total disaster damage.[312] In comparison, interna-

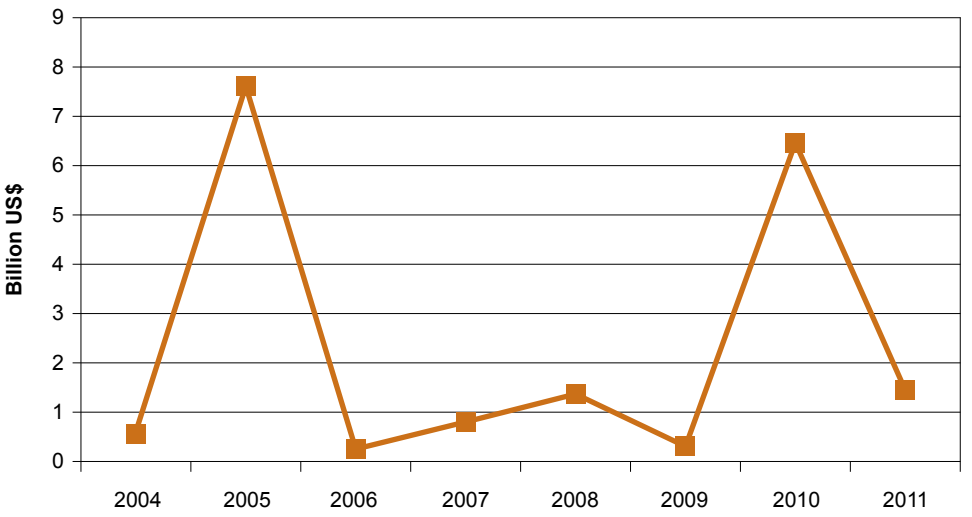
[309] Munich Re, "Review of natural catastrophes in 2011: Earthquakes result in record loss year," 4 January 2012, http://www.munichre.com/en/media_relations/press_releases/2012/2012_01_04_press_release.asp; EM-DAT recorded $366 billion in disaster damage in 2011, Debarati Guha-Sapir, "Disasters in Numbers 2011," *op. cit.*; GDP data: The World Bank, "GDP Ranking," http://data.worldbank.org/data-catalog/GDP-ranking-table

[310] The $366 billion of estimated disaster damage by EM-DAT are more than double of EM-DATs 2010 damage projections of $123.9 billion and also significantly above the 10-year average of disaster-related damages from 2001-2010 of $89.3 billion (See Table 1 in this chapter).

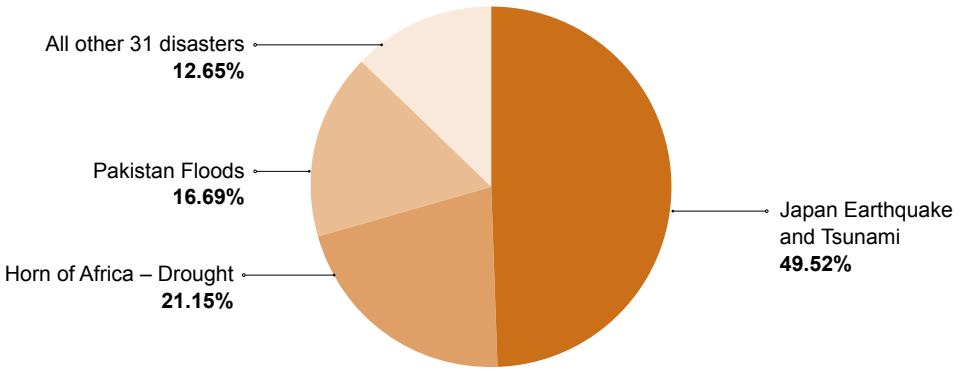
[311] OCHA, "Financial Tracking Service," http://fts.unocha.org

[312] Damage figures from 2012: Münchener Rückversicherungs-Gesellschaft, "The five largest natural catastrophes of 2011," Geo Risks Research, NatCatSERVICE; funding figures from: OCHA, Financial Tracking Service, "Natural Disasters in 2011," accessed 5 January 2012, http://fts.unocha.org

Graph 5: Funding for Humanitarian Responses to Natural Disasters, 2004-2011



Graph 6: International Funding for Natural Disaster Response 2011



tional funding for recovery from the Haiti earthquake in 2010 covered the cost of 40 percent of the estimated damage.[313]

The drought response in the Horn of Africa was the second-highest funded disaster response in 2011, receiving around $307 million or 21.15 percent of the funding recorded by UN OCHA's Financial Tracking Service (FTS), followed by the relief and recovery efforts for the renewed floods in Pakistan which received $242 million or 16.69 percent of all funding. The 31 other internationally-funded disaster response operations shared 12.65 percent of humanitarian disaster funding for 2011, or $184 million.[314]

[313] Ferris and Petz, *op. cit.,* p. 23.

