



THE YEAR OF RECURRING DISASTERS A REVIEW OF NATURAL DISASTERS IN 2012

The Brookings Institution –
London School of Economics
Project on Internal Displacement

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Cover photo

Tornadic supercell in the American plains. There were 1,037 tornadoes reported in the U.S. in 2012, of which at least 932 have been confirmed. Photo: © Thinkstock.com

Back cover photos

Left: A young girl peeks from her tent at the camp. UN Photo/Victoria Hazou.

Right: Leah and Brian, just two of many New York Care organization volunteers, handing out bottled water to residents of Brooklyn, NY after Hurricane Sandy. Photo: © Tomatika | Dreamstime.com

BROOKINGS

THE YEAR OF RECURRING DISASTERS: A
REVIEW OF NATURAL DISASTERS IN 2012

BY ELIZABETH FERRIS, DANIEL PETZ AND CHAREEN STARK

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NORTH DARFUR, SUDAN A local trader prepares jerry cans at the voucher distribution centre at Abu Shouk Camp for Internally Displaced Persons (IDPs) in North Darfur. Photo: UN Photo/Albert González Farran

CABARET, HAITI UN peacekeepers from Paraguay and members of the Haitian Department of Civil Protection evacuate residents during a disaster response simulation. Photo: UN Photo/Victoria Hazou



ABOUT THE BROOKINGS-LSE PROJECT ON INTERNAL DISPLACEMENT

The mission of the Brookings-LSE Project on Internal Displacement is to promote the human rights of internally displaced persons (IDPs), in particular by supporting the work of the UN Special Rapporteur on the Human Rights of Internally Displaced Persons. The Project promotes the dissemination and application of the Guiding Principles on Internal Displacement; works with governments, regional bodies, international organizations and civil society to create more effective policies and institutional arrangements for IDPs; convenes international seminars on internal displacement; and publishes major studies, articles and reports.

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ACRONYMS

| | |
|-------------------|--|
| AHA | ASEAN Coordinating Centre for Humanitarian Assistance |
| AU | African Union |
| ASEAN | Association of Southeast Asian Nations |
| ATSR | Along Track Scanning Radiometer |
| CAN | Andean Community of Nations |
| CARICOM | Caribbean Community |
| CAP | Consolidated Appeal Process |
| CAPRADE | Andean Committee for Disaster Prevention and Assistance |
| CCRIF | Caribbean Catastrophe Risk Insurance Facility |
| CDEMA | Caribbean Disaster Emergency Management Agency |
| CEPREDENAC | Coordination Center for Natural Disaster Prevention in Central America |
| CERF | Central Emergency Response Fund |
| CHF | Common Humanitarian Fund |
| CoE | Council of Europe |
| CRED | Centre for Research on the Epidemiology of Disasters |
| DRM | Disaster Risk Management |
| DRR | Disaster Risk Reduction |
| ECHO | European Community Humanitarian Office |
| ECOWAS | Economic Community of West African States |
| EM-DAT | Emergency Events Database (International Disaster Database) |
| ERF | Emergency Response Fund |
| EU | European Union |
| FAO | Food and Agriculture Organization |
| FCPF | Forest Carbon Partnership Facility |
| FEMA | Federal Emergency Management Agency |
| FIP | Forest Investment Program |
| FTS | Financial Tracking Service |
| GDP | Gross Domestic Product |
| GFDRR | Global Facility for Disaster Risk and Reconstruction |
| HFA | Hyogo Framework for Action |
| IASC | Inter-Agency Standing Committee |
| IDMC | Internal Displacement Monitoring Centre |
| IDP | Internally Displaced Person |

VII

ACRONYMS

ACRONYMS (continuation)

| | |
|----------------|--|
| IDRL | International Disaster Response Law |
| IFRC | International Federation of the Red Cross and Red Crescent Societies |
| IGAD | Intergovernmental Authority on Development |
| IMF | International Monetary Fund |
| IOM | International Organization for Migration |
| IPCC | Intergovernmental Panel on Climate Change |
| IRIN | Integrated Regional Information Networks |
| LAS | League of Arab States |
| MODIS | Moderate Resolution Imaging Spectroradiometer |
| NGO | Non-governmental Organization |
| NHC | National Hurricane Center |
| NOAA | National Oceanic and Atmospheric Administration |
| NRC | Norwegian Refugee Council |
| OAS | Organization of American States |
| OECD | Organization for Economic Co-operation and Development |
| OFDA | Office of Foreign Disaster Assistance (USAID) |
| PPP | Purchasing Power Parity |
| REDD | Reducing Emissions from Deforestation and Forest Degradation |
| SAARC | South Asian Association for Regional Cooperation |
| SADC | South African Development Community |
| SICA | Central American Integration System |
| SOPAC | South Pacific Applied Geoscience Commission |
| UNDP | United Nations Development Programme |
| UNFCC | United Nations Framework on Climate Change |
| UNHCR | United Nations High Commissioner for Refugees |
| UNICEF | United Nations Children's Fund |
| UNIFEM | United Nations Development Fund for Women |
| UNISDR | United Nations International Strategy for Disaster Reduction |
| UN OCHA | United Nations Office for the Coordination of Humanitarian Affairs |
| USAID | United States Agency for International Development |
| WFP | World Food Programme |
| WMO | World Meteorological Organization |
| WUI | Wildland-Urban Interface |



HAITI 25 October 2012: Hurricane Sandy passed to the west of Haiti, causing heavy rains and strong winds, flooding homes and overflowing rivers. Photo: UN Photo/Logan Abassi

VARANASI, UTTAR PRADESH, INDIA 11 August 2011: India's monsoon rains were 14 percent above normal. Photo: © Mathes | Dreamstime.com



FOREWORD

It is with great pleasure that I introduce this report, *The Year of Recurring Disasters: A Review of Natural Disasters in 2012*, by the Brookings-LSE Project on Internal Displacement. For nearly a decade, the Project has made important contributions in highlighting the human rights of communities affected by natural disasters. This Review is intended to deepen the understanding of current trends in disasters and international disaster response.

As the Special Rapporteur on the Human Rights of Internally Displaced Persons, I have witnessed the destruction and suffering caused by natural disasters first-hand. During my mission to Sudan last year, I came away with a strong impression of how slow-onset disasters such as drought and desertification interface with conflict and together cause the displacement of millions of people. Predictions are that climate change will only increase the stresses on many societies. And within societies, it is usually those who are most vulnerable, such as displaced persons, women, children and the elderly, who suffer the worst consequences. A human rights approach to disasters is of the utmost importance as it puts the focus of disaster planning and response on those who are the most vulnerable.

This Review provides an overview of natural disasters occurring in 2012 and of the international humanitarian community's responses. The authors examine the important, emerging role of regional organizations in preparing for and managing disasters. The report examines the hazard of wildfires with a particular focus on how trends such as urban growth and climate change impact their occurrence. The Review closes with analysis of the intersection between natural disasters and gender, looking at the different ways that disasters affect men and women and emphasizing the importance of women's participation in disaster risk management.

Over the past decade, there has been increased awareness of the human rights dimensions of natural disaster response. Notably, the Operational Guidelines on the Protection of Persons in Situations of Natural Disasters, adopted by the Inter-Agency Standing Committee, offer concrete guidance to agencies. The revision of those Guidelines in 2010 further strengthened this guidance by, among other things, highlighting the need to adopt disaster risk reduction strategies which take human rights issues into consideration.

I hope that by contributing to a deeper understanding of natural disasters and their impact, this study will help us to prevent natural hazards from becoming disasters and to be better prepared once a disaster strikes.



Chaloka Beyani

UN Special Rapporteur on the Human Rights of Internally Displaced Persons
Co-Director of the Brookings-LSE Project on Internal Displacement



SWITZERLAND 6 February 2012: Frozen cars covered in ice in the town of Versoix, during the cold snap experienced in Europe. Photo: © Akulamatiau | Dreamstime.com

PAKISTAN 11 August 2011: Excavator flooded during attempt at clearing Karakorum Highway from a landslide that caused an artificial lake in Northern Pakistan. Photo: © Paop | Dreamstime.com



EXECUTIVE SUMMARY

This report, *The Year of Recurring Disasters: A Review of Natural Disasters in 2012*, examines four topics: disasters in 2012, with a focus on recurring disasters (Chapter 1); the role of regional organizations in disaster risk management (Chapter 2); wildfires (Chapter 3); and the important role of women in disaster risk management (Chapter 4). Here are some of the highlights from this year's review:

- ❖ **The year of recurring disasters.** We refer to 2012 as the 'year of recurring disasters' as several of the year's disasters that had the most of fatalities, economic damages and/or number of people affected were similar to those occurring the previous year (Typhoons Bopha and Washi in the Philippines, Hurricanes Sandy and Irene in the Caribbean/US, and three years of widespread flooding in Pakistan). In the absence of a generally accepted definition, this report defines a recurring disaster as "the recurrence of a single natural hazard in the same geographic region within a one-year period." This report seeks to draw some lessons for humanitarian actors and policy makers from recurring disasters in 2011 and 2012.
- ❖ **What we learn from recurring disasters.** Recurring disasters have severe negative effects on human development by undermining the resilience of affected individuals and communities. Resolving livelihood issues as well as finding durable solutions for those displaced by disasters are core components of successful disaster recovery. The devastation caused by recurring disasters in 2012 also highlights the need for increased commitment and investment in disaster risk reduction. The implementation of sound disaster (and displacement) laws and policies can play an important role in mitigating the negative effects of recurring disasters and can contribute to the development of more resilient societies.
- ❖ **Statistically, 2012 was an 'average' year.** There were no mega-disasters during the year that caused massive loss of life as in 2010 (Haiti earthquake) and 2011 (Great Japan earthquake and tsunami). In comparison with the annual averages over the past decade, fatalities in 2012 were far below average and the amount of economic losses was close to the ten-year average. Data on the number of disasters is mixed, with disaster databases showing both above and below average numbers for 2012. The deadliest disaster of 2012 was Typhoon Bopha/Pablo in the Philippines; the most expensive disaster was Hurricane Sandy in the US and Caribbean; and the disaster affecting the most people was the drought/food crisis in the Sahel region.
- ❖ **While overall humanitarian funding in 2012 was stable, funding for natural disasters dropped.** After several years of mega-disasters and consequent high funding for disaster response, international humanitarian disaster funding dipped to the relatively low level witnessed in 2009. Meanwhile, overall humanitarian funding was fairly stable due to ongoing conflicts and complex emergencies. The

disaster responses receiving the most humanitarian disaster funding in 2012 were the response to the drought/food crisis in the Sahel and the flood response and post-flood early recovery activities in Pakistan.

- ❖ **Regional organizations play an increasing and diverse role in disaster risk management.** The landscape of regional organizations is complex and diverse, reflecting differences among and within regions. In most regions, governments and other actors see value in working together to prevent disasters and, to a lesser extent, to respond to disasters occurring in the region. In several important cases, international organizations have supported the development of strong regional initiatives. While there are few binding regional instruments in disaster risk management, regional organizations have worked out different mechanisms for encouraging collaboration, including frameworks for disaster risk reduction, regional military protocols, joint training exercises and regional insurance schemes.
- ❖ **Wildfires are more often hazards than disasters.** While globally there are hundreds of thousands of wildfires each year, most of them are not considered “disasters” as they do not threaten human health, lives or livelihoods. There were 156 wildfire disasters reported over the 2000-2011 period, making up only 3.39 percent of all natural disasters recorded during that period. The 780 fatalities from wildfires recorded by the international disaster database make up 0.07 percent of global disaster fatalities during the period.
 - ▼ The growth of urban sprawl and climate change are major factors in changing wildfire risks. Because of an array of factors more and more people are living in areas where residential housing borders undeveloped wildland vegetation, called the wildland-urban interface. In the US, for example, this has led to a massive increase in the number of houses destroyed every year by wildfires as well as a massive rise in fire suppression costs.
 - ▼ A hotter and drier climate in many parts of the world, fuelled by global warming, will lead to more favorable conditions for wildfires, while increased precipitation or desertification in other regions might actually decrease wildfire risk. On the other side of the equation, forests and wildlands absorb and store major quantities of carbon dioxide. Loss of forest and forest degradation – in which wildfires play an important role – contributes as much as 17 percent of global greenhouse-gas emissions each year, a quantity higher than emissions from global transport. Burning forests are thus major drivers of climate change.
- ❖ **A gender-sensitive approach to disaster risk management is a smart approach.** The gender dimensions of natural disasters have gained increasing recognition at the international level since the 1990s. It is now generally recognized that women are typically at greater risk from natural hazards than men, particularly in low-income countries and among the poor, and that they often also face particular protection risks in the period following a disaster. Indeed, natural disasters and climate change often exacerbate existing inequalities and discrimination, including those that are gender-based, and can lead to new forms of discrimination. However,

EXECUTIVE SUMMARY

it is also important to recognize that women play significant roles in all stages of disaster and climate risk management; they are often at the frontline as responders and bring valuable resources to risk reduction and recovery efforts. Yet, in practice, disaster risk management policies and processes throughout the world largely exclude the important work already being done by women. We argue that the effective and meaningful participation of women in policy-making, programming and implementation is crucial to increasing the success of disaster risk management in all phases. This participation, combined with timely and adequate attention to the gendered aspects of disasters and climate change, can in turn lead to greater gender equality and strengthen the resilience of entire communities.



UNITED STATES Bronx, New York, 3 November 2012: Gas shortage after Hurricane Sandy. People waited in line for hours at the Armory for a free gas relief program that never came. Photo: © Photopro123 | Dreamstime.com

HAITI 9 July 2012: Member of the Haitian Department of Civil Protection registers evacuated residents at a school which serves as a shelter during a disaster response simulation. Photo: UN Photo/Mark Garten



INTRODUCTION¹

By most measures, 2012 was a ‘typical’ year for disasters. Worldwide, the number of disasters was, depending on which disaster database was consulted, either below or above average, while economic damages were slightly below the ten-year average.² In comparison with recent years, relatively few people died from disasters. There were no mega-disasters³ such as the 2010 earthquake in Haiti which left more than 200,000 dead or the 2010 floods in Pakistan which affected 20 million people, or the 2011 Japanese earthquake/tsunami/nuclear accident, where damages soared over \$360 billion. The most serious disaster in terms of fatalities was Typhoon Bopha in the Philippines, where 1,100 people died in floods and landslides with hundreds still missing in early March. In the United States, Hurricane Sandy hit the industrial northeast, killing 131 people and causing between \$20 and \$50 billion in economic losses.⁴ The year also witnessed earthquakes (Iran, Philippines, Guatemala), floods (Pakistan, Russia, China, Bangladesh, India), cold waves (Europe, Peru), cyclones (Madagascar, Haiti) and drought (Sahel, US).

But even in this ‘average’ year, there are lessons to be learned, particularly in the disquieting parallels between natural hazards occurring in 2011 and in 2012. In the US, Hurricane Sandy brought back memories of Hurricane Irene. Typhoon Bopha in the Philippines triggered comparisons to the 2011 Tropical Storm Washi. For Pakistan, 2012 was the third year in a row where millions were affected by floods. While weather-related natural hazards often occur in regular cycles (e.g. hurricane season in the Caribbean, monsoon season in South Asia, etc.) less is understood about the effects of recurrent disasters on community resilience and about the lessons which policy-makers draw from these experiences. The parallels in several natural hazards occurring in 2011 and 2012 thus offer an opportunity to reflect on the importance of recurring disasters. Drawing from the above examples, in Chapter 1 we provide a narrative and statistical overview of some of the major disasters in 2012 and draw out some comparisons to introduce the theme of recurring disasters featured in this year’s review. The chapter then turns to a brief summary of developments

¹ The authors wish to thank Megan Bradley, Leah Denman, Faraz Haqqi, Sara E. Miller and Maia Rotman for their valuable assistance with this publication. This report was made possible thanks to support from the U.S. Agency for International Development.

² For more detailed data, see Chapter 1, *infra*.

³ While there is no exact definition of mega-disasters, classifications have been attempted. An IFRC article in 2011 noted that 10 percent of all disasters were major disasters, of which 2 percent were ‘cataclysms’ involving more than 50,000 persons killed; damage (partial or total) to more than 100,000 buildings; crisis exceeding the management abilities of national actors; and international economic consequences. See: Malcolm Lucard, Iolanda Jaquemet and Benoît Carpentier, “Out of sight, out of mind,” *Red Cross Red Crescent Magazine*, iss. 2, 2011, p. 20, www.scribd.com/doc/70209252/Red-Cross-Red-Crescent-Magazine-No-2-2011

⁴ The National Oceanic and Atmospheric Administration (NOAA) puts the death-toll from Sandy at 131, while EM-DAT estimates a death toll of 54; see: NOAA, “Billion-Dollar Weather/Climate Disasters,” accessed 18 February 2013, www.ncdc.noaa.gov/billions/events; EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be, accessed 18 February 2013. EM-DAT puts the economic damage from Sandy at \$20 billion; Munich-Re estimates economic losses from Sandy to be \$50 billion. See: Munich Re, 2012 *Natural Catastrophe Year in Review*, 3 January 2013.

and funding patterns in the humanitarian sector. In Chapter 2, we look at one particular and under-studied set of actors in humanitarian response: regional organizations. This analysis underscores the wide variation in regional responses to disasters and highlights a trend of growing regional engagement with disaster risk reduction and response.

The next chapters cover two different themes. Chapter 3 focuses on one particular type of disaster: wildfires, which in many countries are becoming more dangerous and costly, mainly because of climate change and growing urban sprawl. Chapter 4 looks at the gendered effects of disasters and how women play an important, but largely overlooked, role in disaster and climate risk management. This focus on gender is intended to support the mandate of the Special Rapporteur on the Human Rights of Internally Displaced Persons who has made this a priority in his work and will be reporting on the rights and wellbeing of internally displaced women to the UN Human Rights Council in June 2013.

The definitions, sources and methodology used for this report are discussed in Annex I. Finally, Annex II provides an overview of Brookings-LSE Project on Internal Displacement publications and events on natural disasters and climate change.

CHAPTER 1

THE YEAR OF RECURRING DISASTERS

Natural disasters are like snowflakes – while there are often many similarities between them, no two are alike. And yet in reviewing major disasters in 2012, we were struck by the fact that several of the biggest disasters last year were preceded in 2011 by similar events. In 2012 another destructive storm wreaked havoc in the southern Philippines, following a devastating storm in 2011; the United States' east coast – including New York City – was hit by the second devastating storm in a row. For Pakistan, it was the third year in which millions were affected by floods.

In this chapter, we take a closer look at some of the parallels between those disasters, particularly to see if governments and humanitarian actors have learned lessons from one year to the next. With Typhoon Bopha/Pablo (Philippines) being the deadliest disaster in 2012 and Hurricane Sandy the costliest and with the Pakistan floods affecting among the largest number of people, these disasters represent an important cross-section of disasters occurring in 2012. In addition to discussing recurring disasters, this chapter also provides an overview of disasters occurring in the course of the year and analyzes trends in humanitarian funding.

SECTION 1

Disaster Statistics and Trends in 2012

2012 did not experience any mega-disasters – a fact which is reflected in the lower numbers of fatalities, which are approximately a third of fatalities occurring in 2011 (which witnessed the Japanese earthquake and tsunami) and a thirtieth of fatalities in 2010 (which witnessed the Haiti earthquake). Death rates in 2012 were down to about a tenth of the decade's yearly average.

Looking at other indicators, the disaster trends of 2012 are less clear. Munich Re's natural catastrophe loss database (NatCatService) reports a relatively high number of 'loss events,' albeit less than in the record year of 2010.⁵ Some 905 loss events were reported in 2012, 85 more than in 2011 and one of the five highest numbers since 1980. Meanwhile, the International Disaster Database, EM-DAT, reported 310 disasters, a smaller number of disasters than in 2011.⁶ As Munich Re includes smaller disasters in its database than EM-DAT, this probably means that there were a higher number of smaller disasters in 2012

⁵ Munich Re's NatCatSERVICE database records loss events due to natural hazards resulting in property damage or bodily injury. See: Munich Re, *NatCatSERVICE, Natural catastrophe know-how for risk management and research*, 2011.

⁶ Source of data: EM-DAT: The OFDA/CRED - International Disaster Database www.emdat.be Université catholique de Louvain Brussels – Belgium, in: UNISDR, USAID and CRED, "2012, disasters in numbers," 14 March 2013, <http://reliefweb.int/report/world/economic-losses-disasters-set-new-record-2012>; EM-DAT data are subject to revisions because of retrospective analysis (see Annex 1 for explanation).

compared to 2011, but fewer larger ones.⁷ In terms of persons affected by disasters, the number of persons affected by natural disasters in 2012 was with 106 million affected, far lower than the 209 million in 2011, and so was also lower than the average of approximately 269 million persons affected by natural disasters per year between 2002 and 2011.⁸

Table 1 Natural Disasters Worldwide, 2002-2012⁹

| | 2002-11 avg. | 2010 | 2011 | 2012 ¹⁰ |
|---|--------------|---------|---------|--------------------|
| Number of recorded disasters (EM-DAT) | 396 | 411 | 336 | 310 |
| Natural catastrophes (Munich Re) (loss events) | 800 | 960 | 820 | 905 |
| Fatalities (EM-DAT) | 114,502 | 297,730 | 31,105 | 9,330 |
| Fatalities (Munich Re) | 106,000 | 295,000 | 27,000 | 9,600 |
| Persons affected (thousand) (EM-DAT) | 268,280 | 343,864 | 209,512 | 106,087 |
| Damage (\$ billions) (EM-DAT) | 142,5 | 135 | 366 | 138 |
| Overall losses (\$ billions) (Munich Re) | 165 | 150 | 380 | 160 |

In terms of disaster losses, 2012 was slightly below the 10-year average (2002-2012). In comparison with the record year of 2011,¹¹ which saw massive disaster losses of over \$360 billion, especially in developed countries, losses in 2012 were about \$160 billion – still a staggering amount (almost equivalent to the GDP of New Zealand) and the seventh highest annual total of direct losses since 1980.¹²

⁷ See Annex I for further information on the two databases.

⁸ See Annex I of this review for a discussion of criteria used to determine persons “affected” by disasters.

⁹ The figures in this table are derived from: Munich Re data for 2012 and 2002-2011 averages and EM-DAT for 2012. See: Munich Re, *2012 Natural Catastrophe Year in Review*, 3 January 2013; Münchener Rückversicherungs-Gesellschaft, Geo Risks Research, NatCatSERVICE, accessed 4 February 2013; EM-DAT data for 2012: Source of data: EM-DAT: The OFDA/CRED - International Disaster Database www.emdat.be Université catholique de Louvain Brussels – Belgium, in: UNISDR, USAID and CRED, “2012, disasters in numbers,” 14 March 2013, <http://reliefweb.int/report/world/economic-losses-disasters-set-new-record-2012>; EM-DAT data for 2002-2011: Philippe Hoyois and Regina Below, “Disaster data,” in: International Federation of Red Cross and Red Crescent Societies, *World Disaster Report 2012: Focus on forced migration and displacement*, 2012, p. 260 ff., Source: EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be

¹⁰ EM-DAT data for 2012: UNISDR, USAID and CRED, “2012, disasters in numbers,” op. cit. EM-DAT data are subject to revisions because of retrospective analysis (see Annex 1 for explanation).

¹¹ For more discussion of the economic losses from disasters and 2011 data, see: Elizabeth Ferris and Daniel Petz, *The Year that Shook the Rich: A Review of Natural Disasters in 2011*, Brookings-LSE Project on Internal Displacement, www.brookings.edu/research/reports/2012/03/natural-disaster-review-ferris

¹² Loss data from Munich Re, *2012 Natural Catastrophe Year in Review*, 3 January 2013; GDP data from Central Intelligence Agency, The World Factbook, GDP (official exchange rate), www.cia.gov/library/publications/the-world-factbook/fields/2195.html

Table 2 Natural Disasters in 2012 by Number of Fatalities¹³

| Country | Disaster | Month | Fatalities |
|----------------------------|---------------------|------------------|-----------------------|
| Philippines | Typhoon Bhopa/Pablo | December | 1,901 ¹⁴ |
| Europe¹⁵ | Cold Wave | January-February | 587 |
| Pakistan | Flood | August-October | 480 |
| Nigeria | Flood | July-October | 363 |
| Iran | Earthquakes | August | 306 |
| Peru | Cold wave | June | 252 |
| Russia | Flash Flood | July | 171 |
| Korea Dem P Rep | Flood | July | 169 |
| USA, Caribbean | Hurricane Sandy | October | 141/220 ¹⁶ |
| Pakistan | Avalanche | April | 135 |
| China | Flood | April-May | 132 |
| India | Flood | June-July | 120 |
| Total 2012 | | | 9,330 |

In terms of disasters with the most fatalities (see Table 2), the list is topped by Typhoon Bopha/Pablo in the Philippines, followed by a cold wave in Europe early in the year. These are followed by floods in Pakistan and Nigeria and the twin earthquakes in Iran. With over 3,400 fatalities, floods were the deadliest hazard in 2012, closely followed by storms (3,027). Extreme temperatures killed over 1,600 people and earthquakes more than 700).¹⁷ A majority of the twelve deadliest disasters of 2011 took place in Asia (seven out of twelve), which is consistent with the trend of Asia reporting the largest number of disaster fatalities over the last decade.¹⁸ Two of the deadliest disasters occurred in Europe, two in the Americas and one in Africa. Half of the twelve deadliest disasters were floods and all but the Iran earthquakes were hydro-meteorological disasters.

¹³ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, accessed 5 February 2013, Source of data: EM-DAT: The OFDA/CRED - International Disaster Database www.emdat.be Université catholique de Louvain Brussels – Belgium, in: UNISDR, USAID and CRED, “2012, disasters in numbers,” 14 March 2013, <http://reliefweb.int/report/world/economic-losses-disasters-set-new-record-2012>

¹⁴ Munich Re, 2012 Natural Catastrophe Year in Review, 3 January 2013, p. 39.

¹⁵ The highest numbers of deaths were recorded in Ukraine (112 deaths), Romania (86), Poland (82) and Russia (64). EM-DAT, Disaster List, accessed 11 January 2013, www.emdat.be/disaster-list

¹⁶ EM-DAT cumulative numbers for USA, Haiti, Cuba, Jamaica, Bahamas, accessed 5 February 2013. Munich Re puts the number of fatalities from Sandy at 220. See: Munich Re, 2012 Natural Catastrophe Year in Review, 3 January 2013, p. 33.

¹⁷ UNISDR, USAID and CRED, “2012, Disasters in Numbers,” op. cit.

¹⁸ From 2002-2011 EM-DAT reports 744,138 reported fatalities by natural disasters in Asia, which account for 65 percent of the global total of 1.15 million during that time period. See: Philippe Hoyois and Regina Below, “Disaster data,” in: International Federation of Red Cross and Red Crescent Societies, *World Disaster Report 2012: Focus on forced migration and displacement*, 2012, p. 260 ff., Source: EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be

Table 3 Major Disasters in 2012 in Terms of Affected Population¹⁹

| Country | Disaster | Month | Affected (millions) |
|---|---------------------|----------------|---------------------------|
| Sahel (Chad, Gambia, Niger, Mali, Mauritania, Senegal) | Drought | | 12.9 (18.0) ²⁰ |
| China | Flood | June-July | 17.4 |
| China | Flood | April-May | 13.1 |
| Philippines | Typhoon Bopha/Pablo | November | 6.2 ²¹ |
| China | Typhoon Haiku | August | 6.0 |
| Pakistan | Flood | August-October | 5.0 |
| Philippines | Flood | August | 4.4 |
| China | Flood | August | 3.8 |

According to the international disaster database (EM-DAT) 106 million people were affected by disasters in 2012, a significant drop from 209 million that were affected in 2011. Following long-term trends, the largest number of people were affected by floods (62.3 million), followed by drought (24.9 million) and storms (16.4 million).²² As indicated in Table 3, some of the disasters that affected the most people in 2012 were the drought in the Sahel, floods in China, Typhoon Bopha/Pablo in the Philippines, as well as floods inundating large parts of Manila, the capital of the Philippines. As already noted, Pakistan also saw major floods and even though fewer people were affected than in previous years, it was still one of the major disasters in 2012. Final numbers of affected people are not yet available for Hurricane Sandy, but it also affected millions, particularly in Cuba, Haiti and the US. In the US alone, 8.5 million people lost electricity during the storm.²³

¹⁹ Standards and definitions regarding persons affected by a disaster differ significantly from country to country. Different sources often show wide variations in numbers and thus should be treated with caution. If not indicated otherwise, data for this table are derived from EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, accessed 11 February 2013, www.emdat.be

²⁰ UN humanitarian agencies reported that due to drought and conflict 18 million persons were food insecure in the region. See for example: UN News Service, "Despite food assistance, Sahel food crisis still persists – UN agency," 14 September 2012, www.un.org/apps/news/story.asp?NewsID=42892

²¹ OCHA, "Philippines: Typhoon Bopha, Situation Report No. 17," 29 January 2013, <http://reliefweb.int/report/philippines/typhoon-bopha-situation-report-no-17-29-january-2013>

²² UNISDR and CRED, "2012, Disasters in Numbers," 14 March 2013, <http://reliefweb.int/report/world/economic-losses-disasters-set-new-record-2012>

²³ Christina DeConcini and Forbes Tompkins, "Impacts of Hurricane Sandy and the Climate Change Connection," Fact Sheet, World Resources Institute, 2012.

SECTION 2

Continuing, Recurring, Cascading Disasters

While there are frequent references in the literature to the term ‘recurring’ (or recurrent) disaster, there is little clarity about its meaning. The term ‘recurring disaster’ is used here to refer here to the recurrence of a single natural hazard in the same geographic region over a one-year period. In 2008, Haiti was struck by four hurricanes in the course of a year. Pakistan experienced flooding in 2010, 2011 and 2012. These are recurring disasters. From the beginnings of recorded history, there have been recurring disasters – annual flooding of the Nile River and regular monsoon rains in South Asia, for example. For millennia, human civilizations have adapted (albeit imperfectly) to seasonal variations in weather patterns. Yet today, population growth and patterns of human settlement, coupled with long-term global warming, seem to suggest that a higher number of people will be impacted by recurring disasters than ever before in human history.

Other hazards, such as droughts, can persist continuously for years. A drought lasting five years would, by our understanding, be categorized as a single disaster. In some regions, though, droughts occur regularly, with shorter or longer breaks in between. In those instances, if they recur in sufficiently short intervals, we can speak of recurring disasters. Also, while floods are often considered to be a sudden-onset disaster, they can actually be drawn-out affairs. For example, in Colombia in 2010, continuous rainfall caused continuous flooding throughout the country.²⁴ This can also be considered as a single continuous disaster.

But the interaction between natural hazards is even more complex. Some natural hazards tend to occur together; cyclones and hurricanes, for example, often cause flooding and landslides. Earthquakes can cause tsunamis. And, as discussed below, it is usually the intersection between natural hazards and human action that makes a natural hazard a disaster.

There are also many cases where more than one hazard occurs within the same year (or sometimes within the same week). For example, in 2012 seven Asian countries experienced two different natural hazards during the course of the year: Afghanistan (drought and flood); Bangladesh and Vietnam (flood and storm); and India, Malaysia, Pakistan and Sri Lanka (flood and earthquake).²⁵ And, indeed, many national disaster management organizations plan on the basis of identifying and assessing multiple hazards and developing strategies for both multi-hazard mitigation and response.²⁶

There are also what might be considered cascading disasters where one natural hazard triggers another and/or where a natural hazard leads to another type of disaster. For example, in 2011, the Great East Japan earthquake caused a tsunami, damaging a nuclear

²⁴ Alice Thomas, *Surviving Alone: Improving Assistance to Colombia's Flood Victims*, Refugees International, May 2011, <http://refugeesinternational.org/policy/in-depth-report/surviving-alone-improving-assistance-colombias-flood-victims>

²⁵ IRIN, “Asia's 2012 figures and trends,” 11 December 2012, <http://reliefweb.int/report/world/asias-2012-figures-and-trends>

²⁶ See for example: FEMA's initiatives at multi-hazard mitigation planning, <http://www.fema.gov/multi-hazard-mitigation-planning>

plant, which in turn posed a threat to human life. An earthquake can lead to the collapse of a dam, causing major flooding or a heat wave can cause wildfires as occurred in Russia in 2010.

The eruption of Mount Pinatubo in the Philippines in June 1991 illustrates some of the complexity of the interrelationship of disasters. Earthquakes were recorded in the month preceding the eruption of the volcano, leading some scientists to predict that the earthquakes could be a sign of increasing volcanic activity or perhaps a contributing factor to the volcano's eruption. The eruption was the second strongest of the century (ten times stronger than Mt. Saint Helen's in 1980) and had global effects, causing an increase in worldwide ozone levels and a global decrease in temperature of 32.9 degrees Fahrenheit (0.5 degrees Celsius). But the volcano's effects were intensified by the fact that Typhoon Yunya struck the Philippines on the same day as the eruption, only 45 miles away from the volcano. The rains from the typhoon mixed with the ash of the volcanic eruption to create massive lahars – fast-flowing mudflows composed of a slurry of pyroclastic material, debris and water which can destroy communities quickly. Moreover, the longer-term effects of the lahars, the ash and the pollution created by the volcano contributed to crop failure and food insecurity. Long after the eruption, subsequent heavy rains triggered the formation of new lahars.

We suggest that more research is needed into the intersections between different types of natural hazards and to clarify the conceptual definitions and interactions between recurring, continuous and cascading disasters. Moreover, further work is needed to understand how the impact of natural hazards is affected by human activities – such as deforestation and the siting of industrial or nuclear plants. While humans have little control over whether a natural hazard occurs, they can take actions to determine its effects. Whether there are zero or 1,000 fatalities depends on the extent to which communities and governments are prepared to face natural hazards. Disaster risk (or vulnerability to natural hazards) is the result of both the likelihood of natural hazards and the vulnerability of populations to those hazards. For example, Haiti has experienced far greater destruction from a tropical storm than other countries have experienced from much stronger hurricanes.²⁷ A good illustration for this is the World Risk Index, which looks at the relationship between exposure to natural hazards and social vulnerability in calculating risk for all countries in the world, finding that Vanuatu, Tonga and the Philippines have the highest levels of risk in the world.²⁸ In all three cases, the risks are multi-hazard as the three countries are susceptible to typhoons, earthquakes and volcanoes. But the risks are also greater because of patterns of human settlement and the capacity of governments to take measures to adequately protect their populations against this risk.

What is the impact of recurring disasters? When disasters recur frequently, the result is often chronic poverty. Disasters destroy material goods (homes, schools, infrastructure, livestock, seeds) and also impact social capital (for example, decreasing access to

²⁷ Elizabeth Ferris, "Haiti has had it all," in Susan Martin, ed., *Humanitarian Crises and Migration: Causes, Consequences and Responses*, Routledge, forthcoming.

²⁸ United Nations University, "WorldRiskReport 2012: Environmental degradation increases disaster risk worldwide," 11 October 2012, <http://www.ehs.unu.edu/article/read/worldriskreport-2012>

education, eroding social norms and values, contributing to incentives for longer-term migration).²⁹ In a sense, it is a vicious cycle. Chronic poverty makes it difficult to take the measures necessary to mitigate against the effects of disasters. When they do occur, disasters can wipe out resources and increase poverty. The World Risk Index helpfully distinguishes between coping strategies – to respond to an immediate disaster – and longer-term adaptation capacities to prepare for future hazards, suggesting that these require different resources and approaches.³⁰

In one of the few academic studies to focus specifically on the psychological effects of recurring disasters, Omori and Fujimori suggest that differences in perception of the imminence of the threat are key to understanding the effects on affected communities. In particular, they suggest that there is a difference between the likelihood that a monsoon will occur again versus the stress of being near a volcano that has erupted and may erupt again. They examine the case of the eruption of the Oyama volcano on Miyake-island in Japan 2000 which led to the evacuation of the population for nearly five years. However, when the population returned, they found continuing volcanic gas emissions and lived with threat of another eruption. Omori and Fujimori found that the psychological impact on the returnees was serious, and posited a close relationship between recurring disasters and disruptions of healthy living environments. They also point out that it is likely that the influences of sudden short-term disasters – which are perceived as one-time events – are different than recurring disasters. But there is little research on this area.³¹

Local communities often develop effective adaptation strategies to recurrent, small-scale disasters, as a series of case studies conducted by the UN Food and Agriculture Organization suggests. Local knowledge is particularly important in taking actions to mitigate the worst effects of natural hazards. But sudden-onset “extreme events are often perceived as ‘acts of God’” and may not lead to the development of preventive measures.³² A number of studies suggest that recurrent events reduce the resilience of communities.³³ This makes intuitive sense. When a family or a community mobilizes to rebuild after a disaster, only to be hit by another disaster the following year, the incentive, assets and energy for rebuilding are likely to be less. And governmental authorities and international actors may find it more difficult to mobilize the funds and mechanisms to support reconstruction efforts.

