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Annual Disaster Statistical Review 2011

The numbers and trends

Debby Guha-Sapir, Femke Vos, Regina Below with Sylvain Ponserre

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About CRED

The Centre for Research on the Epidemiology of Disasters (CRED) has been active for more than 35 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 due to 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 storms; longer-term disasters such as famines and droughts; and situations creating mass displacement of people such as civil strife and conflicts.

The Centre focuses on health aspects and the burden of disease arising from disasters and complex emergencies. CRED also promotes research on broader aspects of humanitarian crises, such as 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 Centre 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.

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Executive Summary

In 2011, 332 natural disasters[1] were registered, less than the average annual disaster frequency observed from 2001 to 2010 (384). However, the human and economic impacts of the disasters in 2011 were massive. Natural disasters killed a total of 30 773 people and caused 244.7 million victims worldwide (see Figure 1). Economic damages from natural disasters were the highest ever registered, with an estimated US$ 366.1 billion.

Over the last decade, China, the United States, the Philippines, India and Indonesia constitute together the top 5 countries that are most frequently hit by natural disasters. In 2011, the Philippines experienced the highest number of natural disasters ever registered in its history (33). The country was affected by 18 floods and landslides, 12 storms, 2 volcanic eruptions and one earthquake. Tropical cyclone 'Washi' (Sendong) struck the country in December and caused 1 439 deaths, making it the most lethal storm worldwide in 2011.

Amongst the top 10 countries in terms of disaster mortality in 2011, seven countries are classified as high-income or upper-middle income economies (see World Bank income classification)[2]. These countries[3] accounted for 79.2% of global reported disaster mortality in 2011, mainly due to the Tōhoku earthquake and tsunami in Japan on March 11th. This mega-disaster caused nearly 19 850 deaths, representing 64.5% of worldwide disaster mortality in 2011.

The Tōhoku earthquake and tsunami in Japan was the most expensive natural disaster ever recorded, with estimated economic damages of US$ 210.0 billion. Floods in Thailand that occurred from August to December (US$ 40.0 billion), the February 22nd earthquake in New Zealand (US$ 15.0 billion), and storms in the United States in May (US$ 14.0 billion) and April (US$ 11.0 billion) also added significantly to the total disaster damages of 2011.

The disaster that made the most victims in 2011 was the flood that affected China in June, causing 67.9 million victims. Furthermore, China was affected by a drought from January to May (35.0 million victims), a storm in April (22.0 million victims) and another flood in September (20.0 million victims), further contributing to a total of 159.3 million victims in China in 2011, a figure representing 65.1% of global reported disaster victims. Droughts and consecutive famines made many victims in Ethiopia (4.8 million), Kenya (4.3 million) and Somalia (4.0 million). When considering the population size of the country, 42.9% of Somalia's population was made victim of natural disasters in 2011, mostly due to drought.

Comparing 2011 with the previous decade shows that the number of victims increased compared to the annual average number of victims from 2001 to 2010 of 232.0 million. This increase is explained by the larger impact from hydrological disasters. Hydrological disasters caused 139.8 million victims in 2011 - or 57.1% of total disaster victims in 2011 - compared to an annual average of 106.7 million hydrological disaster victims from 2001 to 2010. In 2011, 66.8% of global hydrological disaster victims were from floods and wet mass movements in China.

[1] Biological disasters are not included in this publication.
[2] *http://data.worldbank.org/about/country-classifications/country-and-lending-groups*. Accessed on 1 May, 2012.
[3] High-income: Japan, United States; Upper-middle income: Brazil, China, Colombia, Thailand, Turkey.

Less people were killed by disasters in 2011 compared to 2010, when the Haiti earthquake alone caused the death of more than 222 500 people, and compared to the 2001-2010 annual average of 106 891 deaths. This is mainly explained by a lower number of deaths from geophysical disasters. However, geophysical disasters took the largest share of natural disaster fatalities in 2011, causing 20 949 deaths, and representing 68.1% of global disaster mortality in 2011. On average, geophysical disasters killed 69 098 people per year from 2001 to 2010.

The estimated economic losses from natural disasters in 2011 surpassed the last record year of 2005 (US$ 246.8 billion), and increased by 235% compared to the annual average damages from 2001 to 2010 (US$ 109.3 billion). Damages from geophysical disasters increased the most, from an annual average of US$ 24.1 billion during 2001-2010 to US$ 230.3 billion in 2011. Geophysical disasters represented a share of 62.9% of total damages caused by natural disasters in 2011.

The lower number of reported natural disasters in 2011, when compared to the annual average occurrence from 2001 to 2010, was mostly due to a smaller number of hydrological and meteorological disasters. Hydrological disasters still took by far the largest share in natural disaster occurrence in 2011 (52.1%), followed by meteorological disasters (25.3%), climatological disasters (11.7%) and geophysical disasters (10.8%).

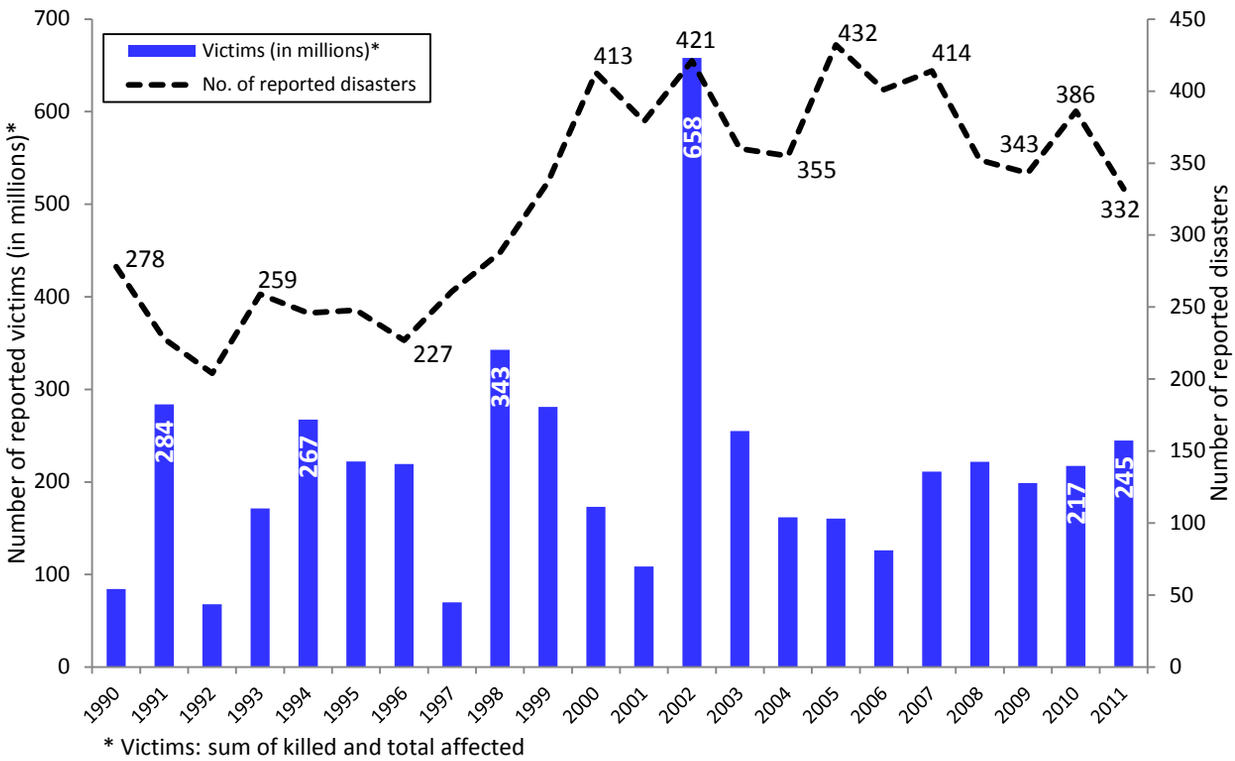
Looking at the geographical distribution of disasters, Asia was the continent most often hit by natural disasters in 2011 (44.0%), followed by the Americas (28.0%), Africa (19.3%), Europe (5.4%) and Oceania (3.3%). This regional distribution of disaster occurrence resembles the profile observed from 2001 to 2010. In 2011, Europe saw the largest decrease in disaster occurrence (68.7%), compared to the decade's annual average, but also Asia and Oceania experienced less disasters. In particular, Europe was less frequently hit by climatological and hydrological disasters.

Asia accounted in 2011 for 86.3% of global disaster victims, followed by Africa (9.2%). The number of victims in 2011 increased especially in Africa and Asia, but also in the Americas and Oceania, whereas fewer victims were reported in Europe, compared to the 2001-2010 annual averages. On a more detailed note, hydrological disasters in Asia caused many more victims in 2011, but climatological disasters made fewer victims, compared to the decade's annual averages. In Africa, it was climatological disasters, especially droughts in the Horn of Africa, which increased the number of victims.

In 2011, Asia also suffered the most damages (75.4% of global disaster damages), followed by the Americas (18.4%) and Oceania (5.6%). For both Europe and Africa, a share of 0.3% of global disaster damages was reported. This distribution of disaster damages between continents differs from the distribution seen over the last decade, when the Americas experienced the most damages, followed by Asia and Europe. Damages in Asia increased the most in 2011 compared to the 2001-2010 annual average, but damages in Oceania and the Americas were also higher. In contrast, damages in Europe decreased. More precisely, geophysical and hydrological disasters contributed most to the increased damages in Asia, mainly due to the Tōhoku earthquake and tsunami in Japan and the floods that affected Thailand from August to December.