[314] OCHA, Financial Tracking Service, "Natural Disasters in 2011," accessed: 5 January 2012, http://fts.unocha.org

As in previous years, international funding for disaster relief in 2011 was highly disproportionate from one crisis to the next. Two or three disasters received more than 85 percent of humanitarian disaster funding in both 2010 and 2011. If we calculate the funding by number of persons affected the disparities are even starker. In 2010 Haiti received an average of $950 per affected person while Chile received around $25 per affected person and a victim of the Chinese floods received on average less than one cent.[315] These differences may reflect differences in need. Poverty in Haiti, for example is widely recognized. But they also reflect media coverage of mega-disasters as evidenced by the fact that almost half of 2011 disaster funding went to Japan – a country with the third largest economy in the world.

If we look at the ratio of humanitarian disaster funding to affected persons in 2011, we see that while international humanitarian disaster funding averaged $1,800 for every person affected by the Japanese earthquake and tsunami, a person affected by the drought and famine at the Horn of Africa only received $24.4 on average (see Table 20).[316] Ratios for flood victims in Sri Lanka and Pakistan were a little higher with $41.9 and $36 respectively per disaster victim, with those affected by Central American floods in October 2011 receiving less than $20 per person.

These figures need to be treated with caution, as they do not include all funding sources per disaster. If we use damage to funding ratios, the Japanese ratio drops substantially given the massive damage figures. The low amount of funding per person for Central American victims might also be at least partially explained by the fact that the floods only occurred in October so humanitarian appeals are still ongoing with much of the funding falling into 2012.

Table 20 Humanitarian Natural Disaster Funding per Affected Person in 2011

Country/Region	Disaster	Funding[317] ($ millions)	Affected persons[318] (millions)	Funding/affected person ($)
Japan	Earthquake/ Tsunami	720	0.4	1,800.00
Horn of Africa	Drought	308	12.6	24.40
Pakistan	Floods	243	5.8	41.90
Sri Lanka	Floods	36	1	36.00
Central America	Floods	28	1.9	14.70

315 Ferris and Petz, *op. cit.,* p. 23.

316 The number of affected that EM-DAT provides for the Japan earthquake and tsunami seems rather to be a low estimate, but even doubling the number of affected, the difference would still be stark.

317 OCHA, Financial Tracking Service, "Natural Disasters in 2011," accessed 5 January 2012, http://fts.unocha.org

318 Numbers for Japan, Horn of Africa (accumulated Ethiopia, Kenya, Somalia), Pakistan, Sri Lanka: EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be; numbers for Central America: IFRC, "Over 1.9 million affected by severe flooding in Central America as the IFRC launches emergency appeals," 28 October 2011.

With most of disaster damage occurring in developed countries in 2011, which required little to no international assistance, the ratio between disaster damage to humanitarian disaster funding at 0.4 percent is the lowest since 2004, and almost four times below the average since 2004 (see Table 21).

Table 21 Humanitarian Natural Disaster Funding Compared to Estimated Cost of Natural Disaster Damage, 2004-2011

	Humanitarian disaster funding/year ($ billions)[319]	Estimated damage from natural disasters/year ($ billions)[320]	Funding/damage %
2004	0.59	136.20	0.43
2005	7.62	214.20	3.56
2006	0.26	34.10	0.76
2007	0.82	74.40	1.10
2008	1.40	190.50	0.73
2009	0.31	41.30	0.75
2010	6.43	123.90	5.19
2011	1.45	366.00	0.40
Average	2.36	147.58	1.62

There are several other qualifications to bear in mind when looking at total financial contributions. First, the humanitarian disaster funding numbers collected by the financial tracking service do not include all contributions to specific emergencies.