²⁹ Hossen M. Anwar, “The Impact of Recurring Natural Disasters on Chronic Poverty,” *Societies without Borders*, 2008, pp. 285-301, <http://societieswithoutborders.files.wordpress.com/2009/11/anwar3-1.pdf>

³⁰ United Nations University, “Fact Sheet WorldRiskReport 2012,” 11 October 2012, <http://www.ehs.unu.edu/file/get/10488.pdf>

³¹ Tetsushi Omori and Tatsuo Fujimori, “Recurring Natural Disasters and their Psychological Effects on the Survivors,” *Yokohama Journal of Social Sciences*, vol. 15, no. 4, pp. 117-128, <http://kamome.lib.ynu.ac.jp/dspace/bitstream/10131/7395/1/9-Omori.pdf>

³² United Nations FAO, *The Role of Local Institutions in Reducing Vulnerability to Recurrent Natural Disasters and in Sustainable Livelihoods Development*, April 2004. <ftp://ftp.fao.org/docrep/fao/007/ae079e/ae079e00.pdf>

³³ *Ibid*, p. 29. See also: IFRC, *The road to resilience, Bridging relief and development for a more sustainable future*, IFRC discussion paper on resilience – June 2012, <http://www.preventionweb.net/english/professional/publications/v.php?id=27375>

Humanitarian actors like to operate in a world of ‘lessons learned’ and ‘best practices.’ Crisis situations such as disasters offer important learning experiences and windows of opportunity for change. After a major disaster strikes, media outlets report the cries for reform and governments often feel the weight of popular pressure for better disaster prevention and response. However, the prospects for positive change can easily be derailed by other, competing priorities, particularly as resources are usually scarce. When disasters recur, however, there should be added incentive to develop the means of mitigating the risk of future disasters. There are (fortunately) cases where major disasters lead governments and humanitarian actors to re-think and adjust their approaches to disaster risk management. The 1995 Kobe earthquake brought about a major rethink on risk reduction; the 2004 Indian Ocean Tsunami brought human rights to the forefront of disaster management; the Great East Japan earthquake and tsunami of 2011 will likely bring improvements in thinking and planning for cascading disasters. It goes without saying that countries that experience recurring disasters have strong incentives to get their disaster management systems right.

A series of recurring disasters in 2012 (hurricanes Sandy and Irene in the US, typhoons Bopha and Wahsi in the Philippines, floods in Pakistan) present an opportunity to see how and if lessons were learned from one year to the next, if responses improved or not and which factors play a role in learning from disasters. It is clear that change takes time and physical adaptation and mitigation measures are difficult to implement in such a short period, particularly when the consequences of earlier disasters must be addressed at the same time. Having to deal with the impacts of major disasters two years in a row might actually slow down processes of change as disaster response is typically urgent and resource-intensive. The sequence of shocks that recurrent disasters cause can stress communities’ abilities to recover, but they can also bring out the best in communities and foster lasting change. In the absence of definitive studies on this subject, we hope that the comparisons offered below will offer some preliminary insights into the particular characteristics of recurring disasters.

Sandy and Irene

In October 2012, Hurricane Sandy swept through the Caribbean, mid-Atlantic and northeastern United States. The storm in the Caribbean Sea was declared a Category 1 hurricane on 24 October by the National Hurricane Center (NHC). It made landfall in Jamaica that evening, strengthened to a Category 2 hurricane and made landfall in Cuba on 25 October. It then weakened to a tropical storm and passed through the Bahamas and re-strengthened to a Category 1 hurricane as it made its way to the United States. On 29 October, the storm system made landfall south of Atlantic City, New Jersey. At the time, Sandy’s classification was changed to ‘post-tropical storm’ because of the structural changes associated with moving into a colder environment. (Sandy was subsequently reclassified as a Category 1 hurricane, as analysis revealed that hurricane-strength winds had been recorded in the US as a result of Sandy).³⁴ At landfall, winds were reportedly 80

³⁴ National Weather Service Forecast Office, “Storm Summary for Superstorm Sandy,” accessed 21 December 2012, www.erh.noaa.gov/phi/storms/10292012.html

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miles per hour (129 kilometers per hour), affecting 24 states, particularly New York and New Jersey.³⁵

As Jeff Masters points out, Sandy was the “largest, most powerful and second most destructive Atlantic hurricane on record.”³⁶ But it is important to examine this hurricane in a broader context. 2012 was the seventh consecutive year without a major hurricane to hit the US. Even though it was not initially considered a hurricane when it made landfall, Sandy was unique in its size and power; the total energy of tropical storm winds were 2.7 times higher than Katrina’s peak energy and no hurricane on record has been wider in geographic scope.³⁷

Sandy wreaked havoc in the Caribbean, particularly in southern Haiti which had already suffered from Hurricane Isaac in August 2012, when more than a dozen people were killed. More than 20 inches (51 centimeters) of rain fell in Haiti due to Sandy, causing 54 deaths and destroying over 6,200 homes and damaging ten thousands throughout the country, with most damage in the south and southeast, according to the International Organization for Migration.³⁸ Prime Minister Laurent Lamothe described the storm as a “disaster of major proportions. The whole south is under water.”³⁹ According to figures from the government of Haiti, the agricultural sector lost one-third of its annual production due to Sandy, Tropical Storm Isaac in August, and drought.⁴⁰ One and a half million people faced food insecurity following Sandy.⁴¹ Three years after the devastating 2010 earthquake, Sandy affected nearly 32,000 earthquake IDPs in 119 camps out of a total of 370,000 IDPs in 541 camps.⁴² Of the total number of IDP camps, 218 had been affected by Isaac, while 78 camps

³⁵ Matt Smith, “Sandy wreaks havoc across Northeast; at least 11 dead,” *CNN*, 30 October 2012, accessed 21 December 2012, www.cnn.com/2012/10/29/us/tropical-weather-sandy/index.html

³⁶ Jeff Masters, “The bizarrely active hurricane season of 2012 draws to a close,” *Weather Underground*, 30 November 2012, www.wunderground.com/blog/JeffMasters/comment.html?entrynum=2302

³⁷ *Ibid.*

³⁸ IOM, “Fact Sheet – Unit of Housing and Public Buildings Construction (UCLBP) and Shelter and CCCM Cluster Haiti – January 2013,” January 2013, www.iom.int/files/live/sites/iom/files/pbn/docs/UCLBP-CCCM-Shelter-Haiti-Jan2013.pdf

³⁹ ABC News, “Hurricane Sandy’s Death Toll Reaches 69 in Caribbean Countries, 29 October 2012, http://abcnews.go.com/ABC_Univision/News/hurricane-sandy-leaves-destruction-wake/story?id=17588956

⁴⁰ OCHA, “UN calls for additional \$39 million to support the government of Haiti respond to the impact of Hurricane Sandy,” 12 November 2012, <http://reliefweb.int/report/haiti/un-calls-additional-39-million-support-government-haiti-respond-impact-hurricane-sandy>

⁴¹ *Ibid.*; OCHA, “Haiti: Hundreds of thousands of people affected by Hurricane Sandy,” 2 November 2012, www.unocha.org/top-stories/all-stories/haiti-hundreds-thousands-people-affected-hurricane-sandy. See also: Jonathan Watts, “Aftermath of hurricane Sandy leaves Haiti facing new disaster,” *The Guardian*, 2 November 2012, www.guardian.co.uk/world/2012/nov/02/aftermath-hurricane-sandy-haiti-disaster

⁴² IOM, “IOM and its Partners Evacuate More than 1,200 Haitians Living in Camps,” 29 October 2012, <https://www.iom.int/cms/en/sites/iom/home/news-and-views/press-briefing-notes/pbn-2012/pbn-listing/iom-and-its-partners-evacuate-mo.html>; IDMC, “Haiti: Tropical Storm Sandy displaces 35,000 people, while over 31,000 earthquake IDPs are hit again,” 16 November 2012, www.unhcr.org/refworld/docid/50acb3ec2.html ; IOM, “Fact Sheet – Unit of Housing and Public Buildings Construction (UCLBP) and Shelter and CCCM Cluster Haiti – January 2013,” January 2013.

were affected by both Sandy and Isaac.⁴³ Sandy also left a band of destruction through other countries in the Caribbean. Eleven people were killed and 35,000 homes were destroyed in Cuba; Jamaica, Puerto Rico and the Bahamas each suffered one fatality from Sandy.⁴⁴

The impact in the United States was serious – and costly. Sandy caused the death of 131 people. Wave heights reached a record 32.5 feet (almost 10 meters) in New York harbor – 25 percent higher than the previous record.⁴⁵ Parts of lower Manhattan and subway tunnels were flooded. Over 20,000 flights were cancelled.⁴⁶ Between 10,000 and 40,000 people were displaced, with the lower estimates indicating people who sought shelter in government-run shelters.⁴⁷

The fact that the storm occurred a week before US presidential elections made the voting rights of those displaced by the storm an issue of political and human rights concern. Some observers felt that the storm's impact may have depressed voter turnout in some areas due to loss of electricity at some polling places. Authorities scrambled to make sure that voters were able to exercise their right to vote, extending voter registration deadlines, early voting and use of electronic ballots. In New Jersey and New York more than 250 polling locations were moved. An estimated one million New York voters lived in areas where polling places were affected by the storm, including 250,000 whose polling place were moved.⁴⁸

The economic costs of Hurricane Sandy were estimated at between \$20 and \$50 billion; as discussed in our Annual Review of Natural Disasters in 2011, economic costs tend to be much higher for disasters occurring in developed countries. Another effect of the storm in the United States was much greater recognition in American political discourse of the relationship between sudden-onset natural disasters and climate change. As former vice president Al Gore stated, "Hurricane Sandy is a disturbing sign of things to come. We must heed the warning and act quickly to solve the climate crisis."⁴⁹ And President Obama referred to damages caused by Hurricane Sandy in calling for increased action on climate change in his January 2013 State of the Union address.⁵⁰

⁴³ IOM, "Fact Sheet – Unit of Housing and Public Buildings Construction (UCLBP) and Shelter and CCCM Cluster Haiti – January 2013," January 2013.

⁴⁴ Jeff Masters, "Massive Hurricane Sandy building a huge and destructive storm surge," *Weather Underground*, 28 October 2012, Last Accessed 21 December 2012, www.wunderground.com/blog/JeffMasters/article.html?entrynum=2278

⁴⁵ Christina DeConcini and Forbes Tompkins, "Impacts of Hurricane Sandy and the Climate Change Connection," *World Resources Institute Fact Sheet*, 2012.

⁴⁶ *Ibid.*, p. 2.

⁴⁷ Malcolm Jones, "What to Do With the Thousands Displaced by Hurricane Sandy?" *The Daily Beast*, 8 November 2012, www.thedailybeast.com/articles/2012/11/08/what-to-do-with-the-thousands-displaced-by-hurricane-sandy.html

⁴⁸ Eric A. Fischer and Kevin J. Coleman, "Hurricane Sandy and the 2012 Elections: Fact Sheet," *Congressional Research Service*, 8 November 2012, pp. 2-3.

⁴⁹ Al Gore, "On Hurricane Sandy," *The Huffington Post*, http://www.huffingtonpost.com/al-gore/statement-on-hurricane-sa_b_2045406.html

⁵⁰ Politico, "Obama to Congress in State of the Union: Act on climate or I will," 12 February 2013, <http://www.politico.com/story/2013/02/obama-to-congress-act-on-climate-or-i-will-87555.html>

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Sandy followed a path reminiscent of Hurricane Irene the year before.⁵¹ Irene landed in North Carolina as a hurricane, transitioning into a tropical storm before hitting New York City on 28 August 2011. In the case of Irene, the government ordered the evacuation of about 370,000 residents and New York officials ordered the shutdown (for the first time ever because of a natural hazard) of the city's transit system. Although it was not considered a hurricane at the time, Irene's damage was extensive with 45 deaths, over 7 million people losing electric power and economic costs exceeding \$7 billion. At the time, Irene was seen as a fluke – it had been more than half a century since a storm of this magnitude hit New York.⁵² And then just a year later, it happened again. Just as in 2011, people from New York and the northeast were evacuated and economic costs were high. In fact, Sandy – a larger and more powerful storm – caused approximately three times the economic damage of the previous year's 'unprecedented' tropical storm Irene. Like Irene, Sandy caused extensive damage before making landfall in the United States. Like Sandy, Irene, while still a hurricane, caused substantial damage in Puerto Rico and the Bahamas before hitting the United States.

The similarities between Sandy and Irene illustrate the difficulties in predicting – and preparing for – storms and hurricanes even in a developed country such as the United States. While Irene was seen as a once in a hundred year storm, just a year later, an even bigger storm struck the same general area.⁵³ Given the fact that climate change is making weather more unpredictable and increasing the likelihood of extreme events, efforts are urgently needed to prevent natural hazards such as hurricanes and tropical storms from becoming major disasters. Hurricane Sandy also confirms the lesson drawn from our Annual Review of Natural Disasters in 2011 that economic losses tend to be greater in developed countries even though the death toll is generally higher in less developed countries.⁵⁴

US government response to both Irene and Sandy has improved substantially in the five years since Hurricane Katrina.⁵⁵ There have been extensive changes in FEMA and relationships between state and local disaster responders have been strengthened. In Connecticut, Governor Dan Malloy reported that response to Sandy was better than to

⁵¹ For a comparison of the two, see: The Wall Street Journal, "Sandy vs. Irene: How Do the Storms Stack Up?" 28 October 2012, <http://blogs.wsj.com/metropolis/2012/10/28/hurricane-sandy-vs-irene-how-do-big-storms-stack-up/>

⁵² Hurricane Carol made landfall on Eastern Long Island in 1954. Before this and the most powerful hurricane making landfall on Long Island was a 1938 Category 3 hurricane. Tropical storm Agnes in 1972 and Hurricane Donna in 1960 also caused major damage to the United States' East Coast. See: New York City Office of Emergency Management, "NYC Hazards: NYC Hurricane History," 19 February 2013, www.nyc.gov/html/oem/html/hazards/storms_hurricanehistory.shtml

⁵³ Jeff Masters, "Irene's 1-in-100 year rains trigger deadly flooding," *Weather Underground*, 29 August 2011, www.wunderground.com/blog/JeffMasters/comment.html?entrynum=1908

⁵⁴ Elizabeth Ferris and Daniel Petz, *The Year that Shook the Rich, A Review of Natural Disasters in 2011*, Brookings-LSE Project on Internal Displacement, www.brookings.edu/research/reports/2012/03/natural-disaster-review-ferris

⁵⁵ Tim Starks, "Katrina's Lessons Seen In Response to Sandy," CQ, 29 December 2012, <http://public.cq.com/docs/weeklyreport/weeklyreport-000004197197.html>. For FEMA's analysis of its response to Hurricane Sandy, see: Written testimony of Federal Emergency Management Agency Administrator Craig Fugate for a House Committee on Transportation and Infrastructure hearing titled "A Review of the Preparedness, Response To and Recovery From Hurricane Sandy," 4 December 2012, <http://www.dhs.gov/news/2012/12/04/written-testimony-fema-administrator-house-committee-transportation-and>

Irene, in part because of drills carried out over the summer and new regulations intended to more rapidly restore power.⁵⁶ Power was restored faster after Sandy than after Irene although millions were left without power for weeks.⁵⁷

Generator sales have gone up but home generators (which have caused several deaths through carbon-monoxide poisoning) cannot replace resilient public infrastructure. Another question surrounds zoning and rebuilding in coastal zones in the US. US government-backed flood-insurance has encouraged people to live in exposed coastal areas by subsidizing insurance. Rising sea levels caused by climate change, coastal erosion and possibly more severe storms in the future will not make the US east coast any safer. New York governor Andrew Cuomo already proposed to spend up to \$400 million to buy out property owners who live in high-risk coastal areas.⁵⁸ Meanwhile New Jersey governor Christie has indicated that he is not concerned about climate change.⁵⁹ Mitigating possible effects from future storms in New York City through building flood barriers or gates would cost billions of dollars, an investment that might be given more thought in light of the massive price tag of Sandy and Irene.

Sandy has brought the question of climate change to the forefront of the debate in the US but it remains to be seen if the shock (coupled with the hottest year in recorded history and the largest drought in decades) will lead to the development of more ambitious and comprehensive US climate change policies.

Bopha and Washi

According to the 2012 World Risk Report,⁶⁰ the Philippines ranks third out of 173 countries in terms of disaster risk – a function both of its susceptibility to a variety of natural hazards (typhoons, volcanoes, earthquakes) and the vulnerabilities of populations exposed to these hazards. According to one study, while Japan and the Philippines face equal exposure to tropical cyclones, “a cyclone of the same intensity would kill 17 times more Filipinos” than Japanese due to the greater vulnerability of the population.⁶¹

⁵⁶ CBS News, “Malloy: Sandy Response Better Than Irene, Halloween Storm,” 8 November 2012 <http://newyork.cbslocal.com/2012/11/08/malloy-sandy-response-better-than-irene-halloween-storm/>

⁵⁷ Associated Press, “Power Outage Time after Sandy not Extraordinary,” 16 November 2012, <http://bigstory.ap.org/article/power-outage-time-after-sandy-not-extraordinary>

⁵⁸ Reuters, “New York’s post-Sandy home buyouts could cost \$400 mln,” 4 February 2013, <http://www.reuters.com/article/2013/02/05/storm-sandy-newyork-buyouts-idUSL1N0B4D1T20130205>

⁵⁹ Matt Katz, “Christie won’t consider climate change in rebuilding after Sandy; scientists say he should,” *The Inquirer*, 20 February 2013, http://www.philly.com/philly/blogs/christie_chronicles/Call-for-Christie-to-consider-climate-change-in-rebuilding-.html. See also: Anna Sale, “Christie and Cuomo’s Dueling Visions for Post-Sandy Rebuilding,” WNYC News, 23 November 2012, <http://www.wnyc.org/articles/its-free-country/2012/nov/23/christie-and-cuomos-dueling-visions-post-sandy-rebuilding/>

⁶⁰ Alliance Development Works in cooperation with United Nations University and the Nature Conservancy, WorldRiskReport 2012, October 2012, <http://reliefweb.int/report/world/world-risk-report-2012-environmental-degradation-increases-disaster-risk-worldwide>

⁶¹ Internal Displacement Monitoring Centre (IDMC) and Norwegian Refugee Council (NRC), *Disaster-induced internal displacement in the Philippines, The case of Tropical Storm Washi/Sendong, January 2013*, <http://www.preventionweb.net/english/professional/publications/v.php?id=30929>

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On 4 December 2012, Typhoon Bopha (known in the Philippines as Typhoon Pablo) struck the east coast of Mindanao island in the southern Philippines. This was the sixteenth most powerful typhoon in the history of the Philippines and the deadliest in the world in 2012. Just a year before, Tropical Storm Washi had hit the northern coast of the island, killing more than 1,250 people in December 2011. It should also be noted that this is a region which has experienced serious conflict for decades usually attributed to ethno-religious conflict.

Bopha made landfall three times as it damaged or destroyed over 233,000 houses and affected over 6.2 million people. “Entire families were washed away,” Interior Minister Manuel Roxas told reporters.⁶² As of 5 February 2013, the death toll stood at 1,146 with an additional 834 people still missing. Months after the typhoon struck, more than 8,000 people were still living in 97 evacuation centers and over 925,000 displaced people were sheltered outside the evacuation centers.⁶³

The government of the Philippines has a strong disaster response capacity and responded well both in preparing for the typhoon (e.g. prepositioning supplies and personnel) and evacuating communities in danger. ASEAN deployed an emergency assessment team and the UN Humanitarian Country Team provided rapid needs assessments, field coordination and information management. UNDP integrated early recovery approaches into the overall humanitarian response and yet much more support will be needed before the country recovers.

The damage caused by the typhoon was immense. Following the storm, nearly one million people were in need of food assistance and the destruction of banana and coconut plantations by the effects of the storm created serious long-term livelihoods needs. The worst-hit province, Compostela Valley, has been the center of the country’s \$500 million banana export industry since the 1960s. As the world’s third largest banana exporting country, about two thirds of the Philippines’ exported bananas are grown in Compostela Valley and about 150,000 people normally depend on working on the plantations as their primary source of income. The destruction of banana plantations has had, and will continue to have, major economic consequences.⁶⁴

More than two months after the typhoon, families were still trying to repair their homes, even in the midst of monsoon rains. Entire small towns, known locally as ‘barangays,’ were submerged following the flooding on 19 January in Davao City – and in the provinces of Davao del Norte and Compostela Valley. Coming shortly after the typhoon, the rains created a miserable situation for hundreds of thousands of people. People needed housing to stay dry in the storms, but housing reconstruction was painfully slow. Two months after the typhoon, the government and aid groups estimated that 95 percent of families recovering from the typhoon continued to live in the remains of their houses.⁶⁵

⁶² Erik de Castro, “Typhoon kills at least 283, hundreds missing, in Philippines,” *Reuters*, 5 December 2012, <http://en-maktoob.news.yahoo.com/philippines-biggest-typhoon-kills-least-82-many-buried-040812763--business.html>

⁶³ OCHA, “Situation Report No. 18,” 5 February 2013, <http://reliefweb.int/report/philippines/typhoon-bopha-situation-report-no-18-5-february-2013>

⁶⁴ IRIN, “Philippines Crop-based livelihoods hit by Typhoon Bopha,” 9 January 2013, www.irinnews.org/Report/97205/Crop-based-livelihoods-hit-by-Typhoon-Bopha

⁶⁵ IRIN, “‘Building back worse’ after Philippines typhoon,” 8 February 2013, www.irinnews.org/Report/97435/Building-back-worse-after-Philippines-typhoon

The issue of housing reconstruction is also tied up with efforts to reduce the risks of future disasters. As of February 2013, the government's Mines and Geosciences Bureau was assessing sites and making recommendations based on geohazard assessments in order to designate some areas as "no build zones" due to flood risks. Relocation sites were being identified and construction of new homes on these sites was expected to begin by March. The policy is that families living in no-build zones do not qualify for the government's emergency shelter assistance grant of \$245 (10,000 pesos). But, as experience has shown, the practice of relocating communities away from areas at risk of disaster is complicated.⁶⁶ Issues of acquiring land, of ensuring that relocated communities have access to services and livelihoods and of determining fair compensation have proven to be difficult in many settings. In the storm-affected areas of Mindanao, concerns are being raised about relocating indigenous communities from their ancestral domains as up to eighty percent of those affected by the typhoon are indigenous peoples.⁶⁷

Barely one year earlier, the world's second most deadly disaster of 2011, Tropical Storm Washi (known as Sendong in the Philippines) landed along the east coast of Mindanao, killing more than 1,500 people, damaging over 50,000 homes and displacing some 430,900 people. Perhaps because of its vulnerability to disasters, the Philippines has been a leader in enacting legislation related to disaster risk reduction, especially the Philippine Disaster Risk Reduction and Management Act, which was signed into law in May 2010 and complements the 2009 Climate Change Act.⁶⁸ The Special Representative of the UN Secretary-General on Disaster Risk Reduction, Margareta Wahlström, has called the Philippines' laws on climate change adaptation and DRR "the best in the world" and indicative of a "shift from a reactive to a proactive stance in addressing disasters."⁶⁹ The legislation, for example, prescribes that a minimum of five percent of local government funds must be used for disasters, with a substantial part of the money being allocated toward risk reduction and resiliency building. The goal of this legislation is that there should be zero casualties because of a lack of aid.⁷⁰ However, legislation is insufficient unless it is supported by strong political will and adequate resources to ensure implementation.

While the Philippine government's preparations for Bopha are generally considered to reflect lessons learned from tropical storm Washi, one study on Washi found that the great majority of those displaced by Washi had been living in high-risk informal settlements – even though it was known that these were dangerous areas.⁷¹ According to experts, unregulated,

⁶⁶ Elena Correa, ed., *Preventive Resettlement of Populations at Risk of Disaster, Experiences from Latin America*, Global Facility for Disaster Reduction and Recovery, 2011, <http://www.gfdr.org/gfdr/node/903>

⁶⁷ IRIN, "'Building back worse' after Philippines typhoon," 8 February 2013.

⁶⁸ Internal Displacement Monitoring Centre and Norwegian Refugee Council, *Disaster-induced internal displacement in the Philippines, The case of Tropical Storm Washi/Sendong*, January 2013, <http://Internal-displacement.org/>

⁶⁹ Ibid, p. 4.

⁷⁰ James Darcy et al., *The Use of Evidence in Humanitarian Decision Making*, Feinstein International Center, Tufts University, Assessment Capacities Project (ACAPS) Operational Learning Paper, January 2013, p. 16, <http://sites.tufts.edu/feinstein/2013/the-use-of-evidence-in-humanitarian-decision-making>

⁷¹ Internal Displacement Monitoring Centre and Norwegian Refugee Council, *Disaster-induced internal displacement in the Philippines, The case of Tropical Storm Washi/Sendong*, January 2013.

small-scale mining had rendered many slopes saturated and pock-marked, making them unstable and prone to landslides and flash floods.⁷² Of those who lost their homes, only an estimated six percent had been able to access a process to reclaim lost property or be compensated and very few had proof of ownership or formal tenancy agreements before the cyclone. The fact that temporary shelters and permanent relocation sites are located in landslide-prone areas means that people effectively moved from one risky home to another. A lack of documentation precluded some families from being able to move. Most of those officially relocated have found themselves far from livelihoods opportunities and resettlement has been slow because of the lack of available land and the high cost of building materials.⁷³

The effects of the two consecutive major cyclones in the Philippines leads to the observation that there are no shortcuts to disaster risk reduction – it is inextricably linked to long-term development and peace processes. Over the past four decades, millions have been displaced in Mindanao, the poorest region of the country, due to armed conflict and human rights violations. Those most exposed to weather shocks are those who have been displaced by conflict. Those who have been displaced by conflict are also more likely to be poor.⁷⁴ In its Humanitarian Action Plan 2013 for the Philippines, the UN and its partners report that most communities in non-urban Mindanao are fragile due to conflict and natural disasters and that many communities at risk have been displaced multiple times in the past.⁷⁵

Chronic poverty decreases resilience and makes it more difficult to recover from disasters, particularly recurrent disasters. And repeated natural disasters contribute to poverty by damaging material goods and depleting social capital. Finding solutions to disaster-induced displacement becomes more difficult when the economic options of affected communities are limited. Building disaster-resilient communities means not only making sure that people live in safe areas, but ensuring that economies offer sufficient livelihood opportunities. Even with a government seeking to do the right thing and investing in DRR, the effects of disaster risk reduction strategies will be limited unless poverty is alleviated, social capital is built and governance is improved.⁷⁶

⁷² IRIN, “Crop-based livelihoods hit by Typhoon Bopha,” 9 January 2013, <http://www.irinnews.org/printreport.aspx?reportid=97205>

⁷³ IDMC and NRC, op. cit., p. 4.

⁷⁴ World Food Programme and the World Bank Group, *Violent Conflicts and Displacement in Central Mindanao, Challenges for recovery and development, Key Findings*, December 2011, http://www.wfp.org/sites/default/files/WB-WFP%20Key%20Findings_0.pdf

⁷⁵ Ibid.

⁷⁶ See for example: AlertNet, “Filipino government makes climate change a top 2013 priority,” 27 January 2013, www.trust.org/alertnet/news/filipino-government-makes-climate-change-a-top-2013-priority/. See also: PreventionWeb, “Philippines: New disaster reduction law strengthens self-reliance,” 18 January 2011, <http://www.preventionweb.net/english/professional/news/v.php?id=17541>

Pakistan: Floods and More Floods

Just as the Philippines experienced deadly typhoons two years in a row, Pakistan experienced recurring floods. In 2010, deadly floods affected 20 million people in Pakistan; in 2011, in roughly the same geographic areas, floods affected more than five million people. Once again in 2012, floods affected five million people.⁷⁷ Approximately 460,000 homes were destroyed and 265,000 people were displaced, taking shelter in makeshift relief camps in Baluchistan, Punjab and Sindh provinces. Food supplies were also severely impacted as over 1.12 million acres of crops were affected and over 9,600 cattle died.⁷⁸ As in the case of the Philippines, Pakistan has also experienced widespread displacement resulting from conflict.

Normally, a flood affecting five million people would be seen as a mega-disaster (after all, the 2004 Indian Ocean Tsunami affected about two million people). But in the case of Pakistan, the 2012 floods did not generate the same international attention as in the previous two years; perhaps recurring disasters the third time around are simply not deemed to be as news-worthy. Media attention is often linked to the mobilization of international funds.⁷⁹

This was the third time in three years that some families had been affected by floods. There was criticism of the slow pace of relief from both national and international authorities.⁸⁰ Villagers in Sindh claimed that elected representatives had not visited them; that local land owners drained their own lands but those of the poor farmers are still flooded; and that they faced health concerns, especially a measles outbreak.⁸¹ Some international agencies, such as the International Organization for Migration (IOM), simply lacked the resources to respond. In addition, there were difficulties for international aid workers to obtain and extend visas.⁸² Responding to floods three years in a row was difficult for authorities, but especially for the affected populations. The shelter cluster which coordinates international response to this sector after disasters reported that by the end of 2012, most people had returned to their villages, but were living in shelters next to their destroyed houses, with three percent still living in camp-like settlements. Significant humanitarian needs remained,

⁷⁷ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, accessed 5 February 2013, www.emdat.be

⁷⁸ UNICEF, "Five million affected by Pakistan floods," 18 October 2012, accessed 20 December 2012, www.unicef.org.au/Media/Media-Releases/October-2012/Five-million-affected-by-Pakistan-floods.aspx

⁷⁹ Elizabeth Ferris and Daniel Petz, *A Year of Living Dangerously: A Review of Natural Disasters in 2010*, Brookings-LSE Project on Internal Displacement, April 2011, <http://www.brookings.edu/research/reports/2011/04/nd-living-dangerously>

⁸⁰ Ahmed Mahvish, "Flood victims still waiting for help," 7 December 2012, <http://dawn.com/2012/12/07/flood-victims-still-waiting-for-help/>

⁸¹ Hussain Imtiaz, "Flood victims still living under wretched conditions," 17 January 2013, www.thenews.com.pk/Todays-News-3-154690-Flood-victims-still-living-under-wretched-conditions; see also: "Government's poor relief measures more devastating than natural disasters," 24 November 2012, <http://tribune.com.pk/story/470360/govts-poor-relief-measures-more-devastating-than-natural-disasters/>

⁸² The News, "IOM limiting flood response in Pakistan," 4 November 2012, www.thenews.com.pk/Todays-News-6-140906-IOM-limiting-flood-response-in-Pakistan. On visas see: OCHA, "Humanitarian Bulletin, Pakistan," Issue 10, 12 November-21 December 2012.

but, owing to a lack of funding, most international actors were scaling back or shutting down operations toward the end of 2012.⁸³

A number of evaluations were undertaken during and after the 2010 floods and while the government implemented a number of reforms, the changes were not apparent to observers on the ground in 2012.⁸⁴ For developing countries such as Pakistan, where large swaths of the population live in poverty, recurring shocks are a severe impediment to social and economic advancement. The recurring floods in Pakistan are a prime example of the reasons why disaster risk reduction needs to be an integral part of any development agenda. It would therefore be an important sign if the international post-2015 development agenda would put a strong commitment to scaling up international support for risk reduction and disaster preparedness. The Rio+20 summit issued a clear statement urging the integration of disaster risk reduction into policies, plans, programs and budgets at all levels and its consideration within relevant future international frameworks.⁸⁵

While there has been some, largely anecdotal, attention to the effects of recurring disasters, the cumulative effects of repeated natural hazards on individual and community coping skills remain largely unknown.⁸⁶ It seems obvious that people who have been displaced are usually more vulnerable when another natural disaster occurs. In Haiti, for example, those living in tents because of the 2010 earthquake were particularly affected by Hurricane Tomás in 2010 and Hurricanes Isaac and Sandy in 2012. But while most of those displaced by the Pakistan floods of 2010 and 2011 had moved out of temporary shelters by the time the 2012 floods occurred, it is unclear whether they had found durable solutions – or protection from the next round of flooding.

Comparative Analysis

There are several common themes running through these comparisons of specific disasters in 2011 and 2012. First, displacement is a common characteristic, as evidenced by the repeated displacement of Pakistanis by flooding, of Filipinos by the typhoons and the displacement of people in nine US states affected by Hurricane Sandy who stayed in temporary Red Cross shelters.⁸⁷ Recovery from disasters depends on resolving displacement. In the past few years, much of the thinking about post-disaster recovery as well as disaster risk reduction has focused on the concept of resilience. Finding solutions

⁸³ OCHA, “Humanitarian Bulletin, Pakistan,” Issue 10, 12 November–21 December 2012.

⁸⁴ The Guardian, “Pakistan ‘nowhere near prepared for another major disaster,’” 3 August 2012, <http://www.guardian.co.uk/global-development/2012/aug/03/pakistan-nowhere-prepared-major-disaster>; see also: National Disaster Management Authority, *A Review of the Pakistan Flood Relief and Early Recovery Response Plan, Up to December 31, 2010*, 31 January 2011.

⁸⁵ UN System Task Team on the Post-2015 Development Agenda, *Building Resilience to Disasters Through Partnerships, Lessons from the Hyogo Framework for Action*, Thematic Think Piece, January 2013, p. 4.

⁸⁶ National Council for Science and the Environment, “13th National Conference on Science, Preparedness and Resilience,” Washington, D.C., 15–17 January 2013, www.environmentaldisasters.net/

⁸⁷ New Jersey, New York, Pennsylvania, Connecticut, Rhode Island, Maryland, Delaware, Virginia and Massachusetts.

for those displaced by disasters must be a key component of building resilience. It is hard for the displaced to ‘bounce back’ when their lives are in limbo and they are living in temporary housing. Addressing displacement has to be front and center in recovery efforts.

A second common theme is the importance of policies of governments. The ways national and local governments prepare for and respond to disasters and aid in recovery efforts have an impact on the lives of people in communities affected by disasters. People have different expectations of their governments (New Jersey residents have different expectations of their authorities than Sindh residents, for example) but they all have a right to expect their governments to keep them safe and to assist them when natural hazards occur. This requires an investment in preparation, including through the development of adequate legal frameworks. In this respect, the Philippines stands out – its comprehensive disaster management law and policy is one of the best in the world; a new law on internal displacement which deals with displacement from disasters, conflict and development projects was in the final stages of approval as of February 2013. Since Hurricane Katrina, the US government has undertaken major reforms to strengthen its disaster response capacities, although residents of Sandy-affected areas were frustrated by the long delay in appropriating funds for recovery efforts.⁸⁸

A third theme is that the international community can learn from prior experiences, particularly in acting upon early warnings. In comparison with the slow response of international actors to warning signs of drought in Somalia in 2011, the mobilization of response to drought in the Sahel in 2012 was much faster. Continual improvements are needed, particularly in consulting more with affected communities, refining early warning systems and adopting legal and administrative frameworks that address the particular concerns of those affected by natural hazards.