EM-DAT's global approach to the compilation of disaster data continuously provides us with valuable information and trends on the occurrence of natural disasters and their impacts on society. However, the development of guidelines and tools for the creation of national and sub-national disaster databases for the compilation of reliable, standardized, interoperable disaster occurrence and impact data should be prioritized for more effective disaster risk reduction.

Figure 1 – Trends in occurrence and victims



Chapter 1

About EM-DAT: The International Disaster Database

- What is EM-DAT?
- Database definitions, criteria and content
- Methodology
- Disaster classification

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 (USAID/OFDA), CRED has maintained EM-DAT, a worldwide database on disasters. It contains essential core data on the occurrence and impacts of more than 19 500 disasters in the world dating from 1900 to the present. The data are 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 also reflects the fact that most reporting sources do not cover all disasters or have political limitations that can affect the figures. The entries are constantly reviewed for redundancy, inconsistencies and incompleteness. 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 Database definitions, criteria and content

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". Table 1 shows the definitions of natural disaster subgroups and their main types. More disaster definitions can be found in Annex 1. 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.

Table 1 – Disaster subgroup definition and classification

Disaster Subgroup	Definition	Disaster Main Types
Geophysical	Events originating from solid earth	Earthquake, Volcano, Mass Movement (dry)
Meteorological	Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days)	Storm
Hydrological	Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up	Flood, Mass Movement (wet)
Climatological	Events caused by long-lived/meso to macro scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability)	Extreme Temperature, Drought, Wildfire
Biological[4]	Disaster caused by the exposure of living organisms to germs and toxic substances	Epidemic, Insect Infestation, Animal Stampede

[4]Biological disasters are not included in this publication.

EM-DAT includes the following fields:

DISNO:	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 generic group:	Two groups are distinguished in EM-DAT – natural and technological disasters.
Disaster sub-group:	Five sub-groups of natural disasters have been defined: geophysical, meteorological, hydrological, climatological and biological.
Disaster main type and sub-type:	Description of the disaster according to a pre-defined classification (for example, type: flood; sub-type: flash flood).
Date (start and end):	Date 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:	Global figure of the economic impact of a disaster; it is given in US dollars.
Additional fields:	Other geographical information (such as latitude and longitude, location), value and scale of the events (such as the Richter scale value for an earthquake), the international status (OFDA response, request for international assistance, disaster/emergency declaration), the aid contribution (in US dollars), and the different sectors affected.

1.3 Methodology

In EM-DAT and in this report, data are considered at the country level. This is for two reasons: first, it is at this level that they are usually reported; and second, it allows the aggregation and disaggregation of data. Annex 2 shows the list of countries per continent. In order to facilitate the comparison over time for the analyses of this report, the event start date has been used as the disaster reference date.

In EM-DAT, 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 (e.g. 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 the total number of persons reported affected.

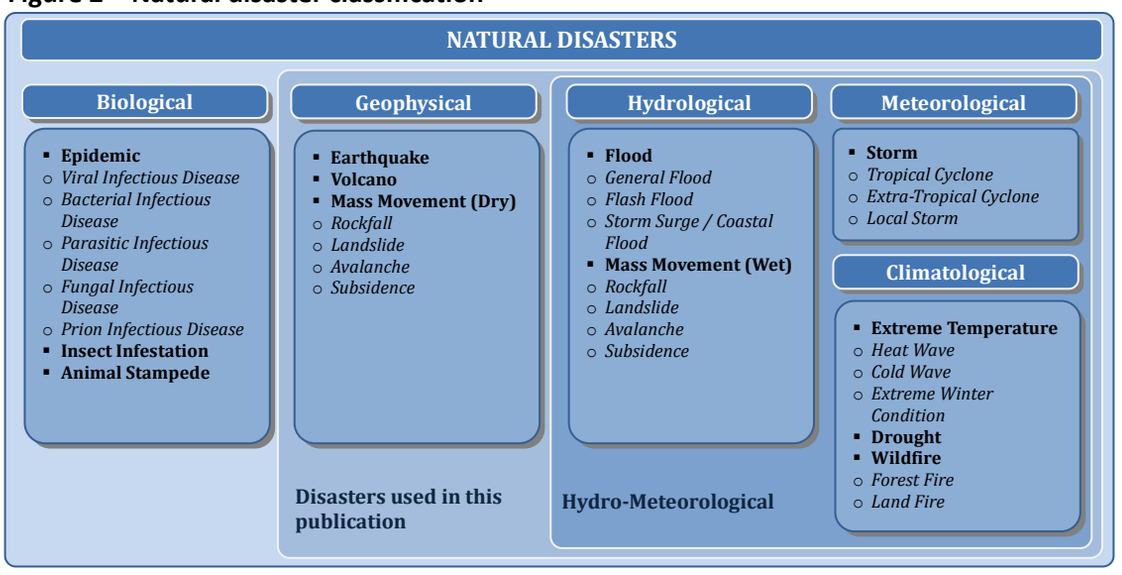
The economic impact of a disaster usually consists of direct consequences on the local economy (e.g. damage to infrastructure, crops, housing) and indirect consequences (e.g. loss of revenues, unemployment, market destabilization). In EM-DAT, the registered figure corresponds to the value of the immediate damage at the time of the event and usually only to the direct damage, expressed in US dollars. Economic damages in this report are converted into 2011 dollar values.

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

1.4 Disaster classification

EM-DAT distinguishes two generic categories for disasters (natural and technological), the natural disaster category is divided into 5 sub-groups, which in turn cover 12 disaster types and more than 30 sub-types (Figure 2). See "*http://www.emdat.be/classification*" for the complete classification and definitions.

Figure 2 – Natural disaster classification



Chapter 2

What did 2011 bring?

- **Thematic Frame: Drought and the complexity of its impacts**

2. What did 2011 bring?

In the year 2011, natural disasters[5] once again had a devastating impact on human society. Worldwide, 332 reported natural disasters caused the death of more than 30 770 people, made 244.7 million victims and caused a record amount of US$ 366.1 billion of damages. A total of 101 countries were hit by these disasters. The five countries that were most often hit, the Philippines, the United States, China, India and Indonesia, accounted for 31% of total disaster occurrence in 2011 (see Figure 3). Year after year, these countries top the list of countries experiencing the highest number of disaster events.

The main burden of disaster impacts was carried by a small number of countries in 2011. The countries that made up the top 10 ranking in terms of disaster mortality in 2011 represented 89.9% of global disaster mortality. Also, the top 10 countries for the number of victims and damages accounted for 90.4% and 97.3% respectively of the global reported number of victims and damages from natural disasters in 2011 (see Figures 4, 5 and 6).

Looking at the top 10 countries in terms of disaster mortality, seven countries are classified as high-income or upper-middle income economies according to the World Bank income classification[6]. These countries[7] accounted for 79.2% of worldwide reported disaster mortality, for the most part due to the Tōhoku earthquake and tsunami in Japan on March 11th, 2011. This disaster caused nearly 19 850 deaths, signifying 64.5% of global disaster mortality in 2011.

Seven out of the top 10 countries in terms of people killed by natural disasters are located in Asia, and accounted for 83.1% of global reported disaster mortality, while the other three countries are located in the Americas. However, when looking at disaster mortality relative to the number of inhabitants in the country, it is the African continent that appears in the top 10 ranking. Namibia, Lesotho and Angola counted respectively 4.7, 1.2 and 0.7 deaths per 100 000 inhabitants due to natural, and more specifically hydrological, disasters.

Moreover, African countries dominate the top 10 list in terms of disaster victims as a proportion of total population size, mainly due to major droughts and the consecutive famine that affected parts of the continent. On the other hand, five Asian countries counted the highest absolute number of victims due to natural disasters, representing 81.9% of worldwide reported victims. China alone, with 159.3 million reported victims in 2011, accounted for 65.1% of global disaster victims.

The year 2011 was the most expensive year ever in terms of economic damages caused by natural disasters. The Tōhoku earthquake and tsunami in Japan cost US$ 210.0 billion, or 57.4% of global reported damages. But the United States (storms), Thailand (floods), New Zealand (earthquakes) and China (floods) were also main contributors to the total damages of US$ 366.1 billion globally.

A different picture is drawn when comparing economic damages from natural disasters to the countries' Gross Domestic Product (GDP)[8]. Damages in Japan represented 3.9% of the country's GDP, whereas damages from natural disasters in El Salvador and Cambodia - a low-middle income and low-income country, respectively - represented 4.7% and 4.6% of the countries' GDPs. New

[5] Biological disasters are not included in this publication.
[6] *http://data.worldbank.org/about/country-classifications/country-and-lending-groups*. Accessed on 1 May, 2012.
[7] High-income: Japan, United States; Upper-middle income: Brazil, China, Colombia, Thailand, Turkey.
[8] GDP data from the World Bank. *http://databank.worldbank.org/ddp/home.do*. Accessed on 1 May, 2012.

Zealand and Thailand suffered particularly great economic losses, with damages amounting to 12.8% and 12.7 % of their GDPs respectively.

