



# 2021 Disasters in numbers



Extreme events  
defining our lives

# Executive summary

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In 2021, the Emergency Event Database (EM-DAT) recorded 432 disastrous events related to natural hazards worldwide.<sup>1</sup> Overall, these accounted for 10,492 deaths, affected 101.8 million people and caused approximately 252.1 billion US\$ of economic losses.<sup>2</sup> As a continent, Asia was the most severely impacted, suffering 40% of all disaster events and accounting for 49% of the total number of deaths and 66% of the total number of people affected. Globally, whilst the number of deaths and the number of people affected were below their 20-year averages, 2021 was marked by an increase in the number of disaster events and extensive economic losses. Five of the top ten most economically costly disasters in 2021 occurred in the United States of America and resulted in a total economic cost of 112.5 billion US\$.

In 2021, a total of 432 catastrophic events were recorded, which is considerably higher than the average of 357 annual catastrophic events for 2001-2020. Floods dominated these events, with 223 occurrences, up from an average of 163 annual flood occurrences recorded across the 2001-2020 period. During its monsoon season (June to September), India experienced a series of deadly floods that claimed 1,282 lives.<sup>3</sup> In July, the Henan Flood in China was particularly severe, resulting in 352 deaths, 14.5 million people affected, and a cost of 16.5 billion US\$. In the same month, the Nuristan Floods in Afghanistan resulted in 260 fatalities. In July, the Central European Floods and subsequent landslides resulted in 40 billion US\$ of economic costs in Germany alone and stood as the second most costly disaster.

After floods, storms were the second most frequently recorded disaster, with 121 events recorded in EM-DAT in 2021. The number of reported storms was also above the 2001-2020 average of 102 entries per year. Of note, Typhoon Rai, which struck the Philippines in December, resulted in at least 457 deaths and affected 10.6 million people. In April, Tropical Cyclone Seroja passed through Indonesia, claiming 226 lives. Earlier in February, the North American winter storm killed at least 235 people and cost more than 30 billion US\$. Other severe storms that affected the USA in 2021 were Hurricane Ida causing 96 deaths and 65 billion US\$ of economic costs and the tornado outbreaks of December causing 93 deaths and 5.2 billion US\$ of economic costs.

In contrast to floods and storms, relatively few extreme temperature events were recorded in 2021 (three in total) compared to 21 events per year on average between 2001 and 2020. However, the consequences of these extreme temperature events were considerable. At the beginning of April, a cold wave hit France and caused substantial agricultural damage, particularly to vineyards, to the extent of 5.6 billion US\$ in losses. The Western North American Heatwave in June and July 2021 resulted in sharp peaks in excess mortality leading to an estimated death toll of 815 deaths in Canada and 229

deaths in the USA. These latter heatwave events occurred together with wildfires. In general, there were a high number of wildfires in 2021 (19 events) compared to the 2001-2020 average of 11 per year. This is largely attributed to a series of events in the Mediterranean region during the summer period, which affected several countries (Algeria, Bulgaria, Cyprus, Greece, Italy, Macedonia, Tunisia, and Turkey). The deadliest wildfire event occurred in Algeria with 90 fatalities. At the end of 2021, the Marshall Fire event in Boulder County, Colorado, caused economic damage up to 3.3 billion US\$. This makes it the 9<sup>th</sup> most severe disaster event in 2021 in terms of economic losses in EM-DAT.

Besides heat waves, the Western USA encountered persistent drought events in 2021, causing 9 billion US\$ in total economic costs. Worldwide, 15 droughts were reported. Africa (South Africa, Somalia, Ethiopia, Kenya) and Asia (Afghanistan, Iraq, Syria, Iran) were most heavily impacted in terms of the number of people affected. Estimating the exact number of people affected or killed by droughts is challenging; drought events are often associated with complex emergencies involving multiple and compound hazards (e.g., food shortages, the COVID-19 pandemic, political instability, economic crises, or human/livestock/crop diseases). In addition, the interaction between a number of such factors can affect exposure, vulnerability, and capacity to cope with the crisis.

