Centre for Research
on the Epidemiology
of Disasters

THIRTY YEARS OF NATURAL DISASTERS 1974-2003: THE NUMBERS

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About CRED and our partners

The Centre for Research on the Epidemiology of Disasters (CRED) was established in Brussels in 1973 at the School of Public Health of the Université catholique de 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 Programme for Emergency Preparedness and Response.

Since then, CRED has increased its international network substantially and collaborates closely with numerous UN agencies, inter-government and governmental institutions, non-governmental organizations, as well as several research institutes and universities.

The goals

With a special focus on public health, epidemiology, structural and socioeconomic issues, CRED promotes research, training, information dissemination and technical services on disasters and other humanitarian emergencies. It aims to enhance the effectiveness of developing countries' disaster management and prevention capabilities as well as fostering policy oriented research.

The scope

CRED's activities focus on all emergency situations with a major human impact. This includes all types of sudden, natural or man-made catastrophes, such as hurricanes, earthquakes and industrial accidents, and longer-term disasters and complex emergencies, such as famines and armed conflicts. CRED focuses primarily on the public health and sanitary aspects of mass disasters, as well as on their socioeconomic and developmental effects. However, disaster preparedness, mitigation and prevention for vulnerable populations is gaining a higher profile.

The staff

CRED is headed by Dr. Debarati Guha-Sapir, an epidemiologist and public health expert with more than 20 years of experience in the field. The staff at the Centre is both multidisciplinary and multicultural; the working languages are French and English.

Some of CRED's partners

International Agencies

World Health Organization (WHO)
United Nations Office for the Coordination of Humanitarian Affairs (UN/OCHA)
United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR)
United Nations High Commission for Refugees (UNHCR)
World Bank Hazard Management Unit (WB/HMU)
United Nations Children's Fund (UNICEF)

Inter-Governmental and Government Institutions

European Union
United States Government
Belgian Government Direction Générale de la Coopération Internationale (DGCI)

Non-Governmental Organizations

International Federation of Red Cross and Red Crescent Societies (IFRC)
Save the Children - UK (SCF/UK)
Médecins Sans Frontières (MSF)
ASEAN Committee on Disaster Management (ACDM)
Asian Disaster Reduction Center (ADRC)

Universities and Research Institutes

St. Luc Hospital Departments of Emergency Medicine and Psychiatry, Belgium
Instituto Superiore della Sanita, Italy
Harvard School of Public Health, U.S.
University of Columbia Earth Institute, U.S.

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A look behind the numbers

Today, the world is facing disasters on an unprecedented scale: more than 255 million people were affected by natural disasters globally each year, on average, between 1994 and 2003, with a range of 68 million to 618 million. During the same period, these disasters claimed an average of 58,000 lives annually, with a range of 10,000 to 123,000. In the year 2003, 1 in 25 people worldwide was affected by natural disasters.

During the last decade disasters caused damage of an estimated US$67 billion per year on average, with a maximum of US$230 billion and a minimum of US$28 billion. The economic cost associated with natural disasters has increased 14-fold since the 1950s.

Scientific predictions and evidence indicates that global climate change will increase the number of extreme events, creating more frequent and intensified natural hazards such as floods and windstorms. Population growth, urbanization and the inability of poor populations to escape from the vicious cycle of poverty makes it all the more likely that there will be an increase in the number of people who are vulnerable to natural hazards, with a resulting increase of natural disasters and environmental emergencies.

Relief tops funding

Most decision makers agree that the integration of disaster preparedness, mitigation and prevention measures into policy development is key to reducing the vulnerability of human populations to natural hazards. Yet funding patterns, an undeniable indicator of real priorities, show that it is disaster relief – not reduction or prevention – that tops the list of all disaster management funding. This holds true for both donor countries and disaster prone. Why is this?

- First, relief is media friendly, action oriented, easy to quantify – tonnes of food distributed, number of family shelters shipped – and readily accountable to donor constituencies as concrete actions in response to a disaster.