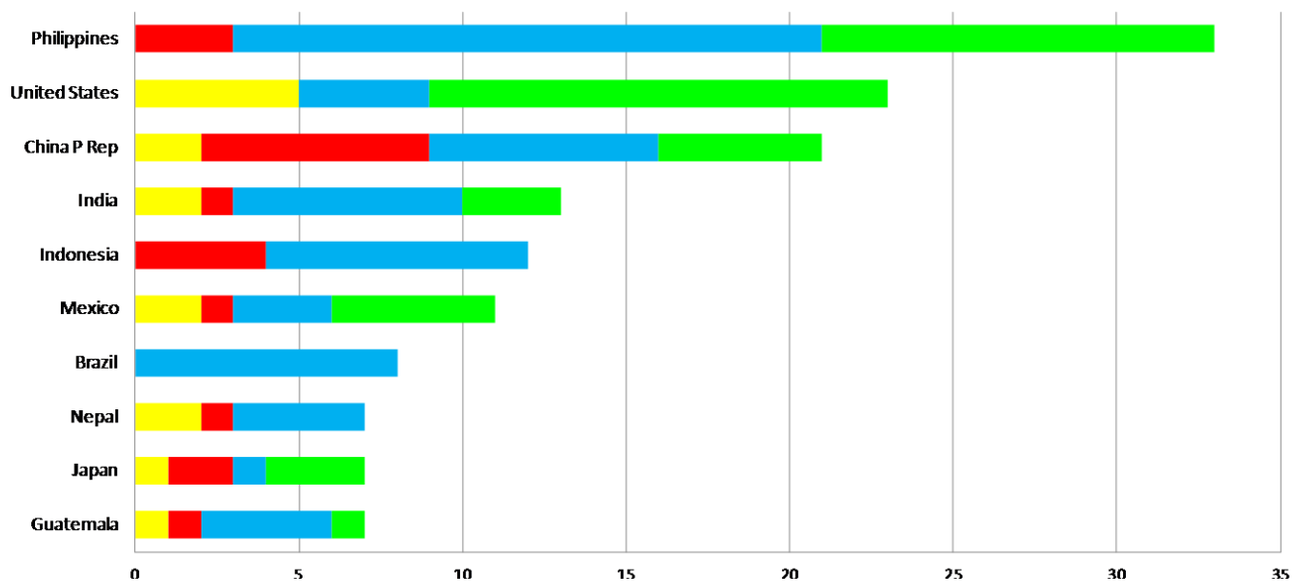
The Philippines experienced the highest number of natural disasters ever registered in its history. The country was affected by 33 natural disasters, mostly floods and storms. A series of tropical cyclones struck the country from May onwards, killing over 1 780 people, most of them by tropical cyclone 'Washi' (Sendong) (1 439 deaths). This series of tropical cyclones caused 9.5 million victims, while floods resulted in 2.2 million victims in the country.

Large parts of Thailand were severely flooded from August onwards, causing more than 800 deaths and 9.5 million victims. With a total of US$ 40.0 billion of damages, it was the most expensive natural disaster in Thailand's history. Brazil experienced its deadliest natural disaster ever registered, when a flood in January caused the death of 900 people.

In China, a total of 67.9 million victims were reported after severe flooding in June. This natural disaster alone accounted for 42.6% of total victims in the country and 27.8% of global reported victims in 2011. But a drought (January-May), a storm (April) and a flood (September) also made many victims in China.

In 2011, the 10 most important disasters in terms of mortality, victims and damages accounted for 82.5%, 76.5% and 87.7% of total disaster figures, respectively (see Tables 2, 3 and 4). This clearly shows the impact that few single disaster events can have on human society, both in high-income and low-income countries.

Figure 3 – Top 10 countries by number of reported events in 2011



	Philippines	United States	China P Rep	India	Indonesia	Mexico	Brazil	Guatemala	Japan	Nepal	Total
Climatological	0	5	2	2	0	2	0	1	1	2	14
Geophysical	3	0	7	1	4	1	0	1	2	1	20
Hydrological	18	4	7	7	8	3	8	4	1	4	64
Meteorological	12	14	5	3	0	5	0	1	3	0	43
Total	33	23	21	13	12	11	8	7	7	7	141

Figure 4 – Top 10 countries in terms of disaster mortality in 2011 and distributed by disaster type

Country	Disaster distribution	No. of deaths	Country	Disaster distribution	Deaths per 100 000
Japan		19 975	Japan		15.7
Philippines		1 933	Namibia		4.7
Brazil		978	New Zealand		4.2
Thailand		896	Cambodia		2.2
India		852	Philippines		2.1
United States		809	Thailand		1.3
China P Rep		746	Lesotho		1.2
Turkey		655	Turkey		0.9
Pakistan		511	Lao P Dem Rep		0.8
Colombia		313	Angola		0.7

Climatological Geophysical Hydrological Meteorological

Figure 5 – Top 10 countries by victims in 2011 and distributed by disaster type

Country	Disaster distribution	No.victims (millions)	Country	Disaster distribution	Victims/ pop. (%)
China P Rep		159.3	Somalia		42.9
India		12.8	Lesotho		23.9
Philippines		11.7	Cambodia		23.2
Thailand		11.2	Djibouti		22.5
Pakistan		5.4	Namibia		21.9
Ethiopia		4.8	Niger		19.6
Kenya		4.4	Thailand		16.2
Somalia		4.0	Philippines		12.6
Brazil		3.7	Burkina Faso		12.1
Mexico		3.7	China P Rep		11.9

Climatological Geophysical Hydrological Meteorological

Figure 6 – Top 10 countries by damages in 2011 and distributed by disaster type

Country	Disaster distribution	Damages (US$ bn.)	Country	Disaster distribution	% of GDP
Japan		212.5	**New Zealand**		12.8
United States		59.4	**Thailand**		12.7
Thailand		40.3	**El Salvador**		4.7
New Zealand		18.0	**Cambodia**		4.6
China P Rep		14.4	**Japan**		3.9
Australia		2.6	**Pakistan**		1.4
Pakistan		2.5	**Sri Lanka**		1.0
Colombia		2.3	**Tonga**		0.9
Canada		2.3	**Afghanistan**		0.8
India		2.0	**Colombia**		0.8

Table 2 – Top 10 natural disasters by number of deaths

Event	Country	No. of deaths
Earthquake/Tsunami, March	Japan, Indonesia*	19 847
Tropical cyclone 'Washi' (Sendong), December	Philippines	1 439
Flood, January	Brazil	900
Flood, August-December	Thailand	813
Earthquake, October	Turkey	604
Flood, August-November	Pakistan	509
Flood, June	China P Rep	467
Storm, April	United States	354
Flood, August-November	Cambodia	247
Flood, August-October	India	204
	Total	**25 384**

*Japan (19 846), Indonesia (1).

Table 3 – Top 10 natural disasters by number of victims

Event	Country	Victims (in millions)
Flood, June	China P Rep	67.9
Drought, January-May	China P Rep	35.0
Storm, April	China P Rep	22.0
Flood, September	China P Rep	20.0
Drought	Burundi, Djibouti, Ethiopia, Kenya, Somalia, Uganda*	14.0
Flood, August-December	Thailand	9.5
Flood, August-October	India	5.5
Flood, August-November	Pakistan	5.4
Cold Wave, January	China P Rep	4.0
Flood, August-September	China P Rep	3.8
	Total	**187.2**

*Ethiopia (4.8 million), Kenya (4.3 million), Somalia (4.0 million), Uganda (0.7 million), Djibouti (0.2 million), Burundi (0).

Table 4 – Top 10 natural disasters by economic damages

Event	Country	Damages (in 2011 US$ bn.)
Earthquake/Tsunami, March	Japan, Indonesia*	210.0
Flood, August-December	Thailand	40.0
Earthquake, February	New Zealand	15.0
Storm, May	United States	14.0
Storm, April	United States	11.0
Drought, January-December	United States, Mexico**	8.0
Hurricane 'Irene', August-September	United States, Puerto Rico, Bahamas, Dominican Rep, Haiti, Canada***	7.9
Flood, June	China P Rep	6.4
Flood, April-May	United States	4.6
Flood, September	China P Rep	4.3
	Total	**321.1**

*Japan (210.0 billion), Indonesia (0).
**United States (8.0 billion), Mexico (0).
***United States (7.3 billion), Puerto Rico (0.5 billion), Bahamas (0.04 billion), Dominican Rep (0.03 billion), Haiti (0), Canada (0).

Thematic Frame: Drought and the complexity of its impacts

Photo Credit: UN Photo/John Isaac

As for almost every year, droughts strike everywhere on earth - their impacts increasing in magnitude and complexity due to the effects of a changing climate.

Unlike other natural hazards such as storms, earthquakes and floods, which occur with a specific period of time and result in concrete damages, drought emerges slowly and quietly and lacks highly visible and structural impacts. When does it begin, when does it end? Geographically speaking, where are the limits of its spatial impacts?

The lack of standardization in drought hazard characterization contributes to the problem of attributing definitive losses. Even if drought information has improved and the methodology applied in EM-DAT has been strengthened over the last years, data still remain inconsistent because of the complexity of droughts, especially in terms of measuring the direct human impact[9]. Indeed, the impacts of drought may endure for years, and providing a strict spatial definition is difficult due to the spatial patterns of droughts and the localized nature of precipitation.

Understanding the complex impacts of drought could be the key to enhancing drought mitigation and preparedness. "Data on disaster losses in Africa is low", highlights the UNISDR[10] in its Briefing Note no. 4, entitled "Effective measures to build resilience in Africa to adapt to climate change". This fact does not lessen the evidence showing that "Gross Domestic Product (GDP) growth in African countries is under threat from the impact of natural hazards, particularly agricultural drought."

"Drought is predictable and does not happen overnight. Therefore, it should not claim lives nor lead to famine, which results when drought is coupled with policy failure or governance breakdown or both. However, as with desertification, drought is a silent and slow killer, and both have a way of creeping up on us, fooling us into underestimating their urgency," asserts Mr. Luc Gnacadja, Executive Secretary of the UN Convention to Combat Desertification.

