CRED

Annual Disaster Statistical Review

The Numbers and Trends 2007

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About CRED and our Partners

The Centre for Research on the Epidemiology of Disasters (CRED) has been active for more than 30 years in the fields of international disaster and conflict health studies, with research and training activities linking relief, rehabilitation and development. It was established in Brussels in 1973 at the School of Public Health of the Catholic University of Louvain (UCL) as a non-profit institution with international status under Belgian law. In 1980, CRED became a World Health Organization (WHO) Collaborating Centre as part of WHO's Global Program for Emergency Preparedness and Response. Since then, CRED has increased its international network substantially and collaborates closely with numerous UN agencies, inter-governmental and governmental institutions, non–governmental organizations, research institutes and universities.

Objective

The Centre promotes research and provides an evidence base to the international community on the burden of disease and related health issues of disasters and conflicts, in order to improve preparedness and responses to these humanitarian emergencies.

CRED trains field managers, students, relief personnel and health professionals in the management of short and long-term humanitarian emergencies.

CRED's focus

CRED's research focuses on all humanitarian and emergency situations with a major impact on human health. These include all types of natural and human-made disasters, such as earthquakes, floods and wind storms; longer-term disasters such as famines and droughts; and situations creating mass displacement of people such as civil strife and conflicts.

The two main areas of focus of the Centre are the health aspects and the burden of, disease arising from disasters and complex emergencies. However, CRED also promotes research on broader aspects of humanitarian crises, including issues of human rights and humanitarian law, socio-economic and environmental issues, early warning systems, the special needs of women and children, and mental health care.

The Centre is actively involved in stimulating debate on the effectiveness of various humanitarian interventions. It encourages scientific and policy discussions on existing and potential interventions and their impacts on acute and chronic malnutrition, human survival, morbidity, infectious diseases and mental health.

The CRED team works in four main areas:
- natural disasters and their impacts;
- civil strife and conflict epidemiology;
- database and information support;
- capacity building and training.

The CRED team

The Center is composed of a multinational and multidisciplinary team that includes experts in medicine and public health, informatics and database management, psychology, nutritional sciences, sociology, economics and geography. The working languages are English and French.

CRED's partners

International Agencies
United Nations Office for the Coordination of Humanitarian Affairs (OCHA)
International Strategy for Disaster Reduction (ISDR)
United Nations Children's Fund (UNICEF)
United Nations Development Program (UNDP)
United Nations High Commission for Refugees (UNHCR)
United Nations Food and Agriculture Organization (FAO)
United Nations Population Fund (UNFPA)
United Nations World Meteorological Organization (WMO)
World Health Organization (WHO)

Government Agencies/Multilateral Agencies
Canadian International Development Agency (CIDA)
European Commission
European Center for Disease Prevention and Control (ECDC)
National Oceanic and Atmospheric Administration (NOAA)
United Kingdom Department for International Development (DFID)
United States Agency for International Development (USAID)
United States Centers for Disease Control and Prevention (CDC)
United States Government Accountability Office (GAO)
United States Department of State
World Bank

Non-Governmental Organizations
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American Red Cross (ARC)
Asian Disaster Reduction Center (ADRC)
Citizens' Disaster Response Center (CDRC)
Concern
Goal
InterAction
International Federation of Red Cross and Red Crescent Societies (IFRC)
International Medical Corps (IMC)
International Rescue Committee (IRC)
Mercy Corps
Médecins sans Frontières (MSF)
Save the Children Fund (SCF)
Sphere Project
Tearfund
World Vision

Private companies
Munich Reinsurance Company
Swiss Reinsurance Company

Research Institutions
Columbia University, United States
Fafo Institute of Applied International Research, Norway
Harvard University, Harvard Humanitarian Initiative (HHI), United States
Johns Hopkins University, United States
London School of Hygiene & Tropical Medicine, United Kingdom
University of Heidelberg, EVAPLAN, Germany
University of Tulane, School of Public Health and Tropical Medicine, United States
Karolinska Instituet, Department of Public Health Sciences, Sweden
University of Indonesia, Jakarta, Indonesia
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Editorial

We are pleased to present the second edition of the Annual Disaster Statistical Review based on the EM-DAT database.

As always, we report on the effects of disasters on human populations in 2007. This second issue analyses the 2007 disaster figures with comparisons to previous years.

For 20 years, the Centre has maintained the EM-DAT emergency database containing essential core data on the occurrences and impacts of disasters across the globe from 1900 to the present. CRED and the EM-DAT team have continuously strived during all these years to improve and enhance their data in order to help the international community achieve a better understanding of the trends that describe natural disasters over time. This has become particularly important in light of the threats of climate change.

Collecting data for our international database through evidence-based research is essential for effective policy. In this context the natural disaster research programme of CRED has recently launched a major applied research project called MICRODIS. This EU funded 6th Framework Integrated Project looks at the social, economic and health impacts of floods, windstorms and earthquakes here at home in Europe and in ASIA - the most affected region in the world[1].

In the last weeks in Asia, the world once again witnessed the devastating power and the dramatic human consequences of natural disasters. Extreme events like the Sichuan earthquake in China and cyclone Nargis in Myanmar remind us of the fragility of human communities. These extreme events reasserted the need for, and importance of, continuous efforts to reduce the vulnerability of the world's most exposed populations and to improve their resilience.

[1] More information can be found at www.microdis-eu.be

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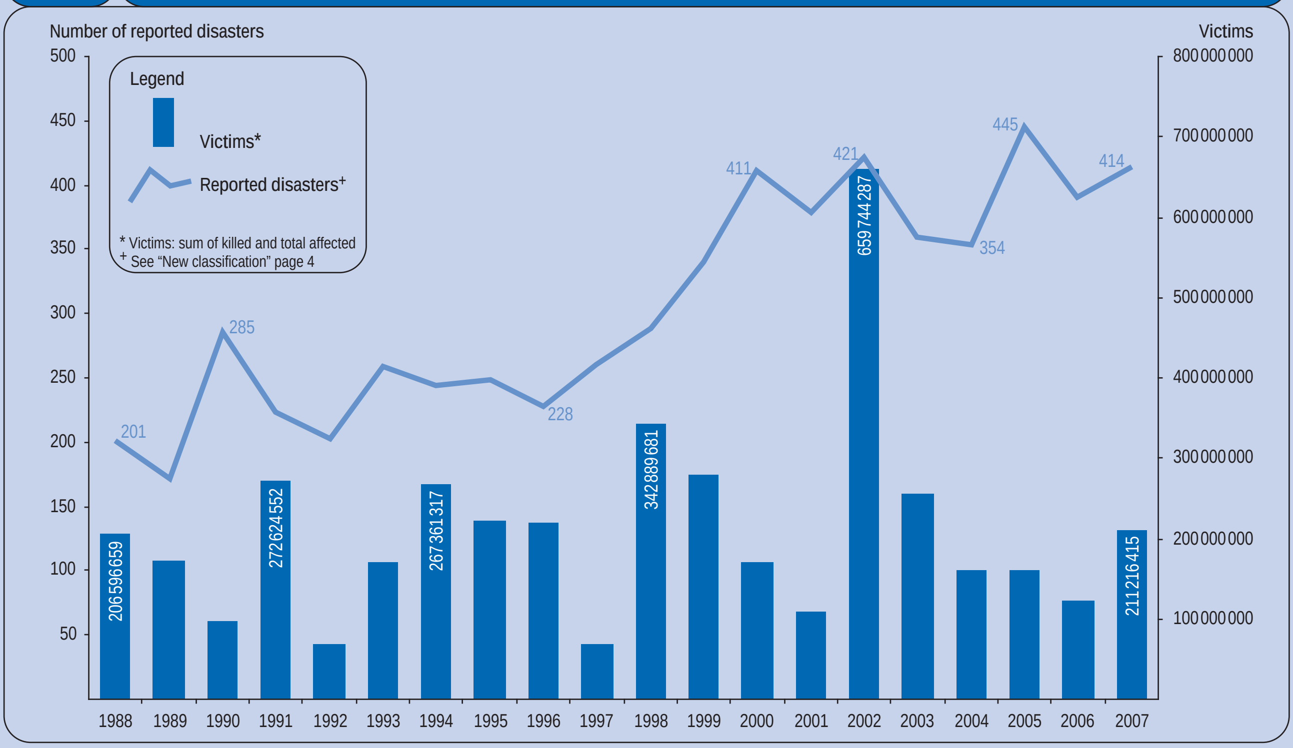
Executive Summary

In 2007, 414 natural disasters were reported. They killed 16847 persons, affected more than 211 million others and caused over 74.9 US$ billion in economic damages.

Even if a greater diffusion of disaster occurrence across countries was noted, the toll of human impacts remained concentrated across a small number of disasters and countries. Despite no "mega disaster" being reported, the 10 most important disasters in terms of mortality, victims, and damage accounted for 55.6%, 85.2%, and 66.2% respectively of all the reported deaths, people affected, and damages.

Last year's number of reported disasters confirmed the global upward trend in natural disaster occurrence. This upward trend is mainly driven by the increase in the number of reported hydro-meteorological disasters. Hydrological (essentially floods) and meteorological (storms) disasters are the major contributors to this pattern. In recent decades, the number of reported hydrological disasters has increased by 7.4% per year on average. Furthermore, we have witnessed a strengthening of the upward trend in recent years, with an average annual growth rate of 8.4% in the 2000 to 2007 period.

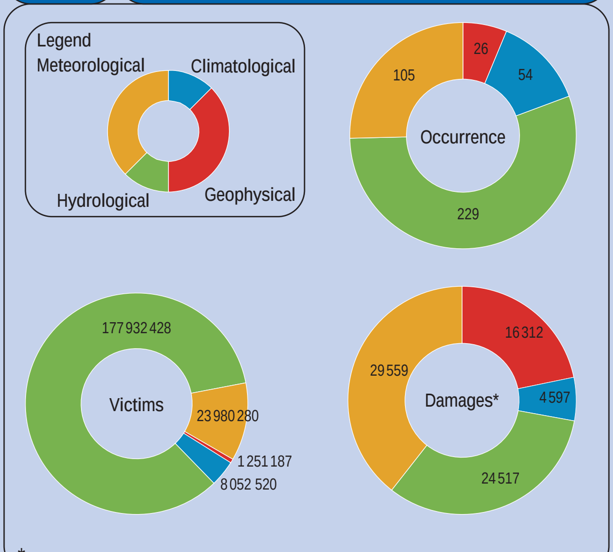
Figure 1 Trends in occurence/victims



Nonetheless- despite a steady increase in the overall disaster occurrence- the number of reported victims remained relatively stable over the years, as it is illustrated by the observed trends in occurrence and numbers of victims. This is reflected in the appearance of a decreasing trend in the average number of reported victims per disaster. This decreasing trend raises questions as to its origin. Is it the result of a better preparedness, a better response of government and humanitarian agencies during emergencies, or is it due to improvements in the reporting of disaster occurrence and impacts? All of these questions remain unanswered and underpin the need for a better system to capture the impact of various disaster reduction efforts.

As in previous years, hydro-meteorological disasters were the major source of casualties, particularly in the form of hydrological disasters. The latter affected over 177 million people and killed more than 8859 others. Although the human impacts were essentially concentrated in Asia, all the regions experienced some major hydro-meteorological events.

Figure 2 — 2007 Disaster occurrence and impacts by major disaster groups



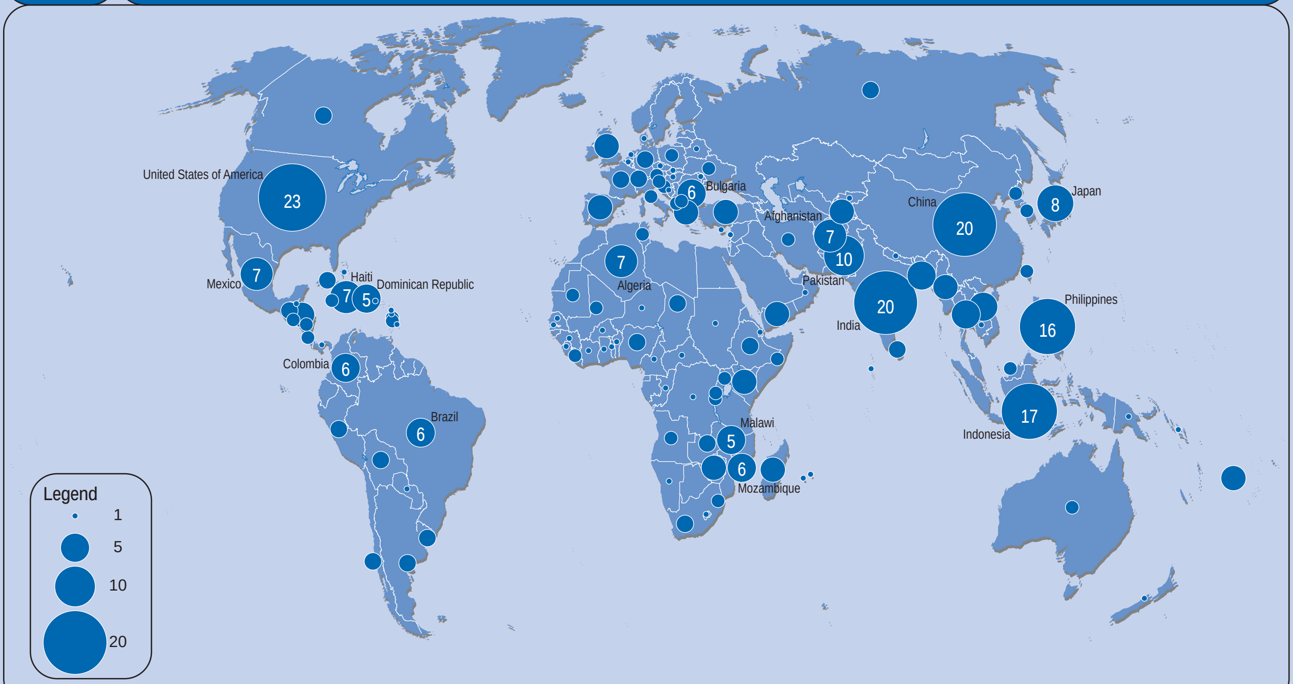
* (in $US Million)

Meteorological disasters were on the increase last year compared to 2006. Tropical cyclones were the major contributor to this increase, their occurrence increased by 28% compared to the 2000-2006 average and they accounted for 61% of meteorological disaster occurrence. Even if the deadliest reported disaster last year was a meteorological disaster (tropical cyclone Sidr), the number of reported victims was among the lowest of the last decade. The implementation of early warning systems in numerous countries at high cyclonic risk, like Bangladesh, already proved their effectiveness in saving human lives. The efficiency of these systems could probably partly explain the decrease in the number of reported tropical cyclones victims.

Other major disaster groups also saw a decrease in human impacts. Indeed, the number of reported victims of climatological disasters was the lowest in a decade. About five million victims were reported in 2007 compared to 20 million in 2006, and an average of more than 88 million a year for the 2000-2006 period. Similarly, the number of reported geophysical disasters was the lowest since 1989. Only 26 geophysical disasters were reported, 20 due to earthquakes, and six due to volcanic eruptions. This unusually low number of events resulted in a strong decrease in human impacts.

Nonetheless, with more than 74.9 US$ billion in economic damages, the economic impact of natural disasters remained high last year. Once again with over 29 billion US$ in reported damages, meteorological disasters were the costliest group of disasters.