- Second, as development aid is decreasing in real and relative terms, emergency relief is easier to obtain as it is morally difficult to refuse aid to people and communities suffering abject misery and multiple deaths.

- Finally, the reality is that development programmers often neglect the importance of disaster reduction due to the absence of convincing analyses of trends and estimated losses. There is little demand by the development sector for reliable and systematic data on disasters to assess their socio-economic impact over the short term and even less so over the long term. As a result, disaster prevention activities often appear costly.

An ad hoc response

The need for systematic data for disaster mitigation and prevention has been a growing concern of both development and emergency response agencies. Until recently the needs were addressed on an ad hoc basis by collecting information at the time of the emergency. As a result, data were incomplete, outdated or unusable for a variety of reasons. Generally, the time pressure to respond quickly for fundraising or relief planning is paramount. As a result, the quality and availability of information suffers.

Public sector agencies have not seriously committed themselves to preparedness and prevention. Calculations of risks and vulnerability assessments were a lower priority than response. The general approach to disaster management has remained reactive, focusing on relief, followed by rehabilitation and reconstruction. Prevention planning or community preparedness has been rarely funded and was not a policy priority, either with national governments or with UN and other development institutions.

With the increase in magnitude of disaster impacts, mostly in poorer developing countries, concern is mounting over inadequate preparedness and prevention. Natural disasters create serious setbacks to the development process. This has been proven time and time again, particularly at the end of the last decade with the devastation caused by Hurricane Mitch in Central America, the Yangtze River floods in China and earthquakes

in Turkey, Iran and India. All of these events diverted development funds towards reconstruction.

These events resulted in an increased demand from policy makers and development planners for data on disasters, their impact and frequency. Accurate data that are comparable across countries and consistent over time are in demand and are required for priority setting between competing demands for national and international budget allocations.

The harsh reality behind the statistics

Based on the data in CRED's EM-DAT database, between 1974 and 2003 there were 6,367 natural disasters, not counting epidemics. This resulted in the reported deaths of slightly more than 2 million individuals, about 5.1 billion people being cumulatively affected, 182 million persons made homeless and estimated reported damages of US$1.38 trillion. Only in the last decade, 86% of all disaster-related deaths were caused by natural hazards, with just 14% resulting from technological disasters such as transport or industrial accidents. Asia alone suffered 75% of the deaths from natural disasters.

These figures may seem very high, but they are probably underestimates. For example, droughts reportedly killed 500,367 people in Ethiopia over the last three decades. But some estimate that the number of people who died from the great Ethiopian drought of 1984-1985 alone may have numbered between 600,000 and 1 million. Even worse is the case of economic damages, where not more than a third of reported disasters estimate economic losses.

Such large numbers may appear abstract and difficult to conceptualise, but they are a harsh reality for families who have lost loved ones, had their homes reduced to rubble, or have watched their investments destroyed by natural disasters.

The devastating impact of human behaviour

Natural disasters are often perceived as being "acts of god", with little causal relationship to human activities. This may be true for some natural hazards such as earthquakes and volcanoes, however, the definition of a disaster is based on a human impact, often in terms of lives lost or homes destroyed.

Over the last 50 years, there has been a growing body of evidence pointing to the effect of human behaviour on the global natural environment and on the possibility that certain types of natural disasters, such as floods, may be increasing as a direct consequence of human activity.

The purpose of this publication is to review and analyse the occurrence and the consequences of natural disasters over the last 30 years, a period when data quality and coverage has improved substantially. While the EM-DAT database is far from perfect, numbers at this scale provide satisfactory indicative trends to appreciate the directions and the comparative impact of different disasters.

The report begins with an analysis of disaster data and its reporting and takes the reader through how disasters have evolved over time and where they occur most frequently. It explains how people are affected by different types disasters in various regions and draws links between poverty, vulnerability and disasters. In tallying the costs, the report draws some important conclusions about how disasters affect the poor and vulnerable as compared to those populations with a higher income. It discusses epidemics and warns about the need to strengthen the global response to infectious diseases. Some interesting trends regarding inequitable distribution of resources are revealed when comparing which disasters attract the most donor attention. The report concludes with a look towards the future and a call to action - for we still have a long way to go if we are to focus on preparedness and prevention rather than quick, band-aid solutions.