At the end of February 2012, government representatives, climatologists, agricultural experts, disaster risk managers and others gathered in Kigali, Rwanda for three days to discuss the possibility of a third consecutive year of drought in the Horn of Africa. During the Forum, ICPAC and UNISDR held joint training sessions to help strengthen the existing cooperation between climate scientists and disaster risk managers. The aim was to analyse the rainy season and to consider measures to ensure that early warning leads to early action in the event of a lack of rains and harvest failures.

The second edition of the Global Assessment Report on Disaster Risk Reduction (GAR11) highlights improvements in early warning, preparedness and response. "The massive mortality from Sub-Saharan African droughts in the 1970s has not been repeated". However, compared to other hazards, risks associated with drought remain poorly understood and badly managed, particularly in some African countries. To avoid these gaps, UNISDR released "Drought contingency plans and planning in the Greater Horn of Africa" in early 2012.

This paper is a UNISDR contribution towards effective Drought Contingency Planning (DCP) for stakeholders and partners implementing drought risk reduction programmes in the Greater Horn of Africa (GHA). It attempts to convert findings, concepts and guidelines into a guidance document to address critical gaps and bridge general drought preparedness, contingency planning and early response.

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[9] *Below R., Grover-Kopec E., Dilley M. (2007) Drought related disasters: A global assessment, Journal of Environment and Development, 16: 328-344*

[10] *UNISDR, the United Nations Office for Disaster Risk Reduction and secretariat of the International Strategy for Disaster Reduction*

Moreover, national reports prepared by African countries on the implementation of the Hyogo Framework for Action (HFA)[11] and the related Africa Regional Strategy for Disaster Risk Reduction[12] provide useful examples of efforts by countries to address risk of natural hazards in their national and local planning and budgeting.

A global blueprint for disaster risk reduction efforts with a ten-year plan, the HFA was adopted in January 2005 by 168 governments at the World Conference on Disaster Reduction in Kobe, Japan. Its aim is to provide a framework for taking action to reduce disaster risk and reduce vulnerabilities to natural hazards. The HFA assists the efforts of nations and communities to become more resilient, and to better cope with hazards that threaten their development gains.

Online tools to capture the information on progress in HFA have been designed and coordinated by the UNISDR and are hosted on PreventionWeb – the disaster risk reduction community knowledge platform. These tools capture the information on progress in HFA, generated through the multi-stakeholder review process at the national, regional and global levels. The 2011-2013 biennial national HFA Monitor cycle has been available since the beginning of April for countries to begin a self-assessment of their progress in implementing disaster risk reduction actions. “Africa has a long history of regional political commitment to disaster risk reduction – often acting as a pioneer in recognizing the importance of preventive action to reduce disaster risk. Africa acted on the impetus provided by the global blueprint for disaster risk reduction, the Hyogo Framework for Action”, cites the UNISDR Briefing Note. More than 25 countries reported their HFA progress for the period 2009-2011.

Moreover, according to the Intergovernmental Panel on Climate Change (IPCC), the Sahel and West Africa are among the most vulnerable regions to future climate fluctuation. Additionally, the region faces an exponential population growth - double since the 1970’s. But food production has not kept up with that growth, leading to severe and continuing environmental degradation, thus increasing poverty and food insecurity. The food crisis is becoming chronic, because the majority of the population depends on agriculture for the livelihoods. We see that the problems affecting the region, from climate change, agricultural policies, military conflicts, migration and the effects of the global markets on local economies, are endorsing now a geopolitical dimension. “Maybe more than any other disaster risk, drought risk is constructed by economic decisions and social choices”, highlights the 2011 Global Assessment Report.

“Today's drought may be the worst in decades. But with the effects of climate change being increasingly felt throughout the world, it will surely not be the last. This means practical measures: drought-resistant seeds, irrigation, rural infrastructure, livestock programs.” said United Nations Secretary-General Ban Ki-moon in July 2011.

Drought will be a main part of the discussion during the Fourth Session of the Global Platform for Disaster Risk Reduction that will be held in Geneva, Switzerland from the 19th to the 23rd of May, 2013.

Contributed by UNISDR

[11] *About the Hyogo Framework for Action (www.preventionweb.net/english/hyogo/framework/)*
[12] *Africa Regional Strategy for Disaster Risk Reduction (www.preventionweb.net/go/4038)*

Chapter 3

How different was 2011?

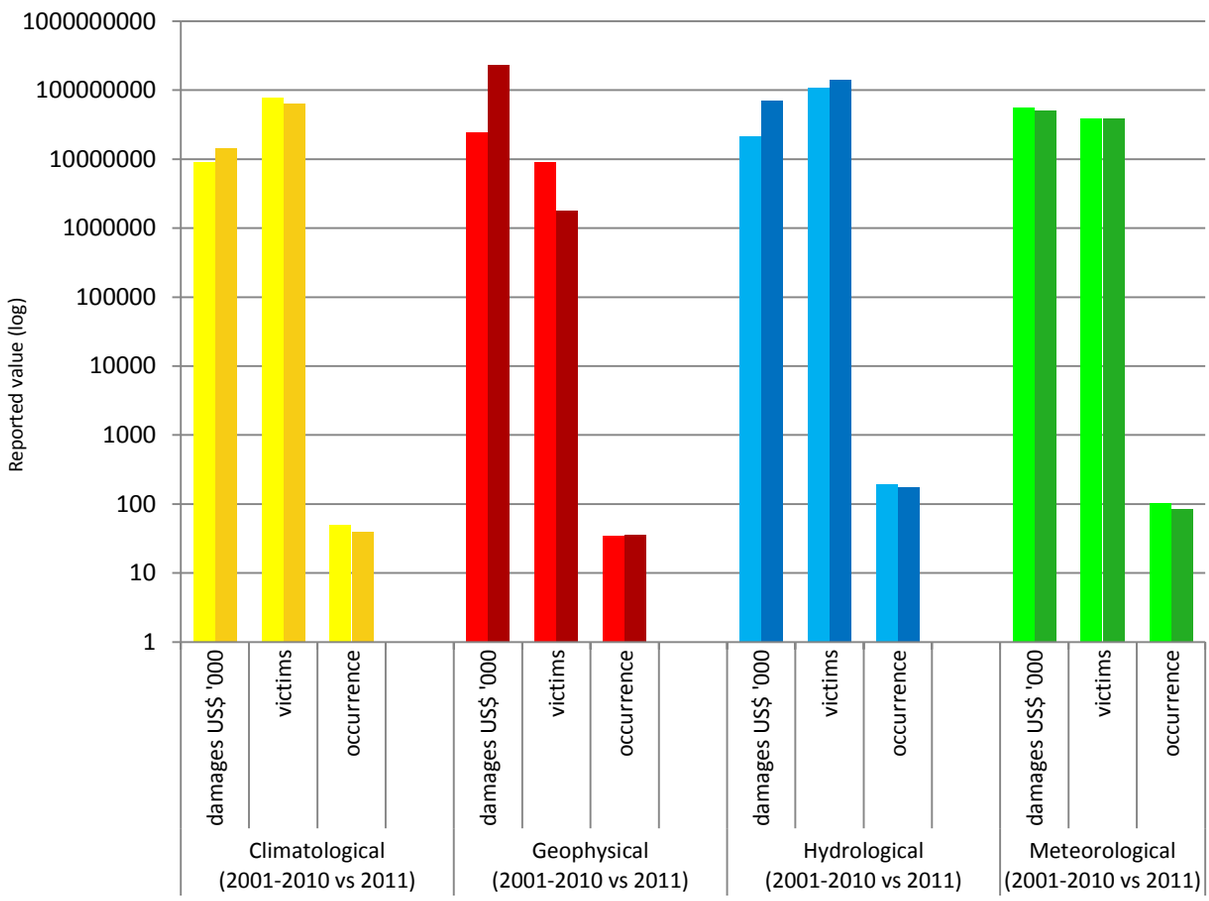
- **Thematic Frame: Economic impacts related to disasters in developed countries**

3. How different was 2011?

The number of reported natural disasters in 2011 (332) was lower than in 2010 (386) and also below the annual average disaster occurrence for 2001-2010 (384), indicating a stabilization of the growth in the number of reported disasters observed in previous decades. Less people were killed by disasters in 2011 (30 773) compared to 2010, when the Haiti earthquake alone caused the death of more than 222 500 people, and compared to the 2001-2010 annual average (106 891). However, the number of reported victims in 2011 (244.7 million) was the largest since 2003, when 255.1 million victims were registered, and also was above the decade's annual average of 232.0 million victims. The estimated economic losses from natural disasters in 2011 (US$ 366.1 billion) were the highest ever registered, and surpassed the last record year of 2005 (US$ 246.8 billion). The Tōhoku earthquake and accompanying tsunami in Japan were mainly responsible for these damages (57.4%). Such single, high-impact events can greatly influence disaster trends.

The lower number of reported natural disasters in 2011 was mainly due to a smaller number of hydrological and meteorological disasters, when compared to the annual average occurrences from 2001 to 2010 (see Figure 7). However, the higher number of victims in 2011 is explained by the larger impact from hydrological disasters compared to the decade's average. The drop in the reported number of people killed by natural disasters in 2011, compared to the 2001-2010 annual average, is mostly explained by a lower number of deaths from geophysical disasters. Paradoxically, in 2011 these disasters took the largest share of natural disaster fatalities. In addition, geophysical disasters were primarily responsible for the large increase in damages from natural disasters in 2011.