Finally, these comparisons of disasters in 2011 and 2012 suggest that in the future more preparation and resources will be needed to be able to respond effectively to hazards, particularly weather-related extreme events. In a sense, all of the 2012 disasters described above were foreseen in 2011, if not earlier. Pakistan will surely experience flooding in the future, typhoons will continue to strike the Philippines, and the possibility of major storms striking the northeastern United States in the near future cannot be ruled out. Measures to reduce the risk of disasters are not only an essential step in protecting communities in hazard-prone areas but are increasingly demanded by citizens. Taking steps to reduce the risk of future disasters is not an option but an imperative. The experiences of 2012 – which after all, was not a ‘bad’ year for disasters – are a clear sign that much more extensive work is needed to prepare for what are likely to be more intense and more frequent natural hazards.

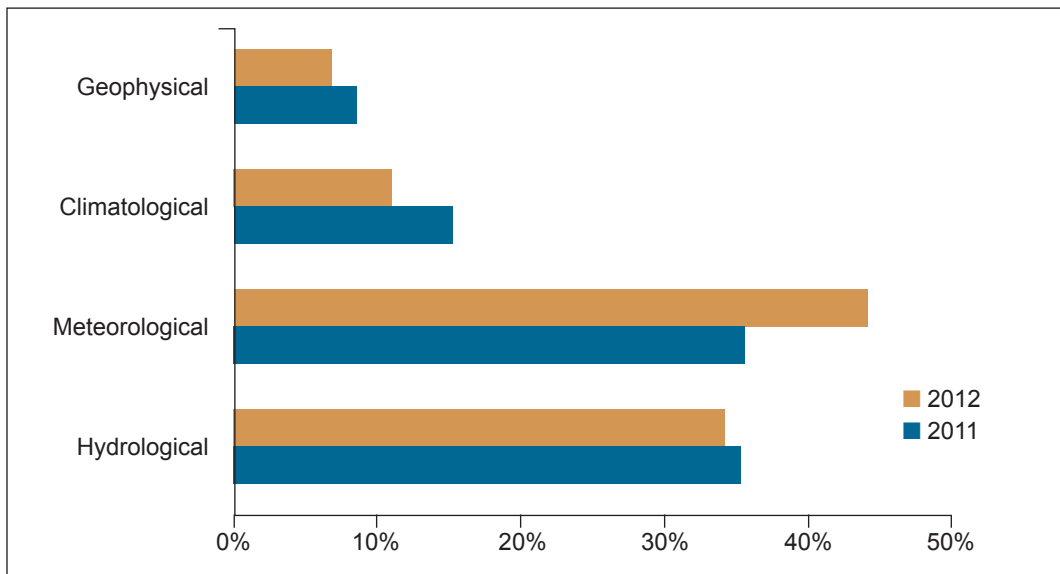
⁸⁸ Department of Homeland Security, “Written testimony of Federal Emergency Management Agency Administrator Craig Fugate for a House Committee on Transportation and Infrastructure hearing titled “A Review of the Preparedness, Response To and Recovery From Hurricane Sandy,” 4 December 2012, <http://www.dhs.gov/news/2012/12/04/written-testimony-fema-administrator-house-committee-transportation-and>

SECTION 3

Review of Some of the Major Disasters in 2012

The large majority of disasters in 2012 were hydro-meteorological in nature. Munich Re calculates that 45 percent of the 905 loss events in its database were caused by storms and 36 percent by hydrological disasters such as floods and avalanches. Twelve percent were caused by climatological events, such as extreme temperatures, droughts and forest fires, while the remaining six percent were caused by geophysical events (earthquakes, tsunamis, volcanic eruptions). Compared to 2011, storms became more prominent in 2012, while all other disaster categories declined.⁸⁹

Graph 1 2011-2012 Disaster Loss Events by Disaster Category⁹⁰



Hydro-Meteorological Disasters

As noted, the large majority of disasters in 2012 were hydro-meteorological in nature with a particularly high percentage of loss events from storms. It is not easy to ascribe reasons for annual changes in natural hazards as many weather and climate extremes are the result of natural climate variability (including phenomena such as El Niño). In recent years, though, these natural decadal or multi-decadal variations have been intensified by

⁸⁹ Of the 310 disasters in 2012 reported by EM-DAT, 121 were floods, 77 storms, 49 extreme temperatures, 26 earthquakes, 19 droughts, 13 wet mass movements, 3 wild fires, 1 volcano and 1 wet mass movement. Source of data: EM-DAT: The OFDA/CRED - International Disaster Database www.emdat.be Université catholique de Louvain Brussels – Belgium, in: UNISDR, USAID and CRED, “2012, disasters in numbers,” 14 March 2013, <http://reliefweb.int/report/world/economic-losses-disasters-set-new-record-2012>.

⁹⁰ Munich Re, *2012 Natural Catastrophe Year in Review*, 3 January 2013, p. 32; and Munich Re, “Natural catastrophes worldwide 2011, Percentage distribution,” January 2012.

a globally warming climate which is changing precipitation and weather patterns, making certain kinds of extreme events and disasters more likely. Globally, 2012 was the tenth warmest year since record keeping began in 1880 and the thirty-sixth consecutive year with a global temperature over the twentieth century's average. It was also the warmest La Niña year on record.⁹¹

The Review of Natural Disasters in 2011 discussed in detail the probable effects of the La Niña event on 2011 disasters.⁹² In 2012, after the 2010/11 La Niña episode came to a close in the early months of the year, the El Niño-Southern Oscillation (ENSO) moved to neutral (neither El Niño nor La Niña) and stayed there for the rest of the year. During ENSO-neutral periods the ocean temperatures, tropical rainfall patterns and atmospheric winds over the equatorial Pacific Ocean are near the long-term average.⁹³

Storms

We now take a brief look at some of the major areas facing tropical storm hazards: the Atlantic, West Pacific, East Pacific, Indian Ocean and Southern Hemisphere. Two of the largest disasters in 2012 were storms: Hurricane Sandy, which caused the largest damage and Typhoon Bopha, which killed the most persons in a single disaster. However, statistically the 2012 storm season was relatively quiet with 82 named storms, 44 of those above the hurricane/typhoon/cyclone threshold and 19 of them becoming major storms (Category 3 or above). To put this in context, the average for the 1980-2011 period is 85 named storms per year, with 47 of these storms passing the hurricane/typhoon/cyclone threshold.⁹⁴

The 2012 Atlantic hurricane season was very active with 19 named storms – the third highest number since 1851 – but there were only two major hurricanes, Michael and Sandy.⁹⁵ As discussed above, Hurricane Sandy was the most expensive disaster of 2012 and one of the largest storms ever witnessed in the Atlantic, with tropical storm winds stretching over 943 miles (1517.6 kilometers) of the United States coast at landfall.⁹⁶

⁹¹ National Oceanic and Atmospheric Administration, National Climatic Data Center, "State of the Climate," accessed 11 February 2013, www.ncdc.noaa.gov/sotc/?utm_source=dlvr.it&utm_medium=twitter

⁹² Elizabeth Ferris and Daniel Petz, *The Year that Shook the Rich: A Review of Natural Disasters in 2011*, op. cit.

⁹³ 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. For updates on ENSO, see: NOAA/National Weather Service, Climate Prediction Center, "El Nino- Southern Oscillation (ENSO)," www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml

⁹⁴ AON Benfield, *Annual Global Climate and Catastrophe Report, Impact Forecasting – 2012*, January 2013, p. 15.

⁹⁵ Hurricane Sandy was reclassified a major hurricane in February 2013. See: The Weather Channel, "Sandy: Hurricane Winds Reached U.S., NOAA Says," 13 February 2013, www.weather.com/news/weather-hurricanes/sandy-major-hurricane-noaa-report-20130212?pageno=2

⁹⁶ Jeff Masters, "The bizarrely active hurricane season of 2012 draws to a close," *Weather Underground*, 30 November 2012, www.wunderground.com/blog/JeffMasters/comment.html?entrynum=2302

The Eastern Pacific hurricane season was moderately active with 14 storms, of which half became hurricanes; five developed into major hurricanes. However, few of the storms made landfall; Carlotta in June (landfall in southern Mexico) and Paul in October (landfall on Baja California Peninsula) caused the largest damages.⁹⁷

The Western Pacific typhoon season was the most active since 2008, with 26 named storms, of which 16 became typhoons. Of the 16 typhoons, ten reached Category 3 or higher, which was eleven percent above the average from 1980-2012. With Typhoon Bopha, which reached maximum sustained winds of 160 miles per hour (260 kilometers per hour), the region saw the world's deadliest natural disaster in 2012.⁹⁸

Cyclone activity was below average in the Indian Ocean with only three named storms (lower than the 32-year average of 4.7) and for the first time since 2009 no cyclones formed.⁹⁹ The most destructive event was tropical storm Nilam, which killed eight and displaced over 8,000 after making landfall in India's Tamil Nadu province in late October.¹⁰⁰

The Southern Hemisphere saw a total of 18 named storms, which was 30 percent below average. Of those storms, eight cyclones formed, with three cyclones reaching Category 3 strength, which is more than 50 percent below the average since 1980. The most destructive storms in the region were Cyclone Giovanna, which made landfall in Madagascar in February and Tropical Storm Irina, which killed 77 persons in the same country.¹⁰¹ Cyclone Evan crossed Samoa, Fiji, Tonga and other Pacific islands in mid-December, causing extensive damage and at least 14 fatalities.¹⁰²

Floods and Avalanches

Floods in Russia

Heavy rains hit the town of Krymsk and neighboring towns in Russia's Krasnodar region in the early hours of 7 July 2012, resulting in torrential floods. Almost 11 inches (28 centimeters) of rain fell throughout the region in the middle of the night, catching most residents unaware. The volume of rainfall was unprecedented, with the equivalent of five months of rain falling overnight.¹⁰³ The flood wave was sixteen feet (five meters), inundating houses.¹⁰⁴

⁹⁷ National Hurricane Center, "2012 Eastern Pacific Hurricane Season," accessed 11 January 2013, www.nhc.noaa.gov/2012epac.shtml

⁹⁸ AON Benfield, *Annual Global Climate and Catastrophe Report, Impact Forecasting – 2012*, January 2013, p. 15.

⁹⁹ *Ibid.*, p. 16.

¹⁰⁰ Sangeetha Rajeeesh, "Eight Dead and Over 8,000 Displaced by Cyclone Nilam," *The New York Times*, 1 November 2012, <http://india.blogs.nytimes.com/2012/11/01/eight-dead-and-over-8000-hit-by-cyclone-nilam/>

¹⁰¹ AON Benfield, *op. cit.*, p. 17. Fatality figure from EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, accessed 5 February 2013, www.emdat.be

¹⁰² AON Benfield, *op. cit.*, p. 76.

¹⁰³ BBC News, "Russia flash floods: 144 killed in Krasnodar region," 8 July 2012, www.bbc.co.uk/news/world-europe-18751198

¹⁰⁴ See: Miriam Elder, "Russian floods kill 150 and leave thousands homeless," *The Guardian*, 8 July 2012,

According to the IFRC, approximately 34,650 people were affected by the floods and 7,200 homes were destroyed. In addition to the 171 fatalities, 3,910 people were injured.¹⁰⁵ The elderly were particularly vulnerable. According to residents of the region, officials knew that massive flooding was likely, but refused to issue timely warnings or evacuation orders.¹⁰⁶ Eventually, the Russian government acknowledged that it had received word of the pending floods at ten o'clock in the evening, but that it decided not to warn the population. The flood hit at about two o'clock in the morning. Russian president Vladimir Putin arrived in the region the same day and set up a commission to investigate the floods. Although denied by the government, rumors persisted that the flooding was caused by a deliberate opening of a sluice gate.¹⁰⁷ In spite of popular discontent with the government's response among affected communities and the arrest of some officials, there is no evidence that this has led to a change of policies or behavior on the part of authorities.¹⁰⁸

Floods in Bangladesh, India and China

India suffered multiple rounds of floods in 2012. Heavy monsoon rainfall caused the Brahmaputra River and its tributaries to flood the northeastern state of Assam twice in 2012, once in late June and again in September. The first round of floods affected more than 2.3 million people in over 4,000 villages across the state of Assam and was labeled the worst since 1998.¹⁰⁹ Flood waters breached 43 levees, affecting some areas that are not traditionally susceptible to floods.¹¹⁰ Towards the end of the monsoon season, in September, rainfall caused floods and landslides in Assam and Sikkim, killing 33 and displacing more than a million people across northeast India.¹¹¹ In August, floods in northwestern India also killed 36 people as Rajasthan received its heaviest rainfall in over 30 years.¹¹² Further to the north, in Uttarakhand, 34 people were killed and more than 2,000 people took shelter in relief camps.¹¹³

www.guardian.co.uk/world/2012/jul/08/russia-floods-deaths. Also see: Masha Lipman, "Floods and Suspicion in Russia," *The New Yorker*, 12 July 2012, www.newyorker.com/online/blogs/newsdesk/2012/07/floods-and-suspicion-in-russia.html

¹⁰⁵ IFRC, "DREF Final Report Russian Federation: Flash Floods," DREF Operation number MDRRU015, 23 July 2012, p. 2, <http://reliefweb.int/sites/reliefweb.int/files/resources/MDRRU015dfr.pdf>

¹⁰⁶ Miriam Elder, op. cit.

¹⁰⁷ Ellen Barry, "After Russian Floods, Grief, Rage and Deep Mistrust," *The New York Times*, 10 July 2012, www.nytimes.com/2012/07/11/world/europe/after-russian-floods-grief-rage-and-deep-mistrust.html?_r=0

¹⁰⁸ Alina Lobzina, "Krymsk officials arrested over deadly flooding," *The Moscow News*, 23 July 2012, <http://themoscownews.com/russia/20120723/189988923.html>

¹⁰⁹ Sphere India, "Assam Floods 2012: Situation Analysis (21 August 2012)," ReliefWeb, <http://reliefweb.int/report/india/assam-floods-2012-situation-analysis-21-august-2012>

¹¹⁰ Ibid.

¹¹¹ Biswajyoti Das, "Floods, landslides displace 1 million in India; 33 dead," *Reuters*, 24 September 2012, www.reuters.com/article/2012/09/24/us-india-floods-idUSBRE88N08L20120924

¹¹² Narayan Bareth, "Heavy rains in India's Rajasthan kill 36 people," *BBC News*, 27 August 2012, www.bbc.co.uk/news/world-asia-india-19389163

¹¹³ BBC News, "India monsoon floods kill 34 in Uttarakhand," 6 August 2012, <http://www.bbc.co.uk/news/world-asia-india-19144580>

In Bangladesh, some five million people were affected by floods and landslides beginning on 23 June.¹¹⁴ The city of Chittagong in eastern Bangladesh received 15.7 inches (40 centimeters) of monsoon rainfall within a single twelve hour period on 26 June 2012, causing flash floods and landslides around the city and in nearby villages.¹¹⁵ Most deaths were caused by landslides and collapsing structures.¹¹⁶ The monsoons displaced 600,000 people and many were still in temporary shelters several months after the flood waters receded.¹¹⁷ Even when monsoon floods come as expected every year, their impact on human communities is severe.

China suffered multiple floods in 2012, a result of torrential rainfall and a series of typhoons that killed hundreds and cumulatively affected more than 40 million people in 28 provinces, autonomous regions and municipalities between January and August 2012.¹¹⁸ In July, heavy rains caused floods in many parts of Beijing, resulting in \$1.5 billion in damage and economic losses and causing approximately 60,000 to be evacuated from their homes.¹¹⁹ Officials initially claimed that 37 people had died during the floods; however, this number was later revised to 77.¹²⁰ The floods have widely been attributed to the inability of Beijing's antiquated drainage system to cope with the heaviest rainfall the city has received in 60 years.¹²¹

Avalanche in Pakistan

On the morning of April 7, 2012, an avalanche buried the Gayari military base located near Pakistan's border with India in Kashmir under 21 meters of snow. Although the number of missing was initially estimated at 111 and revised to 135,¹²² the military eventually declared 129 soldiers and eleven civilian personnel dead.¹²³ To date, more soldiers in the mountainous border region have died from weather conditions than in combat.¹²⁴

¹¹⁴ Reliefweb, "Bangladesh: Floods and Landslides - Jun 2012," accessed 19 February 2013, <http://reliefweb.int/disaster/fi-2012-000106-bgd>

¹¹⁵ BBC News, "Bangladesh calls off rescue after floods kill 110," 28 June 2012, www.bbc.co.uk/news/world-asia-18622569

¹¹⁶ Ibid.

¹¹⁷ Syed Zain Al-Mahmood, "Bangladesh farmers caught in vicious cycle of flood and debt," *The Guardian*, 23 August 2012, www.guardian.co.uk/global-development/2012/aug/23/bangladesh-farmers-cycle-flood-debt

¹¹⁸ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, accessed 20 February 2013, www.emdat.be; Xinhua, "236 dead, 101 missing in China floods this year," 18 July 2012, http://news.xinhuanet.com/english/china/2012-07/18/c_123431053.htm

¹¹⁹ BBC News, "Deadly Beijing floods prompt infrastructure questions," 23 July 2012, <http://www.bbc.co.uk/news/world-asia-china-18950977>

¹²⁰ BBC News, "Beijing floods: Death toll climbs to 77," 26 July 2012, www.bbc.co.uk/news/world-asia-china-19002080

¹²¹ Jacob Fromer, "An Epic Downpour Wipes Away a Capital's Sheen," *The New York Times*, 26 July 2012, www.nytimes.com/2012/07/27/world/asia/an-epic-flood-exposes-a-creakier-beijing.html?pagewanted=all&_r=0

¹²² BBC News, "Kashmir avalanche: Up to 135 feared dead on Siachen," 8 April 2012, www.bbc.co.uk/news/world-asia-17647029

¹²³ BBC News, "Pakistan declares Siachen avalanche buried dead," 29 May 2012, www.bbc.co.uk/news/world-asia-18246239

¹²⁴ Ibid.

Climatological Disasters¹²⁵

While the percentage of climatological disasters in 2012 was down quite significantly in comparison with 2011, some of the most significant disasters were caused by climatological hazards, among them the drought in the Sahel. Other significant events were a cold wave that hit Europe in early 2012, which became the second most deadly disaster of the year and a drought in the US which was the second most costly disaster of 2012. In addition, over 250 people were killed in a cold wave in Peru in June. There were also several severe wildfires, particularly in the United States, some of which we discuss in more detail in Chapter 3.

Sahel Drought and Food Crisis 2012

In May 2012, the World Bank warned that 17 million people were at risk of starvation due to drought which had begun in 2011, particularly in Mauritania, Mali and Niger.¹²⁶ As in the Horn of Africa a year earlier, the impact of the drought (less rainfall) was exacerbated by environmental degradation, political and economic factors (such as high grain prices and a decrease of remittances from workers in Libya) and displacement.¹²⁷ But unlike the case of Somalia in 2011, widespread famine was avoided, even in Mali, where the situation worsened over the course of 2012 due to escalating conflict. This was due in large measure to the fact that the rains eventually came and there was a good harvest in 2012, but it is also attributable to the difference in humanitarian response. First, early warning systems worked in the Sahel, with warnings coming out in October 2011 in some places and aid agencies across the region systematically carrying out SMART surveys (a methodology that gives an accurate assessment of the severity of a crisis by analyzing the nutritional status of infants and population mortality rates) every lean season.¹²⁸ Donors heeded the early warnings and committed funds early, while in Niger and Chad governments took the lead in responding to nutritional needs.¹²⁹ The World Food Programme (WFP) bought food in neighboring countries rather than importing it from outside the region and gave cash to beneficiaries to purchase food.¹³⁰ Governments, regional organizations, donors and international agencies expressed their commitment to work together to improve the long-term resilience of the people living in the Sahel. In July 2012, the governments of the Economic Community of West African States (ECOWAS), WFP, the Food and Agriculture

¹²⁵ Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability), e. g. extreme temperature, drought, wildfire. See: EM-DAT, "Classification," accessed 25 February 2013, <http://www.emdat.be/classification>

¹²⁶ The World Bank, "Drought Worsens in the Sahel Region of Africa – Millions of People at Risk," 31 May 2012, <http://go.worldbank.org/K11FM4JEQ0>

¹²⁷ See also: Metro, "Sahel drought in West Africa leading to crisis as millions of lives at risk," 3 August 2012, <http://metro.co.uk/2012/08/03/sahel-drought-in-west-africa-leading-to-crisis-as-millions-of-lives-at-risk-521534/>

¹²⁸ IRIN, "Sahel: What went right in the crisis response?," 24 October 2012, www.irinnews.org/report/96632/SAHEL-What-went-right-in-the-crisis-response

¹²⁹ Ibid.

¹³⁰ Metro, "Sahel drought in West Africa leading to crisis as millions of lives at risk," 3 August 2012,

Organization (FAO), CILLS (Inter-state Committee to fight drought in the Sahel) and donors launched the Global Alliance for Resilience Initiative (AGIR) to help the populations in the region cope with future shocks partly by focusing more on agriculture. In addition, at the time of writing, the UN was formulating a Sahel resilience strategy.¹³¹

That being said, the situation in Mali offered parallels with Somalia where conflict intensified the effects of the drought. In early 2012, a rebellion of ethnic Tuareg (Mouvement National de Libération de l'Azawad, or MNLA) spread in northern Mali, seizing northern Mali by April and declaring independence. Accusing the government of failing to deal with the Tuareg threat, military officers staged a coup d'état in March, further destabilizing the political situation. Meanwhile, in May, the Islamist group Ansar Dine and the Tuareg MNLA merged and declared northern Mali an Islamic state, a deal endorsed by al-Qaeda in North Africa. Soon after, Ansar Dine turned on the MNLA and took control of most cities in northern Mali.¹³² As in Somalia, large numbers of people were displaced by the deadly combination of poor rainfall and conflict. By the end of the year, some 200,000 Malians were displaced internally and almost 200,000 had fled to neighboring countries.¹³³ Problems of access and breakdown of government services, especially in northern Mali, made responding to the humanitarian crisis difficult and by September 2012, 560,000 children were at risk of acute malnutrition; 175,000 faced severe or acute malnutrition.¹³⁴

In January 2013, a joint French-Malian military offensive managed to defeat the Islamists in most of northern Mali. The heightened conflict brought additional risks to the Malian population and led to still more displacement. Still, even as fighting in major cities came to an end and the first groups of IDPs and refugees declaring a willingness to return to their homes in Timbuktu, Gao and other cities in northern Mali, the displacement and humanitarian crisis in Mali was far from over. OCHA reported in February that 4.3 million people were still in need of humanitarian assistance.¹³⁵ An Oxfam report from January 2013 brought into focus the difficult humanitarian situation facing Malian refugees in neighboring countries.¹³⁶ As in Somalia in 2011, the presence of armed groups associated with al-Qaeda in Mali complicated the provision of assistance, but at least in the case of Mali they may have increased international attention to the unfolding crisis.

¹³¹ IRIN, "SAHEL: What went right in the crisis response?" op. cit.

¹³² BBC, "Mali profile," updated 29 January 2013, www.bbc.co.uk/news/world-africa-13881978

¹³³ UNHCR, "2013 UNHCR country operations profile - Mali situation (Mali, Niger, Burkina Faso)," accessed 19 February 2013, www.unhcr.org/pages/49e484e66.html

¹³⁴ OCHA, "Mali, Complex Emergency Situation Report No. 15," 11 September 2012, <http://reliefweb.int/report/mali/mali-complex-emergency-situation-report-no-15>

¹³⁵ UNHCR, "Mali: Refugees still fleeing, internal return prospects mixed," 1 February 2013, www.unhcr.org/510b90856.html; see also: AlertNet, "Aid agencies call for more Mali funding as fighting exacerbates humanitarian crisis," 8 February 2013, <http://www.trust.org/alertnet/news/aid-agencies-call-for-more-mali-funding-as-fighting-exacerbates-humanitarian-crisis/>

¹³⁶ Oxfam, "Mali's Conflict Refugees," Oxfam Briefing Paper 167, 22 January 2013, www.oxfam.org/en/policy/malis-conflict-refugees

Cold Wave in Europe

Polar winds sweeping across Russia engulfed much of Europe in the second half of January and early February 2012, causing temperatures to drop as low as -22 degrees Fahrenheit (-30 degrees Celsius) in parts of eastern Europe and -40 degrees Fahrenheit (-40 degrees Celsius) in northern Europe and Russia. The cold wave was accompanied by heavy snowfall in many countries in southeastern Europe, especially on the Balkan Peninsula, where some areas received between 20 and 40 inches (50 and 100 centimeters) of snow.¹³⁷ Snow also fell in several regions that do not typically experience it, including the south of France and northern Italy and Mediterranean islands such as Corsica and Mallorca.¹³⁸

At least 587 deaths have been attributed to the cold wave, with London-based reinsurance broker Aon Benfield attributing more than 824 deaths to the cold wave in central and eastern Europe and estimated \$660 million in economic losses in Serbia alone.¹³⁹ The highest numbers of deaths were recorded in Ukraine (112), Romania (86), Poland (82) and Russia (64).¹⁴⁰

Drought in US

2012 witnessed a record in the US for the hottest year on record, with temperatures of 3.2 degrees Fahrenheit (1.7 degrees Celsius) above the twentieth century average and 1.0 degrees Fahrenheit (0.55 degrees Celsius) above the previous record in 1998. The year was also the fifteenth driest year on record for the contiguous US. The area of the contiguous US experiencing moderate-to-exceptional drought peaked at 61.8 percent during July. Jeff Masters noted that “this was the largest monthly drought footprint since the Dust Bowl year of 1939.”¹⁴¹

Not surprisingly, given these weather conditions, the United States experienced its worst drought in 50 years, with 62 percent of the continental United States experiencing a moderate to exceptional drought, compared to 29 percent in 2011.¹⁴² The drought manifested itself differently across the country. It resulted in some of the poorest corn and wheat crops on record; unusual December wildfires in northern Colorado; record-low water levels in

¹³⁷ World Meteorological Organization, “Cold Spell in Asia in Late Winter 2011/2012,” 2012, p. 11, https://www.wmo.int/pages/mediacentre/news/documents/dwd_2012_report.pdf

¹³⁸ Ibid.

¹³⁹ EM-DAT, Disaster List, accessed 11 January 2013, www.emdat.be/disaster-list; Aon Benfield, “February 2012 Global Catastrophe Recap,” 2012, p. 4, http://thoughtleadership.aonbenfield.com/ThoughtLeadership/Documents/201202_if_monthly_cat_recap_february.pdf

¹⁴⁰ EM-DAT, Disaster List, accessed 11 January 2013, www.emdat.be/disaster-list

¹⁴¹ Jeff Masters “2012: Warmest and 2nd most extreme year in US history,” *Weather Underground*, 8 January 2013, www.wunderground.com/blog/JeffMasters/article.html?entrynum=2324. US temperature records reach back until 1895.

¹⁴² The New York Times, “Drought (U.S. Drought of 2012),” 7 December 2012, <http://topics.nytimes.com/top/news/science/topics/drought/index.html>

major waterways like the Mississippi River; and rising food prices.¹⁴³ The combination of economic losses to the country's agricultural sector and losses stemming from factors such as business interruption have been estimated at \$35 billion.¹⁴⁴ Although by February 2013, rains reduced the area covered by drought to 'only' 56.8 percent of contiguous United States, the fact remains that more than half of the contiguous US was affected by drought.

Geophysical Disasters

After two consecutive years which saw mega-disasters from geophysical hazards (2010 Haiti earthquake, 2011 Great Japan earthquake and tsunami), 2012 was a relatively quiet year in this respect. The deadliest geophysical disaster was a twin-earthquake in Iran on August 11, killing over 300 persons. Aside from earthquakes in Iran, the Philippines and Guatemala, which we briefly discuss below, there were also deadly earthquakes in June in Afghanistan (killing 73 persons), July in China (killing 81 persons), November in Myanmar (killing 38 persons). In addition, there was a series of quakes in Italy's Emilia Romagna region in May, which killed 24 persons and caused losses of up to \$16 billion.¹⁴⁵ Volcanoes were particularly quiet in 2012, with the eruption of the Fuego volcano in Guatemala the most notable event, leading to the evacuation of 33,000 persons but fortunately causing no fatalities.¹⁴⁶

Earthquake in the Philippines

Shortly before noon on 6 February 2012, an earthquake of magnitude 6.7 struck off the coast of the province of Negros Oriental in the Central Visayas region of the Philippines.¹⁴⁷ According to the National Disaster and Risk Reduction Management Council (NDRRMC) in the Philippines, the earthquake affected more than 320,000 people and damaged more than 15,000 houses.¹⁴⁸

¹⁴³ The Economist, "Drying Times," 21 July 2012, www.economist.com/node/21559381; The New York Times, "Drought (U.S. Drought of 2012)," 7 December 2012, <http://topics.nytimes.com/top/news/science/topics/drought/index.html>

¹⁴⁴ Doyle Rice, "Hurricane Sandy, drought cost U.S. \$ 100 billion," *USA Today*, 25 January 2013, www.usatoday.com/story/weather/2013/01/24/global-disaster-report-sandy-drought/1862201/; see also: United States Department of Agriculture, "US Drought 2012: Farm and Food Impacts," last updated 6 February 2013, <http://www.ers.usda.gov/topics/in-the-news/us-drought-2012-farm-and-food-impacts.aspx>

¹⁴⁵ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, accessed 21 February 2013, www.emdat.be; loss data from Munich Re, 2012 *Natural Catastrophe Year in Review*, 3 January 2013; see also: BBC News, "Guatemala Fuego volcano eruption triggers evacuation," 13 September 2012, <http://www.bbc.co.uk/news/world-latin-america-19594481>

¹⁴⁶ BBC News, "Guatemala Fuego volcano eruption triggers evacuation," op. cit.

¹⁴⁷ U.S. Geological Survey, "Magnitude 6.7 Negros-Cebu Region," 2012, accessed 3 January 2013, <http://earthquake.usgs.gov/earthquakes/eqinthenews/2012/usb0007wgq/#details>.

¹⁴⁸ National Disaster and Risk Reduction Management Council, "NDRRMC Update: SitRep No. 22 re. Effects of the 6.9 Earthquake in Negros Oriental," 20 February 2012, accessed 15 January 2013, www.ndrrmc.gov.ph/attachments/article/439/NDRRMC%20Update%20Sitrep%2022%20on%20Negros%20Earthquake.pdf

Twin Earthquakes in Iran

Within a timespan of eleven minutes, two powerful earthquakes hit Iran on 11 August 2012. The first, measured by the US Geological Survey at magnitude 6.4, struck 37 miles (60 kilometers) northeast of the city of Tabriz in the East Azerbaijan province in northwest Iran. The second, with a magnitude of 6.3, struck near Varzaghan, just 30 miles (49 kilometers) northeast of Tabriz.¹⁴⁹ The earthquakes affected over 1,000 villages in the area, killed over 300 people and injured over 3,000.¹⁵⁰

Earthquake in Guatemala

On the morning of 7 November 2012, a 7.4-magnitude earthquake struck 15 miles (24 kilometers) off the Pacific coastal town of Champerico in Guatemala.¹⁵¹ The quake registered as Guatemala's strongest in 36 years and was felt over 745 miles (1,200 kilometers) away in Mexico City.¹⁵² At least 52 people died as a result and 73,000 were left without power.¹⁵³ The state capital of San Marcos was hit particularly hard and suffered severe structural damage to key buildings including the police station, courthouse and prison.¹⁵⁴

¹⁴⁹ Iranian Earthquake Engineering Association (IEEA), "Learning from Earthquakes: The M_w 6.4 and M_w 6.3 Iran Earthquakes of August 11, 2012," EERI Special Earthquake Report, December 2012, http://eeri.org/cohost/newsletter/December_2012/Varzaghan_Iran.pdf

¹⁵⁰ Yeganeh Torbati, "Two earthquakes in Iran kill 300 and injure 5,000," *Reuters*, 12 August 2012, www.reuters.com/article/2012/08/12/us-iran-earthquake-idUSBRE87A08N20120812; see also: Fox News, "Ahmadinejad criticized for leaving Iran soon after quake, as death toll hits 306," 13 August 2012, www.foxnews.com/world/2012/08/13/series-major-earthquakes-in-northwestern-iran-reportedly-leaves-dozens-dead/#ixzz2LNwX7QXZ www.foxnews.com/world/2012/08/13/series-major-earthquakes-in-northwestern-iran-reportedly-leaves-dozens-dead/

¹⁵¹ U.S. Geological Service, "Magnitude 7.4 – OFFSHORE GUATEMALA," accessed 21 February 2013, <http://earthquake.usgs.gov/earthquakes/recenteqsww/Quakes/usb000dlwm.php>

¹⁵² Al Jazeera, "Dozens killed in Guatemala earthquake," 8 November 2012, www.aljazeera.com/news/americas/2012/11/201211805947793553.html

¹⁵³ BBC News, "Guatemala earthquake: Search for San Marcos missing," 8 November 2012, www.bbc.co.uk/news/world-latin-america-20256454

¹⁵⁴ Al Jazeera, op. cit.

SECTION 4

International Humanitarian Disaster Funding in 2012

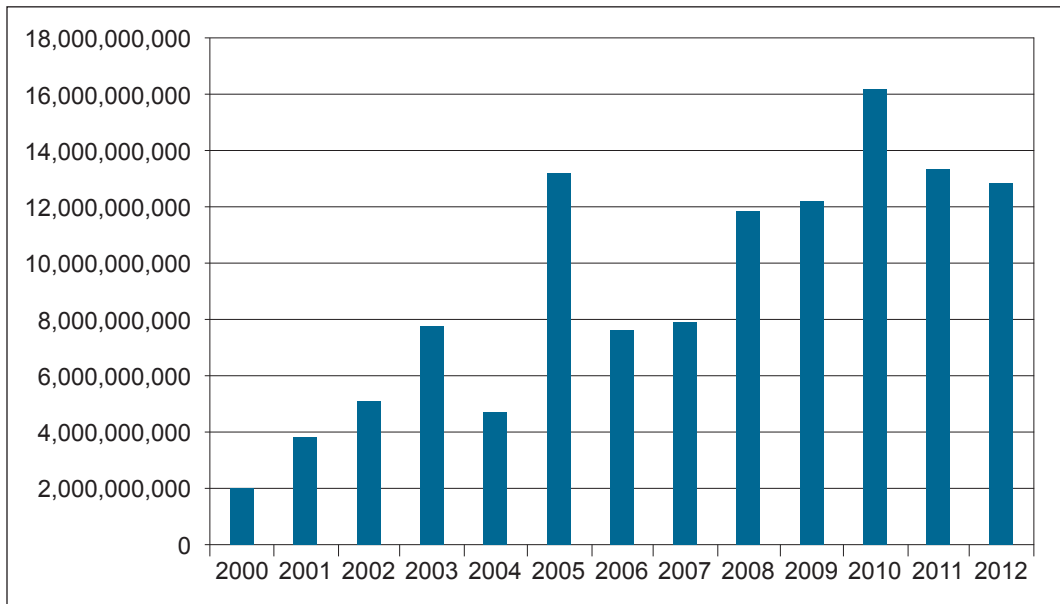
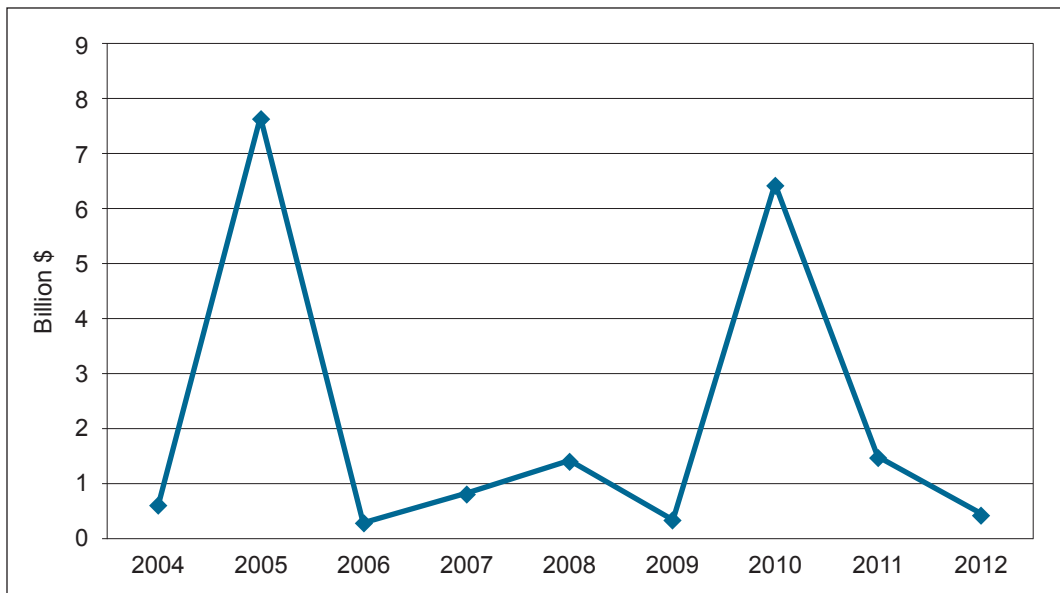
In 2012, total international humanitarian funding recorded by OCHA's Financial Tracking Service (FTS)¹⁵⁵ decreased for a second year in a row to \$12.8 billion, following an all-time peak of over \$16 billion in 2010 (see Graph 2).¹⁵⁶ In terms of humanitarian disaster funding, the decrease from 2010's record is evident and more dramatic than the trend in total humanitarian funding. FTS only identifies \$0.38 billion for disaster funding in 2012, which is a steep decline from the over \$6 billion in 2010 and approximately \$1.5 billion in 2011. In both categories, total humanitarian funding and disaster funding, 2012 closely resembles 2009, a year that also did not see any mega-disasters and which also had fairly similar numbers of disaster fatalities as 2012. And while in 2012 disaster damage was more than triple the amount in 2009 (\$160 billion to \$50 billion), most of the damage was due to disasters in the United States which did not request any international assistance.¹⁵⁷

Comparing graphs 2 and 3 (see below) on total humanitarian funding and humanitarian disaster funding over the last several years, it is clear that while overall humanitarian funding demonstrates some variations depending on annual crises, the total has been fairly stable since 2009, hovering at around \$12 billion (with a spike in 2010), after a relatively steady rise from the beginning of the last decade to 2009. Disaster funding, on the other hand, has been crisis-driven, with massive spikes in 2005 (Indian Ocean Tsunami in late 2004) and 2010 (Haiti earthquake, Pakistan floods), caused by mega-disasters affecting developing countries.