Map 1 — Natural disaster occurrence in 2007



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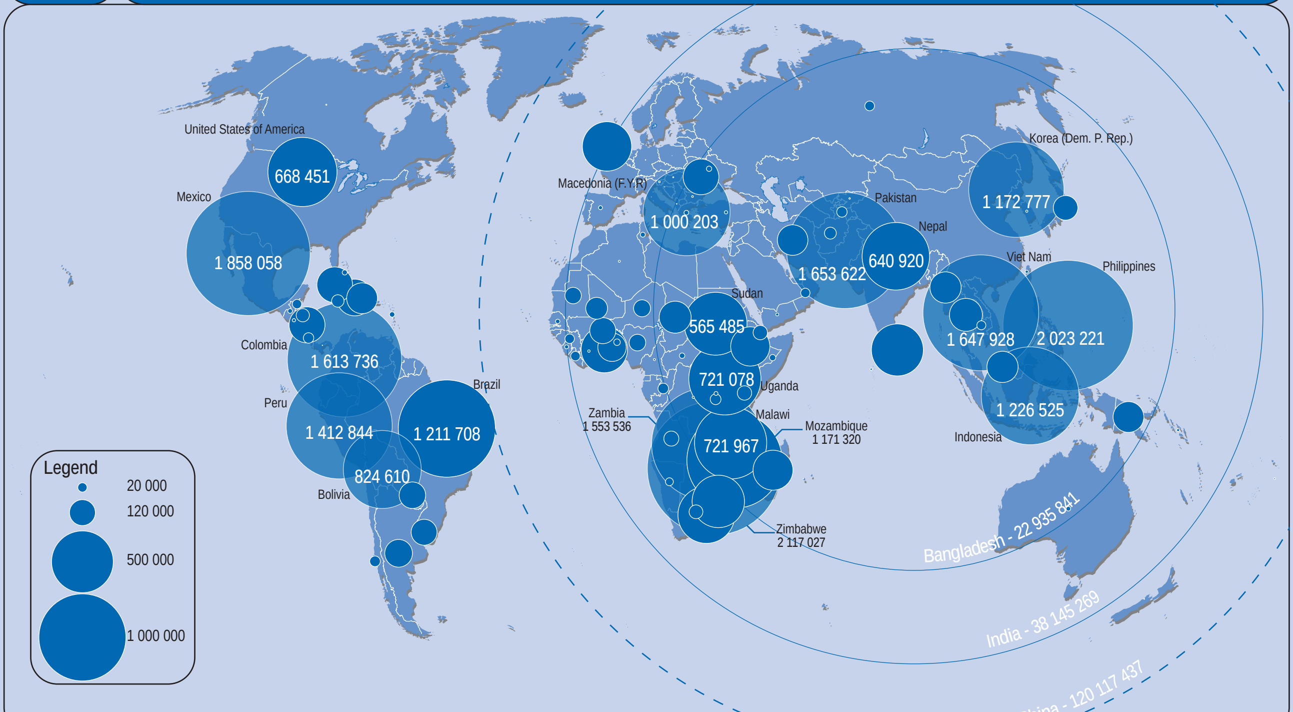
Map 2 Number of reported victims of natural disasters in 2007



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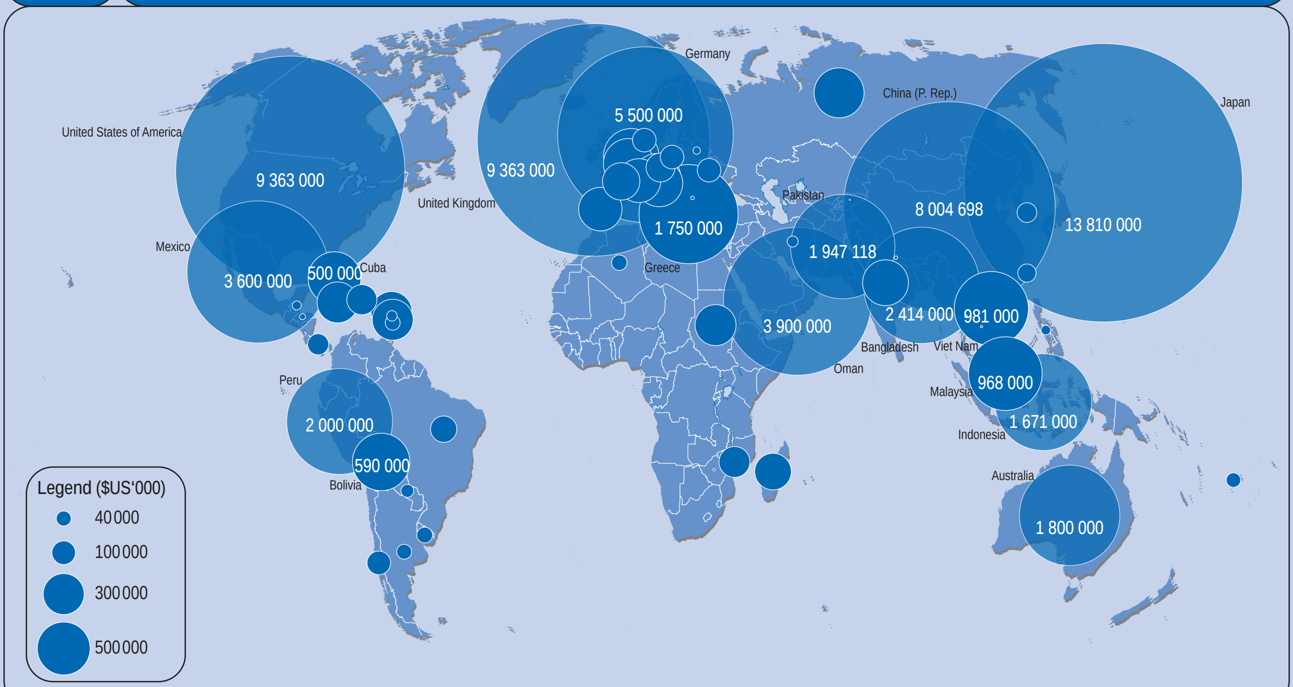
Map 3 Natural disaster reported damages in 2007



The boundaries and names shown and the designations used on maps and graphics do not imply official endorsement or acceptance by the United Nations.

Asia remained the region hardest hit and most affected by natural disasters in 2007. Indeed 37% of the year's reported disasters occurred in Asia, accounting for 90% of all the reported victims and 46% of the economic damage due to natural disasters in the world. Asia was especially hard hit by strong monsoon related events. This was particularly the case for India, China, and Bangladesh- the most affected countries of the region. Indeed China and India accounted for 62 % and 20% respectively of all of Asia's reported victims in 2007. While Bangladesh suffered last year's deadliest disaster, the Tropical cyclone Sidr that killed 4234 persons, and was also the Asian country with highest share of population affected by natural disasters (14.4%).

Other regions of the world also experienced some history making hydro-meteorological disasters. Africa and South America were mainly affected by hydrological disasters (i.e. Mexico, Uruguay and Zambia experienced their countries worst flooding eventsever recorded in EM-DAT).

Europe, also, witnessed several exceptional events like the two floods in the United Kingdom, which affected more than 370 000 people and caused more than US$ 8 billion in economic damages, and the extra-tropical cyclone Kyrill that swept across Northern and Western Europe in January 2007 and was responsible for over US$ 9 billion worth of damages.

Nonetheless, Europe remained a region where natural disasters are relatively rare and their impacts are mainly economic rather than human. Indeed, the 65 disasters reported in Europe in 2007 accounted for 27% of the world's economic damages from natural disasters, but only 1% of the world's victims.

Although if the above mentioned trends are consistent with the conclusions of the IPPC (Intergovernmental Panel on Climate Change) fourth assessment report- stating that climate change is likely to affect the severity, frequency, and spatial distribution of extreme climatic events such as hurricanes, storm surges, floods and droughts- the linking of past trends in the EM-DAT figures and to climate change needs to remain guarded.

Indeed, justifying the upward trend in hydro-meteorological disaster occurrence and impacts essentially through climate change would be misleading. Climate change is probably an actor in this increase but not the major one- even if it impact on the figures will likely become more evident in the future. The task of identifying the possible impact of the climate change on the EM-DAT figures is complicated by the existence of several concomitant factors. For instance, one major contributor to the increase in disasters occurrence over the last decades is the constantly improving diffusion and accuracy of disaster related information.

Furthermore, disaster occurrence and impacts do not only depend on exposure to extreme natural phenomena but also depend on anthropogenic factors such as government policy, population growth, urbanisation, community-level resilience to natural disaster, etc. All of these contribute to the degree of vulnerability people experience.

Beside past major efforts to reduce disaster risk, the vulnerability of those populations most at risk continued to increase over the last decades. Climate change comes as an additional pressure on this rising vulnerability. Developing countries, many of which are already the most vulnerable to natural disasters, will be particularly affected by climate change. This will occur not only through the experience of more frequent and/or or severe disaster phenomena, but also through the slow onset impacts of climate change.

For example, large sections of the population of these countries directly rely on agriculture for living and many of these from subsistence farming. Climate change, through its impacts on the environment and the importance of the environment for the livelihood of the poorest populations, will contribute to reinforcing the vulnerability of large shares of the poorest populations. Therefore, it is important that climate change's risks be integrated into broader efforts to reduce people's vulnerability and increase their resilience to natural disasters. Disaster risk reduction and more robust development planning are crucial in adapting to these increasing risks.

1

About EM-DAT: the International Disaster Database

1.1 What is EM-DAT?

Since 1988, with the sponsorship of the United States Agency for International Development's Office of Foreign Disaster Assistance (OFDA), CRED has maintained EM-DAT, a worldwide database on disasters. It contains essential core data on the occurrence and effects of more than 17,000 disasters in the world from 1900 to the present. The database is compiled from various sources, including UN agencies, non-governmental organizations, insurance companies, research institutes and press agencies.

Priority is given to data from UN agencies, followed by OFDA, governments and the International Federation of Red Cross and Red Crescent Societies. This prioritization is not only a reflection of the quality or value of the data. But, it reflects also the fact that most reporting sources do not cover all disasters or have political limitations that could affect the figures. The entries are constantly reviewed for redundancy, inconsistencies and incompleteness. CRED consolidates and updates data on a daily basis. A further check is made at monthly intervals. Revisions are made annually at the end of each calendar year.

The database's main objectives are to assist humanitarian action at both national and international levels; to rationalize decision-making for disaster preparedness; and to provide an objective basis for vulnerability assessment and priority setting.

1.2. Data definitions

Definition

CRED defines a disaster as "a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering".

Criteria

For a disaster to be entered into the database, at least one of the following criteria must be fulfilled:
- 10 or more people reported killed;
- 100 or more people reported affected;
- declaration of a state of emergency;
- call for international assistance.

Content

EM-DAT includes the following fields:
DISNO: a unique disaster number for each disaster event (8 digits: 4 digits for the year and 4 digits for the disaster number – for example, 19950324).
Country: country(ies) in which the disaster occurred.
Disaster group: two groups are distinguished in EM-DAT – natural and technological disasters (as defined below).
Disaster sub-group: six sub-groups of natural disasters have been defined: geophysical, meteorological, hydrological, climatological, biological and extra-terrestrial disasters.
Disaster type and subset: description of the disaster according to a pre-defined classification (for example, type: flood; sub-type: flash flood).
Date (start and end): the dates when the disaster occurred and ended (month/day/year).
Killed: number of people confirmed dead and number missing and presumed dead.

Injured: number of people suffering from physical injuries, trauma or an illness requiring immediate medical treatment as a direct result of a disaster.
Homeless: number of people needing immediate assistance for shelter.
Affected: number of people requiring immediate assistance during a period of emergency; this may include displaced or evacuated people.
Total affected: sum of injured, homeless and affected.
Victims: sum of killed and total affected
Estimated damage: several institutions have developed methodologies to quantify these losses, although there is no standard procedure to determine a global figure for economic impact; the estimated damage is given in US dollars.
Additional fields: other geographical information (such as the latitude and longitude of the disaster's location), the value and scale of the events (such as the Richter scale value for an earthquake), the international status (OFDA/EU response, request for international assistance, disaster/emergency declaration), the aid contribution (in US dollars), and the sectors affected.

1.3. Methodology

In EM-DAT and in this report, data are considered at country level. This is for two reasons: first, it is at this level that they are usually reported; and second, it makes possible the aggregation and disaggregation of data.
In order to facilitate the comparison over the time, for the analysis of this report, the event start date has been used as the disaster reference date.

The number of people killed includes those confirmed dead and those missing and presumed dead. People affected are those requiring immediate assistance during a period of emergency (i.e., requiring basic survival assistance such as food, water, shelter, sanitation and immediate medical help). People reported injured or homeless are aggregated with those affected to produce the total number of people affected.

In this report, the number of victims is used as a measure of the human impact of a disaster. The number of victims is equal to the sum of persons reported killed and total number of persons reported affected.

The economic impact of a disaster usually consists of direct consequences on the local economy (e.g., damage to infrastructure, crops, housing) and indirect consequences (e.g. loss of revenues, unemployment, market destabilization) when the information available. In EM-DAT, the registered figure corresponds to the value of the immediate damage at the time of the event and usually only to the direct damage, expressed in US dollars (current value).

CRED/EM-DAT Team continuously strives to improve its data reporting methodologies and the EM-DAT database as a whole.

1.4. New classification

CRED and MünichRe have recently led a collaborative initiative on a "Disaster Category Classification for Operational Databases". Technical meetings were held in Münich in 2007, which brought together CRED, MünichRe, SwissRe, ADRC and UNDP.

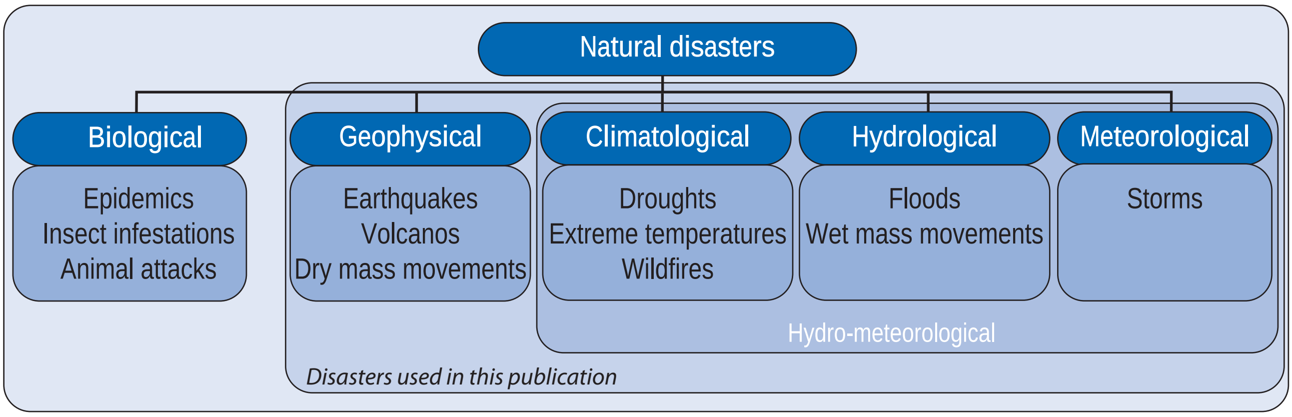
The goals were to:

1. Create and agree on a common hierarchy and terminology for all global and regional databases on natural disasters;
2. Establish a common and agreed definition of sub-events that is simple and self-explanatory.

The conditions were to:

1. Allow MünichRe and CRED databases (NatCat and EM-DAT) to compare and exchange data at a detailed level;
2. Allow all other databases using this standard to do the same.

This classification is a first step in the development of a standardized international classification of disasters.
EM-DAT distinguishes two generic categories for disasters (natural and technological), the natural disaster category being divided into six sub-groups, which in turn cover 12 disaster types and more then 32 sub-types (see Annex 1 for the detailed classification of natural disasters and for relevant definitions).



2

2007 Major disasters and most affected countries

2.1 Major Disasters and Most Affected Countries

As in previous years, the USA, China, and India were the countries the most hit by natural disasters in 2007. Nevertheless, despite the fact that the total number of disasters reported was the third highest ever recorded in EM-DAT, the number of disasters in these countries decreased. Inevitably, this means that disasters were spread more widely across countries. On average during 2000-2006, 116.3 countries were hit by disasters each year, but in 2007 it was 133.

Despite the greater diffusion of disasters, their human impact remained concentrated in a small number of disasters and countries. Although no "mega disaster" was reported, the 10 most important disasters in terms of mortality, victims, and damage accounted for 55.6%, 85.2% and 66.2% respectively. This explains the high concentration of the impact in a restricted number of countries. For instance, the 10 most affected countries accounted for 76.5 % of the global mortality from natural disasters. The concentration is even more pronounced in terms of victims, as the total number of reported victims for the top 10 countries represented 91.7 % of the overall number of victims. This is partly due to the high number of reported victims in China: China alone reported over 120 million of victims (62% of the world's total), of which 105 million were affected by an exceptional flood in July 2007. Bangladesh also paid a high price in human lives lost to natural disasters in 2007, suffering two of the most deadly disasters reported: cyclone Sidr, which killed 4 234 people, and the July monsoon related floods. Indeed Asia as a whole, with six out of the top ten disasters in terms of victims, was strongly affected by the exceptional flooding events of that summer. This was particularly true of China and India, which respectively recorded more than 108 and 38 million victims of flooding.