For example, let us take a look at selected 2011 consolidated and flash appeals (see Table 22). The Consolidated Appeal Process (CAP) aims to create a common strategic approach in emergencies by fostering cooperation between donors, NGOs, UN agencies, governments and the International Red Cross and Red Crescent Movement. Donors rely on the CAP for a one-stop overview of humanitarian action, a catalogue of projects to be funded, and a system that ensures their funds are spent strategically, efficiently and with greater accountability. When a new disaster is foreseen or occurs, humanitarian and other partners develop a flash appeal within a few days to address people's most urgent needs in the short term. This can be followed by a consolidated appeal if the crisis persists.[321] The process of developing an appeal is a complex one, involving negotiations between various humanitarian actors with differing capacities in the concerned country. In addition to reflecting the overall humanitarian need in the country, appeals are also based on such factors as

[319] OCHA, Financial Tracking Service, "Natural Disasters in 2011," accessed 5 January 2012, http://fts.unocha.org

[320] EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be.

[321] OCHA, "Consolidated Appeal Process," accessed 4 February 2012, http://www.unocha.org/cap/about-the-cap/about-process

the capacity of implementing agencies to spend funds effectively and on an assessment of reasonable expectations of the amount likely to be contributed.

Table 22 Funding Provided for Selected UN 2011 Consolidated and Flash Appeals[322]

	Original requirements ($)	Revised requirements ($)	Funding provided ($)	% covered
Kenya Emergency Humanitarian Response Plan (2011+)	525,827,794	741,818,150	529,420,770	71%
Afghanistan (2011)	678,632,984	582,318,627	342,854,959	59%
Democratic Republic of the Congo (2011)	719,289,671	721,589,589	448,438,492	62%
Djibouti Drought Appeal (2011)	39,199,338	33,264,338	19,370,114	58%
El Salvador Flash Appeal (October 2011)	15,764,212	14,781,209	5,702,807	39%
Haiti (2011)	910,489,407	382,390,619	210,414,074	55%
Nicaragua Flash Appeal (October 2011 – April 2012)	14,289,736	14,840,854	4,457,651	30%
Pakistan Floods Rapid Response Plan (2011, September – March 2012)	356,759,669	356,759,669	174,639,321	49%
Somalia (2011)	529,520,029	1,003,322,063	840,821,865	84%
Sri Lanka Floods Flash Appeal (Revised) (January – June 2011)	50,623,333	46,358,480	26,507,660	57%
Total (21 appeals)	**7,925,557,006**	**8,903,199,466**	**5,449,507,217**	**61%**

As we can see from Table 22, the appeals connected to the Horn of Africa drought managed to raise substantially more money than is included under the Financial Tracking Service's humanitarian disaster funding category.[323]

[322] OCHA Financial Tracking Service, "Consolidated & Flash Appeals 2011," Summary of Requirements and Pledges/Contributions by affected country/region, report as of 24 January 2012.

[323] The natural disaster funding category includes projects that are part of the Consolidated Appeal Process and also includes additional contributions outside of the CAP (bilateral, Red Cross, etc.). For the Horn of Africa drought in 2011, it is difficult to match the funds reported in the FTS's natural disaster category with the funds in the CAP as there were separate appeals for Somalia, Kenya and Djibouti in 2011. As these are complex emergencies not all funding captured in the appeals seems to be classified as natural disaster funding by the FTS. The FTS's humanitarian natural disaster funding numbers for 2011 in turn also don't include the $210 million appeal funding for the victims of the 2010 Haiti earthquake and the following cholera epidemic as it only includes emergencies that happened in that specific year.

Total humanitarian funding in 2011, as recorded by OCHA's Financial Tracking Service, was $12.5 billion, which is lower than the $16 billion in 2010, but higher than the $12.1 billion in 2009. With respect to overall humanitarian funding, 2011 was the year with the third highest total funding in the new millennium after 2005 and 2010.[324]

Second, this analysis of international funding patterns and trends relies on statistics reported by the UN's Financial Tracking System, but this captures only funds reported to the UN by governments, the Red Cross/Red Crescent Movement, and large international NGOs. Smaller NGOs and civil society organizations often channel significant amounts of funding directly to communities affected by disasters, which consequentially are not reported in the UN's summary. The UN's Financial Tracking System also does not capture the many significant financial contributions made by local NGOs and civil society organizations. Moreover, remittances – which dwarf overseas development assistance generally – are an important source of support for communities affected by disasters. The Center for Global Prosperity, for example, reports that remittance flows generally increase during and after natural disasters and other crises and constitute an important financial resource for individuals, families and communities affected by disasters.[325] These contributions are never counted in the statistics and tables compiled by the UN and other financial tracking systems. Thus while much attention is devoted to international funding of disasters, it must be recognized that international contributions are only a part of the total response.