Figure 7 – Natural disaster impacts by disaster sub-group: 2011 versus 2001-2010 annual average



Hydrological disasters (floods and wet mass movements) still took the largest share in natural disaster occurrence in 2011 (52.1%). Hydrological disasters caused 139.8 million victims, or 57.1% of total disaster victims, and were responsible for 20.4% of the total reported number of people killed and 19.3% of total damages. The number of hydrological disasters (173) decreased compared to 2010 (215) and was also below the 2001-2010 annual average (195). However, the number of victims from hydrological disasters increased by 31.0% compared to the decade's annual average number of hydrological disaster victims. Moreover, damages increased by 230.6% in 2011 compared to the previous decade. This increase in damages from hydrological disasters was to a great extent due to severe flooding in Thailand from August to December that affected a large part of the country. With an estimated US$ 40.0 billion of damages, it was the most expensive hydrological disaster ever registered.

Meteorological disasters (storms) represented 25.3% of the total disaster occurrence in 2011. Eighty-four meteorological disasters were reported, less than the 2001-2010 annual average of 104. This was reflected in a slight decrease in the human and economic impacts from these disasters, compared to the annual averages from 2001 to 2010, as the numbers of victims and damages decreased by 1.5% and 7.1% respectively. Meteorological disasters accounted in 2011 for 10.1% of total reported fatalities, 15.7% of total victims and 13.9% of total damages from natural disasters.

Climatological disasters (extreme temperatures, droughts and wildfires) took in 2011 an 11.7% share of total disaster occurrence, comparable with a share of 12.9% per year on average for 2001-2010. Out of the 39 climatological disasters, 17 were droughts, 15 extreme temperatures and 7 wildfires. Climatological disasters took the second-largest share of total disaster victims in 2011 (64.6 million or 26.4% of total disaster victims), as was also the case for the period 2001-2010. The reported damages in 2011 increased by 56.3% compared to the 2001-2010 annual average damages from these disasters. Droughts affecting the United States and Mexico from January to December caused US$ 8.0 billion damages, while droughts in China from January to May contributed another US$ 2.4 billion to the total reported damages from climatological disasters of US$ 14.2 billion. It should be noted that reported damages from climatological disasters are often underestimated due to a lack of standardized methods for quantifying and reporting losses.

In 2011, 36 **geophysical** disasters (earthquakes/tsunamis, volcanoes and dry mass movements) were registered, representing a share of 10.8% of total disaster occurrence. Geophysical disasters accounted for 68.1% of total reported deaths from natural disasters in 2011, compared to a share of 45.5% per year on average for 2001-2010. They caused 1.8 million victims, less than the annual average number of victims from 2001 to 2010 (8.9 million). Geophysical disasters took a share of 62.9% of total damages caused by natural disasters in 2011, compared to a share of 20.0% per year on average from 2001 to 2010. In absolute terms, damages increased from an annual average of US$ 24.1 billion for 2001-2010 to US$ 230.3 billion in 2011.

Damages from geophysical, hydrological and - to a lesser extent - climatological disasters increased, while damages from meteorological disasters decreased in 2011 compared to the annual average damages from 2001 to 2010. This led not only to an overall increase of disaster damages in 2011 compared to the decade, but also a different distribution of damages between disaster subgroups.

Thematic Frame: Economic impacts related to disasters in developed countries

Photo Credit: MakaniMike (flickr)

The last three years were marked by powerful earthquakes strongly hitting countries such as Haiti, Japan, Chile, the People's Republic of China, Indonesia and Italy. Earthquake strikes everywhere, at anytime - with little to no warning.

Since modern record-keeping began in 1900, only five earthquakes have had a magnitude higher or equal to 9.0. The Great East Japan Earthquake[13] is one of them. It was the most powerful known earthquake ever to have hit Japan. This quake triggered enormous tsunami waves that reached heights of up to 40.5 meters and which, in the Sendai area, travelled up to 10 km inland, striking the Daiichi Nuclear Power Station[14].

In Japan, there is a traditional effort to reduce disaster risk. Japan is one of the best prepared countries in the world - from the inclusion of risk reduction curricula in their education system, to having building codes in place. The Japanese government has made disaster risk reduction a high priority for a long period of time. Nevertheless, the intensity of the March 11, 2011 earthquake exceeded the planning parameters that had been foreseen.

"The crisis that has arisen from the damage to the nuclear power plant gives new impetus to the critical need - plan broadly and inclusively for unique risk-scenarios. Clearly, overall risk mitigation and preparedness planning for critical and vulnerable core socio-economic infrastructure must be given higher priority", said UN Special Representative of the Secretary-General for Disaster Risk Reduction Margareta Wahlström.

Disaster-related economic losses are increasing across all regions, critically threatening the economies of low-income countries and even outstripping wealth creation across many of the world's richer nations, highlighted the second edition of the Global Assessment Report on Disaster Risk Reduction (GAR11). The report makes the direct correlation between disaster-related economic losses and the limited investment in risk management, particularly at the local level. To avoid these gaps, UNISDR launched the Handbook for Local Government Leaders: How to Make Cities More Resilient, at the 2012 Resilient Cities Congress. The Handbook was developed at the request of city leaders to explain why building disaster resilience is necessary, and what kind of strategies and actions are required by cities and local governments to achieve resilience. "UNISDR is helping cities enrich their understanding of risks accumulated from years of development without attention to proper land-use planning, uncontrolled population growth and other vulnerabilities", declared Jurgen Nimptsch, Mayor of Bonn, a Campaign member and Role Model City leader.

Since 2000, UNISDR has advocated for disaster risk reduction through its World Disaster Reduction Campaign to create global awareness of disaster risk reduction benefits and empower people to reduce their vulnerability to hazards. The Making Cities Resilient: 'My city is getting ready!' campaign entered its second phase 2012-2015: from awareness to implementation.

Based on the success and stock-taking by partners and participating cities in the first phase (2010-2011), the campaign will continue and shift its focus to more implementation support, city-to-city learning and cooperation, local action planning and monitoring of progress in cities. In addition, the campaign will continue to advocate for widespread commitment by local governments to build resilience to disasters and increase support by national governments to cities for the purpose of strengthening local capacities.

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[13] *News collection on the Great East Japan Earthquake*
http://www.preventionweb.net/english/professional/news/tags/index.php/pw:jpnearthquake2011/Great%20East%20Japan%20Earthquake%202011/

[14] *News collection on the Fukushima Daiichi nuclear disaster*
http://www.preventionweb.net/english/professional/news/tags/index.php/pw:jpnnuclear2011/Japan:%20Fukushima%20Daiichi%20nuclear%20disaster%202011/

The majority of the world's population now lives in urban areas. The very mechanism of a city is the concentration of its functioning systems of transportation, housing and industry - that all facilitates interaction between people and businesses, benefiting both parties in the process. But disaster can easily make this mechanism fragile.

In 2011, heavy rains due to the monsoon season claimed hundreds of lives and adversely affected millions of people in Thailand[15], Cambodia, Bangladesh, the Philippines and India. In Thailand, the economic losses were huge, since key industries are concentrated in the region north of the capital, Bangkok, and its environs. It became the costliest disaster in the country's history. This disaster demonstrated once again how vulnerable the networked world economy is. "The floods claimed [...] seven major industrial areas with production facilities belonging mainly to Japanese groups. A large number of electronic key component manufacturers were affected, leading to production delays and disruptions at client businesses. Approximately 25% of the world's supply of components for computer hard drives is manufactured in Thailand and was thus directly impacted by the floods." highlighted MunichRe. In May 2012, Japan's Sony Corp flagged a record $6.4 billion loss partially impacted by the great East Japan Earthquake and Thailand's flooding.

As we can see disasters strike everywhere and their impacts could have effects around the world due to our networked world economy. The 2013 Global Assessment Report for Disaster Risk Reduction (GAR13) will contribute to more research on how public regulation and private investment shape disaster risk, in the context of broader changes in the global political economy. What is the relationship between the political economy and disaster risk trends? How should disaster risks be considered in investment decision-making? All these questions will be addressed in the GAR13, to be launched during the Fourth Session of the Global Platform for Disaster Risk Reduction in Geneva, Switzerland, 19-23 May 2013.

Contributed by UNISDR

[15] *News collection on the Bangkok floods in 2011 http://www.preventionweb.net/english/professional/news/tags/index.php/pw:bkkfloods2011/Thailand:%20Bangkok%20floods%202011/*

Chapter 4

Regional analysis

- Africa
- Americas
- Asia
- Europe
- Oceania

4. Regional analysis

In 2011, Asia was most often hit by natural disasters (44.0%), followed by the Americas (28.0%), Africa (19.3%), Europe (5.4%) and Oceania (3.3%). This regional distribution of disaster occurrence is comparable to the profile observed from 2001 to 2010 (see Table 5). The largest decrease in disaster occurrence in 2011, compared to the decade's annual average, was in Europe (68.7%).

Asia accounted in 2011 for 86.3% of worldwide reported disaster victims, while Africa accounted for 9.2%. The number of victims in Africa, Asia, the Americas and Oceania increased, whereas fewer victims were reported in Europe, compared to the annual average number of victims from 2001 to 2010.