Figure 3 Top 10 countries by number of reported events in 2007

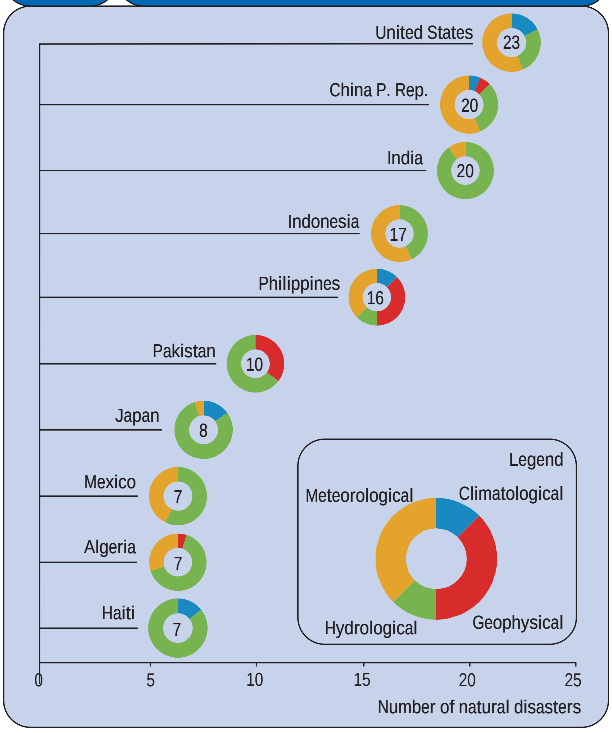


Figure 4 Top 10 countries in terms of disaster mortality

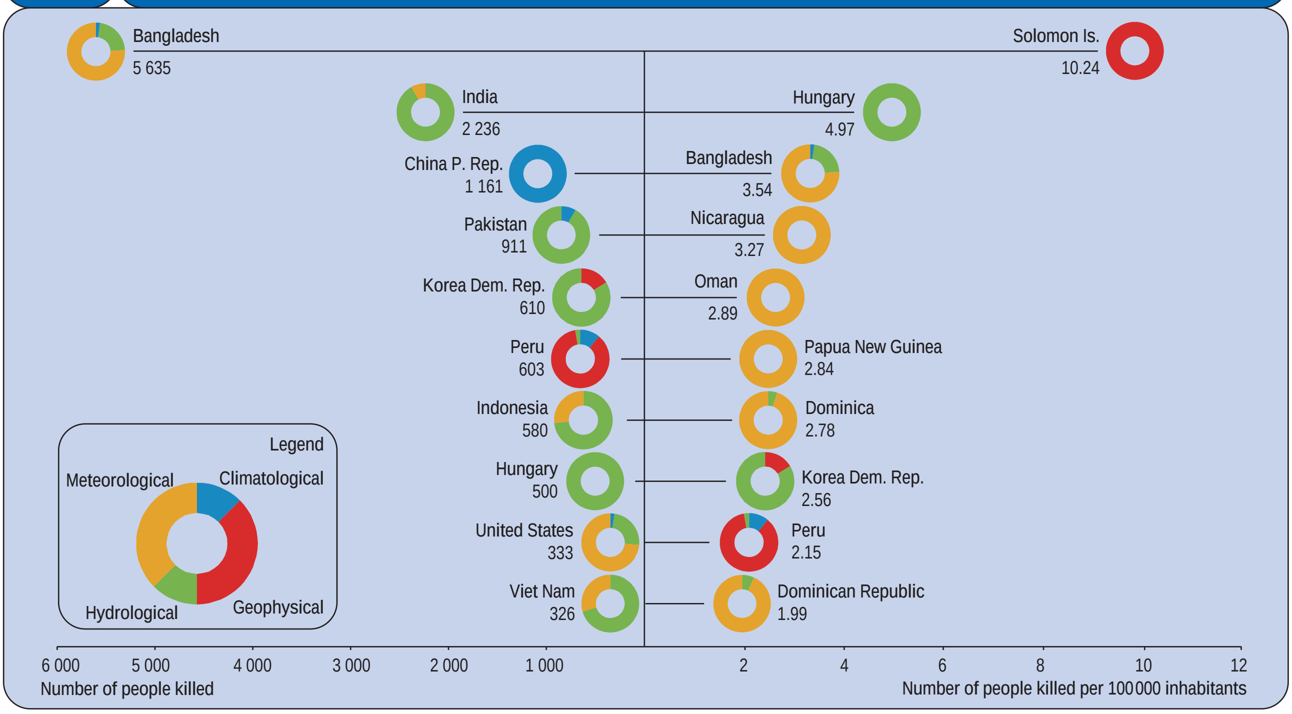
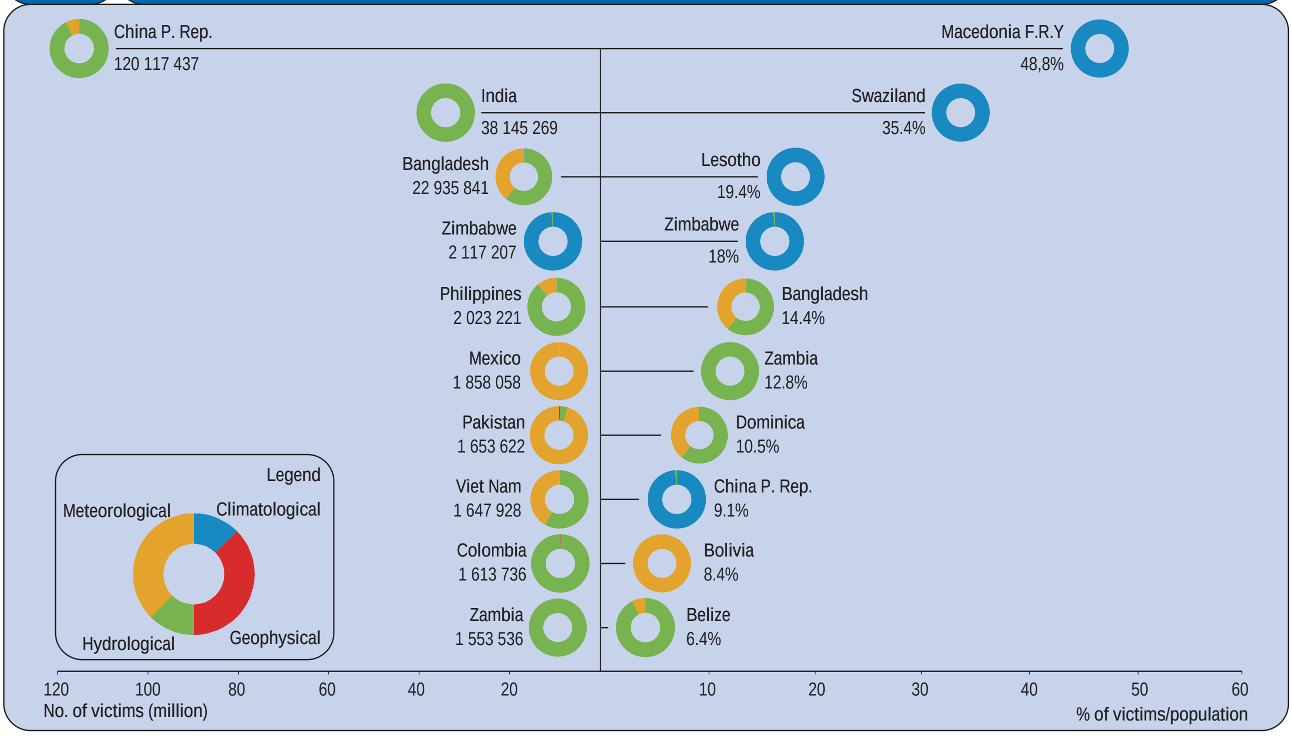
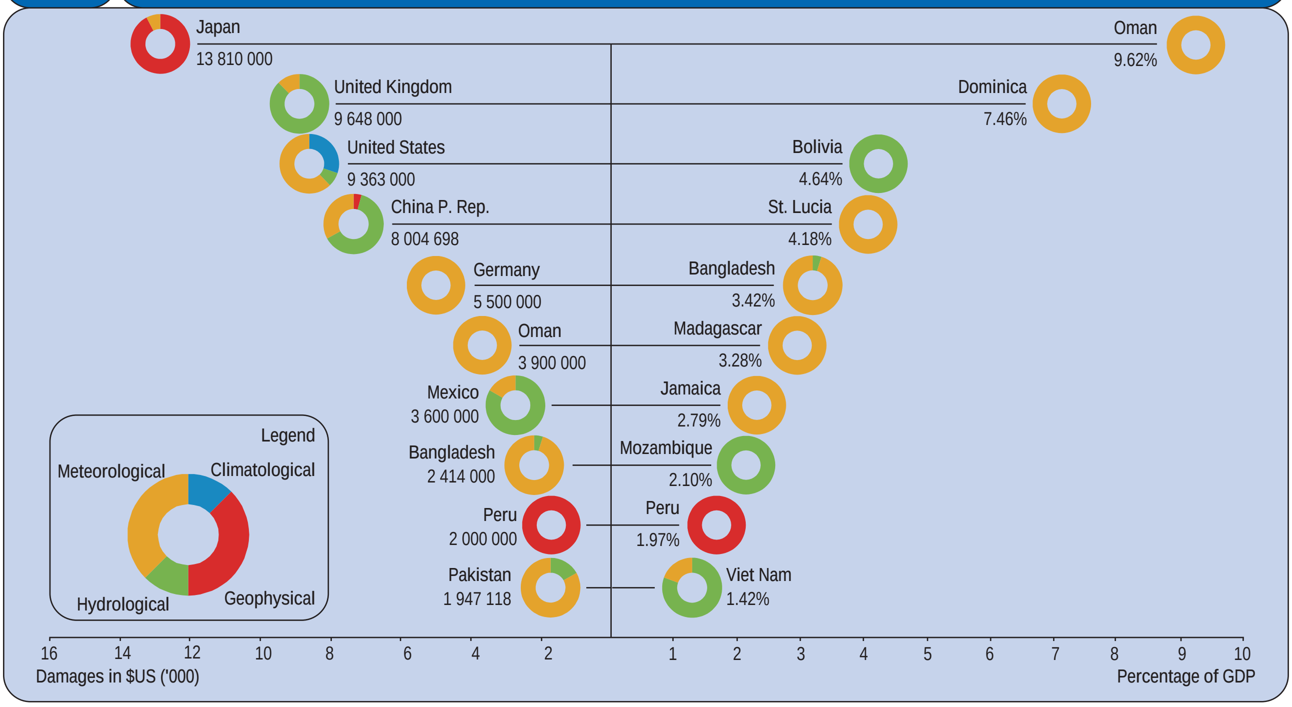


Figure 5 Top 10 countries by victims in 2007



Once again, drought didn't spare Africa. Zimbabwe, Lesotho, and Swaziland respectively saw 18%, 19%, and 35% of their populations affected by drought events. Climatological disasters also badly affected southern Europe, which experienced two extreme heat waves with temperatures exceeding 40 C°, breaking many previous records. Hungary and Macedonia were particularly badly hit. Hungary experienced a heat wave that killed 500 people, and exceptional wildfires affected 48% of Macedonia's population.

Figure 6 Top 10 countries by damages in 2007



In terms of economic damage of natural disasters, Japan, with over 13 billion US dollars of reported damage, was the country that suffered the most last year. These costs were essentially due to a single event, an earthquake that cost the country over US$ 12.5 billion. Europe also incurred high economic damage due to natural disasters last year. Two countries were especially badly hit: the UK, which lost over US$ 8 billion in damage caused by two exceptional floods in July 2007, and Germany, which was hit by the extra-tropical cyclone Kyrill. Kyrill was responsible for more than US$ 9 billion of damage in Europe, with Germany alone incurring losses of over 5.5 billion. The United States, with more than US$ 9 billion of reported damage, also paid a high tribute to natural disasters in 2007. It was affected by several costly disasters, the most expensive of which was a wildfire that occurred in California in October and was responsible for US$ 2.5 billion of damage.

When the economic cost of damage is compared to countries' GDP, we find that Oman and Dominica were particularly badly affected in 2007, the damages amounting to 9.6% and 7.4 % of their GDP respectively. In both countries, the cause of damage was a tropical cyclone, typhoon Gonu in Oman and hurricane Dean in Dominica.

Table 1 Top 10 most important disaster by number of killed

Event	Country	People killed
Cyclone Sidr, November	Bangladesh	4234
Flood, July - August	Bangladesh	1110
Flood, July - September	India	1103
Flood, August	Korea Dem. P. Rep.	610
Heat Wave, July	Southern Europe and the Balkans*	567
Flood, June - July	China P. Rep.	535
Earthquake, August	Peru	519
Cyclone Yemyin, June	Pakistan	242
Flood and Landslides, June	Pakistan	228
Flood, July	India	225
	Total	9373

* Hungary (500), Romania (30), Greece (16), Italy (6), Austria (5), Cyprus(4), Turkey(3), Bulgaria(2), Slovakia(1)

Table 2 Top 10 most important disaster by victims

Event	Country	Victims
Flood, June-July	China P. Rep.	105 004 535
Flood, July	India	18 701 103
Flood, July-August	Bangladesh	13 772 490
Flood, July	India	11 100 096
Cyclone Sidr, November	Bangladesh	8 982 775
Typhoon Sepat, August	China P. Rep., Philippines, Taiwan*	8 381 854
Flood, September	India	7 200 080
Flood, August	China P. Rep.	2 430 026
Flood, May	China P. Rep.	2 300 093
Drought, January	Zimbabwe	2 100 000
	Total	179 973 052

* China P Rep (8 000 039), Philippines (380 003), Taiwan (1812)

Table 3 Top 10 most important disaster by damages

Event	Country	Damages 2007 US$ ('000)
Earthquake, July	Japan	12 500 000
Wind Storm Kyrill, January	Nothern Europe*	9 010 000
Flood, June - July	China P Rep.	4 425 655
Flood, June - July	United Kingdom	4 000 000
Flood, July	United Kingdom	4 000 000
Cyclone Gonu, June	Oman	3 900 000
Flood, November	Mexico	3 000 000
Wild Fires, October	United States	2 500 000
Cyclone Sidr, November	Bangladesh	2 300 000
Wind Storm, April	United States	2 000 000
Earthquake, August	Peru	2 000 000
	Total	49 635 655

* Germany (5 500 000), United Kingdom (1 200 000) , Netherlands (550 000), Belgium (450 000), Austria (400 000), France (250 000), Czech Rep (150 000), Denmark (100 000), Poland (100 000), Slovenia (100 000), Switzerland (100 000), Ukraine (100 000), Belarus (10 000)

Thematic frame: Tropical cyclone Sidr

- 11 −16 November 2007
- category 4 cyclone (SSHS)
- strongest winds: 250 km/h
- total population (2004), 2004: 153 281 000
- surface area: 147 570 km²
- density 1062 hab/km2
- Impact: 4 234 killed; 8 978 541 affected; US$ 2.3 billion damage

Photo credit: NASA

Bangladesh has a history of cyclone damage. In the past it has been affected by the some of the most devastating cyclones ever recorded, including in 1970 when more than 300 000 people were killed, or more recently in 1991 when cyclone Gorky killed over 138 000 people.

Since cyclone Gorky, the international relief effort (donor community and NGOs) has strongly supported disaster-preparedness to mitigate the impact of cyclones in Bangladesh. This support consisted, inter alia, in the modernization of the early warning system which combines weather-satellite data with radio, television, and neighborhood messaging to provide information about evacuations.

Bangladesh now has a 48-hour early warning system in place that allows people to evacuate to safe cyclone shelters hours before a cyclone makes landfall. This has dramatically reduced the death toll from cyclones − from 300 000 deaths from cyclone Bhola in 1970, to 4 234 for Sidr. An estimated 40% of the people living on the coast were successfully evacuated in the day-and-a-half preceding Sidr's landfall. Of the estimated 6 million people displaced or made homeless by cyclone Sidr, half were children (many under 5 years old). The effects of Sidr on these populations, which are especially vulnerable to life-threatening diarrhea and other waterborne illnesses, are intensified by the lack of access to clean water and sanitation.

Although the death toll from cyclone Sidr was relatively modest, the damage to homes, crops and livelihoods was very extensive. It hit at the end of the monsoon season, which further intensified its impact. Even during a normal year, up to half of the country is flooded, and more than 10 million people live in areas regularly hit by natural disasters. These multiplications of the impact of natural disasters increase the number of people unable to fully recover from multiple economic shocks. The geographic/climatic aspect, combined with economic, social and cultural indicators, show that historically Bangladeshis are the most vulnerable population in the world to natural disasters.

(cc) Photo credit: uncultured on Flickr

Thematic frame: Extratropical cyclone Kyrill

- 15−19 January 2007
- strongest winds: 225km/h (Aletsch glacier, Switzerland)
- Impacts: 46 killed, 132 injured, US$ 9 billion damage

German weather experts described the Kyrill storm as a “once in a decade” event. According to CRED data the last time storms to affected northern Europe on a similar scale were Lothar in 1999 and Daria in 1990. This type of storm can be described as a severe cyclonic storm that moves across the North Atlantic towards north-western Europe in the winter months. They are sometimes referred to as hurricanes, even though few originate as tropical cyclones. They usually move over the north coast of the United Kingdom, towards Norway but can veer south to affect other areas and can generate hurricane-force winds (sometimes resembling those associated with major hurricanes).

Although, the human impact of Kyrill was limited, its effects on infrastructure (buildings, harbors, and road, air, rail and sea transportation) was extensive, causing more than US$ 9 billion worth of damage.

Damages of Kyrill

Country	Damages 2007 US$ ('000)
Germany	5 500 000
United Kingdom	1 200 000
Netherlands	550 000
Belgium	450 000
Austria	400 000
France	250 000
Czech Rep.	150 000
Denmark	100 000
Poland	100 000
Slovenia	100 000
Switzerland	100 000
Ukraine	100 000
Belarus	10 000
Total	9 010 000

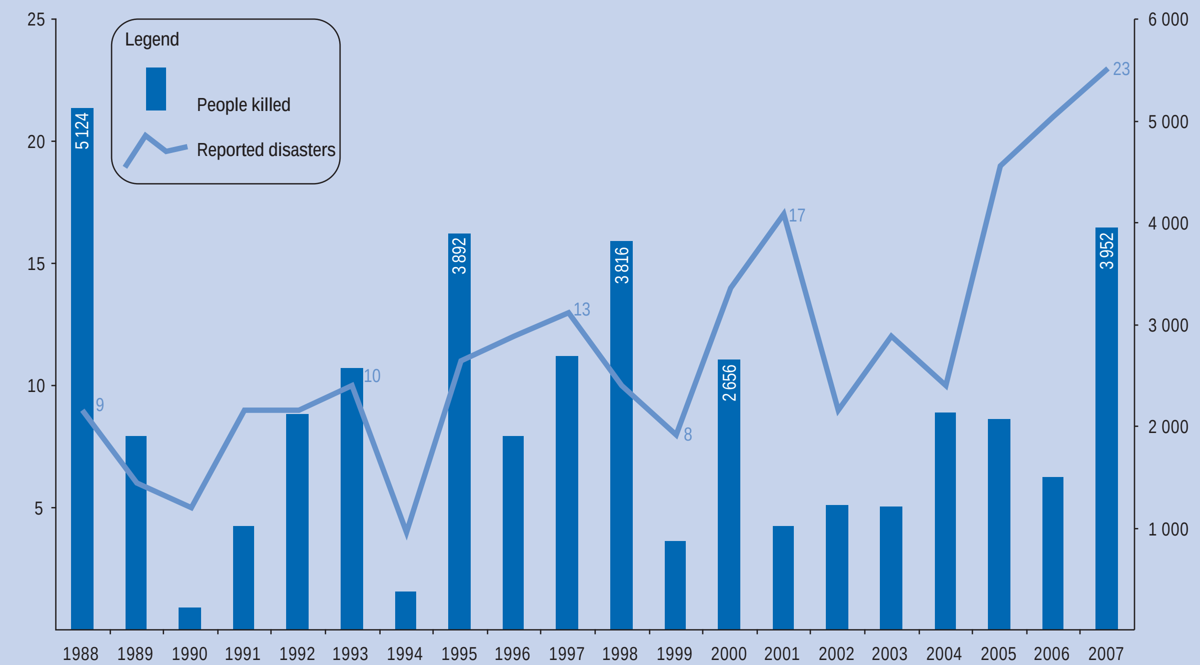
Thematic frame: Asian monsoon

Photo credit: inexplicable on Flickr

The word “monsoon” is derived from the Arabic word “mausim” which means season. The most famous monsoon is probably the Indian summer (June to September) monsoon, as it affects such a large portion of Asia (India, Bangladesh, Pakistan, and neighboring countries including south of China). As the ESA says “The south-east trade wind air streams are deflected by Coriolis force in a westerly direction when they cross the Equator and stream towards the Indian subcontinent. This is due to the thermal differences between the surfaces of the land and sea. Land masses heat up faster than water. The air over the land rises and generates a low-pressure zone into which the air from the Equator streams. The monsoon crosses the Indian Ocean on its way to Southern Asia, absorbing a lot of water. It starts to rise over the warm land mass. While rising, the air cools down, heavy clouds appear and the monsoon rains start to fall. The Himalayas form a natural barrier for the monsoon, which the air streams are unable to surmount. Southern parts of the Himalayan region are subject to heavy rainfall, whereas northern parts are extremely dry. Rainfall varies from 2000 to 4000 mm a year on the western coast of India, to only 200 mm a year in the Tharr desert. The city of Cherrapunji in the Khasi Mountains is worthy of particular note, with a rainfall of more than 10 000 mm a year, making it the rainiest city in the world! ” (Eduspace “learning with Earth Observation” - ESA European Space Agency)

Monsoon rainfall is considered to be that which occurs in any region that receives the majority of its rain during a particular season. Widespread torrential rains, and severe thunderstorms, which accompany the “onset” of the monsoon, affect large numbers of people due to the high population density in this part of the world.