¹⁵⁵ The FTS is a global, real-time database which records all reported international humanitarian aid (including aid to NGOs and the Red Cross/Red Crescent Movement, bilateral aid, in-kind aid and private donations). This includes international funding for responses to conflict, disasters and complex emergencies. FTS features a special focus on consolidated and flash appeals, because they cover the major humanitarian crises and because their funding requirements are well defined, which allows FTS to indicate to what extent populations in crisis receive humanitarian aid in proportion to needs. FTS is managed by the UN Office for Coordination of Humanitarian Affairs (OCHA). All FTS data are provided by donors or recipient organizations. See: <http://fts.unocha.org/pageloader.aspx?page=AboutFTS-uctrlAboutFTS>

¹⁵⁶ OCHA Financial Tracking Service, "Trend Analysis," accessed 11 February 2013, <http://fts.unocha.org/pageloader.aspx?page=Trend-TrendAnalysis>

¹⁵⁷ Figures from Munich Re, "Few major natural catastrophe losses in 2009: General trend confirmed by large number of weather extremes," 29 December 2009, www.munichre.com/en/media_relations/press_releases/2009/2009_12_29_press_release.aspx

Graph 2 Total Humanitarian Contributions, 2000-2012¹⁵⁸**Graph 3** Funding for Humanitarian Responses to Natural Disasters, 2004-2012¹⁵⁹

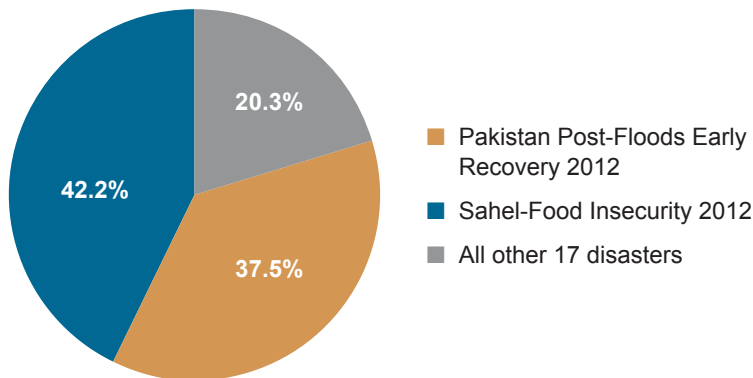
¹⁵⁸ OCHA Financial Tracking Service, "Trend Analysis," accessed 11 February 2013, <http://fts.unocha.org/pageloader.aspx?page=Trend-TrendAnalysis>

¹⁵⁹ OCHA Financial Tracking Service, "Natural Disasters," accessed 1 February 2013, <http://fts.unocha.org/>; 2004-2011 data from Elizabeth Ferris and Daniel Petz, *The Year that Shook the Rich: A Review of Natural Disasters in 2011*, Brookings-LSE Project on Internal Displacement, March 2012.

CHAPTER 1: THE YEAR OF RECURRING DISASTERS

The two situations receiving the most humanitarian funding for natural disaster response in 2012 were the Pakistan floods and the Sahel drought and food security crisis, which cumulatively received almost 80 percent of humanitarian disaster funding as categorized by FTS (Typhoon Bopha was too late in the year to feature in that funding category¹⁶⁰).

Graph 4 International Humanitarian Funding for Natural Disaster Response, 2012¹⁶¹



According to FTS data, most international disaster funding in 2012 went to Africa (52.7 percent) and Asia (41.6 percent). The Americas received 4.15 percent and the Pacific 1.47 percent. In comparison, in 2011, over 75 percent of funding went to Asia, 21.5 percent to Africa, 2.27 percent to the Americas and 0.7 percent to the Pacific. No European country received assistance in either year. A list of humanitarian disaster funding for 2012 is provided in Table 4.

Table 4 Funding for Humanitarian Responses to Natural Disasters, 2012¹⁶²

| Country/Region | Disaster | Time | Funding (\$ millions) |
|-------------------|----------------------------|--------------|-----------------------|
| Sahel | Food Insecurity | 2012 | 161.7 |
| Pakistan | Post-Floods Early Recovery | 2012 | 143.4 |
| Lesotho | Food Insecurity | 2012/13 | 24.5 |
| Caribbean | Hurricane Sandy | October 2012 | 15.8 |
| Bangladesh | Floods and Landslides | June 2012 | 5.9 |
| Comoros | Floods | April 2012 | 5.9 |
| Mozambique | Tropical Cyclone | January 2012 | 4.2 |

Continues

¹⁶⁰ On 10 Dec, the Government of the Philippines and the Humanitarian Country Team launched the Bopha Action Plan for Response and Recovery, which was revised on 23 Jan 2013 seeking \$76 million, a 17 percent increase from the \$65 million originally requested. As of 25 Jan, \$27 million has been contributed towards the appeal, leaving a funding gap of \$48 million. See: Reliefweb, "Typhoon Bopha - Dec 2012," accessed 7 March 2013, <http://reliefweb.int/disaster/tc-2012-000197-phl>

¹⁶¹ OCHA Financial Tracking Service, "Natural Disasters in 2012," accessed 1 February 2013, <http://fts.unocha.org>

¹⁶² OCHA Financial Tracking Service, "Natural Disasters in 2012," report as of 8 February 2013, <http://fts.unocha.org>

Continuation

| Table 4 Funding for Humanitarian Responses to Natural Disasters, 2012¹⁶² | | | |
|--|--------------------|---------------------|------------------------------|
| Country/Region | Disaster | Time | Funding (\$ millions) |
| Madagascar | Tropical Cyclone | February 2012 | 4.1 |
| Korea DPR | Floods | July 2012 | 3.4 |
| Fiji | Tropical Cyclone | April/December 2012 | 2.8 |
| Iran | Earthquake | August 2012 | 2.8 |
| India | Floods | June 2012 | 2.7 |
| Fiji | Floods | January 2012 | 1.6 |
| Samoa | Tropical Cyclone | December 2012 | 1.2 |
| Sri Lanka | Severe Local Storm | March 2012 | 1.0 |
| Niger | Floods | July 2012 | 0.8 |
| Malawi | Floods | February 2012 | 0.7 |
| Philippines | Earthquake | February 2012 | 0.2 |
| Paraguay | Drought | January 2012 | 0.1 |
| Total | | | 382.8 |

It is important to note that the amount that FTS records as humanitarian disaster funding is only a very small part of the overall international humanitarian funding picture. The consolidated and flash appeals in 2012 (see Table 5, below) show, that many of the countries that were major recipients of the over \$5.6 billion raised in appeals, such as countries in the Sahel (in particular Mali), Sudan and South Sudan and Somalia, face a complex array of crises and emergencies, all of which are impacted by environmental factors, in particular drought and desertification.¹⁶³ Haiti is also still reeling from the effects of the 2010 earthquake, with over 300,000 people still in IDP camps at the end of 2012 and an ongoing cholera crisis, compounded by drought and destruction from Hurricanes Isaac and Sandy.¹⁶⁴

¹⁶³ 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 urgent needs in the short term. This can be followed by a consolidated appeal if the crisis persists. 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 the capacity of implementing agencies to spend funds effectively and on an assessment of reasonable expectations of the amount likely to be contributed. See: OCHA, "Consolidate Appeal Process," accessed 4 February 2013, www.unocha.org/cap/about-the-cap/about-process.

¹⁶⁴ CCCM Cluster, "Displacement Tracking Matrix," accessed 12 February 2012, <http://iomhaitidataportal.info/dtm/>

Table 5 Consolidated and Flash Appeals, 2012¹⁶⁵

| | Original requirements \$ million | Revised requirements \$ million | Funding \$ million | Percentage of appeal covered |
|---|--|---------------------------------------|-----------------------|------------------------------------|
| Republic of South Sudan 2012 | 762.88 | 1,176.89 | 797.38 | 68 |
| Somalia 2012 | 1,521.93 | 1,167.74 | 679.64 | 58 |
| Sudan 2012 | 1,064.17 | 1,051.02 | 592.57 | 56 |
| 2012+ Kenya Emergency Humanitarian Response Plan | 763.76 | 796.80 | 573.30 | 72 |
| Democratic Republic of the Congo 2012 | 718.56 | 791.34 | 565.75 | 71 |
| Chad 2012 | 457.37 | 571.95 | 354.56 | 62 |
| Yemen Humanitarian Response Plan 2012 | 447.14 | 585.60 | 344.06 | 59 |
| Niger 2012 | 229.15 | 489.64 | 312.73 | 64 |
| occupied Palestinian territory 2012 | 416.70 | 419.90 | 297.71 | 71 |
| Afghanistan 2012 | 437.14 | 448.56 | 222.02 | 49 |
| Zimbabwe 2012 | 268.38 | 238.45 | 198.04 | 83 |
| Mali 2012 | 213.82 | 214.56 | 149.56 | 70 |
| Cote d'Ivoire 2012 | 173.09 | 160.69 | 98.01 | 61 |
| Burkina Faso 2012 | 126.06 | 126.06 | 85.55 | 68 |
| Central African Republic 2012 | 134.46 | 124.01 | 80.40 | 65 |
| Haiti 2012 | 230.54 | 151.08 | 69.28 | 46 |
| Mauritania 2012 | 94.24 | 92.36 | 57.30 | 62 |
| Djibouti Appeal 2012 | 79.07 | 79.31 | 40.22 | 51 |
| Liberia 2012 | 121.57 | 97.92 | 37.23 | 38 |
| Philippines Humanitarian Action Plan 2012 | 66.49 | 51.23 | 35.26 | 69 |
| Lesotho Food Insecurity (9/2012 - 3/ 2013) | 38.46 | 38.46 | 21.00 | 55 |
| Total | 8,364.98 | 8,873.57 | 5,611.57 | 63 |

Pooled Humanitarian Funds in 2012

Pooled humanitarian funds have gained importance as funding vehicles in recent years. Like the Common Humanitarian Funds (CHFs), they can provide aid to populations facing

¹⁶⁵ OCHA, Financial Tracking Service, "Summary of Requirements and Pledges/Contributions by affected country/region," Report as of 11 February 2013, <http://fts.unocha.org/pageloader.aspx?page=emerg-emergencies§ion=CE&Year=2012>

complex emergencies or like the Emergency Response Funds (ERFs) they can address unforeseen humanitarian needs.¹⁶⁶ These funds are managed by OCHA. Immediately following a disaster, the United Nations Resident Coordinator or Humanitarian Coordinator (RC/HC) can make a CERF application for humanitarian funding for priority, life-saving activities. In countries where there is an ERF or CHF, the RC/HC can immediately release available funds for agreed priorities at the country level. NGOs cannot access CERF funds directly, but CHFs and ERFs can allocate funds to NGOs. In fact, the majority of ERF and CHF funds are now provided to NGOs.¹⁶⁷

In 2012, pooled funds dispersed almost \$1 billion, making up more than nine percent of international humanitarian funding received by the 52 countries that benefited from one or more pooled funds. The CERF disbursed over \$477 million, the CHFs over \$368 million and ERFs over \$73 million.¹⁶⁸ For several countries facing natural disasters in 2012 (for example, the Philippines) and countries recovering from disasters (Haiti), contributions from pooled funds made up more than 10 percent of humanitarian funding during 2012. However, the largest recipients of funding from pooled funds were countries facing complex crises, such as the DRC, Sudan, South Sudan and Somalia, which also receive funding through country CHFs.

Table 6 Pooled Humanitarian Funds, 2012¹⁶⁹

| Country | Central Emergency Response Fund (CERF) | Common Humanitarian Funds (CHF) | Emergency Response Funds (ERF) | Total pooled fund allocations | Total humanitarian funding received | Pooled funds as % of total funding received |
|-------------|---|---------------------------------------|--------------------------------------|----------------------------------|--|--|
| South Sudan | 40.04 | 108.44 | | 148.48 | 880.16 | 16.9 |
| DR Congo | 31.49 | 87.87 | 1.08 | 120.44 | 631.00 | 19.1 |
| Sudan | 20.16 | 76.81 | | 96.97 | 691.75 | 14.0 |
| Somalia | 0.00 | 89.27 | | 89.27 | 866.63 | 10.3 |
| Ethiopia | 13.98 | | 37.76 | 51.75 | 660.00 | 7.8 |
| Syria | 36.48 | | 4.97 | 41.45 | 426.40 | 9.7 |

Continues

¹⁶⁶ Common Humanitarian Funds (CHFs) are funds created to provide more flexible and predictable funding in countries that are subject to complex humanitarian emergencies. As of March 2012, there were five CHFs in operation for the Central African Republic, the DRC, Somalia, Sudan and South Sudan. See: Development Initiatives, *Common humanitarian funds (CHFs)*, Global Humanitarian Assistance, March 2012, www.globalhumanitarianassistance.org. Emergency Response Funds (ERFs) provide rapid and flexible funding to in-country actors to address unforeseen humanitarian needs. For donors that don't have in country presence, the ERF offers a platform through which they can channel their funding. See: Development Initiatives, *Emergency response funds (ERFs)*, Global Humanitarian Assistance, July 2011, www.globalhumanitarianassistance.org

¹⁶⁷ OCHA, "Humanitarian Financing – Overview," accessed 11 February 2013, <http://www.unocha.org/what-we-do/humanitarian-financing/overview>

¹⁶⁸ OCHA Financial Tracking Service, "Pooled Funds," accessed 11 February 2013, <http://fts.unocha.org/pageloader.aspx?page=Pooled-SummaryPoolFunds&year=2012>

¹⁶⁹ *Ibid.*

Continuation

Table 6 Pooled Humanitarian Funds, 2012¹⁶⁹

| Country | Central Emergency Response Fund (CERF) | Common Humanitarian Funds (CHF) | Emergency Response Funds (ERF) | Total pooled fund allocations | Total humanitarian funding received | Pooled funds as % of total funding received |
|---------------------------------|---|---------------------------------------|--------------------------------------|----------------------------------|--|--|
| Pakistan | 36.74 | | 1.42 | 38.16 | 452.69 | 8.4 |
| Yemen | 23.46 | | 6.27 | 29.74 | 424.94 | 7.0 |
| Niger | 24.61 | | | 24.61 | 427.28 | 5.8 |
| Myanmar | 16.65 | | 1.21 | 17.86 | 122.09 | 14.6 |
| Burkina Faso | 14.87 | | | 14.87 | 145.45 | 10.2 |
| Chad | 14.78 | | | 14.78 | 412.49 | 3.6 |
| Mali | 13.95 | | | 13.95 | 209.03 | 6.7 |
| Central African Republic | 7.99 | 5.88 | | 13.87 | 98.69 | 14.1 |
| Haiti | 11.90 | | 1.14 | 13.04 | 130.18 | 10.0 |
| Philippines | 13.01 | | | 13.01 | 85.93 | 15.1 |
| Total (52 countries) | 477.34 | 368.27 | 70.05 | 915.67 | 9,919.90 | 9.2 |

As evidenced from this discussion, the international humanitarian funding landscape is a complex system of different funding streams and vehicles. If domestic contributions or remittances were included, the picture would be even more complex.¹⁷⁰

This chapter has provided an overview of disasters occurring in 2012 with an emphasis on recurring disasters. We suggest that the issue of recurring, continuing and cascading disasters merits much more research as does the intersection of disasters and other kinds of emergencies, such as conflicts and industrial disasters. The next chapter looks at the growing role of regional organizations in responding to disasters.

¹⁷⁰ Recent years have seen the development of comprehensive research reports that focus specifically on these issues. For example, Development Initiatives' *Global Humanitarian Assistance Report* delves deeper into this topic than we can in this publication.



JAKARTA, INDONESIA 22 November 2012: Landslides on the banks of the river due to heavy rain in Depok, West Java, Indonesia. Photo: © Ngarto Febuana | Dreamstime.com

MIDWESTERN UNITED STATES 6 August 2012: Drought conditions advisory sign along a rural road. Photo: © Charles Brutlag | Dreamstime.com



CHAPTER 2

ASSESSING REGIONAL ORGANIZATIONS' WORK IN DISASTER RISK MANAGEMENT

This chapter looks at one group of important but little-studied actors in disaster risk management (DRM): regional organizations.¹⁷¹ Although regional mechanisms are playing increasingly important roles in disasters, there has been remarkably little research on their role in disaster risk management. In fact, there are few published studies about the relative strengths and weaknesses of regional bodies, much less comparisons of their range of activities or effectiveness in DRM.¹⁷² A recent study carried out by the Brookings-LSE Project on Internal Displacement sought to address this gap by providing some basic information about the work of more than 30 regional organizations involved in disaster risk management and by drawing some comparisons and generalizations about the work of thirteen of these organizations through the use of 17 indicators of effectiveness.¹⁷³ This chapter provides a summary of some of that research.

SECTION 1

Introduction and Methodology: Why a Focus on Regions?

Since the 1950s when European regional integration seemed to offer prospects not only for the region's post-war recovery, but also for lasting peace and security between former enemies, regional organizations have been growing in number and scope. They have

¹⁷¹ There has been a trend to move away from a rigid dichotomy between activities intended to reduce risk/prepare for disasters and those associated with emergency relief and reconstruction. Thus the term "disaster risk management" (DRM) is used as the overarching concept in this study. However, as the dichotomy between pre-disaster and post-disaster activities is still prevalent in international institutions, international agreements and frameworks, government institutions and regional institutions, the disaster risk reduction (DRR) is also used as a catch-all term for pre-disaster activities while the term disaster management (DM) refers to all post-disaster activities. While epistemologically this is not the cleanest of distinctions, it was found to be helpful for the analytical framework.

Also, note that a distinction is usually made in the literature on regionalism between regional and subregional organizations. For example, in Africa, the African Union (AU) would be seen as a regional organization, while the Economic Community of West African States (ECOWAS) would be classified as a subregional organization. As this distinction is not clear-cut in all global regions, this study refers to all organizations as regional organizations unless the distinction is clear.

¹⁷² Exceptions include Patricia Weiss Fagen, *Natural Disasters in Latin America and the Caribbean: National, regional and international interactions*. HPG Working Paper, October 2008, www.odl.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3415.pdf. For analysis of the engagement of regional organizations in disaster risk reduction initiatives, see: Ana-Cristina Costea and Tania Felicio, *Global and Regional Mechanisms of Disaster Risk Reduction and Relief: Review, Evaluation, Future Directions of Integration*, UNU-CRIS Occasional Papers, O-2005/12, www.cris.unu.edu/fileadmin/workingpapers/20051021102742.O-2005-12.pdf

¹⁷³ Elizabeth Ferris and Daniel Petz, *In the Neighborhood: The Growing Role of Regional Organizations in Disaster Risk Management*, Brookings-LSE Project on Internal Displacement, February 2013, www.brookings.edu/research/reports/2013/02/regional-organizations-disaster-risk-ferris. This research was made possible thanks to support from the Australian Civil-Military Centre.

become more active in many areas – from free trade agreements (which now number in the hundreds) to cooperative initiatives on resource management to counter-terrorism measures.¹⁷⁴ As Louise Fawcett summarizes, “the regional momentum has proved unstoppable, constantly extending into new and diverse domains.”¹⁷⁵ In terms of global governance, she argues that “what is emerging is a de facto, albeit often ad hoc, division of labour, sometimes consensual, sometimes contested, where regional actors take on increasingly important roles...”¹⁷⁶

In today’s globalizing world, regions can be seen as serving as an effective bridge between the international and national systems. As Haver and Foley point out, “a regional entity, working from cultural and linguistic commonalities, can provide a forum for building trust and familiarity that is not possible on a global scale. For these reasons they can often be more effective in establishing common policies and resolving issues of contention.”¹⁷⁷

One particular area where regional organizations seem to be playing a leading role is in the relationship between migration and climate change. Regional processes to deal with labor migration have been increasing in importance over the past decade or so, leading one international official to observe that migration governance has “witnessed a marked shift to the regional level.”¹⁷⁸ With growing recognition of the potential effects of climate change, regional organizations are becoming aware that they have particular roles to play in policy discussions.¹⁷⁹ Regions are more likely to face similar environmental phenomena and hazards. If or when people are forced to leave their countries because of the effects of climate change, they are likely to turn first to nearby countries. Writing about possible ways of addressing cross-border disaster-induced displacement, Kälin and Schrepfer argue that “regional and subregional organizations are often more coherent in terms of interests of member states and thus more likely to reach consensus on issues.”¹⁸⁰

¹⁷⁴ See for example: Kati Suominen, “Globalizing Regionalism: Harnessing Regional Organizations to Meet Global Threats,” UNU-CRIS Occasional Papers, 2005/11, www.cris.unu.edu/UNU-CRIS-Working-Papers.19.0.html, pp. 8-11

¹⁷⁵ Louise Fawcett, “Exploring regional domains: A comparative history of regionalism,” *International Affairs*, vol. 80, no. 3, 2004, p. 431.

¹⁷⁶ Ibid.

¹⁷⁷ Katherine Haver and Conor Foley, *International and Regional Initiatives*, Background paper prepared for the International Dialogue on Strengthening Partnership in Disaster Response, October 2011, www.ifrc.org/PageFiles/93533/Background%20paper%202.pdf

¹⁷⁸ Karoline Popp, “Regional Policy Perspectives,” in Frank Laczko and Etienne Piquet (eds.), *People on the Move in a Changing Climate: Comparing the Impact of Environmental Change on Migration in Different Regions of the World*, IOM and Springer (forthcoming).

¹⁷⁹ Interestingly, regional processes set up to deal with labor migration have been reluctant to address the potential impact of climate change on regional migration patterns. Rather, it seems that regional political organizations such as ASEAN, the OAS, the African Union and the Pacific Islands Forum have been more active in considering these issues.

¹⁸⁰ Walter Kälin and Nina Schrepfer, *Protecting People Crossing Borders in the Context of Climate Change: Normative Gaps and Possible Approaches*, UNHCR Legal and Protection Policy Research Series, PPLA/2012/01, February 2012. Similarly Roger Zetter also calls for the development of regional mechanisms to govern cross-border movements resulting from climate change. See: Roger Zetter, *Protecting environmentally displaced people Developing the capacity of legal and normative frameworks*, University of Oxford, Refugee Studies Center, February 2011, www.rsc.ox.ac.uk/pdfs/workshop-conference-research-reports/Zetter-%20EnvDispRep%2015022011.pdf

In terms of disaster response, regional mechanisms may not only be able to respond more quickly than international ones, but their intervention may also be politically more acceptable, as evidenced by the key role played by the Association of Southeast Asian Nations (ASEAN) in responding to Cyclone Nargis in 2008. Regional organizations have developed innovative and effective forms of regional collaboration that could serve as models for other regions. For example, in Central America, the Central American Integration System's Coordination Center for Natural Disaster Prevention in Central America (CEPREDENAC) organizes regional training initiatives, while in the Caribbean there are joint protocols for the use of military assets for a clearly-defined period after a disaster strikes. In the Pacific, UN agencies have organized a regional protection cluster (rather than a national one) and developed a rotation system to ensure a rapid international response to disasters in the region.

Humanitarian organizations tend to stress the role that regional organizations can play in immediate response to disasters, while development actors tend to see the importance of incorporating disaster risk reduction measures into long-term development plans. Other researchers make the case that natural disasters are security threats and argue that:

[R]egional organizations are particularly well-equipped to carry out today's threat management functions. They have solid information and expertise on their regions, inherently tailor their responses to the regional realities and can get on the ground fast. ROs [regional organizations] are also innately compelled to continue their engagement and monitoring of the scene when the other actors depart. And having reshaped their policies and plans over the years to meet newly emerging challenges, ROs have a record of responsiveness and institutional flexibility.¹⁸¹

While this chapter examines the role of regional organizations in the specific area of disaster risk management, it is important to keep in mind that these emerging forms of regional cooperation could have larger implications. It may be that countries that can work together to reduce the risks of natural hazards will find other areas for cooperation. Thus, a focus on regional organizations is of interest not only to those working in the field of disaster risk management but also to those who see regional cooperation as an important part of global governance and as a force for peace, security and development.

The particular roles of regional organizations in a complex network of actors and relationships are sometimes difficult for the outside observer to discern. Thus, this focus on regional organizations necessarily leaves out some important regional initiatives that are not directly related to the work of the regional organization. So, for example, the Asian Development Bank is an active actor on disaster-related issues but is not a part of sub-regional Asian organizations. Rather than providing a comprehensive picture of all DRM activities taking place in a particular region, this chapter examines a subset of a far larger network involved in disaster-related work.

¹⁸¹ Kati Suominen, "Globalizing Regionalism: Harnessing Regional Organizations to Meet Global Threats," UNU-CRIS Occasional Papers, 2005/11. <http://www.cris.unu.edu/UNU-CRIS-Working-Papers.19.0.html>, p. 7.

Regional Actors in DRM: A Plethora of Initiatives

Regional organizations come in many different forms and were established to serve different purposes. Some were intended to coordinate political positions on broad issues of peace and security, others to enhance free trade and still others were intended to enhance cooperation on very specific scientific or logistical issues. As one recent overview concluded:

By and large, the rhetoric of many regional organizations is ahead of the reality. Actors in many regions have called attention to the importance of strengthening national capacities for disaster response and to developing relationships between international and national disaster-management officials, but there remain significant gaps between ‘what is established in principle and what happens in practice.’¹⁸²

In many cases, regional mechanisms were established or strengthened after a particularly severe natural disaster, such as CEPREDENAC after Hurricane Mitch in Central America in 1998. In some cases, such as ASEAN’s response to Cyclone Nargis in 2008, regional engagement in natural disasters involved a high-profile initiative after a particular disaster, but then seemed to take a less prominent role. However, there does not seem to be a direct correlation between the frequency of disasters in a particular region and the role of regional organizations.

While almost 90 percent of those affected by natural disasters globally for the past decade have been from Asia, Asia’s regional mechanisms for responding to disasters are relatively weak, perhaps reflecting the fact that some of the key states in the region do not perceive a need for external assistance as well as political tensions within the region. In some regions, such as Europe and the Caribbean, regional actors seem to be quite active in both disaster response and in mitigation efforts. In other regions, international actors such as UN OCHA and other UN humanitarian agencies have played the leading role in disaster response while regional bodies have been more active in mitigation efforts. This may be the result of funding patterns. In Latin America, for example, Patricia Fagen found that disaster prevention activities are “almost invariably” funded by international donors, often through regional bodies.¹⁸³ This may have the effect of strengthening regional bodies, but may also contribute to a disconnect between prevention and response work.

In many regions, disaster risk management involves a wide array of actors from national disaster management organizations and ministries, regional organizations, national and regional universities, NGOs and civil society organizations, international organizations, UN agencies, regional and international development banks, military forces, donor

¹⁸² See for example: Katherine Haver and Conor Foley, *International and Regional Initiatives*, Background paper prepared for the International Dialogue on Strengthening Partnership in Disaster Response, October 2011, www.ifrc.org/PageFiles/93533/Background%20paper%202.pdf. Quotation is from Paul Harvey, *The role of national governments in international humanitarian response*, ALNAP meeting paper, 26th Annual Meeting, 16-17 November 2010, Kuala Lumpur, Malaysia. p. 17.

¹⁸³ Patricia Weiss Fagen, *Natural Disasters in Latin America and the Caribbean: National, regional and international interactions*. HPG Working Paper, October 2008, www.odl.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3415.pdf, p. 22.

governments and the private sector. There are sometime overlaps and inconsistencies between regional mechanisms intended to address disaster risk reduction, the effects of climate change, weather and meteorological systems and longer-term recovery efforts.

Moreover, the global architecture of regional organizations is very complex. Some regions, such as the Americas and Africa, have a regional 'big-tent' organization that includes most countries of the continent as members (Organization of American States, African Union) and at the same time have many sub-regional organizations in which some of the continent's members participate. Thus in Africa, the Economic Community of West African States (ECOWAS) and the South African Development Community (SADCC) are important sub-regional actors. Other regions, such as Asia, have many sub-regional organizations but no continent-wide regional organization.

There are also many regional bodies which were not established primarily as DRM mechanisms, but which play important roles in disaster response, such as the Pan-American Health Organization and the Inter-American Development Bank. Following the 2004 Indian Ocean Tsunami, most regional organizations in the area – and most regional offices of international organizations – were involved in responding to the disaster, including some had no previous experience with disaster response.

In many cases, international bodies, such as the United Nations Office for Disaster Risk Reduction (UNISDR),¹⁸⁴ the Global Facility for Disaster Risk and Reconstruction (GFDRR) and the World Bank include regional processes which also overlap with independent regional mechanisms. The relationship between these international initiatives and regional mechanisms is an interesting and dynamic one. In at least some cases, regional mechanisms have been strengthened by international action. For example, "...the UN's International Decade for Natural Disaster Reduction launched in 1990 propelled ROs [regional organizations] to take on a more pro-active role in humanitarian emergency management."¹⁸⁵ International initiatives can foster regional organizational involvement with disaster risk management. Indeed one of the tasks of regional offices of international humanitarian actors is to support the engagement of regional organizations.

Analysis of regional mechanisms presents other difficulties, beginning with the fact that regional and subregional organizations have overlapping memberships. For example, in the Pacific, the Pacific Islands Forum has 16 members, the South Pacific Applied Geoscience Commission (SOPAC) has 21 and the Pacific Regional Environmental Program has 24 (including the US and France). In the Caribbean, the Caribbean Community (CARICOM) has 15 members while CDEMA (the region's disaster response mechanism) has 17 members. There seem to be particular overlaps between membership in regional organizations in East Asia and the Pacific and between North Africa and the Middle East (with, for example, Egypt being a member of both the League of Arab States and African Union.) The situation is further complicated by the fact that many international organizations – from the World Bank to the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)

¹⁸⁴ The UN Office for Disaster Risk Reduction (UNISDR) is the secretariat of the International Strategy for Disaster Reduction and is mandated by the UN General Assembly to ensure its implementation.

¹⁸⁵ Sumonin, op. cit., p. 20.

– have regional offices and programs, often covering a different assortment of countries than those included in regional organizations. These different regional definitions make comparisons difficult.

Cooperation between military forces in responding to disasters takes different forms. For example, the North Atlantic Treaty Organization (NATO) has developed very clear protocols for the use of military assets in responding to disasters. In other cases, military forces within a region cooperate on a less formal basis. The Caribbean Disaster Emergency Management Agency (CDEMA) has developed guidance on how military forces within the region will respond to disasters in member countries. The ASEAN Defense Ministers Plus has a working group on humanitarian and disaster response but has not developed formal protocols for the ways that military forces will be used to respond to disasters in the region. Bilateral and multilateral relations between military forces in a given region are often strengthened by collaborative efforts to prepare for disasters; for example, in Asia and the Pacific, there are dozens of training exercises every year on disaster response. In some cases, international military assistance is used to support regional initiatives, such as training centers.

Methodology

It is difficult to compare the work of regional organizations in DRM given the great variety of regional organizations in terms of history, purpose, size, capacity and other characteristics. In order to facilitate comparisons between diverse organizations, a set of seventeen indicators was developed to serve as a baseline for comparison.

These indicators are:

Does the regional organization have:

1. Regular intergovernmental meetings on DRM
2. A regional DRR framework/convention
3. A regional DM framework/convention
4. A specific organization for DRM
5. A regional/sub-regional disaster management center
6. A regional disaster relief fund
7. A regional disaster insurance scheme
8. A way of providing regional funding for DRR projects
9. A means to provide humanitarian assistance
10. A regional rapid response mechanism
11. Regional technical cooperation (warning systems)
12. Joint disaster management exercises/simulations
13. Regional capacity building for NDMA staff/technical training on DRM issues
14. Research on DRM issues
15. Regional military protocols for disaster assistance
16. A regional web portal on DRM
17. A regional IDRL treaty/guidelines

The research focused on thirteen regional organizations, which was a sample of over thirty regional organizations actively engaged in DRM.

The thirteen organizations for which we analyzed the indicators are:

| | |
|----------------|--|
| ASEAN | Association of Southeast Asian Nations |
| AU | African Union |
| CAN | Andean Community of Nations |
| CARICOM | Caribbean Community |
| CoE | Council of Europe |
| ECOWAS | Economic Community of West African States |
| EU | European Union |
| LAS | League of Arab States |
| OAS | Organization of American States |
| SAARC | South Asian Association for Regional Cooperation |
| SADC | Southern African Development Community |
| SICA | Central American Integration System |
| SPC | Secretariat of the Pacific Community |

SECTION 2

Comparing Regional Organizations: Applying the Indicators

This section looks at some of the trends that emerge from comparing regional organizations according to these indicators.¹⁸⁶

Indicator 1: Regular Intergovernmental Meetings on DRM

Intergovernmental meetings on DRM are common in many regional organizations. Almost all of the organizations covered in this study have had meetings on DRM, but these take different forms. While some organizations have regularly scheduled meetings on DRM issues, in other organizations intergovernmental meetings are more irregular or even one-time events. The frequency of intergovernmental meetings is a clear indication of the importance that member countries ascribe to DRM; it is therefore not surprising that organizations that meet regularly have generally developed broader cooperation on DRM than those which have only occasional or one-off meetings.

¹⁸⁶ A more comprehensive analysis of the research methodology and results can be found in the original report: Elizabeth Ferris and Daniel Petz, *In the Neighborhood: The Growing Role of Regional Organizations in Disaster Risk Management*, Brookings-LSE Project on Internal Displacement, February 2013, www.brookings.edu/research/reports/2013/02/regional-organizations-disaster-risk-ferris

Indicators 2 and 3: Regional DRR and DM Frameworks

Two different approaches were evident in looking at these indicators. While a majority of organizations have developed a comprehensive framework for DRM activities, other organizations have developed separate frameworks for DRR and DM.¹⁸⁷ Regional differences on these indicators were also observed, with African organizations tending to use an approach based on separate frameworks for risk reduction and disaster management, while organizations in the Americas have clearly favored the development of comprehensive frameworks. Table 7 below gives an overview of when organizations established DRM frameworks.