Table 5 – Natural disaster occurrence and impacts: regional figures

No. of natural disasters	Africa	Americas	Asia	Europe	Oceania	Global
Climatological 2011	11	13	11	2	2	**39**
Avg. 2001-10	*9*	*12*	*11*	*17*	*1*	***50***
Geophysical 2011	0	5	28	1	2	**36**
Avg. 2001-10	*3*	*7*	*21*	*2*	*2*	***35***
Hydrological 2011	44	42	76	10	1	**173**
Avg. 2001-10	*44*	*39*	*82*	*24*	*6*	***195***
Meteorological 2011	9	33	31	5	6	**84**
Avg. 2001-10	*9*	*34*	*40*	*14*	*7*	***104***
Total 2011	**64**	**93**	**146**	**18**	**11**	**332**
Avg. 2001-10	***65***	***92***	***153***	***58***	***16***	***384***

No. of victims (millions)	Africa	Americas	Asia	Europe	Oceania	Global
Climatological 2011	20.99	2.68	40.93	0.00	0.00	**64.60**
Avg. 2001-10	*12.29*	*1.22*	*63.45*	*0.27*	*0.00*	***77.23***
Geophysical 2011	0.00	0.01	1.44	0.02	0.30	**1.76**
Avg. 2001-10	*0.08*	*1.02*	*7.77*	*0.01*	*0.04*	***8.92***
Hydrological 2011	1.44	6.94	131.37	0.02	0.00	**139.77**
Avg. 2001-10	*2.18*	*3.31*	*100.82*	*0.35*	*0.04*	***106.70***
Meteorological 2011	0.12	0.98	37.41	0.00	0.01	**38.52**
Avg. 2001-10	*0.35*	*2.72*	*35.88*	*0.11*	*0.04*	***39.10***
Total 2011	**22.55**	**10.60**	**211.16**	**0.04**	**0.31**	**244.65**
Avg. 2001-10	***14.91***	***8.27***	***207.92***	***0.74***	***0.12***	***231.95***

Damages (2011 US$ bn)	Africa	Americas	Asia	Europe	Oceania	Global
Climatological 2011	0.00	11.38	2.79	0.00	0.05	**14.23**
Avg. 2001-10	*0.04*	*1.90*	*3.45*	*3.23*	*0.48*	***9.10***
Geophysical 2011	0.00	0.00	212.10	0.20	18.00	**230.30**
Avg. 2001-10	*0.69*	*4.75*	*17.38*	*0.57*	*0.69*	***24.08***
Hydrological 2011	1.01	11.82	57.00	0.89	0.00	**70.72**
Avg. 2001-10	*0.28*	*3.15*	*11.15*	*5.57*	*1.24*	***21.39***
Meteorological 2011	0.01	44.12	4.14	0.10	2.50	**50.87**
Avg. 2001-10	*0.08*	*40.47*	*9.62*	*4.03*	*0.56*	***54.77***
Total 2011	**1.02**	**67.32**	**276.03**	**1.19**	**20.56**	**366.12**
Avg. 2001-10	***1.10***	***50.27***	***41.61***	***13.40***	***2.97***	***109.35***

Asia suffered the most damages in 2011 (75.4% of worldwide natural disaster damages), followed by the Americas (18.4%) and Oceania (5.6%). A share of 0.3% of global disaster damages was reported for both Europe and Africa. This distribution of disaster damages between continents is different from the one observed over the last decade, when the Americas had the most damages,

followed by Asia and Europe. Damages in Asia increased from an annual average of US$ 41.6 billion from 2001-2010 to US$ 276.0 billion in 2011, mostly due to the March 11th Tōhoku earthquake and tsunami that hit Japan. However, damages in Oceania also increased from an annual average of US$ 3.0 billion during 2001-2010 to US$ 20.6 billion in 2011. On the other side, damages in Europe decreased in 2011 by 91.1% compared to the annual average for 2001-2010.

4.1 Africa

The distribution of disaster frequency in Africa in 2011 resembled the one seen over the last decade. Hydrological disasters represented 68.8% of occurrence, followed by climatological (17.2%) and meteorological disasters (14.1%). No geophysical disasters were recorded in 2011.

However, the number of victims increased in 2011 by 51.3% compared to the annual average number of disaster victims in Africa during 2001-2010, due to the impact of climatological disasters. The number of reported climatological disaster victims in 2011 (21.0 million) surpassed the 2001-2010 annual average number of climatological disaster victims (12.3 million) and accounted in 2011 for 93.1% of total disaster victims in the continent. In particular, droughts and food crises in Burundi, Djibouti, Ethiopia, Kenya, Somalia and Uganda caused 14.0 million victims and droughts in Niger caused another 3.0 million victims.

The estimation of natural disaster damages in Africa remains extremely challenging as data are often poorly reported or lacking altogether. In 2011, no damages for climatological disasters in Africa were reported. Reported damages from hydrological disasters (US$ 1.0 billion) increased in 2011 compared to the annual average reported damages from these disasters during 2001 to 2010 (US$ 0.3 billion).

4.2 Americas

The Americas suffered in 2011 from 93 natural disasters. Hydrological disasters (45.2%) and meteorological disasters (35.5%) occurred most often, followed by climatological (14.0%) and geophysical (5.4%) disasters. This disaster frequency distribution was comparable to that of 2001-2010.

The number of victims from hydrological and climatological disasters doubled in 2011 compared to the 2001-2010 annual average number of victims from these disasters, but the number of meteorological and geophysical disaster victims decreased. Overall, a small increase in the number of disaster victims was observed in 2011, compared to the annual average number of disaster victims from 2001 to 2010. Hydrological disasters in 2011 caused 65.5% of total disaster victims in the Americas, whereas a share of 36.7% per year on average was observed from 2001 to 2010. Meteorological disasters in 2011 were responsible for 9.2% of total disaster victims in the Americas, whereas they took a share of 32.4% per year on average during the past decade.

In 2011, disaster damages in the Americas (US$ 67.3 billion) increased by 33.9% compared to the annual average damages from 2001 to 2010 (US$ 50.3 billion). This increase was mostly due to damages from climatological and hydrological disasters, and to a lesser extent from meteorological disasters. Damages reported for climatological disasters in the Americas in 2011 (US$ 11.4 billion) were the highest since 1977 (US$ 21.6 billion), mostly due to a drought that affected the United States and Mexico and cost US$ 8.0 billion. In contrast, no damages from geophysical disasters were reported in 2011. Meteorological disasters accounted for the largest share of disaster damages in the Americas in 2011 (65.5%), similar to the share of 68.8% per year on average from 2001 to 2010.

4.3 Asia

The number of disasters in Asia in 2011 (146) was higher than in 2010 (136), but below the annual average disaster occurrence during 2001-2010 (153). In particular, less meteorological and hydrological disasters were reported in 2011, compared to the annual average occurrences from 2001 to 2010. On the other hand, the number of geophysical disasters increased. In 2011, 52.1% of disasters were hydrological disasters, 21.2% meteorological and 19.2% geophysical, while climatological disasters accounted for 7.5% of total disaster occurrence in Asia.

The number of victims in Asia in 2011 (211.2 million) was slightly above the 2001-2010 annual average (207.9 million). The number of geophysical and climatological disaster victims in Asia decreased in 2011 by 81.5% and 35.5% respectively, compared to the annual averages from 2001 to 2010. In contrast, the number of hydrological disaster victims increased from an annual average of 100.8 million during 2001-2010 to 131.4 million in 2011. Hydrological disasters represented 62.2% of total disaster victims in Asia in 2011, followed by climatological (19.4%), meteorological (17.7%) and geophysical (0.7%) disasters. In China, a total of 67.9 million victims were reported after severe flooding in June 2011. This disaster accounted for 32.2% of total disaster victims in Asia in 2011. The number of victims in Asia was the highest since 2003 (233.0 million), when severe flooding in China in June and July caused as many as 150.1 million victims. However, when looking at the decade, most victims were reported in 2002 (646.8 million), when a drought in India caused 300 million victims and a dust storm in China caused another 100 million victims.

Disaster damages in Asia in 2011 were the highest ever recorded (US$ 276.0 billion) and increased by 563.4% compared to the annual average damages from 2001 to 2010 (US$ 41.6 billion). At a global level, Asia's share of global damages in 2011 (75.4%) was the largest since 1995 (81.4%), when the January 17th Kobe earthquake in Japan caused US$ 147.5 billion of damages. Damages from geophysical disasters in Asia increased from an annual average of US$ 17.4 billion during 2001-2010 to US$ 212.1 billion in 2011, due to the Tōhoku earthquake and tsunami in Japan. Damages from hydrological disasters also increased in 2011, whereas damages from meteorological and climatological disasters slightly decreased. In 2011, geophysical disasters took a share of 76.8% of total damages in Asia, followed by hydrological (20.7%), meteorological (1.5%) and climatological (1.0%) disasters, compared to an average share per year of 27.2% (geophysical), 34.9% (hydrological), 30.8% (meteorological) and 7.1% (climatological) from 2001 to 2010.

4.4 Europe

The number of reported disasters in Europe was the smallest since 1989, when 13 disasters were registered for the continent. The lower number of disasters in Europe in 2011 (18), compared to the annual average disaster occurrence from 2001 to 2010 (58), is mostly explained by a drop in the number of climatological and hydrological disasters, though, to a lesser extent, meteorological and geophysical disasters also decreased. In 2011, more than half (55.6%) of the reported disasters in Europe were hydrological disasters, followed by meteorological (27.8%), climatological (11.1%) and geophysical (5.6%) disasters. When looking at the decade, we observed that hydrological disasters took a share of 40.8% per year on average, whereas climatological disasters took a share of 29.2%.

In parallel with a lower reported number of disasters, fewer victims were reported in 2011 (35 443) compared to the annual average number of victims from 2001 to 2010 (737 051). Hydrological and climatological disaster victims especially decreased, but also fewer victims of meteorological disasters were reported in 2011. Whereas per year on average from 2001 to 2010, hydrological disasters took the largest share of total disaster victims in Europe (55.1%), followed by climatological (22.7%), meteorological (15.5%) and geophysical (6.8%) disasters, in 2011 the picture

is different. Hydrological disasters still took the largest share (55.0%) but geophysical disasters took a share of 43.2%, only followed by meteorological disasters with 1.7% and climatological disasters with 0.1%.