In 2021, EM-DAT reported 28 earthquakes, in line with the 2001-2020 average of 27 events. However, the number of deaths and people affected by earthquakes, as well as global economic damages, were lower in 2021 than the average for the past 20 years. This is due to the absence of any mega-earthquakes in 2021. Despite this, the 7.2-magnitude earthquake in Haiti, which occurred in August, still ranks top as the deadliest disaster in EM-DAT in 2021, causing 2575 deaths. In addition, the Fukushima Earthquake of February (magnitude 7.1) also appears in the top ten of the costliest disasters in EM-DAT in 2021, causing an estimated 7.7 billion US\$ of economic costs.

1 For the purpose of this report, the term “disaster” is used for natural hazard related disasters reported at a country level, excluding biological and extra-terrestrial disasters.

2 For comparison purposes, all economic damages are adjusted using the Consumer Price Index (CPI): OECD (2022), Inflation (CPI) (indicator). doi: 10.1787/eee82e6e-en

3 The Indian monsoon season was aggregated as one flood event in EM-DAT.

Other geophysical hazards (volcanic activity, mass movements) and hydrological hazards (landslides) generally had a low occurrence in 2021 and resulted in relatively lower human and economic losses compared to other disasters types recorded in EM-DAT. Nevertheless, in April, a compound event triggered by a rock and ice avalanche resulted in a deadly mass flow in the Uttarakhand state (Himalaya, India). In addition to causing significant damage

to hydropower infrastructure, the number of people reported dead or missing was approximately 234, making it one of the top ten deadliest events in 2021. The volcanic eruption of the Cumbre Vieja volcano on the Canary Islands lasted from September to December and stands as the costliest lava flow reported in EM-DAT in the last twenty years, with economic losses estimated at 1 billion US\$.

## Zooming in on the last 20 years

With 252 billion US\$ of reported economic damage, 2021 is the fourth most damaging year recorded in EM-DAT over the last two decades. Hurricane Ida alone cost \$65 billion and ranks as the 6th most damaging disaster of the last 20 years.

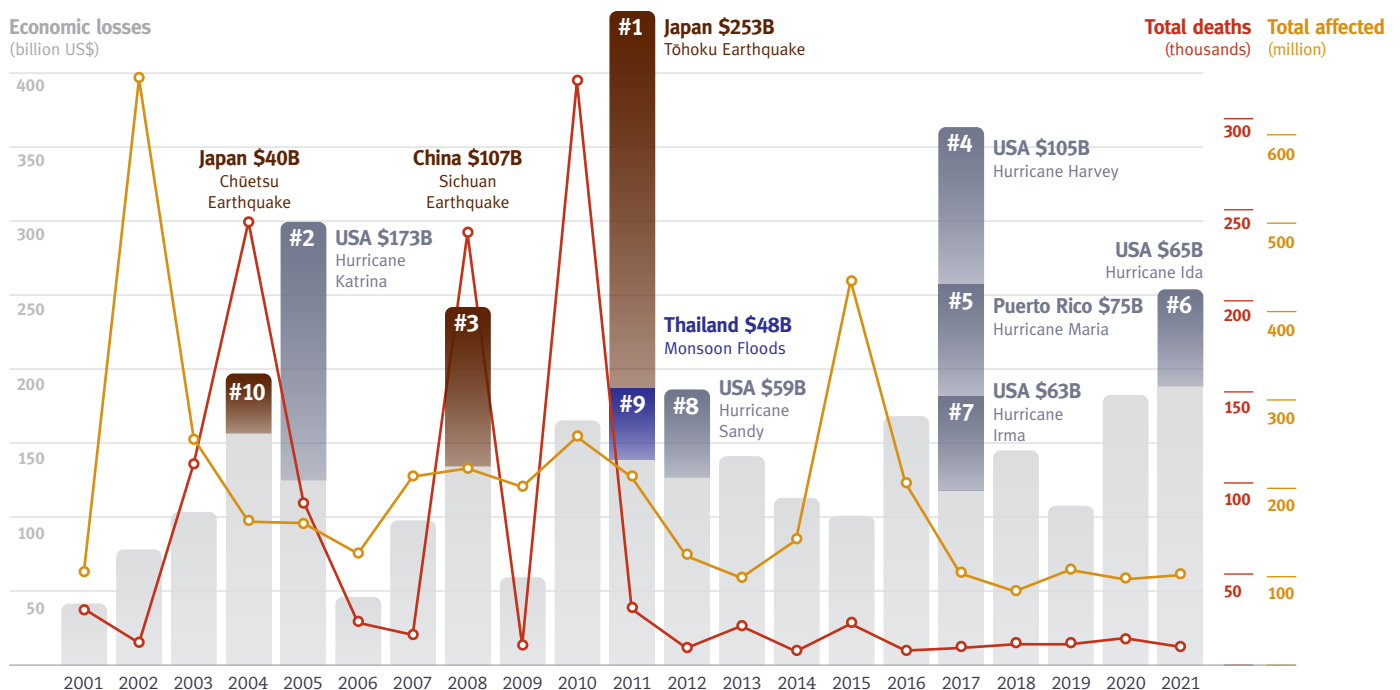
The economic cost of disasters occurring in 2021 was exceeded in 2005, the year of Hurricane Katrina, in 2011, the year of the Great Tōhoku Earthquake and Tsunami, and in 2017, a year hit by a series of exceptional hurricanes (Harvey, Maria, Irma). Historically, the most costly disasters have been hurricanes, often those occurring in the USA, and earthquakes. The exception is the 2011 Thailand floods, occupying the 9<sup>th</sup> place in terms of economic burden and cost 48 billion US\$. The 2021 floods in Germany rank in 11<sup>th</sup> place with a cost of roughly 40 billion US\$, which is slightly lower than the economic cost due to the 2004 Chūetsu Earthquake (Japan).