While most regional organizations had developed a framework that included risk reduction and prevention before the Hyogo Framework for Action (HFA) was adopted in 2005, this trend has intensified in recent years with the formation of regional platforms and networks on DRR, a development called for by the HFA. In many cases, regional organizations have played leading roles in the creation of these platforms and networks. Advocacy and technical support from the UN International Strategy for Disaster Reduction (UNISDR) and the Global Facility for Disaster Reduction and Recovery (GFDRR) have also led to the translation of some of the regional frameworks into action plans, such as the Madang Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005-2015 and the African Union's Programme of Action for the Implementation of the Africa Strategy.

Table 7 Year of Establishment of Regional DRR/DM Frameworks

| Regional Organization ¹⁸⁸ | DRR Framework | DM Framework |
|--------------------------------------|---------------|----------------------------|
| AFRICA | | |
| AU | 2004 | <i>in progress</i> |
| ECOWAS | 2007 | 2012 (humanitarian policy) |
| SADC | 2005-6 | 2001 |
| AMERICAS | | |
| OAS | 2003 | |
| SICA/CEPRENAC | 1999 | |
| CARICOM/CDEMA | 2001 | |
| CAN/CAPRADE | 2004 | |
| ASIA | | |
| LAS | 2010 | 1990 |
| SAARC | 2007 | |
| ASEAN | 2005 | |
| EUROPE | | |
| EU | 2009 | 2001 |
| Council of Europe | 1987 | |
| PACIFIC | | |
| Regional Pacific Framework | 2005 | |

¹⁸⁷ However, it should be noted that more in-depth analysis might show that some of the nominally comprehensive frameworks are strongly biased towards either DM or DRR.

¹⁸⁸ See list of acronyms at the beginning of this report.

By far the dominant approach to governing regional disaster management is through the use of strategic frameworks or policy documents rather than legally-binding agreements. There are only three binding treaties that deal specifically with disaster management as their primary focus: ASEAN's Agreement on Disaster Management and Emergency Response, SAARC's Agreement on Rapid Response to Regional Disasters and CARICOM's Caribbean Disaster Emergency Response Agency (CDERA) Agreement (which continues to inform the work of CDERA's successor, CDEMA). Notwithstanding these important exceptions, the majority of DM instruments at the regional level are non-binding in nature.

Generally speaking, the preferred approach can thus be characterized as one of encouraging cooperation and implementation, rather than attaching legal consequences to non-compliance. Two main mechanisms exist in these informal arrangements that serve to promote compliance and implementation of regional strategies or programs: (i) indirect compliance with regional constituent treaties; and (ii) the establishment of bodies for monitoring compliance or implementation, for coordination, or for support to the framework more generally.

Indicator 4: A Specific Organization for DRM

Indicator 5: A Regional/Sub-Regional Disaster Management Center

There is clear evidence that the formation of a distinct entity, whether it is called an agency, center, mechanism or division is a clear expression of the regional organization's involvement with DRM, while the development of an operational disaster management center is a good indicator of the technical capacity of a regional organization. The trend of having distinctive organizations engaged in DRM seems to be especially pronounced in Latin America and the Caribbean where the CARICOM, SICA and the Andean Community all have formed specific entities to deal with DRM issues: the Caribbean Disaster Emergency Management Agency (CDEMA), the Coordination Center for Natural Disaster Prevention in Central America (CEPREDENAC) and the Andean Committee for Disaster Prevention and Assistance (CAPRADE). Central America and the Caribbean were among the first regions tasking regional organizations with work on DRM. CEPREDENAC was founded in 1987 and the predecessor of CDEMA was founded in 1991 – at least five to ten years before most other regions started to seriously look at DRM on a regional level. This is likely due to the prevalence of disasters in these regions and the need to supplement limited national capacities with regional expertise.

The advantage of having a specialized entity for DRM is that it is usually better staffed and has a higher profile and visibility within a wider organization than when there is no specialized entity. Such a mechanism also brings together the technical expertise on DRM issues which in other cases might be dispersed between different departments. In other regions, DRM activities are also centralized in secretariats or departments but are often bundled with different issues. For example, in ECOWAS, DRM is part of the Directorate on Humanitarian and Social Affairs while in the EU, the Civil Protection Mechanism (CPM) is part of the Commission's European Community Humanitarian Office (ECHO).¹⁸⁹

¹⁸⁹ As DG, ECHO deals with humanitarian assistance in and outside the EU. Given the scope of the EU's CPM we have classified it as having a specialized institution.

Several regional organizations also have disaster management centers. Some of the centers have operational capacity for disaster management, such as the EU's Monitoring and Information Center or the recently-opened ASEAN Coordinating Centre for Humanitarian Assistance. These disaster management centers are tasked with collecting data, monitoring disaster situations and facilitating the process of assistance. In other instances, such as the SAARC Disaster Management Centre, the regional disaster management centers are research and training institutions. Overall, less than half of the 13 regional organizations analyzed seem to have a specific organization for DRM and between a quarter and a third have disaster management centers.

While the organizational structure of DRM activities is important, a major factor determining the effectiveness of the organizations dealing with DRM is the budget and staffing for those activities. Available data seem to indicate that DRM activities are funded through a combination of membership contributions and donor funds with donor contributions apparently responsible for a large percentage of funding for DRM work in most regional organizations. For example, in SOPAC's 2010 budget, about 12 percent of funding was planned to come from membership contributions with the entirety of its projects on disaster reduction funded by donors (almost 50 percent of SOPAC's overall budget).¹⁹⁰ ASEAN member countries are obliged to pay \$30,000 per year in support of the AHA center with the rest of the center's budget provided by donors. One of the better-funded regional initiatives is the CPM, which has a budget of about Euro 25 million (\$31.8 million) from EU membership fees. Staffing levels also vary widely. While the CPM has a staff of about sixty and SOPAC has more than twenty people working on risk reduction projects, SADC's Disaster Risk Unit had only one employee in 2010.¹⁹¹

Indicator 6: A Regional Disaster-Relief Fund

Indicator 7: A Regional Disaster Insurance Scheme

Indicator 8: A Way of Providing Regional Funding for DRR Projects

Funding mechanisms are important but take different roles. Several regional organizations have disaster relief funds, in particular the AU, the EU and the OAS. In some instances, relief funds were an early expression of solidarity among members of regional organizations but have more recently been overtaken by a stronger interest in regional initiatives for disaster insurance and risk-sharing. The AU Special Emergency Assistance Fund, which has dispersed \$40 million for risk reduction and relief activities since 1984, was down to \$2.8 million by 2010 and the Inter-American Emergency Relief Aid Fund of the OAS has only disbursed relatively minor amounts in recent years. The EU's Solidarity Fund on the other hand, disbursed Euro 2.15 billion (\$2.8 billion) for major disasters in Europe between

¹⁹⁰ SOPAC, Final Annual Report Summary of the SOPAC Secretariat, 2010, p. 80.

¹⁹¹ Latest information available from SADC, "Report on the SADC Disaster Risk Reduction and Preparedness Planning Workshop Gaborone, Botswana, 05–08 October 2010," April 2011, <http://reliefweb.int/report/angola/report-sadc-disaster-risk-reduction-and-preparedness-planning-workshop-gaborone>

its founding in 2002 and 2009, which is significantly more than the amount provided by any other regional organization to any of its member states.¹⁹² Other organizations, while not officially having relief funds, do at times provide financial assistance to affected countries. ECOWAS, for example, in November 2012 provided nearly \$400,000 to the Nigerian government for flood relief.¹⁹³

In terms of the provision of funding for DRR projects, only two regional organizations provided direct financial assistance for DRR projects: the EU through both the CPM and the EU's Structural Funds and the AU through the Special Emergency Assistance Fund discussed above. That regional organizations are not strong donors for DRR projects is not surprising, as much of the funding for most regional organizations themselves comes from donor governments and international development actors. Rather than funding DRR activities, regional organizations often provide technical assistance to member governments on DRR issues and work on joint projects with member governments.

Other, innovative, regional approaches include risk insurance and risk finance mechanisms for disaster response. Caribbean states pioneered the concept of risk insurance with the establishment of the Caribbean Catastrophe Risk Insurance Facility (CCRIF) in 2007. The CCRIF provides emergency liquidity for countries hit by hurricanes or earthquakes. Following the 2010 earthquake, the government of Haiti received \$7.7 million from the CCRIF — the only direct funds the government received in the initial weeks after the disaster. Other regions have since begun to explore risk insurance and finance options, including Pacific countries and ASEAN.¹⁹⁴ For Pacific countries, pooling their insurance policies has allowed them to access global reinsurance markets for the first time. In June 2012, the AU decided to establish an African Risk Capacity Secretariat with the aim of developing a risk-insurance scheme for African nations.¹⁹⁵ Similarly, the Indian Ocean Commission has been exploring options regarding risk insurance.¹⁹⁶

¹⁹² European Commission, European Union Solidarity Fund, *Annual report 2009*, 23 March 2011, COM(2011) 136 final, p. 11. US dollar equivalent was calculated using exchange course of 12 March 2013. See: www.oanda.com/currency/converter

¹⁹³ ECOWAS, "ECOWAS Supports Nigerian Flood Victims with US\$382,000," 13 November 2012, Press release No. 312/2012, <http://news.ecowas.int/presseshow.php?nb=312&lang=en&annee=2012>

¹⁹⁴ See: CCRIF, "About us," www.ccrif.org/content/about-us

¹⁹⁵ UNISDR, "UNISDR champion applauds African Union for decision on disaster insurance," 5 August 2012, www.unisdr.org/archive/27926

¹⁹⁶ Interview with Laura Bourdreau, GFDRR Risk Finance, 2 November 2012.

Indicator 9: A Means to Provide Humanitarian Assistance**Indicator 10: A Regional Rapid Response Mechanism****Indicator 11: Regional Technical Cooperation (Warning Systems)****Indicator 12: Joint Disaster Management Exercises/Simulations****Indicator 13: Regional Capacity Building for NDMA Staff/Technical Training on DRM Issues****Indicator 14: Research on DRM Issues**

In looking at regional response mechanisms and technical cooperation, it becomes clear that regional organizations play an important role in fostering technical cooperation on DRM issues. Ten of the thirteen organizations reviewed were doing at least some work to foster technical cooperation and at least seven were engaged in capacity building and technical training. As is the case with other indicators, cooperation takes a variety of forms. In many cases, regional organizations support the development of specialized technical centers and units in the region. In some cases, such as the SADC Climate Services Center or the Intergovernmental Authority on Development (IGAD) Climate Prediction and Applications Centre, the technical centers are directly affiliated to regional organizations. In others, such as the African Center of Meteorological Applications for Development (ACMAD) or EUR-OPA's (Council of Europe) network of over twenty Euro-Mediterranean Centers, the institutions are based on cooperation between regional organizations and an array of other actors, such as international agencies, universities and specific host governments.¹⁹⁷

The area of capacity building and research is closely related to the issue of technical cooperation and about half of the organizations analyzed are active in one of these two areas. For some organizations, such as CDEMA, training is an important part of the disaster management framework while SAARC's core institution, the SAARC Disaster Management Centre, seems to be mainly focused on research and training activities.¹⁹⁸ In the Pacific, several organizations (SOPAC, OCHA, IFRC, etc.) have formed the Pacific Emergency Management Training Advisory Group (PEMTAG), which provides a forum for agencies involved in the design and delivery of emergency management training.¹⁹⁹ In many cases, regional organizations cooperate with international actors in research and training and serve as important conveners for regional training activities and/or research projects.

A small number of regional organizations (such as the EU and ECOWAS) also organize regional disaster management exercises and simulations. For example, disaster focal points from ECOWAS member states convened in Abuja in June 2011 to simulate a regional

¹⁹⁷ Detailed footnotes provided in the specific organization's description in Annex 1 of the original paper. See: Elizabeth Ferris and Daniel Petz, In the Neighborhood: *The Growing Role of Regional Organizations in Disaster Risk Management*, February 2013.

¹⁹⁸ SAARC Disaster Management Center, "Training Programmes," accessed 31 August 2012, <http://saarc-sdmc.nic.in/training.asp>

¹⁹⁹ SOPAC, "Implementation of the Hyogo Framework for Action and the Pacific Disaster Risk Reduction and Disaster Management Framework for Action 2005 – 2015, Regional Synthesis Progress Report, Report for the period 2007 – 2009," June 2009, p. 20.

emergency and forge a joint response.²⁰⁰ The EU Commission financially supports civil protection exercises at EU-level which are multi-country thematic exercises, organized by member states.²⁰¹

In terms of humanitarian assistance and rapid response mechanisms, it appears that:

- ❖ Regional organizations that have invested in disaster response capacity often take on the roles of: (a) monitoring and relaying disaster information and (b) coordinating regional response efforts, as in the EU's CPM. The ASEAN's AHA Centre seems to aim at providing a similar type of services to ASEAN member states. In the Caribbean, CDEMA, if requested by a member state, is responsible for soliciting and coordinating assistance from governments, organizations and individuals both within and outside the region.
- ❖ In addition, several organizations have developed rapid response capacities which can be deployed in disaster situations to (a) assist in coordinating assistance and/or (b) provide damage and needs assessments.
- ❖ Some regional organizations go further and play active roles in pooling and training rapid response capacity from member states as in the case of the EU. In the Caribbean when the national capacities of affected states are overwhelmed, CDEMA can activate the Caribbean Disaster Relief Unit (CDRU), which comprises representatives from the military forces within CARICOM.
- ❖ Large-scale humanitarian assistance still seems to lie in the realm of other actors' responsibility, including national disaster management agencies, military forces, UN agencies, the International Federation of Red Cross and Red Crescent Societies (IFRC), international NGOs, etc. Aside from the EU, which is a major donor for humanitarian assistance and also a provider of assistance, most regional organizations seem to have neither the mandate, nor the will or capacity to engage in large-scale humanitarian operations.

Indicator 15: Regional Military Protocols for Disaster Assistance

In looking at the development of regional military protocols/treaties/conventions on disaster assistance, the main international instrument on this issue is the Guidelines on the Use of Military and Civil Defense Assets in Disaster Relief, updated in November 2006 ("The Oslo guidelines") and the Guidelines on the Use of Military and Civil Defense Assets (MCDA) to Support United Nations Humanitarian Activities in Complex Emergencies.²⁰² Several

²⁰⁰ IRIN, "Disasters: ECOWAS stepping up response," 13 July 2011, <http://www.irinnews.org/Report/93222/DISASTERS-ECOWAS-stepping-up-response>

²⁰¹ See: European Commission, Humanitarian Aid and Civil Protection, "Preparedness," last accessed 12 March 2013, http://ec.europa.eu/echo/policies/prevention_preparedness/preparedness_en.htm

²⁰² OCHA, *Guidelines on the Use of Foreign Military and Civil Defence Assets in Disaster Relief ("Oslo Guidelines")*, November 2007, available at: www.unhcr.org/refworld/docid/47da87822.html; OCHA, *Guidelines on the Use of Military and Civil Defense Assets to Support United Nations Humanitarian Activities in Complex Emergencies*,

regional organizations have incorporated these guidelines into their policies, such as the EU, the AU and ASEAN.

Indicator 16: A Regional Web Portal on DRM

One trend in recent years has been for regional organizations to develop web portals on DRM issues. Some of the portals, such as ASEAN's Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) website, relay real-time information about hazards and disasters.²⁰³ Others, such as Pacific Disaster Net, are comprehensive information platforms which serve as tools to support national action planning and decision making and are also rich in resources from reports to risk management plans.²⁰⁴ In the Caribbean, the Caribbean Virtual Disaster Library provides resource materials for disaster management.²⁰⁵

Indicator 17: A Regional IDRL Treaty/Guidelines

A final indicator examined whether regional organizations had developed International Disaster Response Laws, Rules and Principles (IDRL) guidelines or treaties in line with the IFRC's 2007 Guidelines for the Domestic Facilitation and Regulation of International Disaster Relief and Initial Recovery Assistance (the "IDRL Guidelines").²⁰⁶ The guidelines deal with four major areas: emergency planning, emergency management and co-ordination on site, logistics/transport and legal and financial issues. While the IFRC has mainly encouraged states to incorporate IDRL in their disaster laws and policies, two regional organizations have activities on IDRL: the OAS and the EU.

One important asset of regional organizations in DRM which is not captured by any of these indicators is their convening power. Their knowledge of the ways member governments work and their staff's contacts with the relevant ministries and agencies make them important facilitators of communication between international actors, donor governments and governments of affected countries.

January 2006, available at: www.unocha.org/what-we-do/coordination-tools/UN-CMCoord/publications#

²⁰³ See: ASEAN Coordinating Centre for Humanitarian Assistance on disaster management, <http://www.ahacentre.org/>

²⁰⁴ Pacific Disaster Net is a collaboration of SOPAC, UNDP, OCHA, IFRC and ISDR. See: <http://www.pacificdisaster.net/pdn2008/>

²⁰⁵ See: Caribbean Disaster Information Network, http://www.mona.uwi.edu/cardin/virtual_library/searchlibrary.asp

²⁰⁶ International Federation of Red Cross and Red Crescent Societies, "IDRL Guidelines," accessed 15 November 2012, www.ifrc.org/en/what-we-do/idrl/idrl-guidelines/

SECTION 3

Conclusion

In almost all regions of the world, regional organizations are playing increasingly active roles disaster risk management. While each region has unique characteristics that shape the nature and activities of its regional bodies, it seems as if they all (or almost all) see value in working together to prevent disasters and to a lesser extent to respond to disasters occurring in the region.

International organizations seem to play an important role in building regional capacity and in supporting the development of strong regional organizations. International humanitarian agencies have developed an impressive operational capacity in disaster response and international development agencies are leading the way in advocating for disaster risk reduction. Regional organizations also add value in cases where disasters have regional consequences – whether through warning systems for tsunamis or sharing seismic data or monitoring volcanic activity. However, for governments with far less capacity, such as Myanmar, Laos, Haiti, Bolivia and Liberia, regional organizations may have an important role to play in responding to disasters, particularly in smaller-scale disasters that do not trigger major media coverage and international funding.

The principle of subsidiary suggests that a regional organization will play different roles vis-à-vis its members depending on their capacities and needs. Thus ASEAN played a more crucial role in responding to Cyclone Nargis in Myanmar in 2008 than it did in responding to the Thai floods in 2011. In this respect, one of the important roles which regional bodies can play is in addressing the needs of its weaker members and working to build their capacities for future response.

Regional organizations are playing an increasingly important role but more research is needed to understand the interaction between national governments, regional bodies and international actors in order to determine the particular value added by these different layers of DRM. More analysis is also needed of the way in which national and regional politics affects the work of regional bodies. The relationship between military and civilian regional mechanisms is an area in which more in-depth analysis would be useful. Finally, it would be helpful to survey member states of regional organizations about their expectations of regional bodies: What do they need? What do they expect? What are they willing to contribute? What are they willing to give up?



COLORADO, US (WALDO CANYON FIRE) 23 June 2012: By the time the fire was fully contained nineteen days later, it had led to the evacuation of 32,000 persons, cost two lives and destroyed 347 homes, the largest number in the history of Colorado. Photo: NASA/Jesse Allen and Robert Simmon

PORTUGAL Forest wildfire near houses. © Thinkstock.com



CHAPTER 3

IT ONLY TAKES A SPARK: THE HAZARD OF WILDFIRES

Prologue: The 2012 Waldo Canyon Fire

On 23 June 2012, cyclists spotted smoke and flames in a forested valley during a training ride a few miles outside of Colorado Springs (Colorado, USA). Erratic winds and what was to be the hottest and one of the driest years in many parts of the US led to the rapid spread of the Waldo Canyon Fire. By the time the fire was fully contained nineteen days later, it had led to the evacuation of 32,000 persons, cost two lives and destroyed 347 homes, the largest number in the history of Colorado. Overall, the 4,167 wildfires recorded in Colorado in 2012 caused losses of more than half a billion US dollars.²⁰⁷

What's in a Name?

Since the beginnings of human history, human beings and fire have enjoyed an intimate but uneasy relationship. While the control of fire was central to the development of human civilization, over the ensuing millennia fire has posed a constant threat to human beings and their settlements. Indeed, even though fire safety rules and regulations have steadily increased in recent centuries, approximately 2,500 persons are killed in 350–400,000 residential fires in the US each year.²⁰⁸ While the number of residential fires seems to be stable or even decreasing, at least in developed countries,²⁰⁹ another type of fire has gained increased attention and poses a different kind of threat: wildfires.

Uncontrolled fires originating outside of major human settlements are called wildfires, wild land fires, bushfires, forest fires, vegetation fires or peat fires, depending on the country and category of vegetation burned. In recent years, some of these fires have devastated large areas and received significant media coverage. This list includes a whole series of major wildfires in the western US in recent years; the 2009 devastating Victoria fires in Australia; the haze from Indonesian forest fires, which regularly results in a large band of smoke over Singapore and parts of Malaysia; and the 2010 forest and peat fires in Russia, which coupled with a heat wave, doubled the daily mortality rate in Moscow. In this chapter,

²⁰⁷ Tom McGhee, “4,167 Colorado wildfires caused record losses of \$538 million in 2012,” The Denver Post, 19 January 2013, www.denverpost.com/breakingnews/ci_22396611/4-167-colorado-wildfires-caused-record-losses-538#ixzz2JOM7DztZ. See also: Joey Bunch, “2 killed in Waldo Canyon Fire Identifies,” The Denver Post, 5 July 2012, www.denverpost.com/wildfires/ci_21013712; DenverNews, “Video Captures Start of Waldo Canyon Fire,” 29 June 2012, www.thedenverchannel.com/news/video-captures-start-of-waldo-canyon-fire

²⁰⁸ FEMA, US Fire Administration, “U.S. Fire Administration Fire Estimates,” 7 November 2012, www.usfa.fema.gov/statistics/estimates/index.shtml

²⁰⁹ Relatively few reliable global comparisons on fires exist.

we discuss the hazard of wildfires, beginning with definitions, an overview of some of the largest wildfire disasters in recent years and a statistical comparison between wildfires and other types of disasters. This is followed by analysis of the relationship between wildfires and global megatrends, such as urbanization and climate change. The chapter closes with an examination of the response of governments, fire fighters and communities to the increasing threat of in wildfires.

SECTION 1

Wildfires: From Hazard to Disaster

EM-DAT defines a wildfire as “an uncontrolled burning fire, usually in wild lands, which can cause damage to forestry, agriculture, infrastructure and buildings.”²¹⁰ While there are different definitions of wildfires, it is generally agreed that wildfires, whether accidentally or deliberately caused by human beings, originate outside of densely populated human settlements and that humans lose control over how the fires burn, at least for a period of time.

Compared to other kinds of hazards such as earthquakes, volcanic eruptions, floods or storms, where humans have little influence on the onset of the hazard, humans are directly implicated in causing wildfires. For example, in the US in 2011, of 74,126 recorded wildfires, 63,877 or 86.2 percent of fires were caused by humans.²¹¹ The way in which a wildfire spreads depends on a set of factors, including topography, weather (with dry and hot conditions usually favoring the onset of fires and wind determining their spread) and fuel (the material available for the fire to burn).

More than most other hazards, human action can not only mitigate the effects of wildfires but can intervene to prevent its onset and spread. While humans stand little chance of stopping floods or landslides once they have begun, many countries have become quite adept at successfully fighting wildfires, meaning that the hazard often can be controlled before it causes a disaster. Forests and grasslands can be burned proactively to prevent uncontrolled burning. Forest areas can be cleared of dry fuel to prevent fires from starting.

Even though they are often harmful to humans, naturally occurring wildfires play an important ecological role. The process of burning returns nutrients to the soil, destroys dead or decaying matter and can also rid forests of both disease-ridden plants and insects which harm the forest ecosystem.²¹²

The Food and Agriculture Organization’s 2010 Global Forest Resource Assessment reports that an average of 64 countries, representing 60 percent of the global forest area, reported 487,000 vegetation fires per year during the period 2003-2007. The list was topped by

²¹⁰ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, “Glossary,” accessed 25 January 2013, www.emdat.be/glossary/9

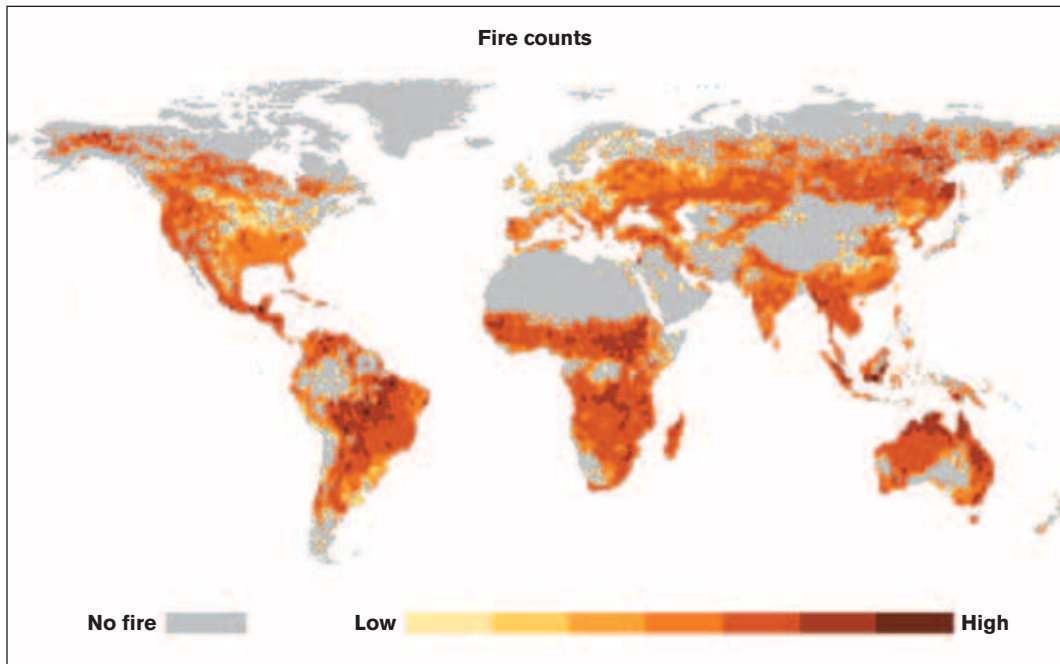
²¹¹ National Interagency Fire Center, “Lighting and Human Caused Fires,” accessed 15 January 2013, www.nifc.gov/fireInfo/fireInfo_stats_lightng.html

²¹² National Geographic, “Wildfires, Dry, Hot and Windy,” accessed 5 February 2013, <http://environment.nationalgeographic.com/environment/natural-disasters/wildfires>

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Mozambique, the United States, Madagascar, Poland, Portugal, the Russian Federation, Spain, Argentina and Hungary, all of which reported an average of more than 10,000 fires per year. The low number of reporting countries shows that on global levels, serious data and reporting gaps on wildfires exist.

Graph 5 Number of Observed Fire Occurrence Readings from Combined Remote Sensing Products, 1996-2007²¹³



In terms of the surface area burned by wildfires (including forested and non-forested areas), data from 78 countries, representing 63 percent of the global forest area, reveal that an average of just under 60 million hectares (148 million acres) of land was burned per year during the 2003-2007 period, an area approximately the size of Ukraine. The largest areas burnt were reported by Cameroon, Mali, Botswana, Chad, Namibia, United States, Ghana, Canada, Mongolia and Senegal.²¹⁴

While globally there are a large number of wildfires, a large majority of them do not cause disasters as they do not threaten human health, lives and livelihoods. The International Disaster Database (EM-DAT), which only records disasters of a certain size,²¹⁵ reports

²¹³ Data from MODIS (Moderate Resolution Imaging Spectroradiometer) and ATSR (Along Track Scanning Radiometer). From Max A. Moritz, M. A. Parisian, E. Batlioni, M. A. Krawchuk, J. Van Dorn, D. J. Ganz and K. Hayhoe, *Climate change and disruptions to global fire activity*, Ecosphere, June 2012, Volume 3, no. 6, Art. 49, p.11, www.esajournals.org/doi/pdf/10.1890/ES11-00345.1

²¹⁴ UN Food and Agriculture Organization of the United Nations (FAO), *Global Forest Resources Assessment 2010, Main Report*, 2010, pages 75ff.

²¹⁵ For an explanation see Annex I of this Review or www.emdat.be

156 wildfire disasters in the 2000-2011 period, making up only 3.39 percent of all natural disasters recorded in the database during that decade. The 780 fatalities from wildfires that the database records make up 0.07 percent of global disaster fatalities during the period. This is still more than the number killed by volcanoes (0.05 percent), but far below the number of deaths caused by earthquakes (responsible for 63.5 percent of fatalities), storms (16 percent), extreme temperatures (13.46 percent), floods (6.2 percent) and drought.²¹⁶

To get a better picture of the scope of and challenges caused by wildfires, we look in more depth at some of the major wildfire disasters in recent years.

Table 8 Major Wildfire Disasters, 1983-2012, in Terms of Fatalities and Economic Damage²¹⁵

| Country | Date | Fatalities | Economic Damage (millions USD) |
|---------------|-----------------|------------|--------------------------------|
| Indonesia | September 1997* | 240 | 8,000 ²¹⁶ |
| China | May 1987 | 191 | 110 |
| Australia | February 2009* | 180 | 1,300 ²¹⁷ |
| Australia | February 1983 | 75 | 400 |
| Greece | August 2007 | 67 | 1,750 |
| Indonesia | August 1991 | 57 | 13.2 |
| Nepal | March 1992 | 56 | 6.2 |
| Russia | July 2010* | 53 | 1,800 |
| Canada | January 1989 | 1 | 4,200 |
| United States | October 2003 | 4 | 3,500 |
| United States | October 2007 | 8 | 2,500 |
| Spain | July 2005 | 11 | 2,050 |

* See below for more in-depth information on these wildfires.

Indonesia, 1997-1998

The wildfires in 1997 on the islands of Kalimantan and Sumatra in Indonesia were the largest in the country's history. Reports indicate that a total of five million hectares (12 million acres) of land were burned of which approximately 20 percent was forested land, 50

²¹⁶ EM-DAT - The International Disaster Database, accessed 31 January 2013, www.emdat.be/

²¹⁷ EM-DAT - The International Disaster Database, accessed 9 October 2012, www.emdat.be/

²¹⁸ The ADB provided an alternate estimate of \$6,307,000. Alternate estimate from Luca Tacconi, "Fires in Indonesia: Causes, Costs and Policy Implications," Center for International Forestry Research, Occasional Paper No. 3, February 2003.

²¹⁹ Estimates on land burned differ widely. Consider, for example, the 1998 survey from the European Union Forest Fire Response Group (EUFFRG), which estimates the affected land area at 2 million hectares. See: David Glover and Timothy Jessup, *Indonesia's Fires and Haze: The Cost of Catastrophe*, Singapore: Institute of Southeast Asian Studies, 1999.

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percent was agricultural land and 30 percent was non-forest vegetation and grasslands.²²⁰ The evidence suggests that many of the fires were deliberately set either to clear land for palm oil and rubber plantations or by smallholders using slash-and-burn techniques.²²¹ Slow-burning peat fires, which proved especially hard to extinguish, caused high levels of haze and carbon dioxide emissions. These fires took place in peat swamp forests, many of which were drained in the 1990s to be converted to agricultural production.²²² In mid-to-late November, the fires were extinguished by heavy rainfall, but reignited on Kalimantan in early 1998. Persistent and heavy haze covered the islands and surrounding region for several weeks, impacting air quality in neighboring Singapore and Malaysia.²²³ Because of their impact on forests in Indonesia and the amount of carbon emitted, these fires have been described as one of the century's worst environmental disasters. (See Table 9 below for a cost breakdown by the Asia Development Bank.)²²⁴

Table 9 Cost Breakdown of 1997 Indonesia Wildfires²²³

| Item | Cost (millions USD) |
|--|---------------------|
| Fire-related costs | |
| Timber | 1,839 |
| Estate crops | 319 |
| Firefighting costs | 12 |
| Carbon emissions | 1,446 |
| Non-timber forest products | 631 |
| Buildings and property | 1 |
| Flood protection/erosion and siltation | 1,767 |
| Smoke hazard-related costs | |
| Health | 148 |
| Tourism | 111 |
| Transportation | 33 |
| Total | 6,307 |

²²⁰ Estimates on land burned differ widely. Consider, for example, the 1998 survey from the European Union Forest Fire Response Group (EUFFRG), which estimates the affected land area at 2 million hectares. See: David Glover and Timothy Jessup, *Indonesia's Fires and Haze: The Cost of Catastrophe*, Singapore: Institute of Southeast Asian Studies, 1999.

²²¹ J. Jackson Ewing and Elizabeth McRae, "Transboundary Haze in Southeast Asia: Challenges and Pathways forward," NTS Alert October 2012, Centre for Non-Traditional Security Studies, S. Rajaratnam School of International Studies, www.rsis.edu.sg/nts/html-newsletter/alert/nts-alert-oct-1201.html

²²² Reuters, "Indonesia peat fires help fuel annual choking haze," 29 August 2007, www.reuters.com/article/2007/08/29/idUSJAK291803_CH_2400

²²³ Elizabeth Frankenberg, Douglas McKee and Duncan Thomas, "Health Consequences of Forest Fires in Indonesia," *Demography*, vol. 42, no. 1, February 2005, pp. 109-129.

²²⁴ Luca Tacconi, "Fires in Indonesia: Causes, Costs and Policy Implications," *Center for International Forestry Research*, Occasional Paper No. 3, February 2003.

²²⁵ Asian Development Bank estimate; adapted from Luca Tacconi, "Fires in Indonesia: Causes, Costs and Policy Implications," *Center for International Forestry Research*, Occasional Paper No. 3, February 2003, p. 8.

While the fires of 1997-1998 were by far the worst in the region's recent history, fires and deforestation continue to pose a major threat throughout the region. Especially in El Niño years, which bring drier conditions to the region and raise the risk of fires, haze has become a major bone of contention in the region. Since the 1990s, ASEAN has taken on the issue and in 2002 adopted a legally binding Agreement on Transboundary Haze Pollution which committed the parties to the ambitious task of drastically reducing forest fires in the region. While this agreement has been signed by all ten ASEAN members, so far Indonesia has declined to ratify the agreement, presumably because of concerns about sovereignty or reputation.²²⁶ Meanwhile Indonesia has taken steps to deal with the issue unilaterally, for example by outlawing the clearing of land by burning, but capacity challenges limit the enforcement of those laws.²²⁷

Australia's Black Saturday Bushfires, February 2009

After two months of almost no rain and a day with temperatures of up to 115 degrees Fahrenheit (46 degrees Celsius) and northwesterly winds over 62 miles per hour (100 kilometers per hour), the worst bushfire in Australia's history occurred on 7 and 8 February 2009 in Victoria. 173 people were killed and approximately 430,000 hectares (one million acres) of land were directly affected by the fires, including 70 national parks and reserves and 3,550 agricultural facilities. Some 2,000 properties and 61 businesses were reportedly destroyed in numerous communities.²²⁸

Australia pursues a 'prepare, stay and defend or leave early' policy, urging people either to stay and defend a well-prepared home or to leave for a safe place well before a fire threat occurs. A study of 100 years of bushfire casualties has demonstrated that most fatalities occurred on open ground, when victims fled the flames at the last moment, rather than in homes. The February 2009 Victorian Black Saturday bushfires seriously challenged many of the assumptions behind the 'prepare, stay and defend or leave early' policy. Studies in the aftermath of the Black Saturday showed that of the 173 people who died in 2009, 113 perished inside their homes and a further 27 just outside their homes. Research showed that not only were people unaware of the fire risk or insufficiently prepared to defend their properties, but also that the extreme conditions of that day would have required a different approach.²²⁹ The Royal Commission formed to investigate the fires called for a revision of

²²⁶ J. Jackson Ewing and Elizabeth McRae, "Transboundary Haze in Southeast Asia: Challenges and Pathways forward," NTS Alert October 2012.