Furthermore, damages from natural disasters in Europe in 2011 (US$ 1.2 billion) were below the annual average damages for 2001-2010 (US$ 13.4 billion), explained by a decrease in damages from hydrological, meteorological and climatological disasters. Whereas meteorological disasters took a damage share of 33.9% of per year on average from 2001 to 2010, followed by hydrological disasters (33.8%), in 2011 hydrological disasters took the largest share of damages (74.7%), followed by geophysical disasters (16.8%) and meteorological disasters (8.5%). The number of reported victims and damages from natural disasters in 2011 were the lowest since 1985, when 27 952 victims and damages of US$ 267.4 million were registered in Europe.

4.5 Oceania

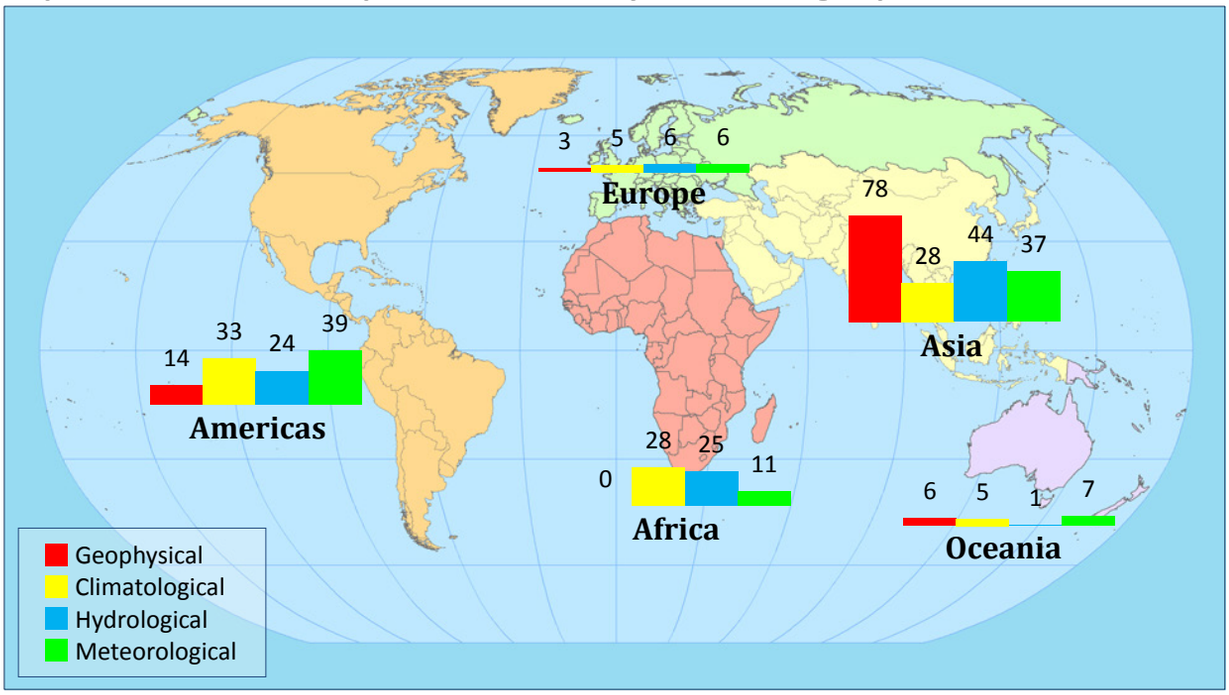
In 2011, meteorological disasters occurred most often in Oceania (54.5%), followed by geophysical and climatological disasters (both 18.2%). In particular, the number of hydrological disasters decreased compared to the annual average occurrence from 2001 to 2010. As a consequence, these disasters took only a 9.1% share in 2011, compared to a share of 36.2% per year on average during the past decade.

Although in 2011 less natural disasters were reported in Oceania, compared to the 2001-2010 annual average, more victims and especially more damages were reported in 2011. The increase in the number of victims in 2011 was due to the impact of geophysical disasters, which accounted in 2011 for 97.5% of total disaster victims in Oceania, essentially explained by the February 22nd earthquake in New Zealand which caused over 300 000 victims. In comparison, geophysical disaster victims represented a share of 22.8% per year on average from 2001 to 2010, only after meteorological (44.2%) and hydrological (28.9%) disasters. The number of hydrological disaster victims in Oceania in 2011 was the lowest since 1995. Also, the number of victims from meteorological and climatological disasters decreased in 2011 compared to the annual average number of victims of these disasters from 2001 to 2010.

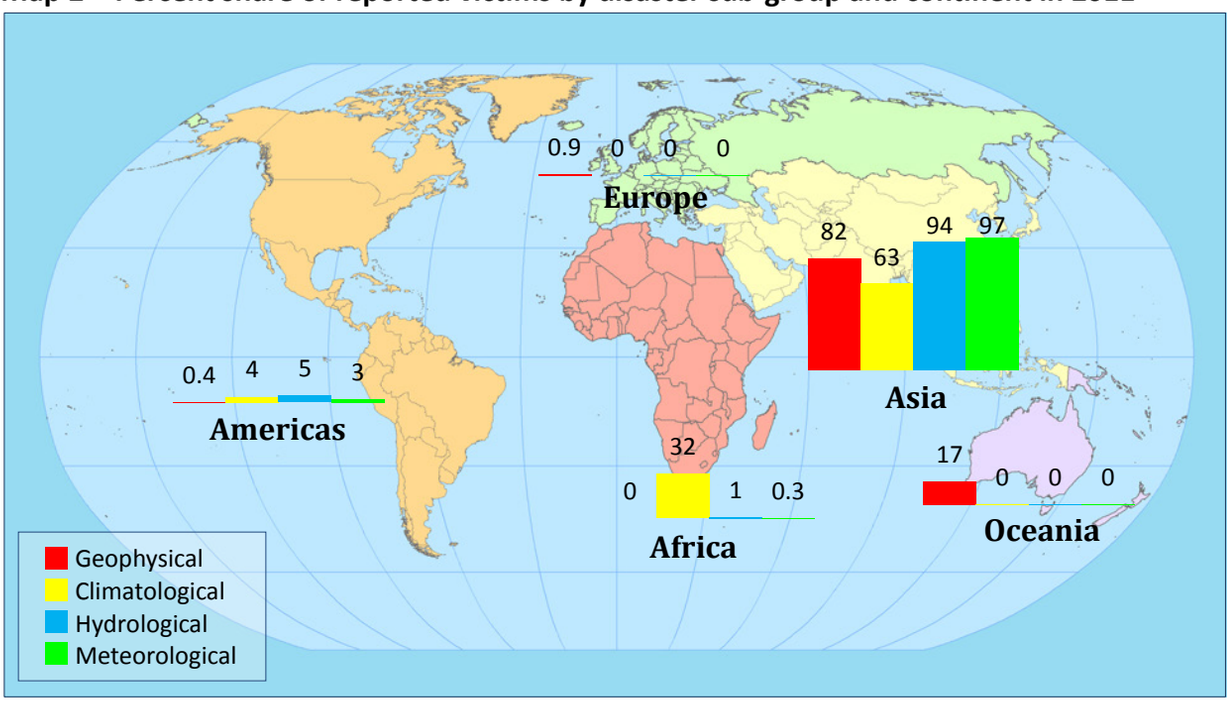
In 2011, disaster damages in Oceania (US$ 20.6 billion) were the highest ever recorded in the continent. The earthquakes which struck New Zealand on February 22nd, 2011 and June 13th, 2011, together caused US$ 18.0 billion damages. Geophysical disasters represented 87.6% and meteorological disasters 12.2% of total damages in Oceania in 2011. In contrast, hydrological disasters took the largest share per year on average from 2001 to 2010 (40.5%).

A comparison between continents of the occurrence and impacts of natural disasters in 2011 is shown in Maps 1, 2 and 3. Geophysical and hydrological disasters were most frequent in Asia (77.8% and 43.9% respectively). Climatological disasters occurred most often in the Americas (33.3%), closely followed by Africa and Asia (both 28.2%). Meteorological disasters were most frequent in the Americas (39.3%), but also occurred often in Asia (36.9%). The human impact in terms of the number of victims was essentially concentrated in Asia, with shares of 81.6%, 63.4%, 94.0% and 97.1% for geophysical, climatological, hydrological and meteorological disasters respectively. Similar to the number of victims they led to, geophysical and hydrological disasters were the cause of the most damages in Asia (resp. 92.1% and 80.6%). However, climatological and meteorological disasters caused the most damages in the Americas (80.0% and 86.7% respectively).