Figure 7 Indian monsoon related hydrological disaster: 20 year trends in Occurrence and Mortality*



* Countries (India, Pakistan, Nepal Bhutan, Bangladesh)

The graph above depicts the number of people killed due to major hydrological hazards such a heavy rains, cyclones, floods, etc, during the monsoon season (June- September). The mortality trend is shown for a period of 20 years from 1988 to 2007. The graph shows that there is a distinct increasing trend in the occurrence of hydrological disasters related to the monsoon; however the mortality trend is stable.

This trend raises questions such as whether this is due to a better preparedness, a better response of Government and humanitarian agencies during emergencies or due to better prevention and mitigation measures put in place by the Government or other national and international agencies; or due to better reporting on occurrence of disasters. All the above questions underpin the need for a better system to capture the impact of various disaster reduction efforts to support the above trends.

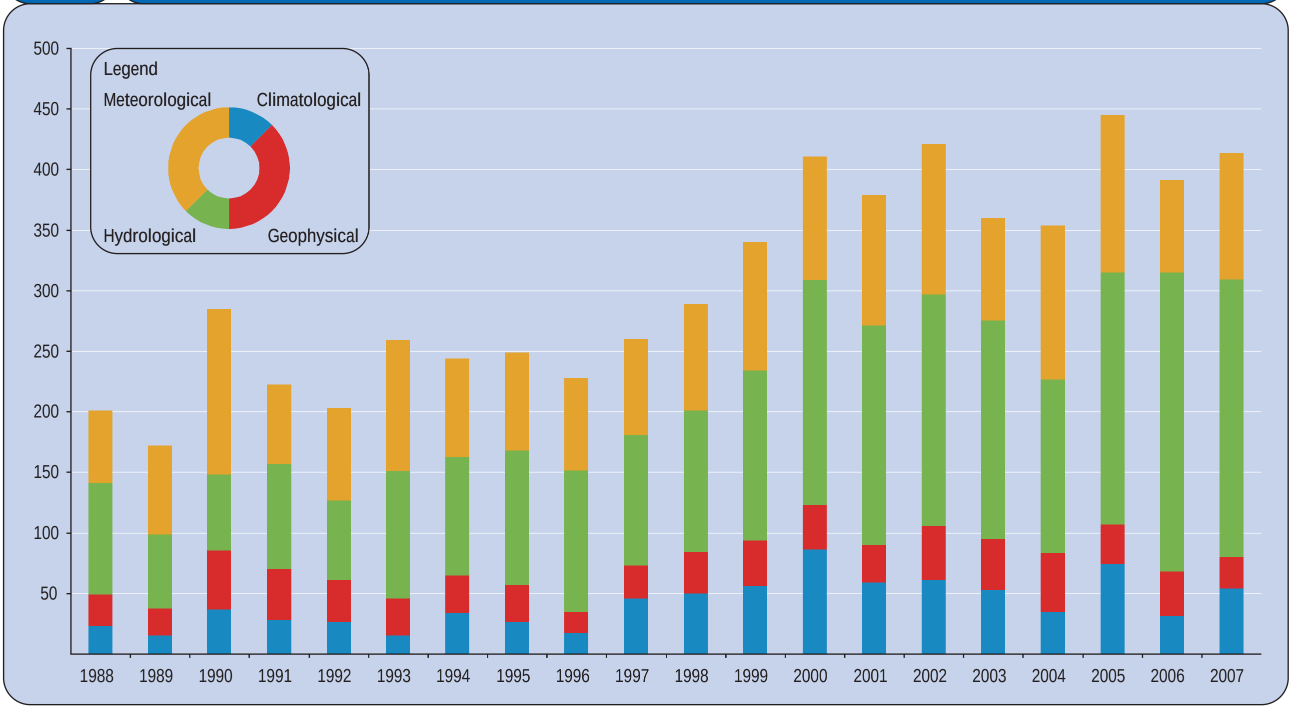
3

2007 Disaster figures

3.1 The occurrence and impact of disasters in 2007 compared to 1988–2006 trends

2007 confirmed the previous year's upward trend in the occurrence of natural disasters across the world. This upward trend is mainly driven by the increase in the number of reported hydro-meteorological disasters. Hydrological (essentially floods) and meteorological (storms) disasters are the major contributors to this pattern. In recent decades the number of reported hydrological disasters has increased by 7.4% per year, on average. Furthermore, we have witnessed in recent years a strengthening of the upward trend, with an average annual growth rate of 8.4% in the 2000 to 2007 period.

Figure 8 Natural disaster occurrence by major disaster groups: 20 years trend



The time trends for the human and economic impact of natural disasters are highly influenced by the occurrence of "mega-disasters" affecting tens of millions of people and/or causing billion of dollars worth of economic damage. These exceptional events lead to a high variation from one year to the next in the disaster impact figures. This great variability makes it difficult to identify clear trends in the human and economic impacts of disasters over time. However, in 2007 the tendency in terms of victims was towards a decline in all the different groups of natural disasters except hydrological. These increased strongly, due to the exceptionally bad summer floods in Asia that pushed up the total number of victims for 2007.

2007 was a costly year in comparison to 2006; the latter offered some relief from the normal pattern. The total reported economic damages for 2007 were close to the average (US$ 88 billion) for the last 20 years.

Figure 9 Victims of natural disasters by major disaster groups: 20 years trend

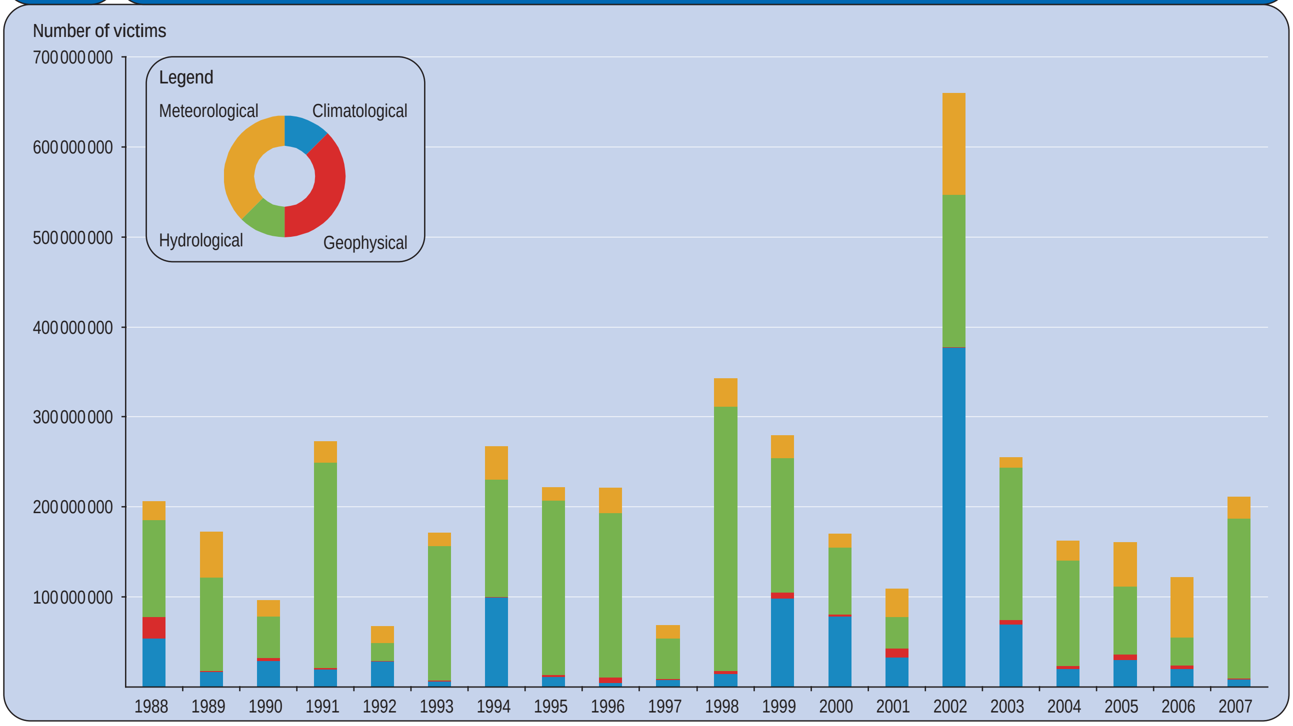
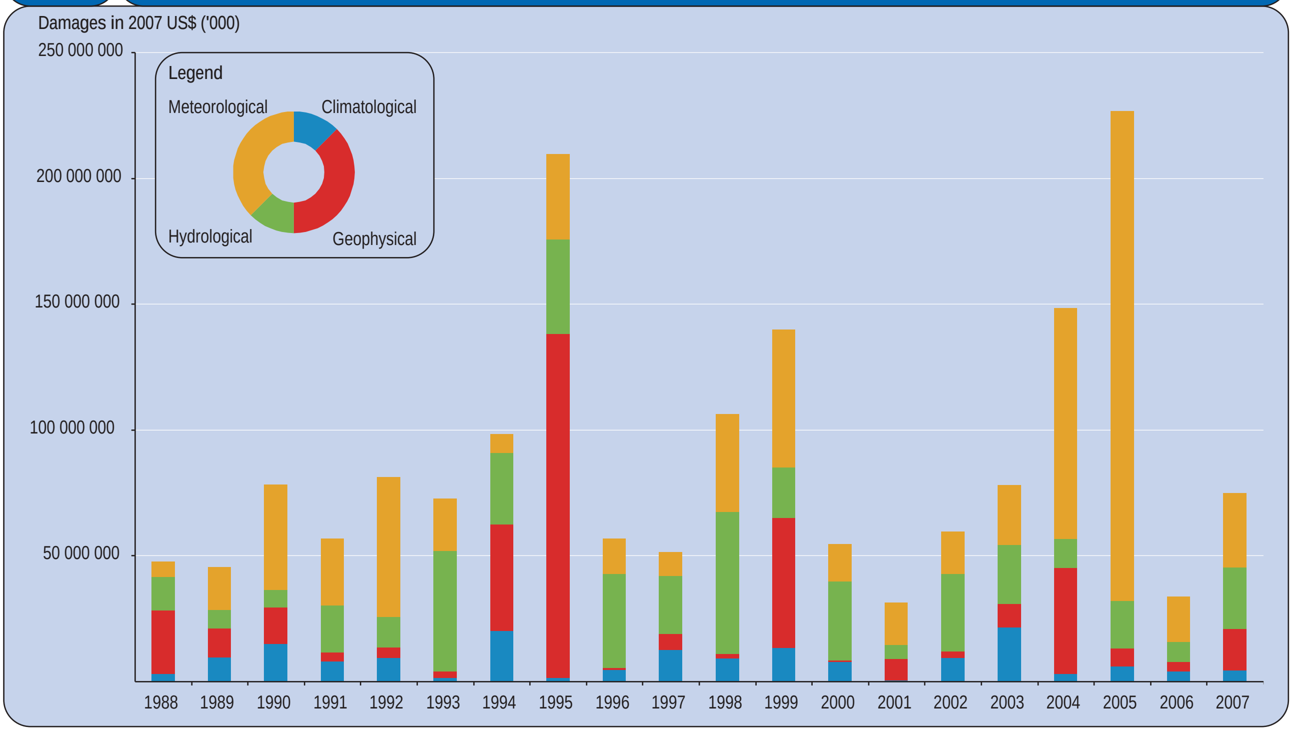


Figure 10 Natural disasters economic damages, by major disaster groups: 20 years trend



3.2. Major disaster groups in 2007 compared to the 2000–2006 average

Table 4 Natural disaster occurrence by major disaster groups

Disaster	2007 Occurrence	2006 Occurrence	Avg. 2000-2006
Geophysical	26	37	39
Climatological	54	31	57
Hydrological	229	247	191
Meteorological	105	76	107.43
Total	414	391	394.43

Table 5 Natural disaster victims by major disaster groups

Disaster	Number of Victims 2007	Number of Victims 2006	Avg. 2000-2006
Geophysical	1 251 187	4 244 163	4 586 467.71
Climatological	8 052 520	20 163 258	89 676 692
Hydrological	177 932 428	30 748 996	95 651 916.57
Meteorological	23 980 280	67 113 561	44 184 680.71
Total	211 216 415	122 269 978	234 099 757

Table 6 Natural disaster economic damages by major disaster groups

Disaster	Damages 2007*	Damages 2006*	Avg. 2000-2006*
Geophysical	16 312	4 058.04	7 514.54
Climatological	4 597.45	3 656.66	10 495.93
Hydrological	24 517.07	8 010.86	18 516.67
Meteorological	29 558.74	18 074.59	53 864.68
Total	74 985.26	33 800.15	90 391.81

* in 2007 $US Million

3.2.1. Geophysical disasters

In 2007, the number of reported geophysical disasters was the lowest since 1989. Only 26 geophysical disasters were reported, 20 due to earthquakes and 6 to volcanic eruptions. This unusually low number of events resulted in a strong decrease in the impact of geophysical disasters on people: the number of people affected in 2007 was 73% below the 2000–2006 average. The level of mortality in 2007 was even further below the average, standing at only 717, compared to an average of 6 708 in the preceding seven years.

Despite the lower number of human casualties, the amount of economic damage caused by geophysical disasters in 2007 was higher than the average. This is essentially due to the high economic cost of the earthquake that hit Japan on 16 July 2007. This event was responsible for over US$ 12 billion in economic damages, accounting for 77% of all the economic damages attributable to geophysical disasters in 2007.

3.2.2. Climatological disasters

Some 54 climatological disasters were reported in 2007, 25 extreme temperature events, 18 wildfires, and 11 droughts. The number of reported climatological disasters was higher than in 2006 but was close to the 2000-2006 average.
The number of reported victims was one of lowest in the last 20 years. During the 2000–2006 period, climatological disasters accounted for an average of 38% of the total number of reported victims. In 2007 this percentage fell to 3.8%, partly because the number of victims of climatological disaster is highly influenced by the occurrence of major droughts. In 2007, the number of people reported killed or affected by droughts was the lowest in a decade. For instance, about 5 million victims were reported in 2007, compared to 20 million in 2006, and an average of more than 88 million a year for the 2000-2006 period.

In terms of reported economic impact, climatologic disasters were responsible for US$ 4.5 billion of damage in 2007, mainly as a consequence of major wildfires. The first was a forest fire that affected Greece in August, destroying over 1600 km^2 of forest and causing US$ 1.75 billion worth of damage. The second was a scrub fire that affected California in October and was responsible for over US$ 2.5 billion damage.

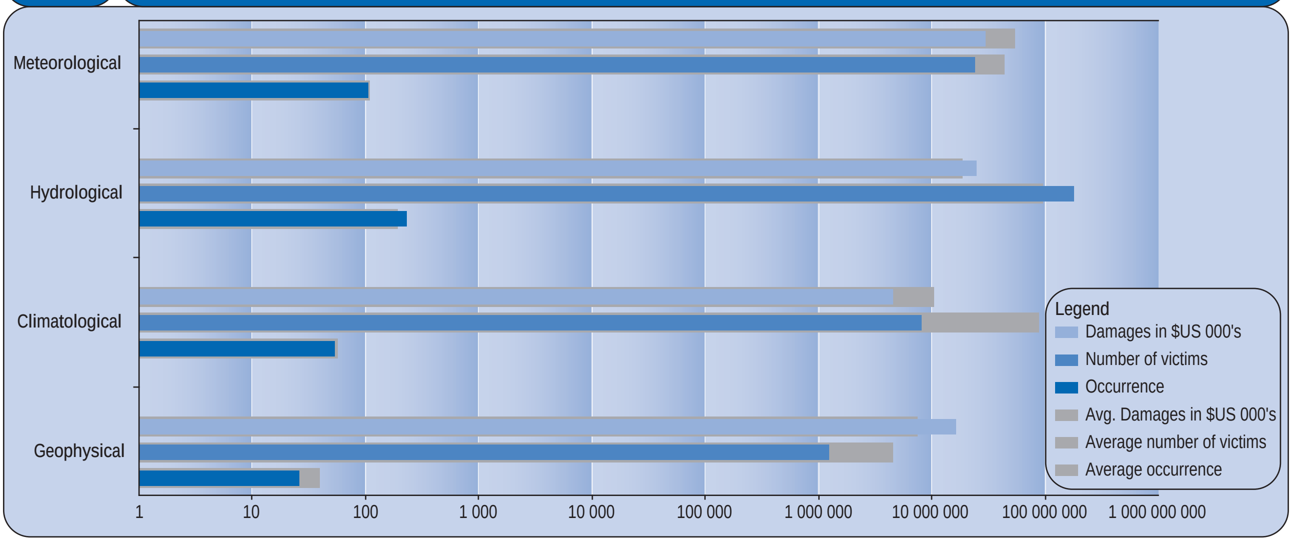
3.2.3. Hydrological disasters

Hydrological disasters remained the most common type of disaster in 2007, with 229 disasters reported (219 floods and 10 wet mass movements). They represent 55% of the overall number of disasters reported in 2007. Although the number of reported hydrological disasters decreased compared with 2006, their occurrence remained above the 2000–2006 average, which reaffirmed the upward trend in the numbers of hydrological disasters.