²²⁷ Liz Gooch, "Malaysia Haze Points to a Regional Problem," *The New York Times*, 23 June 2012, www.nytimes.com/2012/06/24/world/asia/smoky-haze-over-malaysia-signals-a-regional-problem.html?_r=0; see also: Vanda Felbab-Brown, "Indonesia Field Report III – The Orangutan's Road: Illegal Logging and Mining in Indonesia," Brookings Institution, 7 February 2013, www.brookings.edu/research/reports/2013/02/07-indonesia-illegal-logging-mining-felbabbrown

²²⁸ Victoria Department of Sustainability and Environment, "Bushfire history – Major bushfires in Victoria," 2012, www.dse.vic.gov.au/fire-and-other-emergencies/major-bushfires-in-victoria; see also: ABC, "Black Saturday", accessed 30 January 2013, www.abc.net.au/innovation/blacksaturday/#/stories/mosaic

²²⁹ Bushfire CRC, "Evaluation of 'Stay or Go' Policy," accessed 31 January 2013, www.bushfirecrc.com/projects/c6/evaluation-stay-or-go-policy

Victoria's bushfire safety policy, including investment in better warning systems, improved flexibility in responding to heightened risks on particularly severe days and improved bushfire safety education.²³⁰

Russia, July and August 2010

Hundreds of wildfires spread throughout European Russia in late July and early August 2010, stemming from record high temperatures of up to 100 degrees Fahrenheit (38 degrees Celsius).²³¹ Years of poor planning also contributed to the severity of the fires, as flames swept through peat bogs which had been initially drained (and not re-flooded) by Soviet engineers to provide a source of peat for electrical power.²³² The direct death toll as a result of the wildfires was recorded as 53 people, but this does not include the far higher numbers who died from smog-related effects or the heat wave itself. According to the EM-DAT, these two phenomena caused over 55,000 fatalities. Smog and heat saw Moscow's mortality rates double from the previous year.²³³ The Russian Federation's health ministry reported that carbon monoxide levels climbed to more than six times their maximum permissible level, with other unspecified toxins reaching up to nine times acceptable limits.²³⁴ Wildfire flames engulfed and destroyed more than 2,000 homes, propelling Russian authorities to dispatch 2,000 defense ministry troops and 3,000 interior ministry personnel to assist the 10,000 firefighters in suppressing these blazes.²³⁵ More than 14 million hectares (34 million acres) of land were affected, destroying approximately one-quarter of the country's grain crop. Because of the grain losses, the government imposed a ban on exporting wheat, one of the country's main exports.²³⁶

²³⁰ 2009 Victorian Bushfires Royal Commission, *Final Report, Summary*, July 2010, www.royalcommission.vic.gov.au/Commission-Reports/Final-Report/Summary

²³¹ BBC News, "Death Rate Doubles in Moscow as Heatwave Continues," 9 August 2010, www.bbc.co.uk/news/world-europe-10912658; see also: Jakarta Post, "Moscow Deaths Double Amid Smog to 700 People a Day," 9 August 2010, www.thejakartapost.com/news/2010/08/09/moscow-deaths-double-amid-smog-700-people-a-day.html

²³² New York Times, "Past Errors to Blame for Russia's Peat Fires," 12 August 2010, www.nytimes.com/2010/08/13/world/europe/13russia.html?_r=2&ref=world

²³³ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be; see also: BBC News, "Death Rate Doubles in Moscow as Heatwave Continues", 9 August 2010, www.bbc.co.uk/news/world-europe-10912658

²³⁴ Christian Science Monitor, "Russia Wildfires: Thick, Toxic Smog Chokes Moscow Residents," 8 August 2010, www.csmonitor.com/World/Europe/2010/0808/Russia-wildfires-Thick-toxic-smog-chokes-Moscow-residents

²³⁵ Al Jazeera English, "Russia Struggles with Wildfires", 3 August 2010, <http://english.aljazeera.net/news/europe/2010/08/201083114931428770.html>

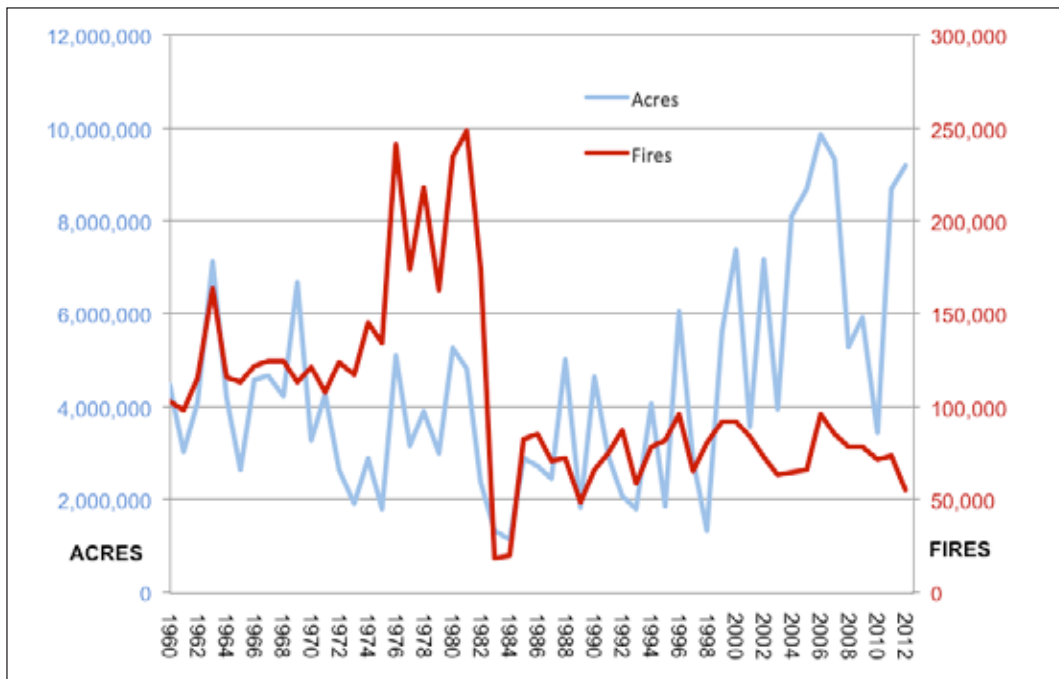
²³⁶ IRIN, "ASIA: Unquantifiable damage caused by wildfires," 11 October 2010, www.irinnews.org/Report/90729/ASIA-Unquantifiable-damage-caused-by-wildfires; see also: International Business Times, "UN Calls for Emergency Meeting on Rising Food Prices," 3 September 2010, www.ibtimes.com/articles/49115/20100903/wheat-russia-un-fao-export-food-grain-prices-cereal-outlook.htm

SECTION 2

More Fires on the Horizon: Wildfire Trends, Urban Sprawl and Climate Change

As discussed above, while wildfires are a hazard that occurs with high frequency in many climate zones and countries, they rarely develop into major disasters. However, when they do become major disasters, they can become both deadly and expensive. In this section we look how global developments and trends, such as urbanization and climate change, affect wildfires. While it is not representative of all countries and climate zones, we focus on the example of the US to discuss some of these trends because it is a heavily exposed country in terms of wildfires and because data availability is high.

Graph 6 Wildfires and Acres Burned in the US, 1960-2012²³⁷



As evident in Graph 6, the overall trend in the US has been a significant decline in the number of wildfires over time, coupled with a steep rise in the acreage burned by those fires. This is due to the fact that there has been an increase in the number of larger, more extreme fires in recent years. This increase in the number of larger fires is the result of a decade-long policy of fire exclusion and suppression, which on the one hand minimized the

²³⁷ National Interagency Fire Center, "Total Wildland Fires and Acres (1960-2009)," accessed 4 February 2013, www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html

area burned during that time, but on the other hand led to the buildup of fuels, which in the long run significantly increased the fire risk and allowed larger fires to develop.²³⁸

Another reason for the rise in area burned is climate change. There is a strong relationship between climate change and wildfires, as climate conditions influence the availability and type of fuel, atmospheric conditions and ignitions. A hotter and drier climate in many parts of the world will lead to more favorable conditions for wildfires, while increased precipitation or desertification in other regions might actually decrease wildfire risk. Particularly in temperate regions, such as the US, the earlier onset of spring pushes the snow-melting season forward, leading to drier soils and vegetation earlier in summer. This, in turn, lengthens the dry season and leads to increased fire risk. Higher average temperatures can also lead to droughts and drier summers. Moreover, changes in precipitation and in fauna and vegetation affect the water cycle and water tables. All these factors influence wildfire patterns. For the US, especially its western parts, most models and scientists anticipate a significant increase in both wildfire probability and the potential areas at risk of burning because of a warmer climate.²³⁹ Another effect of climate change might be the greater prevalence of harmful and invasive species, such as the mountain pine beetle. Warm temperatures in the US contribute to the rapid spread of the mountain pine beetle which is an invasive species that kills pine forests, making them more prone to wildfires.²⁴⁰

Without going into the intricacies of climate change models and the variation of their predictions, climate change science predicts major shifts in wildfire susceptibility in different regions. A recent study by Moritz et al, analyzing fire probability predicted in 16 global climate change models, shows significant differences in changes in fire probability between lower and higher latitudes. According to the study, most of the predicted increase will occur in the higher northern latitudes, while fire activity will decrease in the equatorial regions, a trend which will grow through the end of the century. However, the study also notes that there is little agreement between climate change models in the changes they project for about half of the globe.²⁴¹

There is an interesting feedback loop between climate change and forest fires. While a changing climate leads to a higher wildfire risk in many regions, forests and wildlands also absorb major quantities of carbon emissions. Estimates show that US forests absorb between one million and three million metric tons of carbon dioxide each year, thus offsetting between 20 percent and 46 percent of the country's greenhouse gas emissions. When trees are burned or decompose, they release their carbon back into the atmosphere. Loss of

²³⁸ Fire suppression policies developed in the early twentieth century, partly as a reaction to major forest fires in 1910. Research into the usefulness of fire for forest ecology in the 1970s led to a gradual rethinking of the suppression policy. See: U.S Forest Service, "U.S. Forest Service History," updated 26 June 2012, <http://www.foresthstory.org/ASPNET/Policy/Fire/Suppression/Suppression.aspx>

²³⁹ Max A. Moritz, M. A. Parisian, E. Batlioni, M. A. Krawchuk, J. Van Dorn, D. J. Ganz and K. Hayhoe, "Climate change and disruptions to global fire activity," *Ecosphere*, June 2012.

²⁴⁰ Josh McDaniell, "Wildfire and Beetle Kill Across the Rocky Mountains," *Advances in Fire Practice Website*, 2009, www.wildfirelessons.net/Additional.aspx?Page=141

²⁴¹ Moritz et al., op. cit., see also: Don McKenzie, "Wildland Fire in a Changing Climate," *Symposia at National Council for Science and the Environment*, 13th National Conference on Science, Policy and the Environment, Washington DC, 15 January 2013, www.environmentaldisasters.net/topics/view/81494

forest and forest degradation contributes as much as 17.4 percent of global greenhouse gas emissions each year – a quantity higher than emissions from global transport. One of the major drivers of forest loss is transformation of forest to agricultural land for small and large scale agriculture and much of the forest is cleared through fire. Uncontrolled forest fires on the other hand are an important factor in forest degradation in many countries. These facts lead many to conclude that burning forests are major drivers of climate change.²⁴²

Peat fires release particularly large amounts of emissions into the atmosphere. This is due to the fact that peat represents a huge storage of organic materials, sometimes accumulating over thousands of years. Estimates from the 1997-98 fires in Indonesia are that while only 20 percent of the area that burned consisted of peat, fires in peat areas contributed 90 percent of the total emissions released in the disaster. In total, the Indonesian wildfires in 1997 released greenhouse gases equal to 20 to 40 percent of overall global emissions that year.²⁴³ As more and more peat swamps are drained for land conversion purposes, the fire risk for peat areas significantly increases.²⁴⁴

Aware of the strong link between the destruction of forests and climate change, countries under the United Nations Framework Convention on Climate Change (UNFCCC) during the Thirteenth Conference of Parties in Bali (2007) agreed on a program focusing on the reduction of emissions from deforestation and forest degradation. The REDD (Reducing Emissions from Deforestation and Forest Degradation) mechanism was designed to provide incentives for developing countries to make those reductions by protecting forest areas rather than harvesting them.

The REDD mechanism was expanded to become REDD+ in the UNFCCC Copenhagen summit's Accord, which broadened the initiative to include activities in the areas of conservation, sustainable management of forests and the enhancement of forest carbon stocks to reduce emissions. The Copenhagen Accord also created multilateral REDD+ initiatives including the Forest Carbon Partnership Facility (FCPF) and Forest Investment Program (FIP) hosted by the World Bank.²⁴⁵

Under the REDD mechanism, developing countries protecting their forests have the carbon of those forests assessed and quantified and then receive compensatory financial support from developed countries.²⁴⁶ In the first stage of the REDD mechanism, countries develop their 'REDD readiness,' meaning developing the technical and institutional requirements

²⁴² Toni Johnson, "Deforestation and Greenhouse-Gas Emissions," Council on Foreign Relations, 21 December 2009, www.cfr.org/natural-resources-management/deforestation-greenhouse-gas-emissions/p14919; see also: The Nature Conservancy, Conservation International and Wildlife Conservation Society, *Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience*, 2010; Gabrielle Kissinger, Martin Herold, Veronique De Sy, Drivers of Deforestation and Forest Degradation, A Synthesis Report for REDD+ Policymakers, Lexeme Consulting, August 2012.

²⁴³ Mike Flannigan, "Peat fires could accelerate climate change," Natural Sciences and Engineering Research Council of Canada, www.eurekalert.org/pub_releases/2012-02/nsae-pfc021512.php

²⁴⁴ B. Langemann and A. Heil, *Release and dispersion of vegetation and peat fire emissions in the atmosphere over Indonesia 1997/1998*, Atmospheric Chemistry and Physics Discussions, 4, 2117-2159, 2004.

²⁴⁵ The Forest Carbon Partnership Facility, www.Forestcarbonpartnership.org; The Forest Investment Program, <https://www.climateinvestmentfunds.org/cif/node/5>

²⁴⁶ UN-REDD Programme, "About REDD+," accessed 31 January 2013, <http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx>

to host REDD projects; this stage is followed by the development of REDD demonstration projects. Since 2008, a joint UNDP, UNEP and FAO REDD program supports countries to implement the REDD mechanism on issues such as measurement, reporting and verification of greenhouse gas emissions and monitoring safeguards as well as governance issues.²⁴⁷

Urbanization and Settlement Patterns

While the effects of climate change impact the occurrence of wildfires in many areas, it is human action, especially settlement patterns, which are leading to the increase in catastrophic wildfires. With the massive expansion of the wildland-urban interface (WUI), more people are simply living in harm's way. The WUI is the area where houses meet or intermingle with undeveloped wildland vegetation. It is in these areas where the protection of structures is most difficult and where human-caused fires are most common. The WUI in the US covers about 9 percent of the country's territory and 39 percent of all housing units in the US are located at the WUI.²⁴⁸ Similar trends are observed in other regions of the world, such as southern Europe.²⁴⁹

The trend of increasing urbanization goes hand in hand with the rise in the number of houses destroyed by wildfires each year. The average number of structures lost in wildfires in the US has increased dramatically since the 1990s. In the 1960s, the average number of houses lost per year was 209; in the 2000s it had increased more than tenfold to 2,872. 2011 saw a peak with the destruction of 5,850 structures.²⁵⁰ As urbanization is a global megatrend, with more than half of the world's population living in urban areas since 2008, many countries may encounter similar challenges of managing the cohabitation of human beings and nature in areas of urban sprawl.²⁵¹

The expansion of both the WUI and the areas affected by wildfires in the United States have led to a massive increase in wildfire suppression costs. While annual fire suppression costs were around \$400 million in the 1970s, these costs rose to \$1.4 billion in the 2000s, with a peak of \$1.8 billion in 2007. This means that the percentage of the US Forest Service's total budget devoted to fire suppression has increased from 13 percent in 1991 to 48 percent of the budget during the 2009 fiscal year. Most of the funds have been spent on a small number of very large fires.²⁵² The fact that fighting fires consumes such a high percentage of the agency's budget means that other tasks – such as managing forests and preventing wildfires – get short shrift.

²⁴⁷ For more information see: UN-REDD Programme, "The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries," <http://www.un-redd.org/>

²⁴⁸ V. C. Radeloff et al, "The Wildland-Urban Interface in the United States," *Ecological Applications*, vol. 15, no. 3, 2005, p. 799.

²⁴⁹ European Environmental Agency, "Analysing and managing urban growth," 25 January 2011, www.eea.europa.eu/articles/analysing-and-managing-urban-growth

²⁵⁰ Karen Warnick, "Wildfire Forum – 2011 lessons learned, 2012 prediction, community protection," Arizona Insurance Council, 24 April 2012, www.azinsurance.org/WMI2012WFForum.html

²⁵¹ UNFPA, "Urbanization: A Majority in Cities," accessed 28 February 2013, <http://www.unfpa.org/pds/urbanization.htm>

²⁵² Timothy Ingalsbee, *Getting Burned: A Taxpayer's Guide to Wildfire Suppression Costs*, Firefighters United for Safety, Ethics, & Ecology, August 2010, p. 7.



UNITED STATES Fires and smoke in Georgia and Florida. Photo: © Thinkstock.com

UNITED STATES Smoke from the Waldo Canyon Fire in Colorado Springs. Photo: © Laura Gangi | Dreamstime.com



SECTION 3

Fight Fire with Fire: Concluding Thoughts

*“When we develop somewhere, the planning process should do a risk assessment for a range of things including flood, sea level rise and bushfire. My argument is that what people need to do is not a risk assessment based upon the climate they have been observing, but a risk assessment of what the climate is projected to be in 2050 or 2100.”*²⁵³

—David Karoly, Climatologist, Head of Victoria Government's climate change advisory group

Wildfires are a complex phenomenon and as they occur in almost all vegetation zones and on all continents, the challenges faced by different countries and communities are diverse and manifold. No other natural hazard is more connected to human behavior as evidenced in the many ways that humans shape, reshape, foster and destroy their habitats. From indigenous farmers, who use slash-and-burn agriculture to feed their families, as their ancestors did for millennia, to palm-oil producers torching primary forests to expand their plantations, from city dwellers who want to live in a green and forested suburb even though it is at risk of wildfires, to the hiker who throws away a burning cigarette – all are shaping the profile of global wildfire risk.

Statistically, the likelihood of an individual human being getting killed by a wildfire is fairly negligible, but the human and material costs from wildfires have been increasing in recent decades. Given that climate predictions suggest that developed countries in temperate regions will face increased risk from wildfires, it is likely that economic damages from wildfires will rise substantially in the coming decades. Moreover, there is a strong argument that perhaps the most significant cost of wildfires is not the material losses they cause or the price of fighting them, but the impact that wildfire emissions have on climate change. While scientific debate continues about the exact amount of carbon emissions caused by wildfires, recent studies estimate that fires in the US release about 290 million metric tons of carbon dioxide each year. At the 2011 rate of \$9.20 for a ton of sequestered carbon, offsetting these emissions would cost a staggering \$2.6 billion. In comparison, the REDD global carbon market in 2011 was estimated to be worth \$237 million.²⁵⁴

At the same time, it is important to recognize that wildfires fulfill an important ecological role in natural systems and stopping them completely would be both impossible and harmful. Mechanisms are thus needed to manage the hazard of wildfires which take into account human safety and human forest economy, as well as forest ecology, habitat conservation

²⁵³ Adam Morton, “Climate change must be ‘a factor’ in deciding whether to rebuild,” The Age, 11 February 2009, www.theage.com.au/national/climate-change-must-be-a-factor-in-deciding-whether-to-rebuild-20090210-8315.html#ixzz2JOnikFrR

²⁵⁴ Ecosystem Marketplace, “Forest Carbon Prices Doubled in 2012,” 2 November 2012, www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=9399§ion=news_articles&eod=1; see also: National Science Foundation, “U.S. Fires Release Enormous Amounts of Carbon Dioxide,” Press Release 07-163, 31 October 2007, www.nsf.gov/news/news_summ.jsp?cntn_id=110580. On overall emissions from deforestation see: Nature, “Scientists publish consensus statement on deforestation emissions,” 4 December 2012, <http://blogs.nature.com/news/2012/12/scientists-publish-consensus-statement-on-deforestation-emissions.html>

and climate change mitigation and adaptation. In many cases practices to reduce the risk of catastrophic wildfires and to protect communities from the risk of fires are already well-known. Progress is also being made in managing sustainable forests and providing incentives for conservation rather than the destruction of forest and wildland areas.

Forest and Wildfire Management

Forest management experts have developed a range of proposals on how to more effectively manage wildfires in an era of climate change. US experts, for example, have proposed increasing landscape and biological diversity, detecting and eliminating invasive species and improving watershed management and planning on larger scales. In terms of adapting to climate change, they propose strong partnerships between scientists and resource managers to figure out the best adaptation responses for forest and wildland ecosystems. They also propose treating large fires as an opportunity to develop management plans for what happens after the fires and implementing early detection and rapid response mechanisms to deal with fires at an early stage. The experts also suggest significantly more investment in treating fuels and more prescribed burning of forests under safe conditions.²⁵⁵

More, but smaller, wildfires would cause less damage to both forest ecology and human beings as they are less costly, easier to contain and less intensive, thereby allowing better regeneration of forests. But preventing fire through prescribed burnings is not uncontroversial as even prescribed fires can get out of hand, leading to evacuations and property loss.²⁵⁶ Prescribed fires also cause smoke and haze, which is at minimum a nuisance and often poses a serious health hazard to people living close to the area of prescribed fires. For those reasons, local officials are usually not ardent supporters of managing fire risks through prescribed burning. Colorado Governor John Hickenlooper, for example, suspended the use of such burns in March 2012 after a prescribed fire destroyed dozens of homes near Denver.²⁵⁷

On the international level, the UN Food and Agriculture Organization has developed Fire Management Voluntary Guidelines which are aimed at assisting countries in developing an integrated approach to fire management, from prevention and preparedness to

²⁵⁵ Fuel treatment reduces the amount of burnable materials in a forest by removing dead vegetation and trees, especially at the ground level and/or thinning out the forest. This leads to less intense forest fires.

Jeremy S. Littell et al, *U.S. National Forests adapt to climate change through Science-Management partnerships*, Climatic Change, 5 February 2011; see also: David L. Peterson et al, *Responding to Climate Change in National Forests: A Guidebook for Developing Adaptation Options*, US Department of Agriculture, Forest Service, November 2011; David L. Peterson, "Wildland Fire in a Changing Climate," Symposia at National Council for Science and the Environment, 13th National Conference on Science, Policy and the Environment, Washington DC, 15 January 2013.

²⁵⁶ See for example: The Denver Channel, "Prescribed Burns Getting Out Of Control Not Unheard Of: At Least 5 Wildfires In Colorado Last Year Started As Planned Burns," 28 March 2012, www.thedenverchannel.com/news/prescribed-burns-getting-out-of-control-not-unheard-of

²⁵⁷ Fox News, "Colorado governor suspends prescribed burns after deadly wildfire destroys homes," 28 March 2012, www.foxnews.com/us/2012/03/28/colorado-governor-suspends-prescribed-burns-after-deadly-wildfire-destroys/#ixzz2K8hf56Mu

suppression and restoration. The guidelines suggest that ‘good fires’ should be advocated and supported and that fire regimes should assist in maintaining sustainable, properly functioning ecosystems. In other words, attention should be paid not only to the damage and destruction caused by fires but also to the underlying ecological and social causes of fire.²⁵⁸

It is also significant that climate change negotiations have addressed the crucial role of forests in the global ecosystem, especially with respect to the global carbon balance. While still controversial, particularly evidenced in the critique that it would lead to commodification of forests and further violations of the rights of indigenous peoples and local communities, REDD+ is starting to fulfill an important function by supporting developing countries to reduce emissions and sustainably manage forests. To counter some of the criticism it has attracted, REDD+ has sought to develop safeguards to protect the rights of stakeholders, particularly indigenous groups.²⁵⁹ It is too early to judge how successful the program will be over the long term and whether it will be able to slow deforestation and forest degradation on a large scale, but even with these uncertainties, the engagement of a wide range of actors, from governments to development actors and civil society, has fostered important research and discussion around issues of climate change mitigation through sustainable forestry and wildland management.

Dealing with Risk

As discussed above, one of the main reasons for the increase in wildfire disasters has been the ongoing encroachment of human settlements into wildland areas. Most of the costs in fighting fires stem from protecting human settlements from wildfires. In many cases in the developed world, people who lose their homes are either insured or receive government assistance to rebuild their houses. While wildfires have not led to a situation comparable to flood insurance, where private insurers in the US have declined to provide coverage and the federal government had to step in, a rise in wildfire damage would raise the distinct probability that the public could end up subsidizing people who build in risky areas. While there is a need for a wider societal discussion on who should bear the risks of settling in potentially vulnerable areas, certain steps could help to lessen the exposure and losses from wildfires:

- ❖ Zoning: Authorities should restrict building in the most vulnerable areas or at least urge people who want to build in high risk areas to carry a certain amount of the risk, by either compelling them to purchase insurance policies and/or to take stringent fire mitigation measures.

²⁵⁸ FAO, “Forest and other vegetation fires,” 27 March 2012, www.fao.org/forestry/firemanagement/en; see also FAO, *Fire Management Voluntary Guidelines*, Fire Management Working Paper 17/E, 2006, www.fao.org/docrep/009/j9255e/j9255e00.htm

²⁵⁹ Climate Justice Now, “REDD-plus decision further shapes actions on forests,” 22 December 2012, www.climate-justice-now.org/%E2%80%99Credd-plus%E2%80%9D-decision-further-shapes-actions-on-forests/

- ❖ Risk mapping: Fire risk maps should be publicly available and fire risk should be clearly communicated to community members so they can make informed decisions about where to build. Risk mapping should be informed by the latest science on climate change's impact on wildfires. As this is difficult for small communities, collaboration is needed between communities, national governments and scientists to develop risk maps for high risk areas.
- ❖ Mitigation: People living in high-risk areas should be pushed or incentivized to invest in fire mitigation measures, using fire retardant materials and mitigating fire risk in vulnerable neighborhoods. In the US, some insurance companies evaluate houses' wildfire risk and threaten to drop homeowners' policies if owners do not improve the fire safety of their houses. Specific mitigation measures might be rewarded with discounts on insurance rates.²⁶⁰

Special attention should be paid to safeguarding plants, businesses and research facilities that deal in dangerous and hazardous materials. During the 2010 Russian wildfires, one of the issues was the risk of spreading nuclear fallout from the 1986 Chernobyl nuclear disaster through the wildfires.²⁶¹ In the US in 2011, raging wildfires in New Mexico forced the evacuation of the nuclear lab at Los Alamos.²⁶² Facilities with a certain risk profile should not be built in high wildfire risk areas and if they are already there, stringent wildfire safety and contingency plans need to be created and enforced. Inhabitants need to be informed of secondary and cascading risks stemming from wildfires through such facilities and authorities need to develop contingency plans for the probability of such cascading effects.

- ❖ Public education and information: As Australia's policy shows, defending a house is a possible option, but this needs technical training and information for those living in fire-prone areas as well as warning systems that clearly indicate when defense is not advisable. Public education about evacuation procedures, routes and emergency shelters should also be a standard procedure in wildfire-prone areas.
- ❖ Particularly in countries that will experience higher risk of wildfires in the future, discussion is needed about the risks to firefighters' health and life. In 2011, 61 firefighters were killed on duty in the US (the ten-year average is 91), seven of them while fighting wildfires.²⁶³ Not every building or structure might be worth saving when firefighters' lives are on the line.

²⁶⁰ Bankrate.com, "Wildfires spark home insurance preconditions," 25 June 2012, www.bankrate.com/finance/insurance/wildfires-spark-home-insurance-preconditions.aspx; see also: CNN, "The next battle for wildfire victims: Insurance," 25 October 2007, http://money.cnn.com/2007/10/23/news/companies/california_fires/index.htm

²⁶¹ Time Magazine, "Fallout from Russia's Fires: The Ashes of Chernobyl?" 19 August 2010, www.time.com/time/world/article/0,8599,2011860,00.html#ixzz2KK4CRYwa

²⁶² New York Daily News, "New Mexico wildfires force evacuation at Los Alamos nuclear laboratory," 27 June 2011, www.nydailynews.com/news/national/new-mexico-wildfires-force-evacuation-los-alamos-nuclear-laboratory-article-1.129481#ixzz2KK56VZm2

²⁶³ National Fire Protection Association, "Firefighter Fatalities in the United States, 2011," accessed 4 February 2013, www.nfpa.org/publicJournalDetail.asp?categoryID=2603&itemID=57591&cookie%5Ftest=1

More Data, More Research

Researching the phenomenon of wildfires makes it clear how limited data on wildfires are compared to data on other natural hazards. While there seem to be numerous initiatives to strengthen data and reporting on wildfires globally, most notably through remote sensing (which helps to track the number of fires and the amount of area burnt) there is little comprehensive data about economic costs of wildfires and their broader effects, such as on health.

Given that climate change will change fire risks and patterns in many countries, the scaling down of climate models for regional and local areas is particularly important for the coming decades, as is research on how forest management and communities in fire-prone regions can adapt to climate-triggered changes in wildfire hazards.²⁶⁴ Donor countries should support research and data collection in developing countries and foster learning and exchange to promote sustainable forest management around the globe.

As forests and wildlands in many countries lose out against food and agricultural production or resource extraction, there is an ongoing need to study best practices in sustainable forest use and forest conservation. For example, in examining biofuels, research is needed on how developed economies' sometimes misguided green policies and consumption patterns can have a diminishing footprint on forests and wildlands in developing countries, many of which are burned for the benefit of those who put more greenhouse gasses in the atmosphere than the average person in a developing country.

Wildfires are one of the most complex natural hazards as they closely interrelate with human activity and agency. Many solutions for intelligently dealing with wildfires (using them when needed and preventing them when necessary) already exist, but given the massive challenges there is a need to scale-up effective interventions and to more proactively and effectively share information about what works in managing wildfires. Both urbanization and climate change will lead to major shifts in wildfire risk around the globe. Urban planners and municipal policymakers must consider wildfire risk in planning settlement patterns. Because of the strong interlinkages between forests and climate change, managing wildfire risk is also part of both climate change mitigation and adaptation policies.

²⁶⁴ Downscaling climate data is a strategy for generating locally relevant data from Global Circulation Models (GCMs). The overarching strategy is to connect global scale predictions and regional dynamics to generate regionally specific forecasts. For more information see: University of British Columbia, "Downscaling Climate Data," climate-decisions.org, accessed 12 February 2013, www.climate-decisions.org/2_Downscaling%20Climate%20Data.htm



NORTH DARFUR, SUDAN A woman flashes her ration card at the voucher distribution centre at Abu Shouk Camp for Internally Displaced Persons. Photo: UN Photo/Albert González Farran

An internally displaced mother and her child board the bus to return to Sehjanna in North Darfur, after spending seven years in a refugee camp. Photo: UN Photo/Albert Gonzalez Farran



CHAPTER 4

DISASTER RISK MANAGEMENT: A GENDER-SENSITIVE APPROACH IS A SMART APPROACH

“Disaster risk reduction that delivers gender equality is a cost-effective win-win option for reducing vulnerability and sustaining the livelihoods of whole communities.”²⁶⁵

—**Margareta Wahlström**, UN Assistant Secretary-General for Disaster Risk Reduction, et al.

Women and girls, who account for over half of the 200 million people affected annually by natural disasters, are typically at greater risk from natural hazards than men – particularly in low-income countries and among the poor.²⁶⁶ Natural disasters and climate change often exacerbate existing inequalities and discrimination, including those that are gender-based, and can lead to new forms of discrimination.

The term “gender” refers to the socially-constructed roles, behaviors, activities and attributes that a society considers appropriate for a person based on his or her assigned sex at birth.²⁶⁷ Understanding the gender implications and facets of natural disasters and climate change is critical to effective disaster risk management practices that enable communities and countries to be disaster resilient.²⁶⁸ All women, men, girls and boys do not face the same needs and vulnerabilities in the face of natural disasters and climate change; there are differences within each group and between individuals regarding specific protection concerns and capacities – for example, people with mental or physical disabilities, minorities and indigenous populations, the elderly, chronically ill, unaccompanied children, child-headed household, female-headed households, widows, etc. – and over time throughout the disaster and post-disaster phases. Various factors, including social, economic, ethnic,

²⁶⁵ UNISDR, UNDP and IUCN, *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*, 2009, Preface, by Margareta Wahlström, Julia Marton-Lefèvre, Director General, International Union for Conservation of Nature (IUCN), and Jordan Ryan, UN Assistant Secretary-General, Assistant Administrator of UNDP and Director of the Bureau for Crisis Prevention and Recovery (BCPR), www.unisdr.org/we/inform/publications/9922

²⁶⁶ More than 100 million disaster-affected persons are women and girls. See: Margareta Wahlström, “Women, Girls, and Disasters,” 10 October 2012, <http://www.unisdr.org/archive/29064>. On risk and poverty, see: Alice Fothergill, “Gender, Risk, and Disasters,” *International Journal of Emergencies and Disasters*, vol. 14, no. 1, 1996, pp. 33-56; Alice Fothergill and Lori Peek, “Poverty and disasters in the United States: A review of recent sociological findings,” *Natural Hazards*, vol. 32, no. 1, 2004, pp. 89–110; World Bank, 2003 *World Development Report*; “Fighting Poverty while Supporting Recovery from Major Disasters, Synthesis Report, Learning Lessons from Recovery Efforts,” World Bank DMF and ProVention Consortium 2003, p. 1; Robin Mearns and Andrew Norton, eds., *The Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*, World Bank, 2010.

²⁶⁷ Definition adapted from World Health Organization, “Gender, women and health,” www.who.int/gender/whatisgender/en/

²⁶⁸ While the focus of this chapter is on natural disasters and disaster risk management, there are some parallels with climate risk management, and this chapter discusses some of the gendered vulnerabilities and capacities of women in the face of the expected impacts of climate change.

cultural and physiological factors, affect not only the ways that disasters impact women, men, girls and boys, but also their coping strategies and their participation in prevention, relief, recovery and reconstruction processes.

Women play significant roles in all stages of disaster and climate risk management; they are often at the frontline as responders and bring valuable resources to disaster and climate risk reduction and recovery.²⁶⁹ However, the important roles or potential roles women take on are often not recognized, and women themselves “are largely marginalized in the development of DRR policy and decision-making processes and their voices go unheard.”²⁷⁰ Yet, in most crisis situations, women and children account for the majority of those affected (e.g., more than 75 percent of those displaced by natural disasters, and typically 70 to 80 percent of those needing assistance in emergency situations).²⁷¹ Moreover, global pressures of urbanization have particular implications for men and women in both urban and rural communities. As the frequency and severity of hydro-meteorological hazards due to climate change are predicted to increase, it is important to understand the relationship between gender and disasters.²⁷²

Women serve their communities as leaders in ways that often go unrecognized by national governments and international organizations. While they may not hold positions of visible political leadership (for example, as mayors), women are key to a society’s social fabric and hence, its capacity for resilience. They shape behavior and transmit culture and knowledge through kin and social networks, which are critical to risk prevention and response efforts. They help to rebuild their communities after disasters strike. Women often serve as teachers, nurses and social workers and as such are well-placed to assess community needs and implement disaster relief and recovery programs. Women’s leadership in civil society organizations can provide the potential for their participation in more formal processes of DRR, response and recovery efforts.²⁷³

In addition, it is important to note the important economic role women play, and how disasters and climate change can impact their economic well-being and that of their

²⁶⁹ See for example: Elaine Enarsson, “Promoting Social Justice in Disaster Reconstruction: Guidelines for Gender-Sensitive and Community-Based Planning,” in K.R. Gupta, ed., *Urban Development Debates in the New Millennium* (New Delhi, India: Atlantic Publishers and Distributors, 2005), pp. 25-33, and World Bank, *Gender and Climate Change: Three Things You Should Know*, 2011, p. 7, <http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1232059926563/5747581-1239131985528/5999762-1321989469080/Gender-Climate-Change.pdf>

²⁷⁰ UNISDR, UNDP and IUCN, *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*, 2009, p. 24.