The UN Central Emergency Response Fund in 2010

The Central Emergency Response Fund (CERF) is a humanitarian fund established by the United Nations in 2005 to enable more timely and reliable humanitarian assistance to those affected by natural disasters and armed conflicts. The CERF was approved by consensus by the United Nations General Assembly on 15 December 2005 to promote early action and response to reduce the loss of life, to enhance response to time-critical requirements, and to strengthen core elements of humanitarian response in underfunded crises.[326] The CERF's rapid release of funds to provide humanitarian relief avoids the often slow process of receiving pledges and/or translating pledged money from donor governments into tangible contributions.[327]

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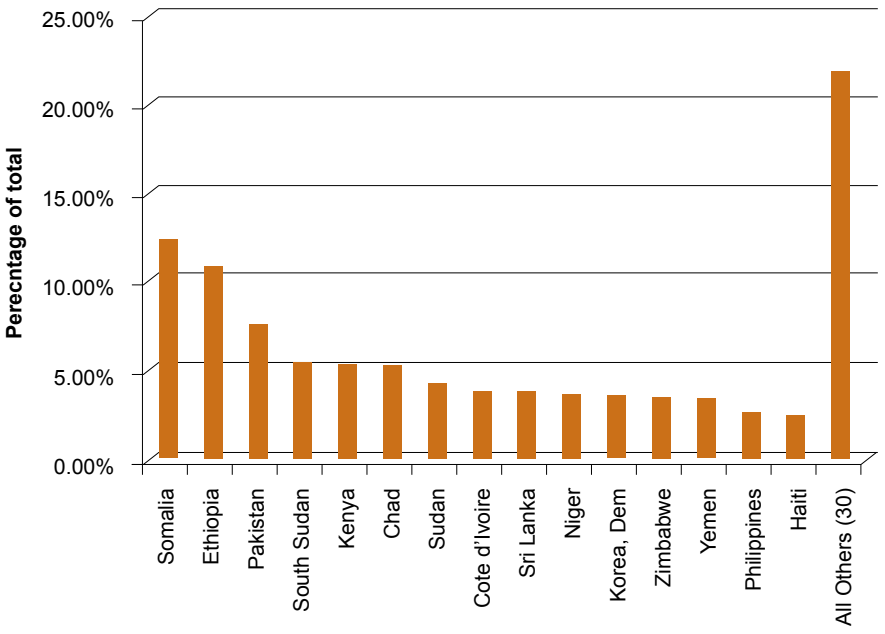
[324] OCHA, Financial Tracking Service, "Trend Analysis, By Sector," accessed 24 January 2012, http://fts.unocha.org/pageloader.aspx?page=Trend-TrendAnalysis

[325] John Telford and John Cosgrave, *Joint Evaluation of the International Response to the Indian Ocean Tsunami: Synthesis Report,* Tsunami Evaluation Coalition, July 2006, p. 21.; See also: John Cosgrove, "Humanitarian Funding and Needs Assessment," in *The Human Response Index 2008: Donor Accountability in Humanitarian Action,* Development Assistance Research Associates, Palgrave Macmillan, September 2008, p. 83, 63.

[326] OCHA, Central Emergency Response Fund, "What is CERF?" 2007, http://ochaonline.un.org/cerf/WhatistheCERF/tabid/3534/language/en-US/Default.aspx

[327] OCHA, Central Emergency Response Fund (CERF), "2011 Funding by Country," http://ochaonline.un.org/cerf

Graph 7 UN Central Emergency Response Fund (CERF) 2011 Funding by Country



In 2011, the CERF dispersed $426 million in 45 countries for both natural disaster and conflict situations, compared to $415.2 million in 2010, and $397.4 million in 2009. As Table 23 demonstrates, in 2010 the majority of funding went to countries affected by the Horn of Africa drought and the ongoing conflict in Somalia, followed by Pakistan and the world's newest country, South Sudan. Somalia, Ethiopia and Pakistan attracted almost 30 percent of all CERF funding in 2011. The World Food Programme (WFP) and UNICEF were the main agencies receiving CERF funds in 2011 with WFP receiving $126.2 million or 29.6 percent of all CERF funds and UNICEF $109.8 million or 25.76 percent respectively.[328]

CERF also provides funding numbers by emergency type. In the first eleven months of 2011, the CERF disbursed 38.2 percent of its funds for refugees and IDPs, 21.4 percent were spent for drought, 11.7 percent for floods and 9 percent for protracted conflict-related emergencies.[329] Funds for various emergency types can be dispersed in a single crisis area, so for example funds disbursed for projects in Somalia might have supported projects pertaining to drought or displaced persons as well as projects related to the conflict.