Hydrological disasters had a tremendously high human impact in 2007. More than 177 million victims were reported, accounting for 82% of the total number of reported victims. This important human impact originated from an unusually devastating Asian monsoon season and from extreme flooding events in China. The number of victims was the second highest in the decade: the largest number of victims ever recorded in EM-DAT occurred in 1998. It is interesting to note that, despite the record number of reported victims, the mortality figures for hydrological disasters in 2007 remained close to the 2000-2006 average (8 859 in 2007 compared to an average of 6 282).

2007 was also marked by the occurrence of unusually costly hydrological disasters. For example, two major floods in the UK in July each caused more than US$ 4 billion of economic damages. These unusual events explain the increase in the overall economic impact of hydrological disasters.

Figure 11 Natural disaster impacts by major disaster group : 2007 versus 2000-2006 average



3.2.4. Meteorological disasters

Despite the increase in the number of reported meteorological disasters in 2007 compared to 2006, the number of reported victims decreased compared to 2006 and to the 2000-2006 average.

This increase in occurrence has been mainly driven by an unusually high number of reported tropical cyclone disasters (28% higher than the 2000-2006 average). The later were the most reported type of meteorological disaster last year. The 64 tropical cyclone disasters reported accounted for 61% of the meteorological disaster occurrence. They also were the primary source of meteorological disaster induced human impact accounting for 96% of the reported victims. However, even if the deadliest reported disaster last year was a meteorological disaster (tropical cyclone Sidr), the number of reported victims was among the lowest of the last decade.

Meteorological disasters were the major source of economic damages. They caused damage worth more than US$ 29 billion and accounted for 39% of the overall economic impact of natural disasters.

3.3 Thematic frame: Health consequences of floods in Europe

Floods are the most common natural disaster in Europe. In the recent years, Europe has witnessed some of the largest flooding events in its history. Indeed, 8 out of the 20 most important floods ever recorded in Europe (in terms of human impacts) occurred during the last decade. Recent flooding events include last summer's major floods in United Kingdom and the Elbe and Danube river floods during the summer of 2002. Over the last 20 years, flood in Europe have affected over 7 million people and killed 1931 others.

Photo credit: cheltenhamborough on Flickr

The health consequences of floods in Europe are being increasingly investigated. These consequences may be broadly categorized in two groups; physical health effects and mental health effects.

Physical health effects comprise mainly death, trauma, and injuries at the impact phase of floods due to falling debris, trees, or buildings. Flash floods are often more deadly than slow-rising riverine floods, as people do not have the time for warning and to seek shelter.

Besides these direct physical impacts, floods may also provoke indirect physical effects, which include infectious diseases, worsening of chronic diseases, and chemical contamination. However, contrary to many developing countries, the risk of infectious diseases following floods is almost non-existent. For example, epidemics of diarrheal diseases following floods are not likely to occur in Europe, unless water sources are severely compromised. The reasons for this are the presence of good sanitation conditions, low endemism of waterborne pathogens, and access to safe water. Similarly, the risk for other communicable diseases, such as acute respiratory infections, skin infections, and vector or rodent-borne diseases is almost non-existent.

More important in Europe are the effects of floods in worsening chronic diseases, which has emerged as a major problem in the last years. Deterioration in chronic diseases may be due to the disruption of treatment and access to health care for people who need regular treatment and/or care, as well as other conditions created by floods, such as cold, fatigue and inadequate diet (see box on chronic diseases). Chemical contamination in humans may occur during and after floods, although very few examples have been reported and further studies should be undertaken to strengthen the scientific evidence.

The mental health problems related to floods mainly include Post Traumatic Stress Disorder (PTSD) and common mental health conditions such as anxiety and depression. The essential feature of PTSD is the development of characteristic symptoms following the exposure to an extreme traumatic stress involving direct personal and often life-threatening experience for oneself or for relatives. Hence, PTSD is more related to the severity of the floods, while the economic losses, disruption in living conditions, bad insurance coverage, and delays in rehabilitations are factors that trigger anxiety and depression. Women, those with past history of mental health problems, and those with low incomes seem to be more at risk of common mental health consequences of floods.

In summary, the direct health effects of floods in European countries, as with other regions of the world, mainly consist of drowning and injuries at the impact phase of floods, especially in the case of flash floods. Indirect health consequences in Europe consist mainly of mental health impacts and the worsening of chronic diseases, while communicable diseases – which may represent a major threat in developing countries – are minimal in their impacts. Since the common mental health disorders may last for months or even years, the true burden of mental health diseases from floods has rarely been appreciated. Further studies should aim at evaluating mental health impacts in the long term.

4

Regional analysis

4.1 Inter-regional comparisons

Despite falling slightly below the 2000–2006 average, Asia remained the region hardest hit and most affected by natural disasters in 2007. Indeed, 37% of the year's reported disasters occurred in Asia, accounting for 90% of all the reported victims and 46% of the economic damage due to natural disasters in the world.

Africa was the region that experienced the greatest increase in the number of disasters in 2007, although the impact of these disasters was less than the 2000–2006 average.

Europe remained a region where natural disasters are relatively rare and their impact is mainly economic rather than human. Indeed, the 65 disasters reported in Europe in 2007 accounted for 27% of the world's economic damage from natural disasters, but only 1% of the world's victims.

The Americas were the second region hardest hit by natural disasters in 2007. As in Europe, the human impact was relatively low compared to other regions and compared to the scale of economic damages.

Map 4 CRED regional breakdown

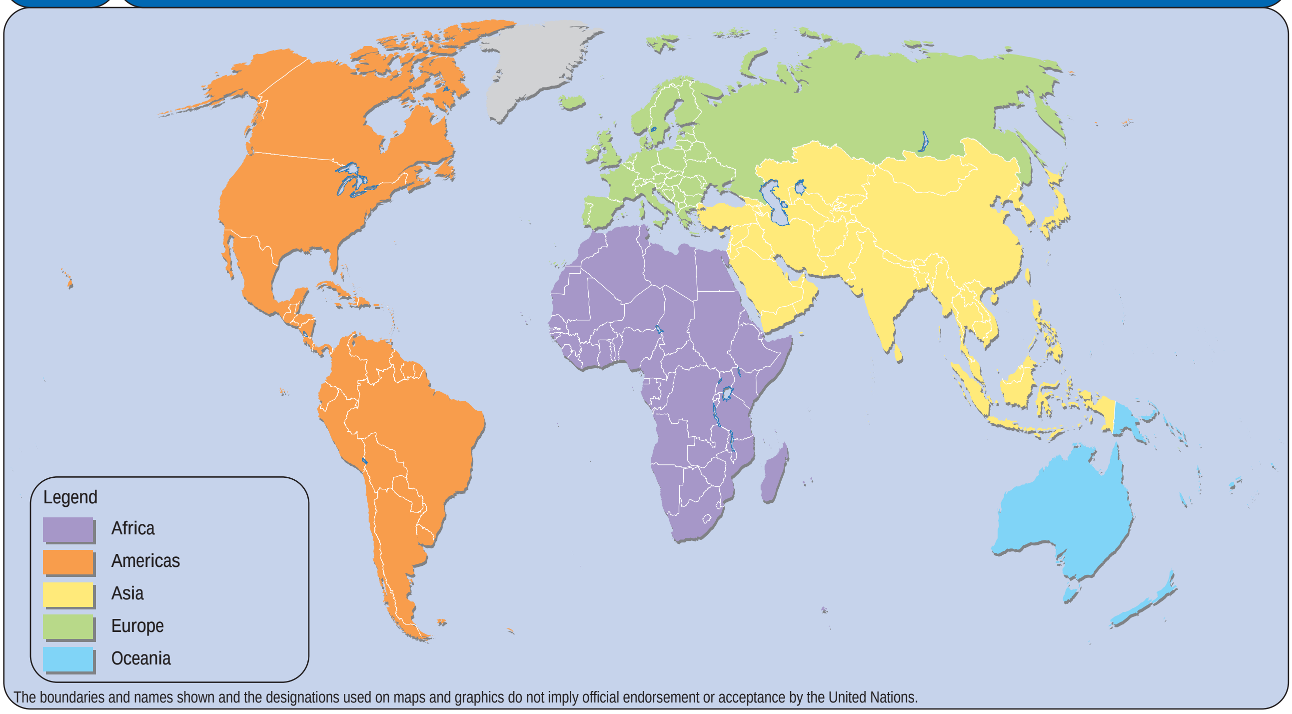


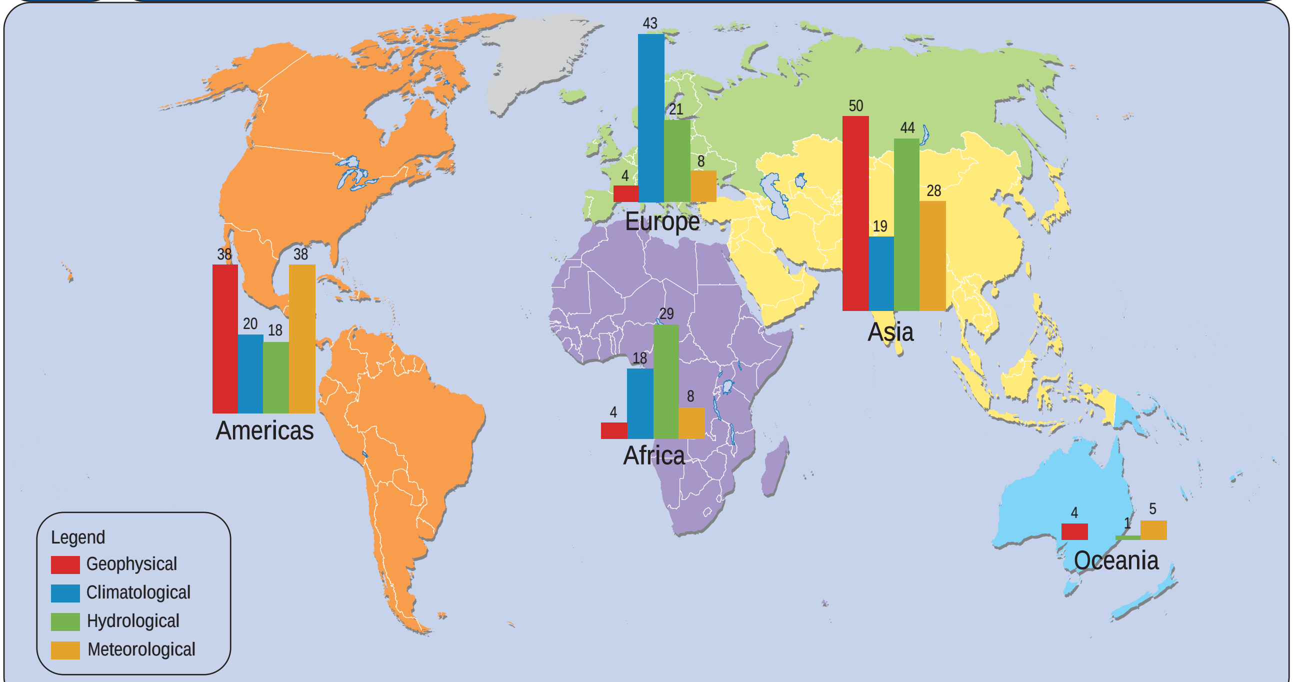
Table 7 Natural disaster occurrence and impacts: regional figures

	Africa	Americas	Asia	Europe	Oceania
Occurrence					
2007	85	102	153	65	9
2000 - 2006 Average	59.7	92.9	160.4	64.7	16.7
Number of Victims					
2007	9 598 158	8 940 362	190 563 162	1 642 878	171 855
2000 - 2006 Average	13 056 460.1	5 172 569.3	214 771 857.9	1 055 514.9	43 354.9
Damages 2007 $US'000					
2007	755 341	17 617 126	34 245 932	20 529 206	1 837 652
2000 - 2006 Average	1 297 221.4	45 809 019.2	29 307 371.2	13 053 541.1	924 357.4

The occurrence and the impact of the various groups of disasters differ between the regions. For instance, although many climatological disasters occurred in Europe (43% of the total), Africa's population was the most affected (50.6% of the victims). Similarly, although the occurrence of hydrological and meteorological disasters was spread over the different regions, their human impact was essentially concentrated in Asia.

The variation between the regions is less obvious for geophysical disasters. Their occurrence and impact were essentially concentrated in Asia and the Americas.

Map 5 2007 Natural disasters: Global proportion of occurrence by major disaster groups by region (in %)



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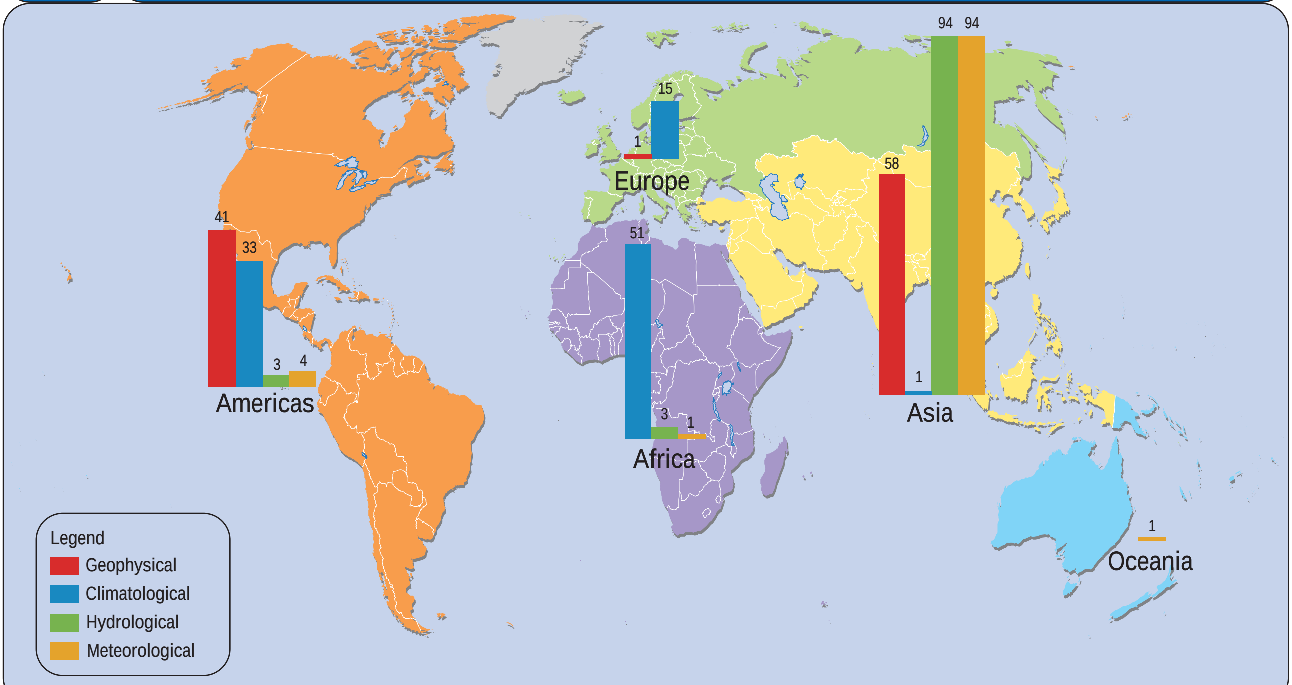
Map 6 2007 Natural disasters: Global proportion of victims by major disaster groups by region (in %)



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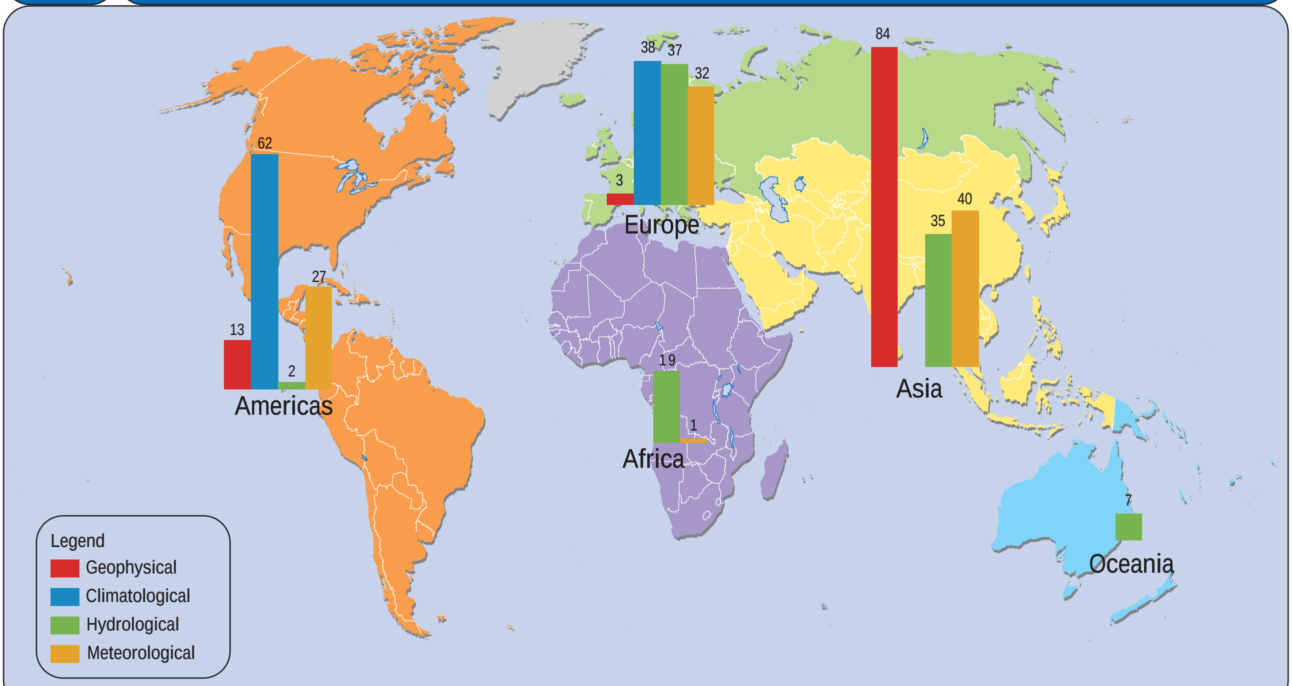
Map 7 2007 Natural disasters: Global proportion of damages by major disaster groups by region (in %)



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4.2 Thematic frame: do not forget chronic diseases

Photo credit: Shahin Edalati on Flickr

In high-income countries, chronic diseases are some of the leading causes of disability and death in adults aged 65 or older. With the demographic and socio-economic transition in developing countries, causes of deaths will shift from communicable, maternal, perinatal, and nutritional causes in the younger population to chronic diseases in older people, and overall disease patterns will also change from acute infectious diseases to chronic diseases. This is known as the epidemiological transition. These chronic diseases include non-infectious diseases (such as arthritis, hypertension, cardiac insufficiency, renal insufficiency, diabetes, chronic obstructive lung disease, and cancer), mainly in the elderly, and infectious diseases (mainly HIV/AIDS) in all age categories.