Map 1 – Percent share of reported occurrence by disaster sub-group and continent in 2011

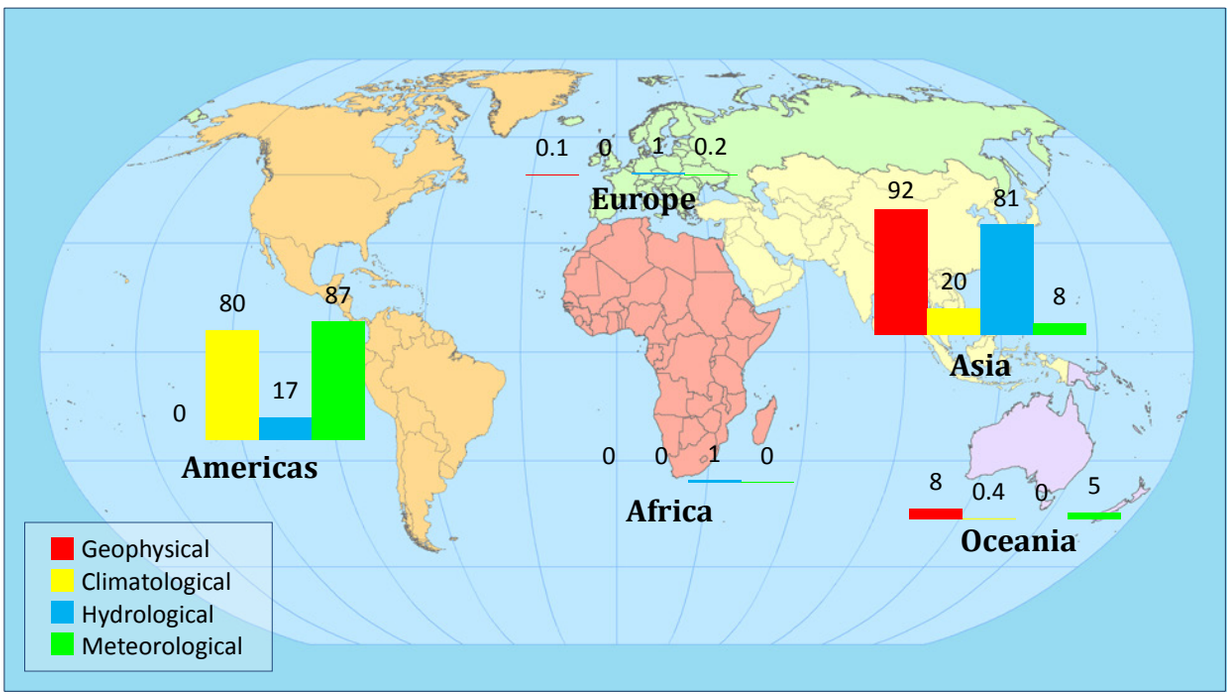


Map 2 – Percent share of reported victims by disaster sub-group and continent in 2011*



*Percentages ≤ 0.05 are displayed as zeros

Map 3 – Percent share of reported economic damages by disaster sub-group and continent in 2011*



*Percentages ≤ 0.05 are displayed as zeros

ANNEX 1: Definitions[16]

Avalanche: 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). Any kind of rapid snow/ice movement.

Biological Disasters: Disasters caused by the exposure of living organisms to germs and toxic substances.

Climatological Disasters: Events caused by long-lived/meso to macro scale processes (in the spectrum from intraseasonal to multidecadal climate variability).

Cold wave: 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 agriculture, infrastructure, and property. Damage caused by low temperatures.

Drought: Long-lasting event triggered by a 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 in agriculture, affect inland navigation and hydropower plants, and cause a lack of drinking water and famine.

Earthquake: Shaking and displacement of ground due to seismic waves. This is the earthquake itself without 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. These are: a) surface wave magnitude (Ms); b) body wave magnitude (Mb); c) local magnitude (ML); d) moment magnitude (Mw).

[16] These definitions have been established by MünichRe/Geo Risks Research Department and CRED. More information on definitions can be found on the EM-DAT website in the "Glossary" section.

Epidemic: Either an unusual increase in the number of cases of an infectious disease that already exists in the region or population concerned, or the appearance of an infection disease previously absent from a region.

Extreme winter condition: Damage caused by snow and ice. Winter damage refers to damage to buildings, infrastructure, traffic (especially navigation) inflicted by snow and ice in the form of snow pressure, freezing rain, frozen waterways, etc.

Flash flood: Rapid inland floods due to intense rainfall. A flash flood describes sudden flooding with short duration. In sloped terrains the water flows rapidly with a high destruction potential. In flat terrains 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.

Flood: Significant rise of water level in a stream, lake, reservoir or coastal region.

Forest fire: Fires in forests that cover extensive damage. They may start by natural causes such as volcanic eruptions or lightning, or they may be caused by arsonists or careless smokers, by those burning wood, or by clearing a forest area.

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.

Geophysical disasters: Events originating from solid earth.

Heat wave: A heat wave is a prolonged period of excessively hot and sometimes also humid weather relative to normal climate patterns of a certain region.

Hydrological Disasters: Events caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up.

Insect infestation: Pervasive influx and development of insects or parasites affecting humans, animals, crops and materials.

Landslide: Any kind of moderate to rapid soil movement including lahar, mudslide and 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. 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.

Local Windstorm (orographic storm): 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, Mistral, Bora etc.

Meteorological disasters: Events caused by short-lived/small to meso scale atmospheric processes (in the spectrum from minutes to days).

Rockfall: Quantities of rock or stone falling freely from a cliff face. It is caused by undercutting, weathering or permafrost degradation.

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.

Subsidence: Downward motion of the Earth's surface relative to a datum (e.g. the sea level). Dry subsidence can be the result of geological faulting, isostatic rebound, human impact (e.g. mining, extraction of natural gas). Wet subsidence can be the result of karst, changes in soil water saturation, permafrost degradation (thermokarst), etc.

Tropical cyclone: A tropical cyclone is a non-frontal storm system that is characterized by a low pressure centre, 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 fuelled by heat released when moist air rises and the water vapour 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). Cyclones in tropical areas are called hurricanes, typhoons and tropical depressions (names depending on location).

Volcanic eruption: All volcanic activity like rock fall, ash fall, lava streams, gases etc. Volcanic activity describes both the transport of magma and/or gases to the Earth's surface, which can be accompanied by tremors and eruptions, and the interaction of magma and water (e.g. groundwater, crater lakes) underneath the Earth's surface, which can result in phreatic eruptions. Depending on the composition of the magma, eruptions can be explosive and effusive and result in variations of rock fall, ash fall, lava streams, pyroclastic flows, emission of gases etc.

Wildfire: Wildfire describes an uncontrolled burning fire, usually in wild lands, which can cause damage to forestry, agriculture, infrastructure and buildings.

ANNEX 2: List of countries per continent

AFRICA		
Algeria	Gabon	Nigeria
Angola	Gambia	Reunion
Benin	Ghana	Rwanda
Botswana	Guinea	Sao Tome and Principe
Burkina Faso	Guinea-Bissau	Senegal
Burundi	Kenya	Seychelles
Cameroon	Lesotho	Sierra Leone
Cape Verde	Liberia	Somalia
Central African Republic	Libyan Arab Jamahiriya	South Africa
Chad	Madagascar	St. Helena
Comoros	Malawi	Sudan
Congo	Mali	Swaziland
Cote d'Ivoire	Mauritania	Togo
Democratic Republic of Congo	Mauritius	Tunisia
Djibouti	Mayotte	Uganda
Egypt	Morocco	United Republic of Tanzania
Equatorial Guinea	Mozambique	Western Sahara
Eritrea	Namibia	Zambia
Ethiopia	Niger	Zimbabwe

AMERICAS		
Anguilla	Dominican Republic	Panama
Antigua and Barbuda	Ecuador	Paraguay
Argentina	El Salvador	Peru
Aruba	Falkland Islands (Malvinas)	Puerto Rico
Bahamas	French Guiana	St. Barthélemy
Barbados	Greenland	St. Kitts and Nevis
Belize	Grenada	St. Lucia
Bermuda	Guadeloupe	St. Martin (French part)
Bolivia	Guatemala	St. Pierre and Miquelon
Brazil	Guyana	St. Vincent and the Grenadines
British Virgin Islands	Haiti	Suriname
Canada	Honduras	Trinidad and Tobago
Cayman Islands	Jamaica	Turks and Caicos Islands
Chile	Martinique	Uruguay
Colombia	Mexico	Venezuela
Costa Rica	Montserrat	United States of America
Cuba	Netherlands Antilles	United States Virgin Islands
Dominica	Nicaragua	

ASIA

Afghanistan
Armenia
Azerbaijan
Bahrain
Bangladesh
Bhutan
Brunei Darussalam
Cambodia
China
Cyprus
Georgia
Hong Kong (China)
India
Indonesia
Iran
Iraq
Israel
Japan
Jordan
Kazakhstan
Korea (Dem Rep)
Korea (Rep)
Kuwait
Kyrgyzstan
Laos
Lebanon
Macau (China)
Malaysia
Maldives
Mongolia
Myanmar
Nepal
Palestine (West Bank)
Oman
Pakistan
Philippines
Qatar
Saudi Arabia
Singapore
Sri Lanka
Syrian Arab Republic
Taiwan (China)
Tajikistan
Thailand
Timor-Leste
Turkey
Turkmenistan
United Arab Emirates
Uzbekistan
Viet Nam
Yemen

EUROPE

Aland Islands
Albania
Andorra
Austria
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Channel Islands
Croatia
Czech Republic
Denmark
Estonia
Faroe Islands
Finland
France
Germany
Gibraltar
Greece
Guernsey
Holy See
Hungary
Iceland
Ireland
Italy
Jersey
Latvia
Liechtenstein
Lithuania
Luxembourg
Macedonia, FYR
Malta
Man, Isle of
Moldova
Monaco
Montenegro
Netherlands
Norway
Poland
Portugal
Romania
Russian Federation
San Marino
Serbia
Slovakia
Slovenia
Spain
Svalbard & Jan Mayen Islands
Sweden
Switzerland
Ukraine
United Kingdom

OCEANIA		
American Samoa Australia Cook Islands Federated States of Micronesia Fiji French Polynesia Guam Kiribati Marshall Islands	Nauru New Caledonia New Zealand Niue Norfolk Island Northern Mariana Islands Palau Papua New Guinea Pitcairn	Samoa Solomon Islands Tokelau Tonga Tuvalu Vanuatu Wallis and Futuna

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