Most importantly, we leave the readers to draw their own conclusions from the numbers.

Disaster data – handle with care!

Data on disaster occurrence, their effect upon people and cost to countries remain at best patchy. No single institution has taken on the role of prime provider of verified data. The data in EM-DAT (see Box What is EM-DAT) is culled from a variety of public sources, including reports by governments, insurance companies, press agencies and aid agencies. The original information is not specifically gathered for statistical purposes and inevitably, even though CRED applies strict definitions for disaster events and parameters, the original suppliers of the information may not. The figures should be regarded as indicative. As a result, relative changes and trends can be more useful to look at than absolute, isolated figures.

compilation of data. In 2003, about 27.9% of the data came from various US Government disaster agencies, 27% from insurance companies, 20% from United Nations organizations, 18.1% from press agencies and the remaining 7% from various humanitarian organizations.

Information systems have vastly improved over the last 30 years and statistical data is now more easily available. However, the lack of systematic and standardized data collection of disasters is now revealing itself as a major weakness for long-term planning. Despite efforts to verify and review data, the quality of disaster databases can only be as good as the reporting systems that feed them.

Figure 1

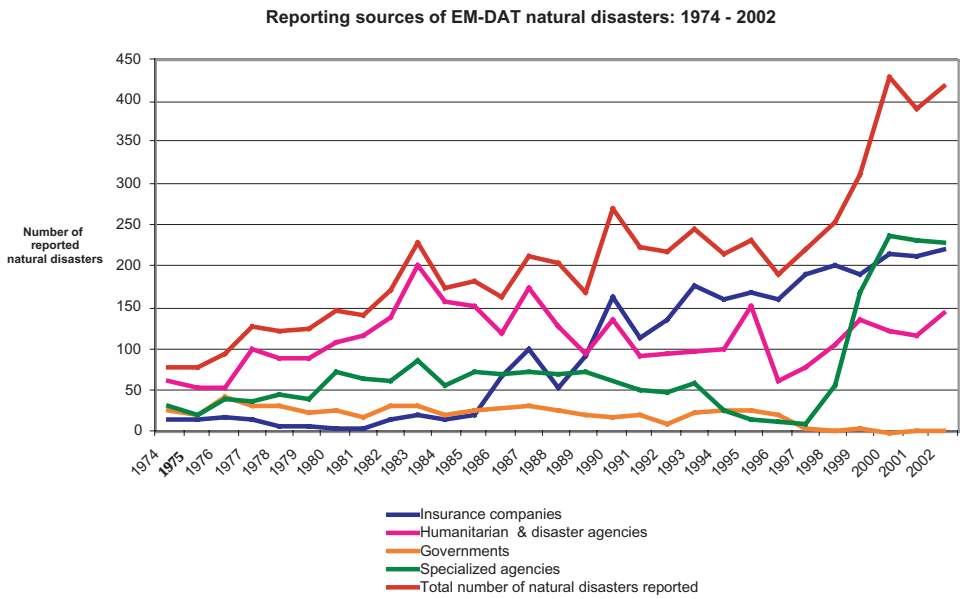


Figure 1 shows the evolution of EM-DAT's sources in reporting natural disasters. The database has gradually increased the use of insurance companies' reports, while using those of humanitarian and disaster agencies has remained relatively constant over time. Reports from specialized agencies, such as the UN World Food Programme, the World Health Organization or the US National Oceanic and Atmospheric Administration, have also increasingly been used as sources for the

Fortunately, due to increased pressures for accountability from various sources, many donor and development agencies have started placing priority on data collection and its methodologies. While this movement is in the right direction, it has yet to result in any recognized and acceptable international system for disaster - data compilation, verification and storage.

What is EM-DAT?