²⁷¹ These figures reflect the typical demographic percentage of populations in developing countries. Chew and Badras, “Caught in the Storm: The Impact of Natural Disasters on Women, Global Fund for Women,” 2005, p. 4, www.globalfundforwomen.org/storage/images/stories/downloads/disaster-report.pdf. Lorena Aguilar, *Climate Change and Disaster Mitigation*, International Union for Conservation of Nature, 2004, www.fire.uni-freiburg.de/Manag/gender%20docs/DRR-Climate-Change-Gender-IUCN-2009.pdf

²⁷² See for example: Intergovernmental Panel on Climate Change (IPCC), *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)*, November 2011, www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

²⁷³ In another context, research found that women’s groups played important roles in at least some peace processes even though women were not officially at the ‘negotiating table.’ See: Brookings-Bern Project on Internal Displacement, *Addressing Internal Displacement in Peace Processes, Peace Agreements and Peace-Building*, September 2007, www.brookings.edu/idp

families.²⁷⁴ Even though women often face inequitable access to control over resources and income generation opportunities, disaster and climate risk management must take into account the important economic contributions of women and how they are, or might be, affected by disasters. As a United Nations Environment Programme study explains:

“Women play a critical role in agricultural and pastoral livelihoods, often bearing significant responsibility for managing critical productive resources such as land, water, livestock, biodiversity, fodder, fuel, and food. They also contribute work and energy towards income generation and carry out a disproportional amount of daily labour compared to men in household and community spheres, such as cooking, cleaning, child care, care of older or sick family members, providing work for collective projects and during weddings, funerals and other cultural ceremonies.”²⁷⁵

Gender dimensions of natural disasters have gained increasing recognition at the international level since the 1990s.²⁷⁶ Initial strategies for disaster risk reduction developed for the 1990-2000 International Decade for Natural Disaster Reduction failed to include specific gender components. However, much progress has since been made to mainstream gender in disaster risk reduction (DRR) policies and programs, particularly since 2001, due to the engagement of UNDP, UNISDR and other UN agencies – such as UNIFEM, the UN Commission on the Status of Women – international financial organizations and regional and civil society organizations.²⁷⁷ Gender is a cross-cutting principle of the Hyogo Framework for Action 2000-2015: on Building Resilience of Nations and Communities to Disaster, which states that: “A gender perspective should be integrated into all disaster risk management policies, plans and decision making processes, including those related to risk assessment, early warning, information management and education and training.” In addition, the Beijing Agenda for Global Action on Gender-Sensitive Disaster Risk Reduction (2009), adopted following the twenty-third special session of the General Assembly, entitled “Women 2000: Gender equality, development and peace for the twenty-first century,” calls for gender-sensitive approaches to disaster prevention, mitigation and recovery strategies and natural disaster assistance.²⁷⁸

²⁷⁴ On climate change impacts, see further the below section: “Understanding Gender-Based Vulnerabilities.”

²⁷⁵ Christian Nellemann et al., (eds.), *Women at the Frontline of Climate Change: Gender Risks and Hopes*. A Rapid Response Assessment, United Nations Environment Programme, GRID-Arendal, 2011, p. 29, www.unep.org

²⁷⁶ See for example: the various examples from the 1990s in World Health Organization, “Gender and Health in Disasters,” 2000, www.who.int/gender/other_health/en/genderdisasters.pdf; Shrader, E. and Delaney, P., “Gender and Post-Disaster Reconstruction: The Case of Hurricane Mitch in Honduras and Nicaragua,” World Bank Draft Report (January 2000); Eric Neumayer and Thomas Plümpner, “The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002,” *Annals of the Association of American Geographers*, vol. 97, iss. 3, 2007, pp. 551–566; Elaine Enarson, “Surviving Domestic Violence and Disasters,” Elaine Enarson, “Gender and Natural Disasters” IPCRR Working Paper no.1., International Labour Organization (Sept 2000), www.ilo.org/public/english/employment/recon/crisis/publ/index.htm; “The Role of Women in Disasters,” Disaster Preparedness in the Americas 34 (Apr 1998), Pan-American Health Organization, available at: www.vdl-bvd.desastres.net; Wiest, R. J. Mocellín and D. Thandiwe Motsisi, “El papel de la mujer en la etapa de reconstrucción y desarrollo” *Desastres y Sociedad* 4 (1995), <http://osso.univalle.edu.co/tmp/lared/public/revistas/r4/art4.htm>; Inventario de desastres en Centro América – Período 1960-1999.

²⁷⁷ For further examples and analysis, see: UNISDR, UNDP and IUCN, *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*, 2009, www.unisdr.org/we/inform/publications/9922

²⁷⁸ See the documents available at UN Women: “Beijing and its Follow up,” www.un.org/womenwatch/daw/beijing/index.html

More generally, the UN system has taken action toward achieving gender equality, such as by adopting the Convention on the Elimination of All Forms of Discrimination against Women in 1979 and the Beijing Platform for Action in 1995 at the Fourth World Conference on Women in Beijing, which established gender mainstreaming as a global strategy for the promotion of gender equality.²⁷⁹ It also recognized that "... many women are also particularly affected by environmental disasters, serious and infectious diseases and various forms of violence against women," and called on governments to implement various actions to guard against and address these issues.²⁸⁰ Building on the Beijing Platform for Action, in 1997, the UN system began to work towards mainstreaming gender perspectives into all of its policies and programs, at all levels, which "...has provided an enabling environment for gender mainstreaming in DRR."²⁸¹ Reflecting this push toward gender mainstreaming in disaster risk management, many UN agencies and organizations have developed guidelines and manuals for a gender-based approach to disaster management.²⁸² However, the challenges lie in translating policy into effective practice. In addition, there is still much to be done to integrate gender-sensitive approaches into national legislation and policies for disaster and climate risk management. Moreover, there is broad recognition, if not a consensus, that gains in disaster and climate risk management are predicated on effectively addressing underlying gender inequities, and that disasters can open up opportunities to improve pre-disaster gender and other inequities.²⁸³ Participation is one area in which inequities must be addressed for gains in risk reduction. As Special Representative of the UN Secretary-General (SRSG) for Disaster Risk Reduction Margareta Wahlström remarked on the occasion of the International Day for Disaster Reduction, which focused on women and girls: "Countries that do not actively promote the full participation of women in education, politics, and the workforce will struggle more than most when it comes to reducing risk and adapting to climate change."²⁸⁴

²⁷⁹ See further: UN Office of the Special Adviser on Gender Issues and Advancement of Women, *Gender Mainstreaming: An Overview*, 2002, www.un.org/womenwatch/osagi/pdf/e65237.pdf

²⁸⁰ *Beijing Declaration and Platform for Action*, para. 256, www.un.org/womenwatch/daw/beijing/pdf/BDPfA%20E.pdf

²⁸¹ Citation from UNISDR et al., *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*, 2009, p. 7.

²⁸² See for example: the Inter-Agency Standing Committee (IASC) *Operational Guidelines on the Protection of Persons in Situations of Natural Disasters* (2011); Sphere Minimum Standards for Disaster Response; UNISDR, UNDP and IUCN, *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines* (2009); Asia-Pacific Forum on Women, Law and Development, *Guidelines for Gender Sensitive Disaster Management* (2006); International Federation of Red Cross and Red Crescent Societies Strategy 2020; IASC *Gender Handbook for Humanitarian Action: Women, Girls, Boys and Men - Different Needs, Equal Opportunities* (2006); *Hyogo Framework for Action 2005- 2015: Building Resilience of Nations and Communities to Disasters* (2005); and the IASC *Guidelines for Gender-based Violence Interventions in Humanitarian Settings: Focusing on Prevention and Response to Sexual Violence in Emergencies* (2005).

²⁸³ UNISDR, *The Disaster Risk Reduction Process: A Gender Perspective. A Contribution to the 2009 ISDR Global Assessment Report on Disaster Risk Reduction—Inputs from the Gender and Disasters Network*, Facilitated by UNISDR, Geneva, February 2009; United Nations Economic Commission for Latin America and the Caribbean (UNECLAC), *Handbook for Estimating the Socio-Economic and Environmental Effects of Disasters*, 2003, Vol. IV, p. 45, www.gdrc.org/uem/disasters/disenvi/VOLUME%20IV.pdf

²⁸⁴ Margareta Wahlström, "Women, Girls, and Disasters," The Independent/All Africa Global Media via COMTEX, 22 October 2012, www.unisdr.org/2012/iddr/docs/IDDR_Factiva_Publications.pdf

In this chapter, we examine some of the gender-related vulnerabilities and capacities in natural disasters, why it is important to adopt a gender-based strategy for planning and response, what a gender-based approach to disaster management looks like, and recommendations to relevant actors.

SECTION 1

Understanding Gender-Based Vulnerabilities

IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters

Protection of Women—Cross-References to Relevant Guidelines

Guideline(s) Topic

- I.1 Non-discrimination
- I.3 Participation and consultation
- I.8 Protection activities to be prioritized on the basis of assessed needs
- A.1.1 Protection of life, physical integrity and health of persons exposed to imminent risks
- A.4.1 Special attention to protection against violence, including in camps and collective centers during and after the emergency
- A.4.2 Protection against gender-based violence
- A.4.3 Protection against trafficking, child labor, contemporary forms of slavery
- A.5.2 Security and protection in camps and collective centers
- B.1.1 – B.1.2 Access to and adequate provision of humanitarian goods and services
- B.1.4 Addressing gender-specific roles in humanitarian action
- B.2.1 Including women in planning, design and implementation of food distribution
- B.2.2 Safety in accessing sanitation facilities in camps and collective shelters
- B.2.3 Adequate shelter addressing the specific needs
- B.2.5 Special attention to health needs of women
- B.2.6 Equal access to education
- C.1.5 Assistance in (re-)claiming property and acquiring deeds in one's own name
- C.2.3 Consultation and participation in planning and implementation of shelter and housing programs
- C.3.1 – C.3.2 Access to livelihoods and skills training
- D.1.1 Equal access to documentation issued in one's own name
- D.4.1 Feedback on disaster response

Women are typically more vulnerable than men to the effects of natural disasters and climate change, not only because of biological and physiological differences, but also, notably, because of socioeconomic differences and inequitable power relations.²⁸⁵ As a result, in most cases, mortality rates in disasters are higher – sometimes much higher – for women than for men. Women seem to have higher mortality rates in countries where their enjoyment of economic and social rights is low. Overall figures for flooding indicate that four women die for every male death, but that the gender differential is much less in countries where women enjoy more rights. Some studies looking at both women and children have found that they are 14 times more likely than men to die in natural disasters.²⁸⁶

Gender inequities can be evident in a lack of, or inadequate, early warning information targeting women and evacuation procedures and arrangements. Indeed, knowledge of early warnings and the decision to evacuate may be the exclusive domain of men. In some cases, women may be ill-informed about natural hazards and not allowed to make the decision to evacuate. This was the case, for example, in Bangladesh's Cyclone Gorky in 1991 in which women accounted for 90 percent of the 140,000 fatalities.²⁸⁷ In contrast, the World Bank notes that the lack of deaths in one community affected by Hurricane Mitch in Nicaragua, La Masica, was a result of women's involvement in preparedness education and other activities, including their monitoring of the early warning system.²⁸⁸

Other differences can also put women at a greater risk of mortality. For example, some women have physiological limitations that prevent them from surviving, such as less strength or endurance compared to men.²⁸⁹ In addition, they may not, compared to men and boys, have been taught to swim, and may face difficulty in fleeing with their children or elderly relatives in tow, and when pregnant.²⁹⁰ The fact that so many more women than men perished during the 2004 Indian Ocean Tsunami meant that many men had to take on new

²⁸⁵ Eric Neumayer and Thomas Plümpner, "The Gendered Nature of Natural Disasters: The Impact of Catastrophic Events on the Gender Gap in Life Expectancy, 1981–2002," *Annals of the Association of American Geographers*, vol. 97, iss. 3, 2007, pp. 551–566. Neumayer and Plümpner analyzed disasters in 141 countries and found that in countries where women and men enjoyed equal rights, mortality rates for both sexes were equal.

²⁸⁶ Ariana Araujo and Andrea Quesada-Aguilar, *Gender Equality and Adaptation*, International Union for Conservation of Nature, 2007, www.gdnonline.org/resources/IUCN_FactsheetAdaptation.pdf; UNDP, *Gender and Disasters*, October 2010, www.undp.org/content/dam/undp/library/crisis%20prevention/disaster/7Disaster%20Risk%20Reduction%20-%20Gender.pdf. See also: Neumayer and Plumper, op. cit.; Oxfam, *The Tsunami's Impact on Women*, Briefing Note, 2005, <http://www.oxfam.org/en/policy/bn050326-tsunami-women>. However, men may be more likely to engage in risky behavior, owing to prevailing social norms, which may lead to higher male mortality rates, as in was observed in reactions to Hurricane Mitch. See for example: World Bank, "Hurricane Mitch: The gender effects of coping and crises," Poverty Reduction and Economic Management Notes, August 2007, No. 57, www1.worldbank.org/prem/PREMNotes/premnote57.pdf

²⁸⁷ Female mortality rates compared to male mortality rates were most significant within the 20–49 age group: they were four to five times higher. For further analysis and a related literature review, see: Keiko Ikeda, "Gender differences in human loss and vulnerability in natural disasters: A case study from Bangladesh," *Indian Journal of Gender Studies*, September 1995, vol. 2 no. 2, pp. 171–193.

²⁸⁸ World Bank, *Gender and Climate Change: Three Things You Should Know*, 2011, p. 5.

²⁸⁹ Oxfam, *The Tsunami's Impact on Women*, Briefing Note, 2005.

²⁹⁰ UNISDR, UNDP and IUCN, *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*, 2009, p. 38.

CHAPTER 4: DRM: A GENDER-SENSITIVE APPROACH IS A SMART APPROACH

roles within their families, while also trying to continue to earn a living.²⁹¹

After natural disasters strike, pre-existing vulnerabilities and patterns of discrimination are usually exacerbated and women face protection risks including unequal access to assistance, discrimination in aid provision, loss of documentation, and inequitable access to property restitution.²⁹² A lack of security in camps, impunity for perpetrators of violence and a breakdown of social structures that is often prevalent in a crisis also result in protection risks for women. Women may face heightened risk of domestic violence, and other forms of sexual and gender-based violence and exploitation, including trafficking.²⁹³ For example, following the 2004 Indian Ocean Tsunami, women in IDP camps in Aceh faced an increased risk of sexual and gender-based violence, including trafficking. Poor IDP camp design, including the placement and design of latrines, increased the protection risks for women and reportedly made women feel unsafe.²⁹⁴ There were reports of traffickers coming to IDP camps promising women and girls jobs, proposing marriage, or seeking adoption, and of IDPs' involvement in trafficking in the camps, such as through the recruitment of girls.²⁹⁵ Following Tropical Storm Bopha (Pablo) in the Philippines, there were reports of the presence of "recruiters" in some affected villages promising women work as domestic help in the Middle East, and a reported rise in some instances in the number of women taking up this offer.²⁹⁶ In Haiti since the 2010 earthquake, while accurate data is difficult to obtain, women and girls have been particularly vulnerable to sexual and gender-based violence in camps.²⁹⁷ A 2010 UN Development Fund for Women (UNIFEM) assessment

²⁹¹ All India Disaster Mitigation Institute, *Tsunami, Gender and Recovery*, Special Issue for International Day for Disaster Risk Reduction, October 12, 2005, iss. 6, p. 3.

²⁹² See: Inter-Agency Standing Committee (IASC) *Operational Guidelines on the Protection of Persons in Situations of Natural Disasters*, Brookings-Bern Project on Internal Displacement, January 2011, (adopted by the IASC in 2010), www.brookings.edu/research/reports/2011/01/06-operational-guidelines-nd

²⁹³ Inter-Agency Standing Committee guidelines on gender based violence (2005) recommend that humanitarian actors assume that sexual violence is present in all displacement and emergency situations, www.humanitarianreform.org/humanitarianreform/Portals/1/cluster%20approach%20page/clusters%20pages/Gender/tfgender_GBVGuidelines2005.pdf. See also: David R. Hodge and Cynthia A. Lietz, "The international sexual trafficking of women and children: A review of the literature," *Affilia*, Vol. 22, No. 2, 2007, pp. 163-174; Elaine Enarson, "Battered Women in Disasters: A Case Study of Gender Vulnerability," Paper presented for ASA, San Francisco, California, August 1998; Victoria Constance, "Disaster and Domestic Violence: Evaluating an Innovative Policy Response," in *Women in Disasters: Conference Proceedings and Recommendations*, May 5-6, 1998, Vancouver, British Columbia, www.gdnonline.org/resources/proceedings-latest.rtf

²⁹⁴ United Nations Population Fund (UNFPA), *Gender-Based Violence in Indonesia: A Case Study*, 2005, p. 12, www.unfpa.org/women/docs/gbv_indonesia.pdf

²⁹⁵ *Ibid.*, pp. 11-12.

²⁹⁶ Meena Bhandari, "Philippine storm rains down trafficking fears," *Al Jazeera*, 8 February 2013, www.aljazeera.com/indepth/features/2013/02/20132686919750.html; Patrick Fuller, "Two months on, Typhoon Bopha's victims still homeless," CNN, 5 February 2013, www.cnn.com/2013/02/05/world/asia/philippines-typhoon-survivors

²⁹⁷ On post-earthquake sexual violence in Haiti, see for example: Republic of Haiti, Submission to the United Nations Universal Periodic Review, 12th Session of the Working Group on the UPR Human Rights Council [October 3 - 14, 2011], *Gender-Based Violence Against Haitian Women & Girls in Internal Displacement Camps*, submitted by MADRE, KOFVIV, FAVILEK et al., <http://ijdh.org/wordpress/wp-content/uploads/2011/03/UPR-GBV-Final-4-4-2011.pdf>; Immigration and Refugee Board of Canada, Haiti: *Sexual violence against women, including domestic sexual violence; in particular, prevalence within and outside of camps for the internally displaced; criminal prosecutions* (2011-May 2012), 8 June 2012, HT1104085.E, www.unhcr.org/refworld/

conducted after the flooding in Pakistan found that women reported sexual harassment in IDP camps, which were characterized by cramped and unsafe conditions that did not allow them to practice *purdah*, and by a mix of tribes, families and villages.²⁹⁸ The text box below highlights the range of specific provisions on the protection of women addressed in the 2010 Inter-Agency Standing Committee (IASC) Operational Guidelines on the Protection of Persons in Situations of Natural Disasters.

Climate change effects also have gendered impacts on rights and livelihoods, and can result in changes to traditional practices.²⁹⁹ For example, when rural men migrate to cities because their livelihoods are threatened by the effects of climate change, rural women left behind often face increased risks.³⁰⁰ Their domestic workload usually increases, which is also generally the case after a disaster strikes. Climate change impacts can result in water scarcity, which increases the burdens on women, who are responsible for collecting water in many parts of the world.³⁰¹ As a result of the increased workload that women bear, girls may drop out of school to help their mothers.³⁰² Marriage customs in Dumuria village in Shyamnagar, India, have changed due to the increased salinity of water. Some parents do not want their daughters marrying, as no one will be able to collect water for them,

docid/4feaceb62.html; IOM, "Addressing Sexual Violence Against Women and Girls in Haiti's Displacement Camps," 17 May 2011, <http://reliefweb.int/report/haiti/addressing-sexual-violence-against-women-and-girls-haitis-displacement-camps>; MADRE, "Press Release: New Report on Sexual Violence in Haiti One Year After the Earthquake," 2011, www.commondreams.org/newswire/2011/01/10-5; Human Rights Watch, *World Report 2013: Haiti*, www.hrw.org/news/2010/12/17/sexual-violence-haiti-s-camps; Human Rights Watch, "Sexual Violence in Haiti's Camps," News, 27 December 2010, www.hrw.org/news/2010/12/17/sexual-violence-haiti-s-camps; Allie Torgan, "Seeking justice for Haiti's rape victims," CNN, 26 April 2012, www.cnn.com/2012/04/26/world/americas/cnnheroes-villard-appolon-haiti-rape. On the incidence of violence against women before the earthquake, note that according to a study conducted by the Inter-American Development Bank in Haiti in 2006, one-third of women and girls said they had suffered physical or sexual violence, and more than 50 percent of those who had experienced violence were under the age of 18; study not available online—see: PAHO, "Are Haitian Women and Children Getting Less Earthquake Aid?" Press Release, 17 November 2010, http://new.paho.org/hai/index.php?option=com_content&view=article&id=2327&Itemid=255 and "The IDB's 'A Response to Gender Based Violence in Haiti' Project, 2005-2009 (US\$145,000)," in Elizabeth Arend, *IFIs & Gender Based Violence Case Study: Haiti*, Gender Action, March 2012, p. 3, www.genderaction.org/publications/haitigbvcs.pdf

²⁹⁸ UNIFEM, *Pakistan Floods 2010: Rapid Gender Needs Assessment of flood affected communities*, September 2010, www.unifem.org/attachments/products/PakistanFloods2010_RapidGenderNeedsAssessment_en.pdf; IDMC and NRC, "Briefing paper on flood-displaced women in Sindh Province, Pakistan," June 2011, <http://www.internal-displacement.org/briefing/pakistan>

²⁹⁹ For further analysis, see for example: Christian Nellemann et al., (eds.), *Women at the Frontline of Climate Change: Gender Risks and Hopes. A Rapid Response Assessment*, 2011.

³⁰⁰ See for example: Dorte Verner, ed., *Adaptation to a Changing Climate in the Arab Countries: A Case for Adaptation Governance in Building Climate Resilience*, World Bank, Report No. 64635; Maximilian Ashwill et al., *Gender Dynamics and Climate Change in Rural Bolivia*, World Bank, November 2011.

³⁰¹ On water insecurity, see: IPCC, *Fourth Assessment Report*, 2007. On the labor burden on women, see: Robin Mearns and Andrew Norton, eds., *The Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*, World Bank, 2010.

³⁰² See for example: UNICEF, *Climate Change and Children: A human security challenge*, Policy Review Paper, UNICEF Innocenti Research Centre in cooperation with UNICEF Programme Division, 2008, www.unicef-irc.org/publications. See also: Baten and Khan (2010), Bartlett (2008), Campbell (2009), and Brody et al. (2008), cited in Christian Nellemann et al., op. cit., pp. 38, 46 and 51.

and marriages are not arranged with people in hard-hit areas.³⁰³ Other ricochet effects of climate change include food insecurity and health concerns. Women may turn to “survival sex” to provide for their families.³⁰⁴ Children may face an increased risk of health issues and economic and sexual exploitation and abuse.³⁰⁵

In order to prevent, mitigate and address protection concerns, the entire cycle of disaster and climate risk management planning and implementation should incorporate gender- and age-based approaches that take into account the vulnerabilities and capacities of women, men and children. To this effect, we now turn to some examples at the national, local and multilateral levels which show progress made and remaining challenges.

SECTION 2

Filling the Void: Women as Agents of Disaster Risk Management

Incorporating gender into disaster risk management efforts requires a rights-based approach at all levels of governance.³⁰⁶ While many UN agencies and international organizations have sought to incorporate gender into their policies, government efforts to incorporate gender into their national HFA plans are lackluster. To date, gender has only been incorporated into a fraction of national Hyogo Framework for Action plans: in 2009, only 20 percent of countries reported significant achievements incorporating gender into DRM, with no improvement by 2011.³⁰⁷ In support of HFA implementation efforts to this effect, UNISDR published in 2009 *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*.³⁰⁸

While there are some national, local and other DRR or DM policies that include gender components or are gender-sensitive, most national policies tend to focus on disaster response rather than disaster management.³⁰⁹ Some exceptions include India's National Disaster Management Guidelines (2007) for the development of state disaster management

³⁰³ Example from ActionAid Bangladesh, cited in Hannah Reid et al., *Up in smoke? Asia and the Pacific: The threat from climate change to human development and the environment*, 2007, p. 23.

³⁰⁴ See discussion on: “Gender and Climate Change,” in Hannah Reid et al., *Up in smoke? Asia and the Pacific: The threat from climate change to human development and the environment. The fifth report from the Working Group on Climate Change and Development*, 2007, pp. 22-23, <http://pubs.iied.org/pdfs/10020IIED.pdf>

³⁰⁵ See further: Emily Polock, *Child Rights and Climate Change Adaptation: Voices from Kenya and Cambodia*, Children in a Changing Climate, February 2010; Christian Nellemann et al., op. cit.

³⁰⁶ OHCHR has examined how climate change impacts identified by IPCC have implications for the enjoyment of human rights and for the obligations of states under international human rights law. See: United Nations Office of the High Commissioner for Human Rights (OHCHR), *Report of the Office of the United Nations High Commissioner for Human Rights on the Relationship between Climate Change and Human Rights*, A/HRC/10/61, 15 January 2009. See also: Oxfam International, “Climate Wrongs and Human Rights: Putting People at the Heart of Climate-Change Policy,” Oxfam Briefing Paper No. 117.

³⁰⁷ UNISDR, 2011 *Global Assessment Report on Disaster Risk Reduction. Revealing Risk: Redefining Development. Summary and Main Findings*, p. 10, www.preventionweb.net/english/hyogo/gar/2011/en/home/executive.html

³⁰⁸ UNISDR, UNDP and IUCN, *Making Disaster Risk Reduction Gender-Sensitive: Policy and Practical Guidelines*, 2009.

³⁰⁹ UNISDR, op. cit., p. 10.

plans, which call for both the participation of women in disaster planning and recognition of women as agents in disaster management.³¹⁰ India's National Policy on Disaster Management (2009) recognizes the vulnerability of women and other groups and mandates the inclusion of women in State Disaster Response Forces, the participation of women and youth in decision-making during community-based disaster preparedness, and charges states with providing for the "permanent" restoration of livelihoods for female-headed households, among other marginalized and vulnerable groups.³¹¹ Japan's Basic Guidelines for Reconstruction (2011), adopted in response to the Great East Japan Earthquake, state the aim to promote the participation of "women in all platforms and organizations of reconstruction, from the perspective of a gender equal society."³¹² As a 2011 study for the HFA Mid-Term Review notes, at the regional level, the Center for the Prevention of Natural

Pastoralist Boran Women in Ethiopia: Community Leaders for Drought Resiliency

Capacity building – including literacy and numeracy skills, and microenterprise training – was provided to pastoralist women's savings and loan groups in southern Ethiopia from 2000 to 2004 as part of the Pastoral Risk Management (PARIMA) project of the Global Livestock Collaborative Research Support Program. As a result of this initiative in impoverished communities on the Borana Plateau – hard-hit by drought in 1983-1985, 1991-1993, 1998-1999 – women (and communities as a whole) facing the 2005-2008 drought cycle were more resilient to chronic drought, with preserved assets, access to income and improved food security.

Using a community-based approach to tackle the issues their communities identified, poor women emerged as leaders, overcoming domestic burdens. As leaders, they engaged in local collective action, inspired from their participation in cross-border tours between their communities and those of Kenyan women leaders. The emergence of female leaders among the Boran shows that traditional gender roles are not always static: "It was...highly unexpected given that women have been typically relegated to performing menial tasks and having a low social profile in this society. Traditional gender roles are distinct for the Boran."

Disasters in Central America (CEPRENAC), an inter-governmental body, stands out for its efforts to bring together national disaster management and other government authorities with grassroots women's organizations to jointly review and develop DRR strategies.³¹³ The

³¹⁰ Government of India, National Disaster Management Authority, *National Disaster Management Guidelines: Preparation of State Disaster Management Plans*, July 2007, Sec. 7.1 and 8.2, www.adrc.asia/documents/dm_information/india_plan02.pdf

³¹¹ Government of India, *National Policy on Disaster Management*, 2009, Sec. 1.2.2; Sec. 3.4.5; Sec. 5.3.2; Sec. 9.5.1, www.preventionweb.net/files/12733_NationalDisasterManagementPolicy2009.pdf

³¹² Government of Japan, *Disaster Prevention and Reconstruction from a Gender Equal Society Perspective - Lessons from the Great East Japan Earthquake. From the "White Paper on Gender Equality 2012" Summary*, June 2012, p. 13.

³¹³ Suranjana Gupta and Irene S. Leung, *Turning Good Practices into Institutional Mechanisms: Investing in grassroots women's leadership to scale up local implementation of the Hyogo Framework for Action: An*

UNDP has noted that while regional bodies such as the Caribbean Disaster Emergency Management Agency (CDEMA) and SOPAC Division of Secretariat of the Pacific Community (SPC) have begun to address the gender aspects of climate risk management, "...much work remains to be done in order to consistently incorporate a gender perspective into ongoing disaster preparedness and management in Caribbean and Pacific island communities."³¹⁴ At the multilateral level, efforts by the World Bank include the development by the East Asia and Pacific department of regional guidance on gender-sensitive disaster and climate risk management, in addition to the provision of capacity building to Bank staff and partners, and country-level policy analysis.³¹⁵

In practice, disaster risk management processes across the board largely exclude the work already being done by women. A meeting of leading women experts at the birthplace of the Hyogo Framework for Action called on SRSRG Margareta Wahlström to exert pressure for gender equality in disaster risk reduction. Former Governor of Chiba Prefecture in Japan, Akiko Domoto, remarked at the meeting: "A lot of actual work is being done by women, but not integrated into policies and the decision-making process. It's a challenge for women to be visible. In disaster risk reduction, more social issues need to be advanced, not just infrastructure related issues."³¹⁶

This gap is evident around the world. According to a 2009 Huairou Commission survey, women's civil society organizations active in DRR in Latin America, the Caribbean, Asia, Africa, and the Middle East and North Africa region felt excluded from national emergency preparedness and other disaster risk reduction programs.³¹⁷ In terms of climate change negotiations, processes and institutions, similar trends in the lack of women's formal participation, despite significant local-level engagement, are prevalent.³¹⁸

While women's grassroots disaster and climate risk management efforts often go unrecognized beyond local levels, there are many examples of women playing DRM leadership roles in their communities. Women leaders around the world, including in the

in-depth study for the HFA Mid-Term Review, Huairou Commission and GROOTS International, 2011, p. 10, www.unisdr.org/files/18197_201guptaandleung.theroleofwomenasaf.pdf

³¹⁴ Lynette S. Joseph-Brown and Dawn Tuiloma-Sua, *Integrating Gender in Disaster Management in Small Island Developing States: A Guide*, 2012, p. 3, www.undppc.org.fj/_resources/article/files/Checklist_gender_DRM_and_SIDS_web.pdf

³¹⁵ Helene Carlsson Rex, Zoe Trohanis, *Making Women's Voices Count: Integrating Gender Issues in Disaster Risk Management*, World Bank, Operational Guidance Notes, 2011; World Bank, *Making Women's Voices Count: Integrating Gender Issues in Disaster Risk Management—Overview & Resources for Guidance Notes*, 2012, www.worldbank.org/eapdisasters; see also: World Bank, *Gender and Climate Change: Three Things You Should Know*, 2011.

³¹⁶ UN International Strategy for Disaster Reduction, "Japanese experts call for gender equality," 16 October 2012, <http://reliefweb.int/report/world/japanese-experts-call-gender-equality>

³¹⁷ Huairou Commission (HC), "Women's Views from the Frontline," 2009, www.preventionweb.net/english/professional/publications/v.php?id=10154

³¹⁸ Christine Haigh and Bernadette Vallely, *Gender and the Climate Change Agenda: The impacts of climate change on women and public policy*, Women's Environmental Network, 2010; Christian Nellesmann et al., (eds), *Women at the Frontline of Climate Change: Gender Risks and Hopes. A Rapid Response Assessment*, 2011, pp. 31-33; *Streamlining Climate Change and Gender: Gender Equality*, Climate Caucus, accessed 7 March 2013, www.climatecaucus.net/gender_equality_rec.htm

political arena, are serving as agents to reduce the risks associated with natural hazards and with climate change. For instance, Mauritania's first female mayor, Abdel Malick, was elected in 2001 and has since championed disaster risk reduction. The capital – which includes her municipality of 60,000 inhabitants, Teveragh-Zeinato, is experiencing rapid urbanization and is vulnerable to the effects of climate change, including sea level rise. To address these issues, in 2011 she joined the UNISDR “Making Cities Resilient

Campaign.” Through this campaign, she has organized several programs and campaigns with community participation, including schools, youth groups and women's groups, in mitigation and preparedness measures.³¹⁹ Gender-sensitive DRR efforts in Mauritania should be understood within the broader political and socioeconomic situation of women in the country.³²⁰ The fact that there were no women's groups participating in national DRR platforms, as revealed in Mauritania's 2013 report on its implementation of the HFA, reflects the trend found in the above-mentioned Huairou Commission survey.³²¹

There is ample evidence that women are actively involved as agents of DRM – in preparation, response and reconstruction efforts.³²² These roles are in addition to their domestic tasks and, in many cases, paid work. Domestic workloads increase for women after disasters, and disasters affect the type of work men and women are able to secure.³²³ In disaster contexts around the world, women have been effective community volunteers for disaster preparedness and mitigation, search-and-rescuers before official responders arrived, sources of community solidarity for coping after a disaster, professional service providers and political organizers for job and housing equity, among other roles and activities.³²⁴ For example, following the Spitak earthquake in Turkey, girls and young women located over 70,000 displaced persons, even though many had lost relatives themselves: “Victim/survivors themselves, they ‘survived psychologically by becoming active in their own rehabilitation.’”³²⁵

UNISDR points to several examples of women engaging at the community level in DRM. For example, in Cuttack, India, the women's group Mahila Milan leads disaster risk reduction efforts in informal settlements, through accurate, disaggregated digitalized risk mapping for urban development planning undertaken in partnership with local slum dweller

³¹⁹ UNISDR, “Mauritania's trailblazer for women and resilience,” www.unisdr.org/archive/30064

³²⁰ See for example: World Bank, *REPUBLIQUE ISLAMIQUE DE MAURITANIE: Evaluation Stratégique des Enjeux en matière de Genre en Mauritanie*, Report No. 39233, 2007.

³²¹ Government of Mauritania, Mauritania: *Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo* (2011-2013), 28 January 2013, www.preventionweb.net/files/31058_mrt_NationalHFAprogress_2011-13.pdf

³²² See examples from Honduras, Canada, United States, Australia, South Africa, India, Mexico, and further discussion in: Elaine Enarson, Gender and Natural Disasters, International Labor Organization, Working Paper No. 1, September 2000, www.ilo.int/wcmsp5/groups/public/---ed_emp/---emp_ent/---ifp_crisis/documents/publication/wcms_116391.pdf

³²³ *Ibid.*

³²⁴ *Ibid.*

³²⁵ Quote from R.A. Ayvazova and B.V. Mehrabian, 1995, “Post-disaster initiatives in traditional society: Armenian women after ‘Spitak’ earthquake,” *Stop Disasters* 24, p. 13, cited in Elaine Enarson, *Gender and Natural Disasters*, International Labor Organization, 2000, p. 16.

federations. City authorities use the digital maps, and data is used “to negotiate support for upgrading or relocating houses, thus reducing disaster risk.”³²⁶ In addition, UNISDR’s 2012 *Making Cities Resilient* report cites numerous examples of the involvement of vulnerable community groups, including women, in disaster risk management processes at the local level in various cities around the world – including in Santa Tecla, El Salvador; Albay, Makati and Quezón, Philippines; Thimphu, Bhutan; Bhubaneswar, India; and San Francisco, United States.³²⁷

Disaster and climate risk management policies and programs should not only involve the participation of women in their development, but efforts must also be taken to ensure that women are well-informed about them. A 2009 Huairou Commission survey of grassroots women’s organizations found that, “While governments have reported that they have comprehensive DM programs, women consistently stated that they were not aware of disaster management programs at the national level, nor did they understand what resources or entitlements were available through their government programs.”³²⁸

As the above analysis shows, in many instances, women already engage effectively in disaster and climate risk management, but there is a huge disconnect between their work and equitable integration into all stages of decision-making processes, policies and programs. As long as women are excluded from effective engagement at such levels, gender inequities will be persistent, and countries will not recover as quickly from both the major and chronic economic shocks that disasters and climate change impacts engender.