Evidence is mounting that chronic health conditions may act as substantial contributors to the public health burden of disasters, both in developed and developing countries.

Natural disasters mainly impact chronic diseases by reducing or disabling access to health care and medication, either by destroying the health infrastructures or by reducing people's mobility. In the aftermath of Hurricane Katrina, for example, in 2005, health infrastructure in New Orleans was destroyed and challenges faced for maintaining health programs, especially for patients with HIV/AIDS and cancer. Most of these patients faced a four to six weeks treatment interruption. Similarly, the treatment of chronic illnesses emerged as a critical problem after the Sumatra-Andaman Tsunami in 2004.

Other conditions created by natural disasters – such as cold, humidity, fatigue, stress and inadequate diet-may also worsen the health status of patients living with chronic conditions. Patients with diabetes for example may lack adequate diet, patients with rheumatism or chronic lung diseases can see their symptoms worsened by cold, stress, and fatigue.

Evacuation can also be challenging for people with disability. While in small communities those requiring special attention are often known by others, people with disabilities often live alone and anonymously in large urban communities. Hence, it is important to have baseline data on older adults living with disabilities from a perspective of disaster preparedness, in order to adequately prepare for evacuation, with adequate material to meet peoples' needs, in the event of a disaster.

Overall, with the likely increase in chronic diseases worldwide, the continued spread of HIV/AIDS and the epidemiological transition in developing countries, it is important not to forget chronic health conditions in natural disasters. To date, very few scientific researchers in the area of disasters have addressed that issue. Hence, further studies should aim at identifying the true burden of natural disasters on chronic diseases, in order to adapt disaster preparedness and management accordingly.

4.3 Africa

East and West Africa were the regions of Africa most badly hit by natural disasters in 2007. They were particularly affected by an unusually high number of hydrological disasters, especially during two series of floods that hit the continent. The first series occurred in January and essentially affected East and Central Africa, causing about 2 million victims. The second series of floods happened during July and August and affected a huge band of central Africa from the West to the East, producing more than 2.6 million victims.

Climatological disasters were also a major source of suffering and casualties in 2007. Although the number of victims was well below the 2000–2006 average, East and Southern Africa were particularly affected by drought. Zimbabwe, with more 2 million reported victims was the country hardest hit by these events, but smaller countries such as Lesotho and Swaziland were also badly affected.

The lack of available information on the economic impact of natural disaster in Africa makes it difficult to get an accurate picture of the damage caused by natural disasters. Despite exceptional flooding, the reported economic damage for 2007 was below the 2000–2006 average in each region of Africa except Eastern Africa, where it was almost double the average. The major source of economic damage was the floods that affected Sudan and caused more than US$ 300 million damage, and cyclone Indhala that hit Madagascar and caused over US$ 240 million worth of destruction.

The country-comparison graphic, which illustrates the occurrence of disasters, the number of reported victims, and the share of the population affected by natural disasters in each affected country, enables readers to easily identify the hardest-hit countries. In Africa, the graph shows that Zimbabwe, Lesotho and Swaziland were especially badly affected, compared to other countries. Hydrological and climatological disasters were the most frequently reported disasters in Africa, and the graph mainly shows the impact of these types of disaster.

Figure 12 Comparison of 2007 affected African countries: Occurrence, Number of Victims and Victims per 1 000 inhabitant

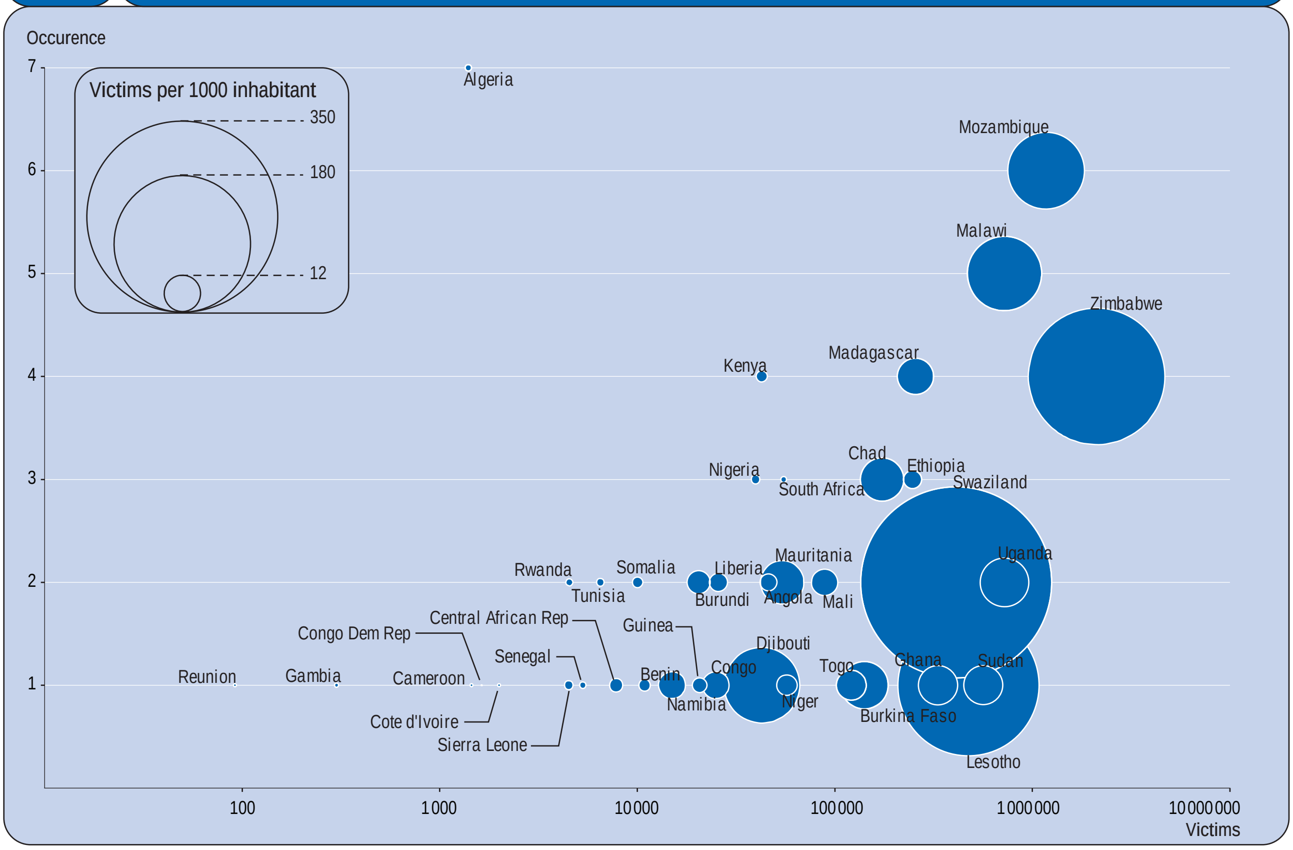

Table 8 Occurrence and impacts by major disaster groups: Africa sub-regional figures

Occurrence	Eastern Africa	Middle Africa	Northern Africa	Southern Africa	Western Africa	Africa
Geophysical 2007	1	-	-	-	-	1
Avg 2000-06	2.1	0.4	1.0	0.1	-	3.7
Climatological 2007	4	-	1	5	-	10
Avg 2000-06	3.7	0.9	0.6	1.4	2.0	8.6
Hydrological 2007	28	8	9	2	18	65
Avg 2000-06	17.1	5.1	5.1	2.7	8.4	38.6
Meteorological 2007	7	1	-	-	1	9
Avg 2000-06	4.6	0.7	0.9	1.7	1.0	8.9
Total 2007	40	9	10	7	19	85
Avg 2000-06	27.6	7.1	7.6	6	11.4	59.7
Victims						
Geophysical 2007	2 005	-	-	-	-	2 005
Avg 2000-06	59 287.6	16 015.9	32 531	8.6	-	107 843.0
Climatological 2007	3 182 750	-	8	888 150	-	4 070 908
Avg 2000-06	6 586 293.7	117 972.7	22.9	2 402 540.6	1 293 770.7	10 400 600.6
Hydrological 2007	3 343 527	255 013	573 388	53 007	911 182	5 136 117
Avg 2000-06	1 588 568	109 829.4	149 252.6	75 885.9	174 679.7	2 098 215.6
Meteorological 2007	385 469	159	-	-	3 500	389 128
Avg 2000-06	416 028.6	15 152.9	18.7	16 068.9	2 532	449 801
Total 2007	6 913 751	255 172	573 396	941 157	914 682	9 598 158
Avg 2000-06	8 650 177.9	258 970.9	181 825.1	2 494 503.9	1 470 982.4	13 056 460.1
Damages (2007 US$ '000)						
Geophysical 2007	-	-	-	-	-	-
Avg 2000-06	35 802.7	1 471.7	861 045.1	3 010.5	-	901 330
Climatological 2007	-	-	-	-	-	-
Avg 2000-06	-	-	138.2	1 707.9	-	1 544.1
Hydrological 2007	171 080.0	-	343 061	-	-	514 141
Avg 2000-06	149 308.7	1 874.1	114 146	60 932.8	8 777.0	335 038.6
Meteorological 2007	241 200	-	-	-	-	241 200
Avg 2000-06	57 005.2	-	7.5	2 295.9	-	59 308.7
Total 2007	412 280	-	343 061	-	-	755 341
Avg 2000-06	242 116.6	3 345.7	975 336.8	67 947.2	8 777.0	1 297 211.4

4.4 Americas

In 2007, there was a high level of disaster occurrence in the Americas, particularly in the Caribbean and Central America. These two regions were badly affected by a large number of meteorological and hydrological disasters. The number of meteorological disasters was especially high in the Caribbean, where the number of reported tropical cyclones in 2007 (16) was almost double the 2000-2006 average (8.4).

In terms of human impact, the number of reported victims in 2007 was well above the average. South and Central America were the worst affected. Together they accounted for over 85% of the total number of victims in the Americas. These regions experienced exceptional hydrological and climatological events. Mexico, Colombia and Bolivia, for instance, suffered several record floods affecting more than 1.6 million people in Mexico and Colombia and more than 800 000 in Bolivia. More than 1 million people suffered from a drought in Brazil and more than 800 000 others were affected by a prolonged period of cold in Peru, Argentina, Chile, and Bolivia. In terms of mortality, the earthquake that hit the south of Peru in August, with 519 people reported killed, was the Americas deadliest disaster in 2007.

The amount of economic damage reported in the Americas in 2007 was highly influenced by a few major events, such as the flood in Mexico, a wildfire and a winter storm in the USA, and the earthquake in Peru. These caused damage worth US$ 3, 2.5, and 2 billion respectively.

Meteorological disasters remained the major source of economic damage (8 US$ billion), accounting for more than 45% of all the damage reported in the region. It is difficult to compare the 2007 figure for economic damage caused by meteorological disasters with the average for earlier years, because, the exceptionally high economic damage caused by hurricane Katrina in 2005 inflated this average. Excluding Katrina, the annual average was US$ 20 billion.

The country-comparison graph clearly shows that, although the USA was the country most badly hit in 2007, the share of its population affected was low compared to that in other major countries in the Americas. Bolivia, Peru and Colombia were also particularly badly affected this year.

Figure 13 Comparison of 2007 affected American countries: Occurrence, Number of victims and Victims per 1 000 inhabitant

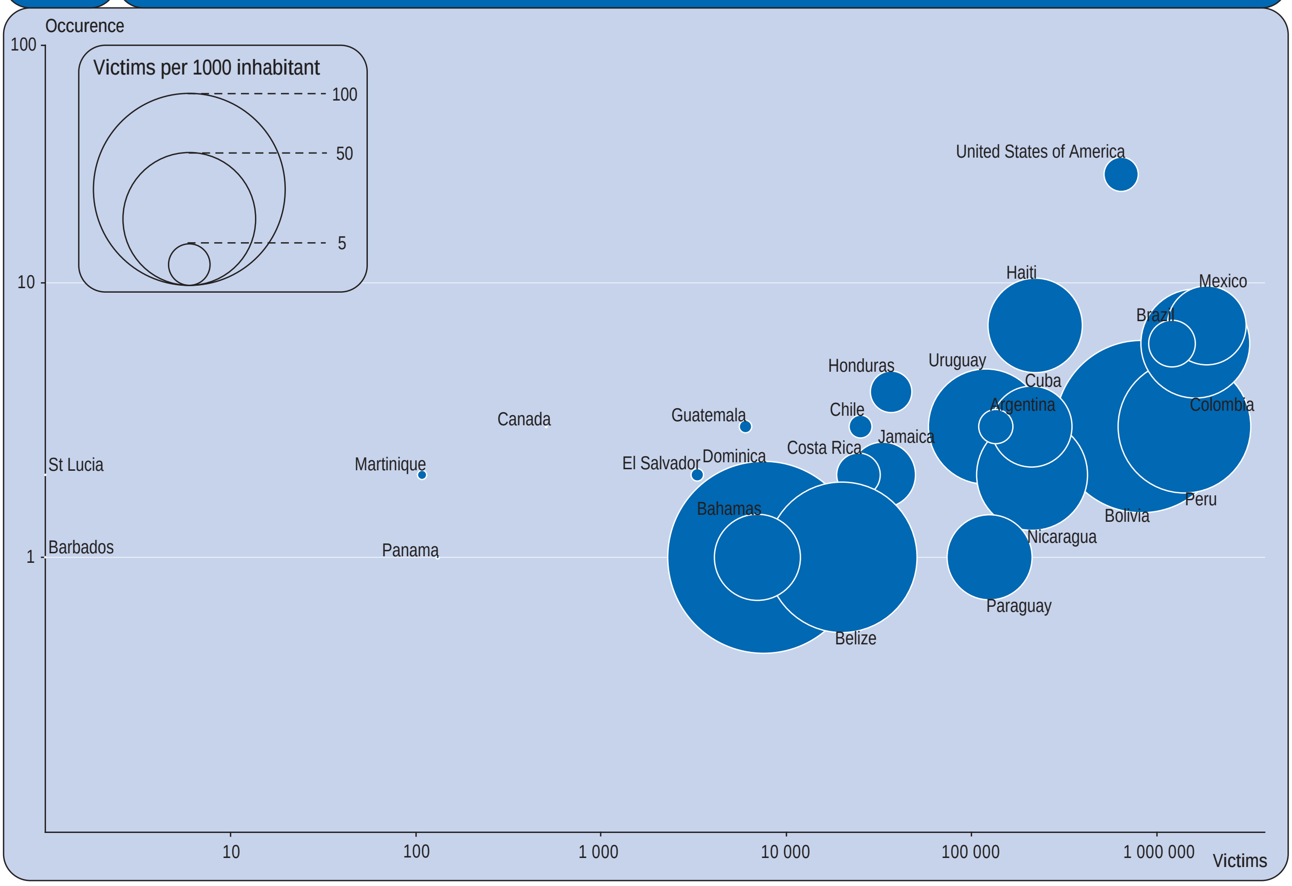

Table 9 Occurrence and impacts by major disaster groups: Americas sub-regional figures

Occurrence	Caribbean	Central America	Northern America	South America	Americas
Geophysical 2007	3	1	-	6	10
Avg 2000-06	0.6	2.6	0.7	3	6.9
Climatological 2007	-	-	4	7	11
Avg 2000-06	0.7	3	6.1	5	14.9
Hydrological 2007	7	12	7	15	41
Avg 2000-06	4.0	8.6	8.1	17.9	38.6
Meteorological 2007	16	9	15	-	40
Avg 2000-06	8.4	6.6	14.6	3	32.6
Total 2007	26	22	26	28	102
Avg 2000-06	13.7	20.7	29.6	28.9	92.9
Victims					
Geophysical 2007	102	1 883	-	509 103	511 088
Avg 2000-06	353	263 267	4 181	130 266	398 067
Climatological 2007	-	-	650 999	2 009 662	2 660 661
Avg 2000-06	5 000	162 387	12 856	740 974	921 218
Hydrological 2007	142 864	1 721 813	9 390	2 949 335	4 823 402
Avg 2000-06	62 879	56 070	41 032	656 805	816 786
Meteorological 2007	498 503	438 140	8 568	-	945 211
Avg 2000-06	1 415 554.3	666 962.1	912 390.4	41 591.7	3 036 499
Total 2007	641 469	2 161 836	668 957	5 468 100	8 940 362
Avg 2000-06	1 483 786.4	1 148 686.3	970 460.1	1 569 636.4	5 172 569.3
Damages (2007 US$'000)					
Geophysical 2007	-	-	-	2 100 000	2 100 000
Avg 2000-06		325 669	394 618	74 299	794 586
Climatological 2007	-	-	2 815 000	30 000	2 845 000
Avg 2000-06	1 513	40 385	1 863 304	290 806	2 196 009
Hydrological 2007	-	3 080 000	728 000	800 000	4 608 000
Avg 2000-06	34 914	26 566	734 352	599 020	1 394 852
Meteorological 2007	1 622 700	621 426	5 820 000	-	8 064 126
Avg 2000-06	1 736 327	1 724 299	37 901 884	61 062	41 423 572
Total 2007	1 622 700	3 701 426	9 363 000	2 930 000	17 617 126
Avg 2000-06	1 772 754	2 116 919.4	40 891 159.1	1 025 186.7	45 809 019.2

4.5 Asia

Asia remained the region most frequently hit by natural disasters in 2007. However it is interesting to note that, although the number of hydrological disasters reported was 27% higher than the 2000- 2006 average, the occurrence of all other types of disaster was below the average. Southeast and South Asia were the sub-regions that experienced the highest number of natural disasters. They were especially strongly hit by the unusually high number of floods last summer.