The EM-DAT database presents core data on the occurrence and effects of over 14,500 disasters from 1900 to present, including:
- Natural disasters
- Technological disasters

Disasters in EM-DAT are defined as:

"A situation or event which overwhelms local capacity, necessitating a request to the national or international level for external assistance, or is recognized as such by a multilateral agency or by at least two sources, such as national, regional or international assistance groups and the media."

Criteria

For a disaster to be entered into the database at least one or a combination of the following criteria must be fulfilled:

- 10 or more people reported killed
- 100 people or more reported affected
- A declaration of a state of emergency
- A 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 of disasters are distinguished in EM-DAT – natural disasters and technological disasters.

Disaster type and subset: Description of the disaster according to a pre-defined classification. For example, type: Windstorm and subset: Cyclone or type: Transport; and subset: Rail.

Date (start and end): The date when the disaster occurred and ended. (Month/Day/Year.)

Killed: Persons confirmed dead and persons missing and presumed dead.

Injured: People suffering from physical injuries, trauma or an illness requiring immediate medical treatment as a direct result of a disaster.

Homeless: People needing immediate assistance for shelter.

Affected: People requiring immediate assistance during a period of emergency; it can also include displaced or evacuated people.

Total affected: Sum of injured, homeless and affected.

Estimated damage: Several institutions have developed methodologies to quantify these losses in their specific domain. However, there is no standard procedure to determine a global figure for economic impact. Estimated damage is given in US dollars and/or euros.

Additional fields: Other geographical information (such as location, latitude and longitude), 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) as well the sectors affected.

EM-DAT is validated and updated daily. It is compiled from various sources, including UN agencies, governmental institutions, insurance companies, research institutes and the media according to a priority list set up by CRED.

Annex 1: disaster maps

The following maps show global disaster data by main disaster categories for the number of disaster occurrences and the number of victims per 100,000 inhabitants.

The main disaster categories are:

- Hydrological disasters include floods, landslides, mudflows, avalanches, storms, typhoons, cyclones, hurricanes, winter storms, tornadoes, tropical storms, droughts, wildfires and extreme temperatures.
- Geological disasters include earthquakes, volcanic eruptions, tsunamis, and tidal waves.
- Droughts and related disasters include droughts, extreme temperatures, and wildfires.
- Floods and related disasters include floods, landslides, mudflows and avalanches.
- Windstorms and related disasters include storms, typhoons, cyclones, hurricanes, winter storms, tornadoes and tropical storms.
- Earthquake and related disasters include earthquakes, tsunamis and tidal waves.
- Volcanic eruptions.