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328 CERF, "CERF Funding by Agency (2011) – Summary (01/01/2011 to 31/12/2011)," accessed 5 February 2012, http://ochaonline.un.org/cerf

329 CERF, "Quarterly Update, 4th Quarter 2011," January 2012, http://reliefweb.int/node/464868

330 OCHA, CERF, "CERF Funding by Country (2011) – Summary," 5 January 2011, http://ochaonline.un.org/cerf

Table 23 Top 5 Countries Receiving CERF Funds, 2011[330]

#	Country	Funds allocated ($)	Percentage of total 2011 CERF funds
1	**Somalia**	52,953,336	12.40%
2	**Ethiopia**	46,475,653	10.89%
3	**Pakistan**	32,370,901	7.58%
4	**South Sudan**	22,766,954	5.33%
5	**Kenya**	22,683,472	5.31%
	Subtotal	**177,250,316**	**41.51%**
	Total	**426,157,020**	**100 %**

The CERF has become an extremely important tool for rapid response and also for funding emergencies that receive little international publicity and donor interest. The gradual growth of CERF funds over the last several years is a positive development, as distribution by the CERF seems to be much less susceptible to media coverage of mega-disasters than the distribution of international humanitarian aid reflected in the UN's Financial Tracking Service.

This chapter concludes with an overview of humanitarian disaster funding in 2011.

Table 24 Funding for Humanitarian Responses to Natural Disasters, 2011[331]

Disaster	Funding ($)	Percentage
JAPAN – Earthquake and Tsunami – March 2011	720,264,717	49.5
HORN OF AFRICA – Drought – July 2011	307,626,972	21.1
PAKISTAN – Floods – August 2011	242,696,041	16.7
SRI LANKA – Floods – January 2011	35,601,287	2.4
TURKEY – Earthquake – October 2011	27,884,148	1.9
CENTRAL AMERICA – Floods – October 2011	27,665,163	1.9
THAILAND – Floods – August 2011	21,508,782	1.5
CAMBODIA – Floods – September 2011	19,631,752	1.3
NEW ZEALAND – Earthquake – February 2011	9,822,642	0.7
BANGLADESH – Floods and Landslides – July 2011	9,192,860	0.6
PHILIPPINES – Floods – June 2011	8,245,835	0.6
INDIA – Floods – July 2011	4,277,551	0.3
BOLIVIA – Floods and Landslides – January 2011	3,429,274	0.2
SOUTHERN AFRICA – Floods – January 2011	3,092,689	0.2
VIET NAM – Floods – September 2011	2,390,293	0.2
MADAGASCAR – Cyclone Bingiza – February 2011	2,090,727	0.1
PHILIPPINES – Tropical Cyclone – July 2011	1,870,526	0.1
DPR KOREA – Floods – July 2011	1,739,903	0.1
COLOMBIA: Floods and Landslides – April 2011	1,389,527	0.1
LAO PDR – Tropical Cyclone – August 2011	1,230,372	0.1
MYANMAR – Earthquake – March 2011	1,008,180	0.1
GUINEA – Floods – August 2011	394,005	0.0
DOMINICAN REPUBLIC – Floods – June 2011	288,204	0.0
MYANMAR – Flash Flood – October 2011	271,606	0.0
BRAZIL – Floods – January 2011	235,705	0.0
VANUATU – Tropical Cyclone Vania – January 2011	195,336	0.0
PHILIPPINES – Tropical Cyclone – October 2011	150,754	0.0
UGANDA – Floods and Mudslides – August 2011	87,426	0.0
TONGA – Tropical Cyclone – January 2011	75,000	0.0
MEXICO – Hurricane Jova – October 2011	70,721	0.0
INDIA – Himalayan Earthquake – Sep 2011	32,597	0.0
NIGER – Floods – August 2011	31,646	0.0
MALI – Floods – August 2011	30,706	0.0
BANGLADESH – Cold Wave – January 2011	30,030	0.0
Total:	**1,454,552,977**	**100.0**

[331] OCHA, Financial Tracking Service, "Natural Disasters in 2011," accessed 5 January 2012, http://fts.unocha.org