In terms of human impact, the majority of the victims were concentrated in two sub-regions: Eastern and Southern Asia. This phenomenon can be explained by the occurrence of several major events in the two most populous countries of the world, both of which are located in these sub-regions: China and India. China alone accounted for more than 62% of all of Asia's reported victims in 2007, while India accounted for 20%. Furthermore, many of these victims were due to two major events, the July flood in China (105 million victims) and the unusual monsoon related floods. It is also worth noticing the unusually low number of reported victims in central and western Asia, although once again, the average figures should be interpreted with caution as they are strongly influenced by a limited number of extreme events in recent years. Despite the high number of reported hydrological disasters in Southeast Asia, the number of victims in that region was relatively low compared to other regions.

It is interesting to note that, despite the large number of hydrological disasters in 2007, the amount of economic damage reported was close to the 2000–2006 average. East Asia, with more than US$ 21 billion worth of damage was the sub-region which paid the highest price for natural disasters. However the percentage of damage caused in this region was lower than in previous years, despite the costly earthquake that hit Japan in 2007 and caused over US$ 13 billion in damages.

The country comparison graph shows that the majority of Asian countries experienced between one and five natural disasters last year. Bangladesh was the country where the highest percentage of the population was affected. Despite their large populations, higher proportions of the Chinese and Indian population were affected than in other Asian countries.

Figure 14 Comparison of 2007 affected Asian countries: Occurrence, Number of Victims and Victims per 1000 inhabitant

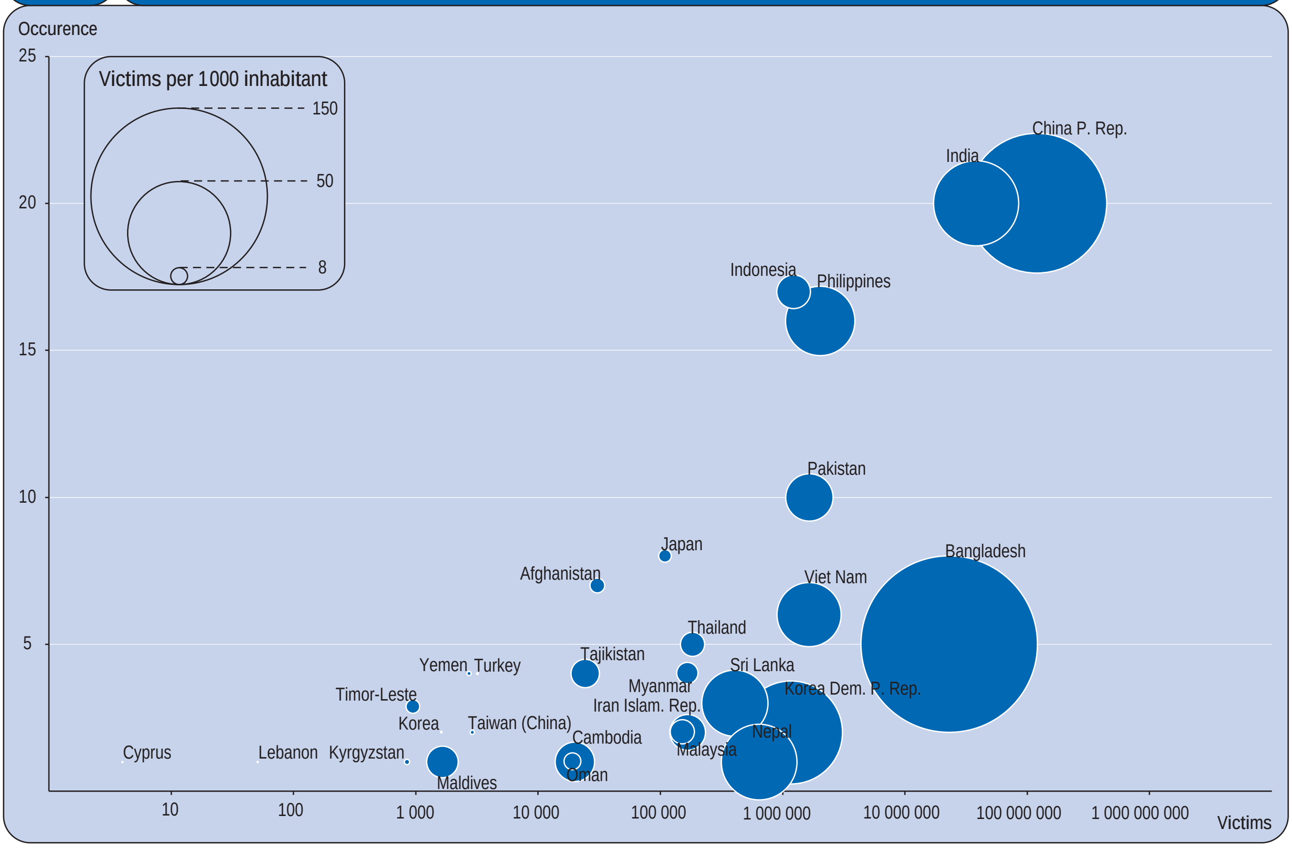

Table 10 Occurrence and impacts by major disaster groups: Asia sub-regional figures

Occurrence	Central Asia	Eastern Asia	South-Eastern Asia	Southern Asia	Western Asia	Asia
Geophysical 2007	1	4	7	-	1	13
Avg 2000-06	1.1	7.3	6.1	6.6	2.4	23.6
Climatological 2007	-	1	2	4	3	10
Avg 2000-06	0.6	3.4	2.3	5.3	2.1	13.7
Hydrological 2007	4	16	35	40	6	101
Avg 2000-06	3.7	17.0	24.7	27.1	6.4	79.0
Meteorological 2007	-	13	10	5	1	29
Avg 2000-06	0.3	19.0	12.7	9.6	2.6	44.1
Total 2007	5	34	54	49	11	153
Avg 2000-06	5.7	46.7	45.9	48.6	13.6	160.4

Victims	Central Asia	Eastern Asia	South-Eastern Asia	Southern Asia	Western Asia	Asia
Geophysical 2007	7 014	55 570	665 539	-	21	728 144
Avg 2000-06	10 264.7	1 061 091.4	702 440.4	2 201 257.3	90 092.7	4 065 147
Climatological 2007	-	3 062	-	100 340	58	103 460
Avg 2000-06	514 289.4	25 446 266.3	1 182 200	50 848 626.4	163 469.1	78 154 851
Hydrological 2007	18 192	112 293 989	2 160 462	53 080 274	5 913	167 558 830
Avg 2000-06	67 369.7	52 297 887	4 572 073.1	35 365 313	37 253	92 339 896
Meteorological 2007		9 051 424	2 607 924	10 793 304	20 076	22 472 728
Avg 2000-06	1 415.6	35 829 853	4 152 861.6	227 219.6	614.4	40 211 964
Total 2007	25 206	121 404 045	5 433 925	63 973 918	26 068	190 863 162
Avg 2000-06	593 339.4	114 635 097.7	10 609 575.1	88 642 416.3	291 429.3	214 771 857.9

Damages (2007 US$'000)	Central Asia	Eastern Asia	South-Eastern Asia	Southern Asia	Western Asia	Asia
Geophysical 2007	-	13 092 000	700 000	-	-	13 792 000
Avg 2000-06	3 208.9	4 859 870.4	1 488 601	2 034 834.3	96 040	8 482 555
Climatological 2007	-	-	-	-	-	-
Avg 2000-06	18 274.8	758 270.6	111 128.8	313 257.3	68 488	1 269 420
Hydrological 2007	200	5 023 155	2 738 100	841 719	-	8 603 174
Avg 2000-06	21 757.8	6 346 322.9	362 541.7	2 627 215.2	66 533.3	9 424 371
Meteorological 2007	-	3 829 543	201 215	3 920 000	3 900 000	11 850 758
Avg 2000-06	38.9	9 778 794.6	333 902.6	7 887.3	10 402.8	10 131 026
Total 2007	200	21 944 698	3 639 315	4 761 719	3 900 000	34 245 932
Avg 2000-06	4 343 280.4	21 743 258.5	2 296 174.2	4 983 194	241 464.2	29 307 371.2

4.6 Europe

In 2007, as in previous years, Europe was mainly affected by hydro-meteorological, especially climatological and meteorological, disasters. Southern Europe was particularly affected by a strong heat wave and numerous summer wild fires. These climatological disasters were the major source of human casualties in Europe last year. The number of meteorological disasters reported was also above the average in 2007, especially in Western Europe. Fortunately, despite the frequency of disasters, the number of victims was lower than in previous years. Once again, the care must be taken when referring to the average figure because it is so strongly influenced by major past major events.

In terms of economic damage, hydrological and meteorological disasters were the two main causes. Three major events were responsible for more than 85% of all reported economic damage: the two floods in the United Kingdom, which affected more than 370 000 people and caused more than US$ 8 billion of economic damage; and the extra-tropical cyclone Kyrill that swept across Northern and Western Europe in January 2007 and was responsible for over US$ 9 billion worth of damage.

Compared to the other main regions of the world, Europe is characterized by a low rate of disaster occurrence and very low percentages of the population affected by natural disasters. Indeed, except for Macedonia where 48,8% of the population was affected by an exceptional wildfire in July, 13 of the 29 European countries hit by disasters in 2007 were among the 20 least affected countries in the world.

Figure 15 Comparison of 2007 affected European countries: Occurrence, Number of Victims and Victims per 1000 inhabitant

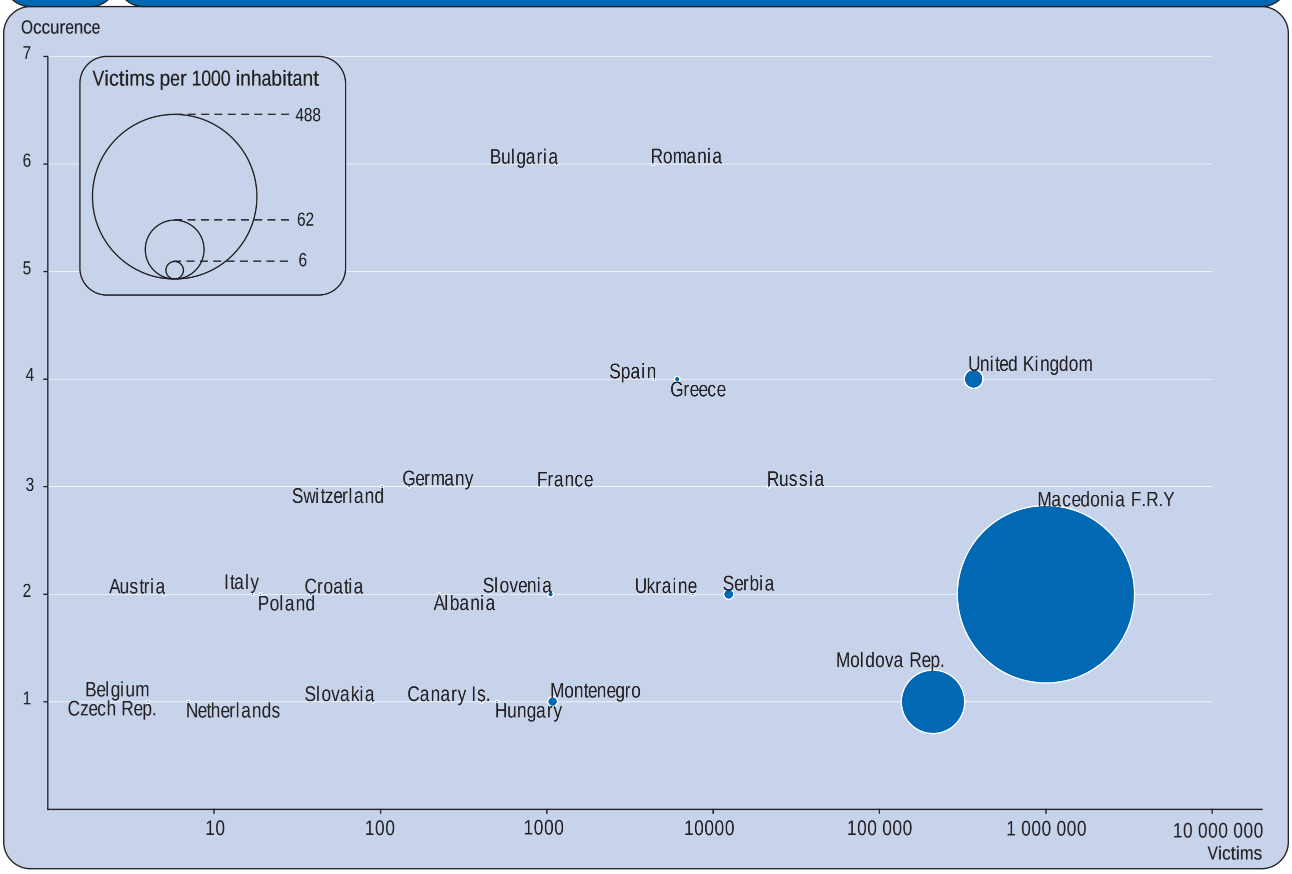

Table 11 Occurrence and impacts by major disaster groups: Europe sub-regional figures

Occurrence	Eastern Europe	Northern Europe	Southern Europe	Western Europe	Europe
Geophysical 2007	1	-	-	-	1
Avg 2000-06	0.7	0.3	1.6	0.1	2.7
Climatological 2007	8	-	14	1	23
Avg 2000-06	7.6	1.4	5.7	3.4	18.1
Hydrological 2007	8	3	6	2	19
Avg 2000-06	13.4	2.0	8.9	5.4	29.7
Meteorological 2007	7	2	3	10	22
Avg 2000-06	4.7	2.7	2.4	4.3	14.1
Total 2007	24	5	23	13	65
Avg 2000-06	26.4	6.4	18.6	13.3	64.7
Victims					
Geophysical 2007	7514	-	-	-	7514
Avg 2000-06	4803	28	1661	21	6514
Climatological 2007	211116	-	1006370	5	1217491
Avg 2000-06	156981	57	36277	5581	198896
Hydrological 2007	19354	370214	18493	103	408164
Avg 2000-06	237594	891	84731	65238	388455
Meteorological 2007	7575	13	1057	1064	9709
Avg 2000-06	382861.9	3351.1	75107.9	328.9	461650
Total 2007	245559	370227	1025920	1172	1642878
Avg 2000-06	782240.4	4328.1	197777.3	71169.0	1055514.9
Damages (2007 US$'000)					
Geophysical 2007	420000	-	-	-	420000
Avg 2000-06	9873	2050	303669	1868	317459
Climatological 2007	2454	-	1750000	-	1752454
Avg 2000-06	298582	32901	2146609	1117701	3595794
Hydrological 2007	25752	8448000	337000	244000	9054752
Avg 2000-06	1112107	1025722	1768939	3285819	7192586
Meteorological 2007	360000	1300000	392000	7250000	9302000
Avg 2000-06	94602	1153768	150405	548928	1947702
Total 2007	808206.0	9748000	2479000	7494000	20529206
Avg 2000-06	1515163.7	2214440.4	4369621.4	4954315.6	13053541.1

4.7 Oceania

In 2007, Oceania was, as usual, mainly affected by meteorological and hydrological disasters. Melanesia was the sub-region with the highest number of disasters. This region was particularly affected by cyclone Gupta that hit Papua New Guinea in November, affecting over 162 000 people. The costliest disaster was a flash flood that caused over US$ 1.7 billion of economic damage in Australia.