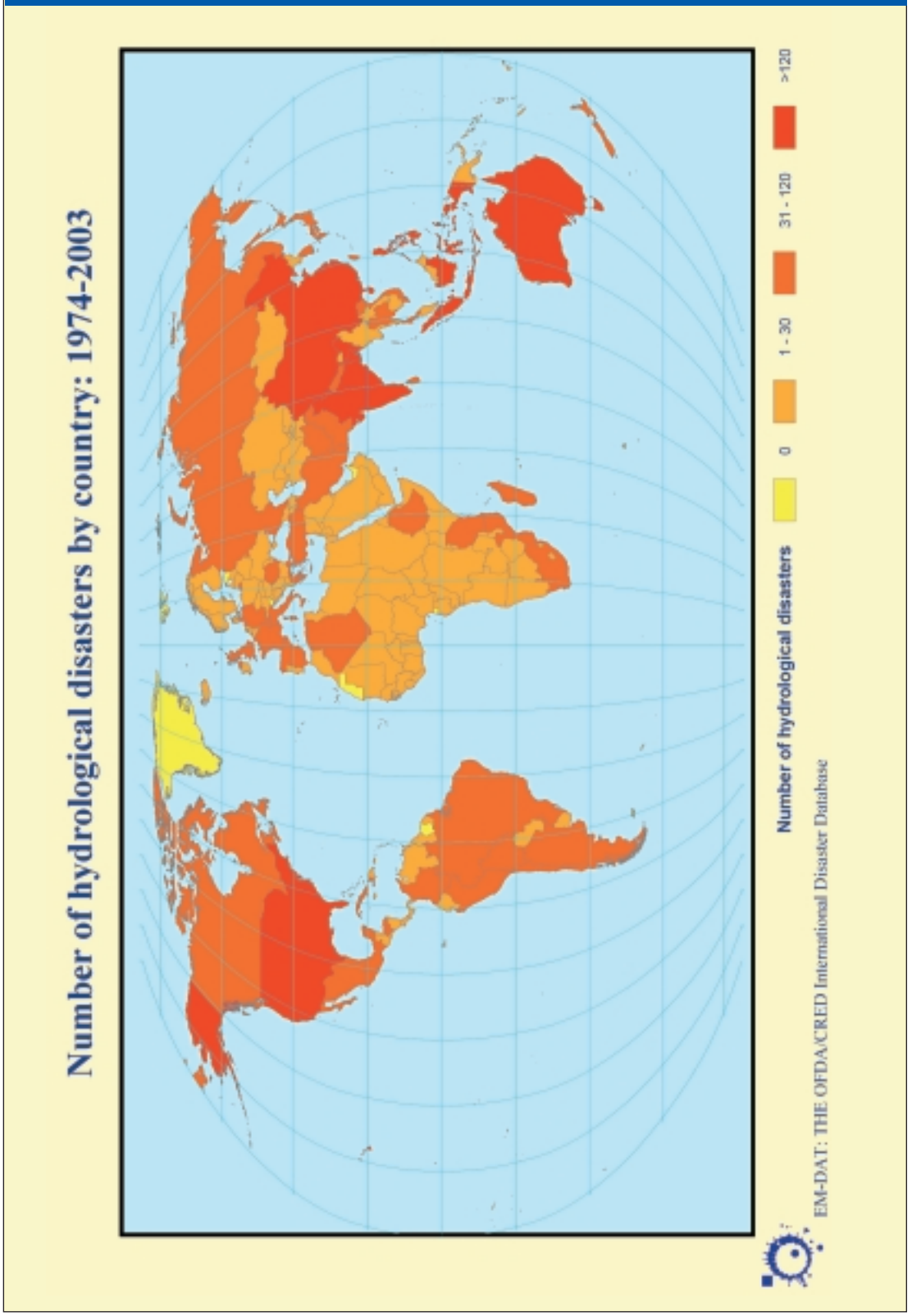
The mean annual number of victims per 100,000 inhabitants was calculated by adding the number of people killed and the number of people affected by a disaster every year, dividing this number by the total number of inhabitants in the country or territory that same year and multiplying the result by 100,000.

For countries such as the former USSR or Yugoslavia, which have experienced a break-up over the previous 30 years, data were disaggregated and associated with the countries resulting from the breakup. When it was impossible to disaggregate the data they were not included in the maps. However, data that have not been included on the maps usually represented less than 1% of the global total.

The classification of the data into the four classes shown on the maps was done manually, depending in part on the mean and range of the data. Classes were also selected so that the number of disasters or victims over the 30 years could be broken down to get annual values. To allow the comparison of the maps showing the number of disasters and the number of victims, a proportionally similar scale was used between the two.

The class representing zero disasters or victims includes situations when no disaster data was reported and when no victims or population data were available.

Map Annex 1


Number of hydrological disasters by country: 1974-2003
Number of hydrological disasters
0
1 - 30
31 - 120
>120
EM-DAT: THE OFDA/CRED International Disaster Database