Perhaps as part of a broader trend to ‘build back better’ after a disaster occurs, some international agencies have seen the possibility of expanding women’s traditional roles in post-disaster response and recovery.³²⁹ As the Borana example above demonstrates, women may have more access to capacity-building programs and more and different livelihood opportunities in the aftermath of a disaster. In at least a few cases, particularly in high-visibility mega-disasters, women may end up with better housing or more tools than they would have otherwise had. The loss of husbands and fathers may lead to women assuming new roles within family structures and to changing power dynamics between women and men. Rather than counting on their husbands to grow food and build structures, for example, they may come to rely on humanitarian assistance. While their work often

³²⁶ UNISDR, *How To Make Cities More Resilient: A Handbook For Local Government Leaders*, March 2012, p. 35, www.unisdr.org/files/26462_handbookfinalonlineversion.pdf

³²⁷ UNISDR, *Making cities resilient report 2012: My city is getting ready! A global snapshot of how local governments reduce disaster risk*, second ed., October 2012, <http://www.unisdr.org/campaign/resilientcities/toolkit/report2012>; Earthquakes and Megacities Initiative, “Local stakeholders in Makati validate risk analysis results,” 6 August 2009, www.emi-megacities.org/home/projects/143-ffo/656-local-stakeholders-in-makati-validate-risk-analysis-results.html

³²⁸ Huairou Commission, “Women’s Views from the Frontline,” p. 3, www.preventionweb.net/files/10154_10154_WomensViewsFromtheFrontline.pdf

³²⁹ See: World Bank, *Handbook for Estimating the Socio-Economic and Environmental Effects of Disasters*, 2003, <http://siteresources.worldbank.org/INTDISMGMT/Resources/10women.pdf>; see also: UNDP, *Gender and Disasters*, October 2010, <http://www.undp.org/content/dam/undp/library/crisis%20prevention/disaster/7Disaster%20Risk%20Reduction%20-%20Gender.pdf>; PAHO, “Gender and Natural Disasters,” PAHO Factsheet: Women, Health and Development Program, <http://www.paho.org/english/hdp/hdw/genderdisasters.PDF>

increases – standing in lines for water or food, searching for fuel, caring for injured relatives – the workload of the traditional head of household may decrease. It is important not to overstate the case that disasters offer ‘silver linings’ for women. But disasters have a way of shaking up traditional structures in ways that may provide, at least in the short term, different possibilities for women.

SECTION 3

Recommendations and Conclusion

We now turn to a few recommendations for relevant stakeholders, to achieve sustainable gains in disaster and climate risk management by incorporating gender-based approaches. These recommendations are mutually reinforcing.

❖ **Promote and provide incentives for the meaningful participation of women in disaster and climate risk management, including in leadership roles**

Women should be effectively engaged in disaster and climate risk management prevention, planning, decision-making and implementation efforts. As a study commissioned for the 2010-2011 HFA Mid-Term Review recommended, governments’ engagement of women’s civil society organizations should be incentivized as a way to overcome their exclusion from decision-making.³³⁰ Providing adequate and timely support to women’s existing work, and ensuring their meaningful participation at local, national, regional and international levels, is critical to addressing gender inequities, with benefits for long-term, sustainable risk management and overall development gains. This means that governments and international humanitarian actors must devote time to identifying women’s associations and networks which are active in the community and creating mechanisms for their effective participation. Often, it is simply not effective to invite representatives of women’s groups to come to a meeting – particularly when most of the participants in the meeting are men. Rather, efforts must be taken to enable women to feel comfortable about putting forward their ideas.³³¹ Finding successful ways of engaging women takes time – more time than identifying traditional community leaders. And time is always difficult to find in the immediate aftermath of a disaster. For this reason, engaging women in longer-term work associated with disaster risk reduction and recovery efforts is more likely to be accepted and successful.

❖ **Ensure the implementation of a rights-based approach to disaster preparedness, response and recovery activities, using the Inter-Agency Standing Committee (IASC) Operational Guidelines on the Protection of**

³³⁰ Gupta and Leung, *Turning Good Practices into Institutional Mechanisms: Investing in grassroots women’s leadership to scale up local implementation of the Hyogo Framework for Action: An in-depth study for the HFA Mid-Term Review*, 2011, p. 26.

³³¹ Some humanitarian agencies have found it useful, for example, to organize focus groups for women only or to deploy female staff to reach out to women in affected communities.

Persons in Situations of Natural Disasters (2011) and other existing guidelines on humanitarian standards in situations of natural disasters.³³²

The Operational Guidelines cover measures for:

1. Protection of life; security and physical integrity of the person; and family ties;
2. Protection of rights related to the provision of food; health; shelter; and education;
3. Protection of rights related to housing; land and property; livelihoods; secondary and higher education; and
4. Protection of rights related to documentation; movement; re-establishment of family ties; expression and opinion; and elections.

These guidelines offer clear guidance to humanitarian actors and provide concrete examples of how to translate them into practice. For example, agencies can consider including women in food distribution teams and setting up separate lines and distribution points where cultural traditions limit women's mobility in public spaces.

As the Operational Guidelines emphasize, "Often, negative impacts on the human rights concerns after a natural disaster do not arise from purposeful policies but are the result of inadequate planning and disaster preparedness, inappropriate policies and measures to respond to the disasters, or simple neglect."³³³ Too often, national government officials and international agencies do not 'see' the needs of affected communities through a gender lens. And, yet, in order to ensure that the rights of all individuals affected by a disaster are upheld, a gender-specific approach is necessary.

In spite of almost ten years of work to raise the visibility of human rights in disaster situations and hundreds of pages of guidelines and manuals, the importance of awareness of gender aspects in DRM policies and practice cannot be overestimated. When those working in all phases of disaster risk management are aware of gender realities, they are more likely to develop and implement policies and programs that not only meet the specific needs of women and men, but that also tap into their invaluable capacities.

❖ **Collect and maintain gender-disaggregated data**

Governments and all organizations involved in disaster and climate risk management efforts must do a better job of collecting and maintaining data disaggregated by sex, age and other key characteristics. This data should inform assessments, strategies, policies, programs and monitoring and evaluation. Without this critical

³³² IASC, *Operational Guidelines on the Protection of Persons in Situations of Natural Disasters*, Brookings-Bern Project on Internal Displacement, January 2011, (adopted by the IASC in 2010), www.brookings.edu/research/reports/2011/01/06-operational-guidelines-nd

³³³ *Ibid.*, p. 2.

data to inform policy and planning, risks may not be adequately or effectively mitigated, thereby wasting precious financial and human resources. According to the 2010-2011 HFA Mid-Term Review, initial data from the 2009-2011 HFA Monitor indicate that 62 out of 70 countries do not collect vulnerability and capacity information disaggregated by gender.³³⁴ Hence, it is clear that collecting such data is a critical starting point for implementing a systematic, gender-sensitive approach to risk management. Governments should insist that their DRM programs collect gender-disaggregated data. Donors should require – and support – those they fund to collect information organized by gender and other relevant categories.

❖ **Conduct further research on gender and disaster and climate risk management**

While there has been a laudable increase in reporting on gender and natural disasters and climate change, particularly in recent years, there is still a dearth of gender-based analysis in existing risk reporting, assessments and evaluations that are not specifically focused on gender. For example, the IPCC's 2003 report failed to include gender considerations in its cross-cutting themes, and there is no attention to gender or women in its 2007 Synthesis report. The Urban Risk Assessment, developed by the World Bank, with UN-Habitat, UNEP and Cities Alliance, only mentions women in its suggestions for urban risk mapping which should take into account vulnerable groups, including "women-headed households," and "gender" as one of the variables which indicate household resiliency, to use in socioeconomic assessments.³³⁵ However, the reporting on the case studies lacked any specific gender analysis.³³⁶ A gender-sensitive approach does not just entail attention paid to or inclusion of women, but also consideration of the needs and capacities of men, which are often overlooked.³³⁷ At the same time, applying a gender analysis only in terms of vulnerabilities often has the effect of de-emphasizing the resources and capacities for leadership which women bring. While it is true that women tend to have specific vulnerabilities, it is also true that not all women are vulnerable. Care must be taken to consider and assess strategies that address the specific needs, vulnerabilities and capacities of men, women, children, and various groups within, as well as how their needs, roles and capacities change over time.

❖ **Ensure the integration of a gender-sensitive approach to disaster and climate risk management in key policies and programs** – including all five priority areas of the HFA, climate risk management plans and programs (e.g., the World Bank's

³³⁴ UNISDR, *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. Mid-Term Review 2010-2011*, March 2011, www.unisdr.org/we/inform/publications/18197

³³⁵ Developed as part of a Memorandum of Understanding on a joint Cities and Climate Change work program between UN-Habitat, UNEP, and the World Bank, and supported by Cities Alliance.

³³⁶ See: World Bank, *Urban Risk Assessments: An Approach for Understanding Disaster and Climate Risk in Cities*, Working Draft, 2011, pp. 31 and 44. The same language was used in the final report, which includes results from case studies where the URA was piloted. See: Eric Dickson et al., *Urban Risk Assessments: Understanding Disaster and Climate Risk in Cities*, World Bank, 2012, pp. 41 and 56, <http://elibrary.worldbank.org/content/book/9780821389621>

³³⁷ See for example: World Bank, *Gender and Climate Change: Three Things You Should Know*, 2011, p. 7.

country-level Strategic Programs for Climate Resilience), development strategies, and poverty eradication strategies. The need to incorporate DRR into development planning and poverty eradication programs is already widely recognized.³³⁸ There is also greater recognition of the need for a gender-sensitive approach to disaster and climate risk management efforts. This multi-pronged approach to disaster and climate risk reduction will greatly reduce risk for women, men, and children – and by extension, communities and countries as a whole.

Conclusion

As this chapter has recounted, international awareness of the importance of gender in humanitarian and development programs dates back some three decades, and national governments and international organizations have taken important steps to incorporate gender into disaster risk management policies and programs. And yet, in almost every major disaster of the past three decades, there are reports of women facing discrimination or neglect in assistance or recovery planning.³³⁹

Ensuring the integration of gender-sensitive approaches requires more than guidelines and statements of intent.³⁴⁰ It requires the active engagement of civil society, particularly human rights groups and women's associations to monitor both the development and implementation of these policies. National human rights commissions, for example, can play a role in identifying areas where women have been excluded from planning processes. Women's groups can develop mechanisms by which women can come together to identify their common concerns and develop strategies for voice these concerns to those in policy-making positions. International organizations should require reporting by their field staff on the concrete results of women's participation in relevant programs. For their part, donors should ensure that the organizations they fund integrate a gender perspective into all of their work.

Adopting a gender-sensitive approach to disaster risk management is not only an issue of basic human rights but also effective on the practical level. Simply put, policies that ensure that women as well as men are fully involved in planning DRR strategies and are full participants in recovery efforts are more likely to succeed. Disaster response strategies that protect and assist women as well as men are better for the community as a whole. A gender-sensitive approach is also a smart policy in that it enables the resources of all members of an affected community to be fully utilized.

³³⁸ UNISDR, "Towards a Post-2015 Framework for Disaster Risk Reduction," 2012, www.unisdr.org/files/25129_towardsapost2015frameworkfordisaste.pdf

³³⁹ See above text for specific examples, e.g. Haiti, Pakistan.

³⁴⁰ Even in developed countries, such as the United States, there were reports of dramatic increases in sexual and gender-based violence for those displaced by Hurricane Katrina in 2005; see: Chris Kromm and Sue Striggs, *Hurricane Katrina and the Guiding Principles: A Global Human Rights Perspective on a National Disaster*, Brookings-Bern Project on Internal Displacement and Institute for Southern Studies, January 2008, www.brookings.edu/~media/events/2008/1/14%20disasters/0114_isskatrina.pdf



BANGKOK, THAILAND 10 November 2011: The boy and barrier—worst flood disasters in 50 years hits Bangkok streets. Photo: © Noppasit | Dreamstime.com

SOMALIA 20 November 2012: Children from a camp for internally displaced persons (IDPs) near the African Union Mission in Somalia (AMISOM) base in Mogadishu. Photo: UN Photo/Tobin Jones



ANNEX I

A WORD ON DEFINITIONS AND SOURCES: PROBLEMS OF DEFINITION, PROBLEMS OF METHODOLOGY

Defining ‘natural disasters’

Natural disasters: “The consequences of events triggered by natural hazards that overwhelm local response capacity and seriously affect the social and economic development of a region.”³⁴¹

Natural hazards in themselves – hurricanes, floods, droughts – are not disasters. Rather it is their consequences and the ability of the local community to respond to them that determine whether the event is characterized as a disaster.

This study draws on reporting by the International Disaster Database (EM-DAT) and by Munich Re’s NatCatSERVICE natural catastrophe loss database as well as government, media, NGO and UN sources.³⁴² In EM-DAT, an event is considered to be a disaster if at least one of the following criteria is fulfilled: “10 or more people reported killed, 100 people reported affected, declaration of a state of emergency, or an appeal for international assistance.”³⁴³ Munich Re’s database classifies disasters in six categories from ‘small-scale loss events’ (small-scale property damage and one to nine fatalities) to ‘great natural catastrophe’ (the region’s ability to help itself is clearly overtaxed, interregional/international assistance is necessary, there are thousands of fatalities and/or hundreds of thousands homeless and economic losses are substantial. Insured losses reach exceptional orders of magnitude).³⁴⁴

As international standards and terminology are essential to enable natural loss events to be assessed and compared, in 2007, Munich Re, CRED (EM-DAT) and Swiss Re defined a common terminology and hierarchy of natural hazards together with the United

³⁴¹ Brookings-Bern Project on Internal Displacement, *IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters*, January 2011, www.brookings.edu/reports/2011/0106_operational_guidelines_nd.aspx

³⁴² Since 1988 the WHO Collaborating Centre for Research on the Epidemiology of Disasters (CRED) has maintained an Emergency Events Database known as EM-DAT. EM-DAT was created with the initial support of the WHO and the Belgian government. The main objective of the database is to provide data to inform humanitarian action at the national and international levels. It is an initiative aimed to rationalize decision making for disaster preparedness, as well as to provide an objective basis for vulnerability assessment and priority setting. See: EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be

³⁴³ *Ibid.*

³⁴⁴ Münchener Rückversicherungs-Gesellschaft (Munich Re), Geo Risks Research, NatCatSERVICE, “Breakdown into catastrophe categories,” accessed 8 February 2013, www.munichre.com/touch/naturalhazards/en/natcatservice/database.aspx

Nations Development Programme (UNDP), the Asian Disaster Reduction Centre and the International Strategy for Disaster Reduction (ISDR). Since then, natural hazards have been divided into four main hazard groups: geophysical events, meteorological events, hydrological events and climatological events, which in turn are subdivided into event families (e.g. storm).³⁴⁵

There are various problems with both the terminology and the methodology used in describing the impact of natural disasters, beginning with the fact that it is particularly difficult at times to distinguish between “natural” and “human-made” disasters. Recognizing the impact that human action has on whether a natural hazard results in a disaster, some refer simply to disasters, others to disasters triggered by natural hazards. Some would go so far as to argue that there are no “natural” disasters – that a “disaster” is the result of the failure of authorities to either prevent or respond adequately to the negative effects of natural phenomena.³⁴⁶ The devastating toll on Haiti of four hurricanes in 2008 was primarily the result of natural phenomena, but certainly their impact was exacerbated by long-term deforestation and poor governmental policies. In fact, in that year, severe hurricanes struck both Haiti and Cuba, but while 700 people died in Haiti, only seven fatalities were reported in Cuba.³⁴⁷

Another definitional problem is the relationship between “sudden-onset” and “slow-onset” disasters. While floods, hurricanes and earthquakes occur with little advance warning, it may take months or years for droughts or environmental degradation to seriously affect the development of an area or to overwhelm local capacity to adapt. While the difference between the two may make intuitive sense, there is no consensus on the dividing line between sudden and slow-onset disasters. Nor are there even accepted definitions of the terms sudden and slow-onset disasters. For example, flooding, even though it is usually considered a sudden-onset disaster, sometimes occurs over a period of weeks or months as it did in Pakistan in 2012.

Defining ‘affected people’

EM-DAT defines affected people as those “requiring immediate assistance during a period of emergency, i.e. requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance. Appearance of a significant number of cases of an infectious disease introduced in a region or a population that is usually free from that disease.” EM-DAT further qualifies that the term “can also include displaced or evacuated people.” The category of “total affected” thus includes “people that have been injured, affected and left homeless after a disaster.”³⁴⁸

³⁴⁵ Munich Re, “Hierarchy and terminology of natural hazards,” accessed 8 February 2013, www.munichre.com/touch/naturalhazards/en/natcatservice/database.aspx

³⁴⁶ Naomi Klein, *The Shock Doctrine: The Rise of Disaster Capitalism*, 2007.

³⁴⁷ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be. In 2008, hurricanes Fay, Gustav, Hanna and Ike killed 698 people in Haiti in August and September, while Hurricane Ike killed seven in Cuba.

³⁴⁸ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be. See: EM-DAT, “The EM-DAT Glossary,” www.emdat.be/glossary/9 and EM-DAT, and EM-DAT, “Criteria and Definition,” www.emdat.be/criteria-and-definition

In practice, there is considerable ambiguity in how the term “affected people” is used. National disaster management agencies and NGOs use different definitions and standards for estimating the effects of disasters. There might in certain cases also be incentives to inflate or deflate the numbers of disaster-affected persons. Sometimes the task of assessing how many people are affected is simply too great given the chaos of a disaster situation. Good governance and strong state capacity should increase the credibility of a country’s disaster data, but sometimes even the richest countries simply do not have systems in place to collect data in the aftermath of a disaster. Collecting reliable statistics on the displaced for example is a complicated task, as witnessed by the fact that estimates of the number of people displaced by Hurricane Katrina in the US in 2005 ranged from 1 to 1.5 million and there was no national tracking system to monitor the movements (including the returns) of those displaced throughout the country. Similarly there are also no conclusive numbers of how many people were displaced by Hurricane Sandy this year.³⁴⁹

It is even more difficult to measure the number of people affected by direct and indirect economic losses resulting from a disaster. For example, a tractor salesman in drought-affected Texas may find that his sales plummet because farmers cannot afford to buy tractors. Even though his income may fall significantly, he is not considered to be “affected” unless he needs immediate life-saving assistance, is injured or made homeless, according to EM-DAT’s definition. Nor does the category of “disaster-affected” even attempt to include such intangible but real effects such as fear, depression, shaken confidence in government authority and personal risk-aversion.

In a globalized world, disasters often have economic effects that ripple around the world. The 2011 floods in Thailand, for example, led to a huge disruption of global supply chains for products such as cars and microchips and almost certainly led to job losses in countries other than Thailand. People who lost their jobs in Japan or Italy because of the floods in Thailand are not covered in the numbers of those affected by the floods. We can therefore assume that the negative effects of disasters are much greater than the numbers of affected persons in the statistics we use suggest.

People who are displaced because of a natural disaster constitute one of the major challenges for both national authorities and international agencies. A study by the Internal Displacement Monitoring Center (IDMC) and the Norwegian Refugee Council (NRC) on disaster-induced displacement found that more than 42 million persons were displaced by sudden-onset natural hazards in 2010 out of a total of over 200 million affected by disasters during that year. It also showed that in 2010, over 90 percent of disaster displacement within countries was caused by climate-related hazards, primarily floods and storms.³⁵⁰ In

³⁴⁹ International Organization for Migration, “Migration, Climate Change and the Environment,” May 2009, p. 3, http://www.egypt.iom.int/Doc/iom_policybrief_en.pdf; see also: Sandra Yin, Population Reference Bureau, “The Plight of Internally Displaced Persons,” October 2005, www.prb.org/Articles/2005/ThePlightofInternallyDisplacedPersons.aspx and The Daily Beast, “What to Do With the Thousands Displaced by Hurricane Sandy?,” 8 November 2012, www.thedailybeast.com/articles/2012/11/08/what-to-do-with-the-thousands-displaced-by-hurricane-sandy.html

³⁵⁰ Internal Displacement Monitoring Centre (IDMC) and Norwegian Refugee Council (NRC), *Displacement due to natural hazard-induced disasters, Global estimates for 2009 and 2010*, June 2011, available at: <http://www.internal-displacement.org/>

2011, 14.9 million people were displaced by natural disasters, 89 percent of whom were in Asia.³⁵¹

Defining ‘drought’

Droughts present particular difficulties in data collection, beginning with the fact that there is no universal definition of what constitutes a drought. The World Meteorological Organization defines drought as “a sustained, extended deficiency in precipitation,” while the UN Convention to Combat Drought and Desertification states that a drought is “the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems.” In contrast, the UN’s Food and Agricultural Organization defines a drought hazard as “the percentage of years when crops fail from lack of moisture.”³⁵² In comparison, EM-DAT defines a drought as a “long lasting event, triggered by lack of precipitation. A drought is an extended period of time characterized by a deficiency in a region’s water supply that is the result of constantly below average precipitation. A drought can lead to losses to agriculture, affect inland navigation and hydropower plants and cause a lack of drinking water and famine.”³⁵³

Under EM-DAT’s methodology, the starting date of droughts in the database is the day of the onset of drought-related losses rather than the moment when the hazard began (e.g. the first day in a three month-long drought period). If the date when these losses began is not available, then the date when the emergency is declared is taken as the starting date of the drought. If this is also not available, then the date of “report publication” is used when entering data into the database.³⁵⁴ As with other disasters recorded in EM-DAT, the end date for a drought in the database is the year and month at which the hazard ceases to exist.³⁵⁵

As it is difficult to determine excess mortality and damage figures from droughts unless they cause famines, EM-DAT seldom provides those figures for droughts. This means that in most cases mortality figures are only available for sudden-onset disasters. Furthermore, EM-DAT only creates an entry for droughts in the starting year of the drought. Damage and casualty numbers, if available, are included for the entire period in that single entry.

³⁵¹ IDMC and NRC, “14.9 million uprooted by natural disasters – Asia worst hit,” press release 19 June 2012, [www.internaldisplacement.org/idmc/website/resources.nsf/\(httpPublications\)/A018C57177748E8AC1257A22002DF0A8?OpenDocument](http://www.internaldisplacement.org/idmc/website/resources.nsf/(httpPublications)/A018C57177748E8AC1257A22002DF0A8?OpenDocument)

³⁵² Ashok K. Mishra, Vijay P. Singh, “A Review of Drought Concepts,” *Journal of Hydrology* 391, 2010: 202-216, p. 206.

³⁵³ EM-DAT, “Glossary,” www.emdat.be/glossary/9

³⁵⁴ EM-DAT does not comment on the specific meaning of this term.

³⁵⁵ EM-DAT, *New Methodology for Tracking Drought Disaster Events, Drought Data in EM-DAT*, <http://www.emdat.net/documents/MethodologyWebPage.pdf>

Data Sources

The most widely cited and reputable source of data on natural disasters is the International Disaster Database (EM-DAT), which is a global database on natural and technological disasters that contains essential core data on the occurrence and effects of more than 18,000 disasters around the world from 1900 to the present. EM-DAT is maintained by the Centre for Research on the Epidemiology of Disasters (CRED) at the School of Public Health of the Université catholique de Louvain located in Brussels, Belgium. The database is compiled from various sources, including UN agencies, non-governmental organizations, insurance companies, research institutes and press agencies.³⁵⁶

This report also uses data from Munich Re's NatCatService, which is the world's largest database of natural catastrophe losses and contains more than 30,000 entries since as early as 79 AD, with a complete dataset available since 1980. The Munich Re NatCatService records up to 1,000 loss events per year. Depending on their financial and human impact, events are assigned to one of six loss categories — from a small-scale loss event to a great natural catastrophe.³⁵⁷ Because it includes small-scale disasters, NatCatService records a higher number of disasters than EM-DAT.

For disaster damage figures in this review both EM-DAT and Munich Re NatCatService data are used. If not otherwise indicated, all financial data in this report are in US dollars (\$).

In terms of humanitarian funding for disaster response, this report relies on data from the Financial Tracking Service (FTS) managed by the UN Office for the Coordination of Humanitarian Affairs (UN OCHA). The FTS is a global, real-time database which records all reported international humanitarian aid (including that for NGOs and the Red Cross/Red Crescent Movement, bilateral aid, in-kind aid and private donations. All FTS data are provided by donors or recipient organizations). FTS features a special focus on consolidated and flash appeals, because they cover the major humanitarian crises and because their funding requirements are well defined. This allows FTS to indicate to what extent populations in crisis receive humanitarian aid in proportion to needs.³⁵⁸

The lack of clarity in defining disasters and in measuring their impact is a serious impediment to comparative analysis of disasters and to understanding the ways that they affect individuals and communities. We therefore follow EM-DAT's recommendation to read available disaster data with caution. In IFRC's 2012 World Disasters Report, researchers from EM-DAT note that: "For natural disasters over the last decade, data on deaths are missing for around one-fifth of reported disasters; data on people affected are missing for about one-quarter of disasters; and data on economic damages are missing for 80 percent of disasters."³⁵⁹ The figures should therefore be regarded as indicative. Relative changes

³⁵⁶ EM-DAT: The OFDA/CRED International Disaster Database, Université catholique de Louvain, Brussels, Belgium, www.emdat.be

³⁵⁷ Munich Re, "NatCatService," www.munichre.com/touch/naturalhazards/en/natcatservice/default.aspx

³⁵⁸ OCHA Financial Tracking Service, "About FTS", <http://fts.unocha.org/pageloader.aspx?page=AboutFTS-uctrlAboutFTS>

³⁵⁹ International Federation of Red Cross and Red Crescent Societies, *World Disaster Report 2012, Focus on forced migration and displacement*, 2012.

and trends are more useful to look at than absolute, isolated figures.”³⁶⁰ To deal with some of the challenges with data collection in natural disasters, EM-DAT uses retrospective analysis and revises data initially provided right after disasters with more advanced tallies, which sometimes are only published years after the disaster happens. Therefore disaster figures in EM-DAT are fluid and can change even several years after they were initially published.³⁶¹

³⁶⁰ Philippe Hoyoïs and Regina Below, “Disaster data,” in *International Federation of Red Cross and Red Crescent Societies, World Disaster Report 2012, Focus on forced migration and displacement*, p. 254.

³⁶¹ *Ibid.*

ANNEX II

PUBLICATIONS AND EVENTS ON NATURAL DISASTERS AND CLIMATE CHANGE BY THE BROOKINGS-LSE PROJECT ON INTERNAL DISPLACEMENT³⁶²

IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters

Human rights do not disappear the moment an earthquake, a hurricane, or a tsunami strikes. As witnessed after the Indian Ocean Tsunami, the earthquake in Haiti and many other disaster situations, the protection of human rights grows in importance during relief and recovery efforts because it safeguards the dignity and wellbeing of all those affected. People are at their most vulnerable in times of crisis, so preventing discrimination and abuse of their rights is vital to effective disaster response operations.

To promote and facilitate a rights-based approach to disaster relief, the Inter-Agency Standing Committee (IASC) adopted Operational Guidelines on Human Rights and Natural Disasters in 2006. The Guidelines are a major contribution to the promotion of a rights-based approach in situations of natural disasters. Following the feedback from the field-testing of the guidelines, the IASC incorporated lessons learned from the field into a revised version of the Guidelines. This revised version also expands the rights-based approach to address preparedness measures. Small steps in preparedness can have a major impact once a disaster strikes.

The Brookings-LSE Project on Internal Displacement published the IASC Operational Guidelines in January 2011. The Operational Guidelines are available on the website of the Brookings-LSE Project on Internal Displacement in Bahasa Indonesia, Bengali, English, French, Hindi, Kyrgyz, Russian and Spanish.

Promoting and Protecting Rights in Natural Disasters: Workshop Modules and Facilitator's Guide

For the past four years the Project on Internal Displacement has organized workshops on “Promoting and Protecting Rights in Natural Disasters” in all regions of the world with the participation of representatives from national and local governments, UN agencies, international and local NGOs and Red Cross/Crescent representatives. These workshops

³⁶² All publications are available at the Project website, www.brookings.edu/idp.

have introduced the IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters and have provided a forum for discussion of good practices in promoting and upholding human rights in disaster risk reduction, emergency response and recovery.

The workshops have shown that there is both broad interest in strengthening protection in situations of natural disasters and a need for training about what it means to apply a rights-based approach. These training modules are intended to encourage others to organize similar training courses or sessions on human rights and natural disasters. The materials include a comprehensive agenda, facilitator's guide, session modules, PowerPoint presentations and resource materials for a two-day workshop on "Promoting and Protecting Rights in Natural Disasters." The modules are based on the workshops we have previously held and have been reviewed by international protection specialists with a specific focus on introducing the IASC Operational Guidelines on Human Rights and Natural Disasters.

The content ranges from basic information about rights-based approaches and protection issues to more specific areas such as protection of specific at-risk groups and protection monitoring tools. The program can be used in its entirety or incorporated into larger workshop agendas. The modules can easily be adapted to local contexts and a wide variety of audiences.

IASC Framework on Durable Solutions for Internally Displaced Persons

Displacement is a life-changing event. While the often traumatic experience of displacement cannot be undone, internally displaced persons (IDPs) need to be able to access durable solutions to their displacement in order to increase their safety and wellbeing. As articulated in Principle 28 of the Guiding Principles on Internal Displacement, IDPs have a right to and often need assistance in their efforts to achieve, a durable solution. Guiding Principles 28-30 set out the rights of IDPs to durable solutions, the responsibilities of national authorities and the role of humanitarian and development actors to assist durable solutions.

Principle 28 recognizes that the competent authorities have the primary duty and responsibility to establish conditions, as well as provide the means, which allow IDPs to return voluntarily, in safety and with dignity, to their homes or places of habitual residence, or to resettle voluntarily in another part of the country. Securing durable solutions for the internally displaced is also in the State's best interests. Leaving IDPs in continued marginalization without the prospect of a durable solution may become an obstacle to long-term peace stability, recovery and reconstruction in post-crisis countries.

Facilitating durable solutions requires that all stakeholders – including national and local authorities as well as humanitarian and development actors – work together, identify the right strategies and activities to assist IDPs in this process and set criteria that will help to determine to what extent a durable solution has been achieved.

The Framework on Durable Solutions for Internally Displaced Persons aims to provide clarity on the concept of durable solutions and general guidance on how to achieve them. This version of the Framework builds on a pilot version released in 2007, which the Inter-Agency Standing Committee welcomed and recommended for field-testing. The Framework was revised and finalized in 2009, taking into account valuable feedback from the field.

On the Front Line of Climate Change and Displacement: Learning From and With Pacific Island Countries

Pacific Island countries are internationally regarded as a barometer for the early impacts of climate change. Their geophysical characteristics, demographic patterns and location in the Pacific Ocean make them particularly vulnerable to the effects of global warming. Small Island Developing States, a UN-established category which includes most Pacific Island countries, are characterized by a high ratio of shoreline to land, low elevation, settlement patterns concentrated in coastal areas and a narrow economic basis — all of which put them at heightened risk of natural disasters, particularly rising sea levels. Perhaps more than in any other region, the populations and governments of Pacific Island countries are keenly aware that they face severe and multifaceted risks as a result of climate change. Their lives and livelihoods are linked to the Pacific Ocean; rising sea levels and other effects of global warming threaten not only their physical assets and coastal zones, but also their way of life and perhaps their national identities.

In the Pacific Islands, this acute awareness of the potential impact of climate change comes not only from books and studies, but from first-hand knowledge and ongoing experiences with the effects of the world's changing climate. The value and relevance of these experiences are not confined to the Pacific Islands, but are relevant for the world at large. This paper aims to conceptualize and distill some dimensions of these experiences, in light of the discussions and presentations made at the “Regional Workshop on Internal Displacement caused by Natural Disasters and Climate Change in the Pacific” (May 2011) organized by the Brookings-LSE Project on Internal Displacement in conjunction with the UN Humanitarian team in the Pacific. The synthesis report on the workshop's proceedings contains additional information on the issues outlined and examined in this paper.

2012 Articles, Blogs, Books, Reports and Speeches on Natural Disasters and Climate Change Issues

February

Crossing Borders Because of Climate Change: Normative Gaps

Walter Kälin

Urban Disasters, Conflict and Violence: Implications for Humanitarian Work

Elizabeth Ferris

March

The Year that Shook the Rich: A Review of Natural Disasters in 2011

Elizabeth Ferris and Daniel Petz

Natural Disasters in 2011 Strike the Rich

Elizabeth Ferris

April

The Normative Framework of Climate Change-Related Displacement

Jane McAdam

Climate Change, Forced Migration and International Law

Jane McAdam

May

Future Directions in Civil-Military Responses to Natural Disasters

Elizabeth Ferris

Rethinking Durable Solutions to Displacement in the Context of Climate Change

Megan Bradley and Jane McAdam

Protecting Rights of Civilians in Natural Disasters in Central Asia and the Caucasus

Workshop Report

Natural Disasters in Central Asia: Thousands Yearly but Little Response Capacity

Elizabeth Ferris

July

A Human Rights-Based Approach and District Disaster Management Plans

Elizabeth Ferris

August

Housing and Disasters: Thoughts on Hurricane Katrina and Haiti

Elizabeth Ferris

Protection and Planned Relocations in the Context of Climate Change

Elizabeth Ferris

Waiting on Isaac, Reflecting on Katrina

Megan Bradley

October

Notes from the Field: Haiti- Displacement and Development in the "Republic of NGOs"

Megan Bradley

Bracing for Sandy: Cutting the Cost of Disaster

Megan Bradley

2012 Events and Workshops on Natural Disasters and Climate Change Issues

January

Climate Change Adaptation in a Post-Durban World

Brookings Institution, Washington DC

March

Natural Disaster Trends and Challenges: Shaken, Drowned, Displaced, Battered and Bruised

Brookings Institution, Washington DC

April

Addressing the Legal Gaps in Climate Change Migration, Displacement and Resettlement: From Sinking Islands to Flooded Deltas

Brookings Institution, Washington DC

*Roundtable for Climate Change
Researchers and Practitioners*

Brookings Institution, Washington DC

May

*Workshop on Protecting Rights of Civilians
in Natural Disasters in Central Asia and the
Caucasus*

Bishkek, Kyrgyzstan

*Crisis in the Horn of Africa and the Sahel:
The Cost of Late Response to Early
Warnings*

Brookings Institution, Washington DC

September

*New Research on Climate Change
Migration and Displacement: Should I Stay
or Should I Go?*

Brookings Institution, Washington DC

*What Research on Climate Change and
Human Mobility Can/Should Provide for
Practitioners and Policy Makers*

Brookings Institution, Washington DC

October

*Disasters and Displacement: Exploring the
Connections*

Brookings Institution, Washington DC

December

*International Course on Law and Legal
Protection in Natural Disasters*

International Institute of Humanitarian Law,
Sanremo, Italy

*Strengthening Regional Mechanisms for
Disaster Management in the Caribbean,
Central America and the Pacific Regions*

International Institute of Humanitarian Law,
Sanremo, Italy

*Lessons from Haiti: Innovations in Tracking
and Housing Internally Displaced Persons*

Brookings Institution, Washington DC

**Transcripts and audio versions of most of the events hosted at the
Brookings Institution are available on our website: www.brookings.edu/idp**



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