Figure 16 Comparison of 2007 affected Oceanian countries: Occurrence, Number of Victims and Victims per 1000 inhabitant

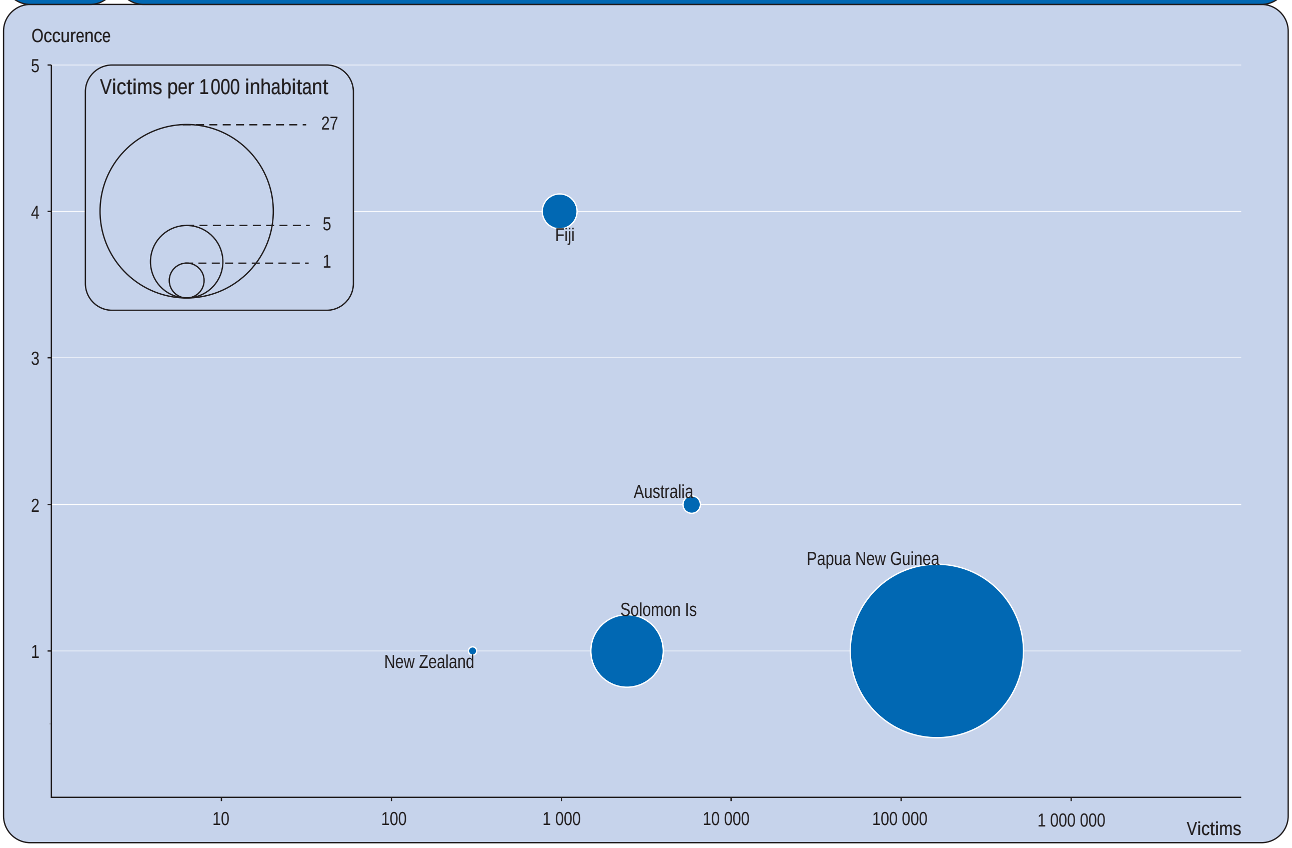

Table 12 Occurrence and impacts by major disaster groups: Oceania sub-regional figures

Occurrence	Australia and New Zealand	Melanesia	Micronesia	Polynesia	Oceania
Geophysical 2007	-	1	-	-	1
Avg 2000-06	-	2.1	-	-	2.1
Climatological 2007	-	-	-	-	-
Avg 2000-06	1.7	-	-	-	1.7
Hydrological 2007	1	2	-	-	3
Avg 2000-06	2.9	2.0	-	-	4.9
Meteorological 2007	2	3	-	-	5
Avg 2000-06	3.6	1.6	1.1	1.4	7.7
Total 2007	3	6	-	-	9
Avg 2000-06	8.1	5.7	1.1	1.4	16.4
Victims					
Geophysical 2007	-	2 436	-	-	2 436
Avg 2000-06	-	8 897	-	-	8 897
Climatological 2007	-	-	-	-	-
Avg 2000-06	1 126	-	-	-	1 126
Hydrological 2007	5 009	906	-	-	5 915
Avg 2000-06	2 865	5 698	-	-	8 563
Meteorological 2007	1 122	162 382	-	-	163 504
Avg 2000-06	2 105.9	13 235.9	3 475.4	5 950.1	24 767
Total 2007	6 131	165 724	-	-	171 855
Avg 2000-06	6 096.6	27 831.1	3 475.4	5 950.1	43 353.6
Damages (2007 US$'000)					
Geophysical 2007	-	-	-	-	
Avg 2000-06	-	-	-	-	-
Climatological 2007	-	-	-	-	-
Avg 2000-06	451 468	-	-	-	451 463
Hydrological 2007	1 700 000	37 000	-	-	1 737 000
Avg 2000-06	161 507	73	-	8 237	169 817
Meteorological 2007	100 000	652	-	-	100 652
Avg 2000-06	231 674	11 806	21 495	38 098	303 072
Total 2007	1 800 000	37 652.0	-	-	1 837 652
Avg 2000-06	844 648.9	11 878.5	21 494.6	46 335.3	924 357.4

Annexes

Annex 1

Disaster Group	Disaster Sub-Group	Disaster Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural	Geophysical	Earthquake	Earthquake	
			Tsunami	
		Volcano	Volcanic Eruption	
		Mass Movement Dry	Rockfall	
			Landslide	Mudslide Debris Flow Lahar
			Avalanche	Snow avalanche Debris avalanche
			Subsidence	Sudden subsidence Long-lasting subsidence
	Meteorological	Storm	Tropical cyclone	
			Extratropical cyclone (winter storm)	
			Local storm	Severe storm Thunderstorm Hailstorm Tornado Sandstorm/dust sto rm Snowstorm/blizzard Origraphic storm
	Hydrological	Flood	General flood	
			Flash flood	
			Storm surge/coastal flood	
		Mass Movement Wet	Rockfall	
			Landslide	Mudslide Debris Flow Lahar
			Avalanche	Snow avalanche Debris avalanche
			Subsidence	Sudden subsidence Long-lasting subsidence
	Climatological	Extreme temperature	Heat wave	
			Cold wave	Frost
			Extreme winter conditions	Snow pressure Icing Freezing rain
		Drought	Drought	
		Wildfire	Forest fire	
			Bush/brush fires	
			Scrub/grass land	
			Urban fire	

Annex 1

Disaster Group	Disaster Sub-Group	Disaster Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural	Biological	Epidemic	Viral Infectious Diseases	
			Bacterial Infectious Diseases	
			Parasitic Infectious Diseases	
			Fungal Infectious Diseases	
			Prion Infectious Diseases	
		Insect Infestation	Grasshopper	
			Locust	
			Animal attack	
	Extra-Terrestrial	Meteorite/Asteroid		
Technological Disasters	Technological Disasters	Industrial Accident	Chemical spill	
			Collapse	
			Explosion	
			Fire	
			Gas Leak	
			Poisoning	
			Radiation	
			Other	
		Miscellaneous Accident	Collapse	
			Explosion	
			Fire	
			Other	
		Transport accident	Air	
			Rail	
			Road	
			Water	

Annex 2 Definition table

Disaster Sub-Group	Disaster Type	Disaster-Sub categories	Definition	Description
Geophysical			Events originating from solid earth	
	Earthquake	Earthquake	Shaking and displacement of ground due to seismic waves. This is the earthquake itself WITH-OUT secondary effects!	An earthquake is the result of a sudden release of stored energy in the Earth's crust that creates seismic waves. They can be of tectonic or volcanic origin. At the Earth's surface they are felt as a shaking or displacement of the ground. The energy released in the hypocenter can be measured in different frequency ranges. Therefore there are different scales for measuring the magnitude of a quake according to a certain frequency range. Those are: a) surface wave magnitude (Ms); b) body wave magnitude (Mb); c) local magnitude (ML); moment magnitude.
		Tsunami	Waves advancing inland	A tsunami is a series of waves caused by a rapid displacement of a body of water (ocean, lake). The waves are characterised by a very long wavelength and their amplitude is much smaller offshore. The impact in coastal areas can be very destructive as the waves advance inland and can extend over thousands of kilometers. Triggers of a tsunami can be: earthquakes, volcanic eruptions, mass movements, meteorite impacts or underwater explosions.
	Volcano	Volcanic eruption	All volcanic activity like rock fall, ash fall, lava streams, gases etc	Volcanic activity describes the transport of magma and/or gases to the Earth's surface which can be accompanied by tremors and eruptions. Depending on the composition of the magma eruptions can be phreatic, explosive and effusive and result in variations of rock fall, ash fall, lava streams, pyroclastic flow, emission of gases etc.
	Mass Movement Dry	Subsidence	Downward motion of the Earth's surface relative to a datum (e.g. the sea level)	Subsidence is the motion of the Earth's surface as it shifts downward relative to a datum (e.g. the sea level). Subsidence (dry) can be the result of: geological faulting, isostatic rebound, human impact (e.g. mining, extraction of natural gas) etc. Subsidence (wet) can be the result of: karst, changes in soil water saturation, permafrost degradation (thermokarst) etc.
		Rockfall	Quantities of rock or stone falling freely from a cliff face.	Rockfall refers to quantities of rock or stone falling freely from a cliff face. It is caused by undercutting, weathering or permafrost degradation.
		Avalanche	Any kind of rapid snow/ice movement	Avalanche describes a quantity of snow or ice that slides down a mountainside under the force of gravity. It occurs if the load on the upper snow layers exceeds the bonding forces of the entire mass of snow. It often gathers material that is underneath the snowpack like soil, rock etc (debris avalanche).

Annex 2 Definition table (continuation)

Disaster Sub-Group	Disaster Type	Disaster-Sub categories	Definition	Description
Geophysical	Mass Movement Dry	Landslide	Any kind of moderate to rapid soil movement incl. lahar, mudslide, debris flow	A landslide is the movement of soil or rock controlled by gravity and the speed of the movement usually ranges between slow and rapid, but not very slow. It can be superficial or deep, but the materials have to make up a mass that is a portion of the slope or the slope itself. The movement has to be downward and outward with a free face.
		Unspecified	All hazards/losses that cannot be put into one of the other categories	
Meteorological			Events caused by short-lived/small to mesoscale atmospheric processes (in the spectrum from minutes to days)	
	Storm	Tropical cyclone	Cyclones in tropical areas e.g. hurricanes, typhoons, tropical depressions etc (names depending on location)	A tropical cyclone is a non-frontal storm system that is characterised by a low pressure center, spiral rain bands and strong winds. Usually it originates over tropical or sub-tropical waters and rotates clockwise in the southern hemisphere and counter-clockwise in the northern hemisphere. The system is fueled by heat released when moist air rises and the water vapor it contains condenses ("warm core" storm system). Therefore the water temperature must be >27 °C. Depending on their location and strength, tropical cyclones are referred to as hurricane (western Atlantic/eastern Pacific), typhoon (western Pacific), cyclone (southern Pacific/Indian Ocean), tropical storm, and tropical depression (defined by wind speed; see Saffir-Simpson-Scale).
		Winter storm (extra-tropical cyclone)	Extra-tropical cyclones in spring, autumn or winter; e.g. storm Daria, Lothar	A winter storm emerges from a extra-tropical cyclone, a synoptic scale low pressure system that occurs in the middle latitudes of the Earth and is connected to fronts and horizontal gradients in temperature and dew point. A winter storm comes along with high wind speeds, gusts, thunder-storms, rain and often storm surges.
		Tempest/ Severe storm	Convective storm	A severe storm or thunderstorm is the result of convection and condensation in the lower atmosphere and the accom-panying formation of a cumulonimbus cloud. A severe storm usually comes along with high winds, heavy precipitation (rain, sleet, hail), thunder and lightning.
		Hail storm	Storm with hailstones as dominant type of precipitation	A hail storm is a type of storm that is characterised by hail as the dominant part of its precipitation. The size of the hailstones can vary between pea size (6mm) and softball size (112mm) and therefore cause considerable damage.

Annex 2 Definition table (continuation 2)

Disaster Sub-Group	Disaster Type	Disaster-Sub categories	Definition	Description
Meteorological	Storm	Lightning	hazards/losses caused by lightning stroke	Lightning is an atmospheric discharge of electricity, which typically occurs during thunderstorms, and sometimes during volcanic eruptions or dust storms.
		Tornado	Tornados NOT hurricanes	A tornado is a rotating column of air (vortex) that emerges out of the base of a cumulonimbus cloud and has contact to the Earth's surface. Typically it forms during a severe convective storm in so-called supercells and is often visible as a funnel-shaped cloud. Tornadoes are usually short-lived, lasting on average no more than 10 minutes. They can generate wind speeds above 400 km/h and are considered the most destructive weather phenomenon. The intensity of tornadoes is assessed using the Enhanced Fujita Scale. Other names for this weather phenomenon are twister, waterspout.
		Local Windstorm (orographic storm)	Like Foehn, Mistral, Bora etc.	Local windstorm refers to strong winds caused by regional atmospheric phenomena which are typical for a certain area. These can be katabatic winds, foehn winds etc.
		Sandstorm /Dust storm	Sandstorm e.g. in deserts	A sandstorm/dust storm typically occurs in arid or semi-arid regions if high wind speeds cause the transportation of small particles like sand or fine clastic sediment by saltation and/or suspension.
		Blizzard /Snowstorm	Blizzard, ice & snow, often in North America	A snowstorm refers to a storm, usually in the winter season, where large amounts of snow fall. If it's a severe snowstorm that meets certain criteria, such as strong winds, blowing snow and low or falling temperatures, it's called blizzard.
Hydrological			Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up	
	Flood	General flood	Gradually rising inland floods (rivers, lakes, groundwater) due to high total depth of rainfall or snowmelt	A general flood is caused when a body of water (river, lake) overflows its normal confines due to rising water levels. The term general flood additionally comprises the accumulation of water on the surface due to long-lasting rainfall (water logging) and the rise of the groundwater table above surface. Furthermore, inundation by melting snow and ice, backwater effects, and special causes such as the outburst of a glacial lake or the breaching of a dam are subsumed under the term general flood. General floods can be expected at certain locations (e.g. along rivers) with a significantly higher probability than at others.

Annex 2 Definition table (continuation 3)

Disaster Sub-Group	Disaster Type	Disaster-Sub categories	Definition	Description
Hydrological	Flood	Flash flood	Rapid inland floods due to intense rainfall	A flash flood describes sudden flooding with short duration. In sloped terrain the water flows rapidly with a high destruction potential. In flat terrain the rainwater cannot infiltrate into the ground or run off (due to small slope) as quickly as it falls. Flash floods typically are associated with thunderstorms. A flash flood can occur at virtually any place.
		Storm surge	Coastal flood on coasts and lake shores induced by wind	A storm surge is the rise of the water level in the sea, an estuary or lake as result of strong wind driving the seawater towards the coast. This so-called wind setup is superimposed on the normal astronomical tide. The mean high water level can be exceeded by five and more metres. The areas threatened by storm surges are coastal lowlands.
		Glacier lake outburst flood /Jökulhlaup	Flooding due to the outburst of a glacier lake	A glacier lake outburst flood occurs when a lake - dammed by a glacier or a terminal moraine - fails. The outburst can be triggered by erosion, a critical water pressure, a mass movement, an earthquake or cryoseism. A jökulhlaup is a special type of a glacier lake outburst flood related to the outburst of an ice-dammed lake during a volcanic eruption.
	Mass Movement Wet	Subsidence	Downward motion of the Earth's surface relative to a datum (e.g. the sea level)	Subsidence is the motion of the Earth's surface as it shifts downward relative to a datum (e.g. the sea level). Subsidence (dry) can be the result of: geological faulting, isostatic rebound, human impact (e.g. mining, extraction of natural gas) etc. Subsidence (wet) can be the result of: karst, changes in soil water saturation, permafrost degradation (thermokarst) etc.
		Rockfall	Quantities of rock or stone falling freely from a cliff face.	Rockfall refers to quantities of rock or stone falling freely from a cliff face. It is caused by undercutting, weathering or permafrost degradation.
		Avalanche	Any kind of rapid snow/ice movement	Avalanche describes a quantity of snow or ice that slides down a mountainside under the force of gravity. It occurs if the load on the upper snow layers exceeds the bonding forces of the entire mass of snow. It often gathers material that is underneath the snowpack like soil, rock etc (debris avalanche).
		Landslide	Any kind of moderate to rapid soil movement incl. lahar, mudslide, debris flow	A landslide is the movement of soil or rock controlled by gravity and the speed of the movement usually ranges between slow and rapid, but not very slow. It can be superficial or deep, but the materials have to make up a mass that is a portion of the slope or the slope itself. The movement has to be downward and outward with a free face.

Annex 2 Definition table (continuation 4)

Disaster Sub-Group	Disaster Type	Disaster-Sub categories	Definition	Description
Climatological			Events caused by long-lived/meso to macroscale processes (in the spectrum from intrasea-sonal to multidecadal climate variability)	
	Extreme temperature	Heat wave	Heat waves like in Central Europe 2003	A heat wave is a prolonged period of excessively hot and sometimes also humid weather relative to normal climat patterns of a certain region.
		Cold wave /frost	Damage caused by low temperatures	A cold wave can be both a prolonged period of excessively cold weather and the sudden invasion of very cold air over a large area. Along with frost it can cause damage to agricul-ture, infrastructure, property.
		Winter storm (Extreme winter conditions)	Damage caused by snow and ice	Winter damage refers to damage to buildings, infrastructure, traffic (esp. navigation) inflicted by snow and ice in form of snow pressure, freezing rain, frozen waterways etc.
	Drought	Drought	Long lasting event; triggered by lack of precipitation.	A drought is an extended period of time characterised by a deficiency in a region's water supply. It's a result of constantly below average precipitation and can lead to losses to agriculture and famine.
	Wildfire	Wildfire	Fire in forested/bush areas e.g. California, Australia.	Wildfire describes an uncontrolled burning fire, usually in wild lands, which can cause damage to forestry, agriculture, infrastructure and buildings.
Biological*			Disaster caused by the exposure of living organisms, to germs and toxic substances	
	Epidemic*		Either an unusual increase in the number of cases of an infectious disease, which already exists in the region or population concerned; or the appear-ance of an infection previously absent from a region.	

Annex 2 Definition table (continuation 5)

Disaster Sub-Group	Disaster Type	Disaster-Sub categories	Definition	Description
Biological*	Insect infestation*		Pervasive influx and development of insects or parasites affecting humans, animals, crops and materials.	
	Animal attack			
Extra-Terrestrial				
	Meteorite /asteroid impact		Events arising from the impact of solid bodies or the influence of radiation from space.	

Most of the definition has been established by MünichRe/Geo Risks Research Department, the one marked by and * are from "UN-DHA. Glossary internationally agreed Glossary of Basic Terms related to Disaster Management". Please note that some definition are still under reviewing process (animal attack and the epidemic sub-categories).

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