Annex 2: statistical tables

Table 1 - Total number of natural disasters: 1974 - 2003

By country and territory

	1974-1978	1979-1983	1984-1988	1989-1993	1994-1998	1999-2003	1974-2003
Afghanistan	3	3	4	13	13	28	64
Albania	ndr	3	3	2	3	2	13
Algeria	1	8	6	5	6	18	44
American Samoa	ndr	ndr	1	3	0	1	5
Andorra	ndr	ndr	ndr	ndr	ndr	ndr	ndr
Angola	ndr	1	1	4	1	11	18
Anguilla	ndr	3	1	ndr	ndr	1	5
Antigua and Barbuda	ndr	1	ndr	2	2	2	7
Argentina	6	6	10	8	8	24	62
Armenia	ndr	ndr	1	ndr	3	1	5
Aruba	ndr	ndr	ndr	ndr	ndr	ndr	ndr
Australia	30	24	16	20	35	33	158
Austria	2	5	6	6	1	6	26
Azerbaijan	ndr	ndr	ndr	ndr	5	5	10
Azores	ndr	1	ndr	ndr	3	ndr	4
Bahamas, The	ndr	ndr	1	2	ndr	2	5
Bahrain	ndr	ndr	ndr	ndr	ndr	ndr	ndr
Bangladesh	16	18	22	37	40	41	174
Barbados	ndr	1	2	ndr	1	1	5
Belarus	ndr	ndr	ndr	1	2	2	5
Belgium	3	2	6	6	3	8	28
Belize	2	1	ndr	2	2	3	10
Benin	3	2	5	1	5	2	18
Bermuda	ndr	ndr	3	1	ndr	1	5
Bhutan	ndr	ndr	ndr	ndr	2	2	4
Bolivia	5	6	5	3	7	14	40
Bosnia and Herzegovina	x	x	x	ndr	ndr	6	6
Botswana	1	2	5	1	1	1	11
Brazil	13	12	21	16	24	26	112
Brunei	ndr	ndr	ndr	ndr	ndr	ndr	ndr
Bulgaria	2	2	1	2	2	7	16
Burkina Faso	5	2	4	1	2	3	17
Burundi	ndr	ndr	ndr	1	ndr	8	9
Cambodia	ndr	ndr	1	1	4	7	13
Cameroon	ndr	ndr	3	1	1	6	11
Canada	6	7	13	6	12	15	59
Canary Islands	ndr	ndr	ndr	ndr	ndr	3	3
Cape Verde	2	3	3	1	1	ndr	10
Cayman Islands	ndr	ndr	ndr	ndr	ndr	1	1
Central African Republic	ndr	2	1	ndr	4	5	12
Chad	7	3	6	2	2	3	23
Channel Islands	ndr	ndr	ndr	ndr	ndr	ndr	ndr
Chile	3	3	10	11	8	14	49
China	5	35	65	77	75	131	388

The publication

Over the last 30 years, 6,367 natural disasters killed more than 2 million people. A cumulative total of 5.1 billion individuals were affected, of which 182 million were left homeless. These same disasters caused US$1.4 trillion worth of damages.

Data on natural disasters and their impact on populations and economies play an essential role in understanding the factors that increase human vulnerability and the importance of disaster preparedness, mitigation and prevention.

The public

Policy analysts, aid and development specialists, researchers and journalists are invited to read this book to familiarize themselves with the occurrence and impact of natural disasters. Engineers, environmental and insurance specialists and other technical professionals will also find this publication valuable.

The authors

Debarati Guha-Sapir is Director of the Centre for Research on the Epidemiology of Disasters (CRED) and Professor at the School of Public Health of the Université catholique de Louvain (UCL). Previously trained in Calcutta University and Johns Hopkins University, she holds a doctorate in epidemiology. For over 20 years, she has been involved in field research and training in humanitarian aid issues.

David Hargitt is a Research Project Officer at CRED. He coordinates projects on disasters and complex emergencies and is in charge of GIS and mapping applications for the centre. He has degrees in biology, human ecology, cartography and remote sensing.

Philippe Hoyois is a Senior Research Fellow at CRED where he is in charge of data analysis. A sociologist, he has been involved over many years in medical and epidemiological studies and has extensive experience in mental health and psychiatric emergency issues.

About CRED

The Centre for Research on the Epidemiology of Disasters is based at the School of Public Health of the Université catholique de Louvain in Brussels, Belgium. For over 30 years, the centre has been involved in multidisciplinary research, training and information dissemination on disasters and conflicts, with a special focus on public health and socio-economic impacts.

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