and 138,000 deaths related to Cyclone Nargis in Myanmar. The highest death toll due to a disaster during the last 20 years was recorded in Haiti, with over 222,000 deaths caused by the catastrophic 2010 earthquake. In August 2021, Haiti once again recorded the most deadly disaster of the year, with an earthquake resulting in 2,575 fatalities. Nevertheless, the overall mortality level due to disasters in 2021 (10,492 deaths) is far below the death tolls generated by the mega-disasters of the early 21<sup>st</sup> century and remain within the range observed over the last five years.

In 2004, the Indian Ocean Mega-earthquake and Tsunami were responsible for more than 225,000 deaths in Indonesia, Sri Lanka, India, and Thailand. Similar levels of mortality were reported in 2008 with about 87,000 deaths or missing persons related to the Sichuan Earthquake (China)

The number of 100 million people affected by disasters in 2021 was relatively stable over the 2017-2021 period. Peaks in the numbers of total people affected, as reported by EM-DAT, correspond to severe droughts during the 2002 and 2015 monsoon period in India, which each affected more than 300 million people.

### Top 10 economic losses and disaster trends (2001-2021)



# Occurrence of disasters

Figure 1

Number of disasters by continent and top 10 countries in 2021 <sup>4</sup>

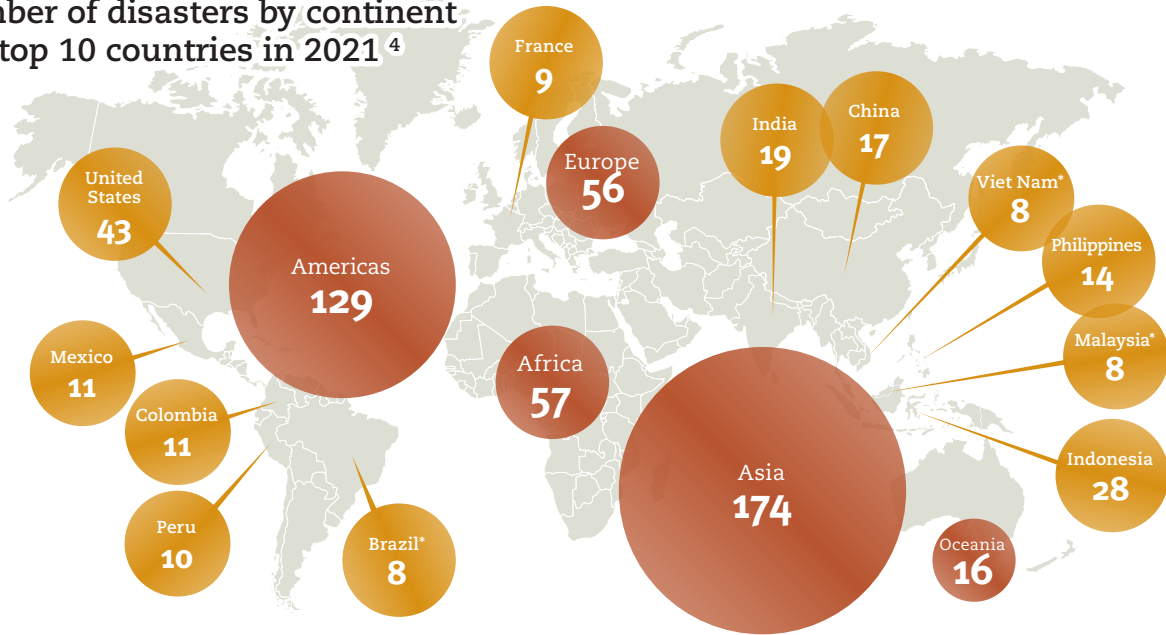
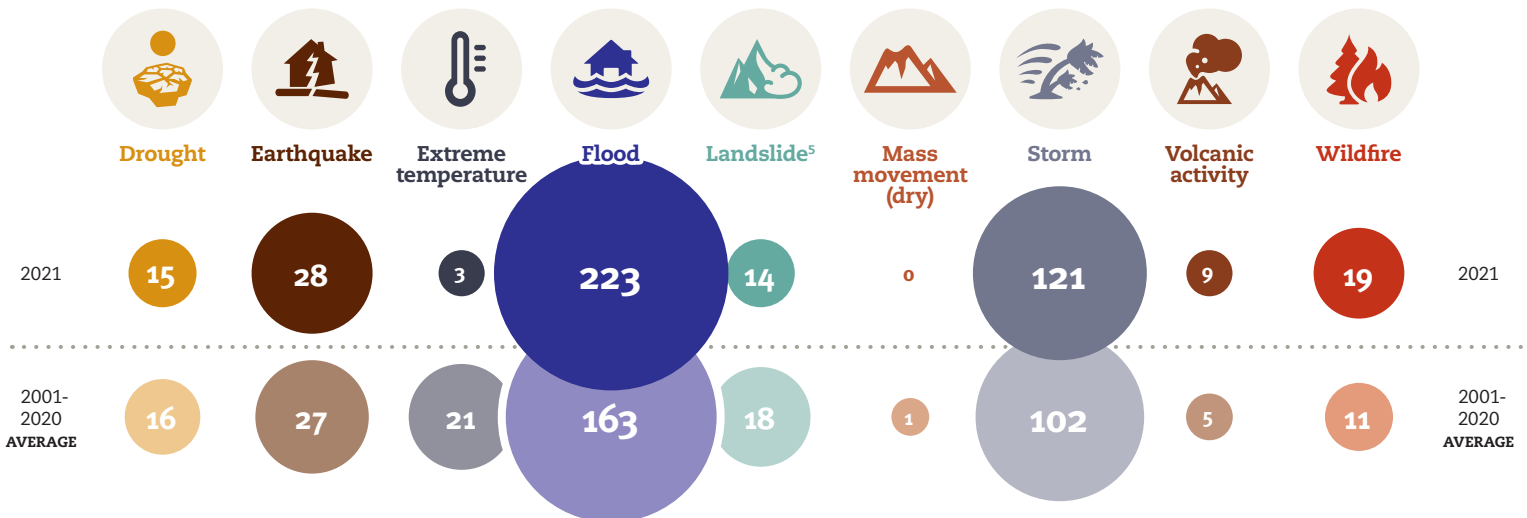


Figure 2

Occurrence by disaster type: 2021 compared to the 2001-2020 annual average

347 2001 to 2020 < 432 in 2021



<sup>4</sup> The 10<sup>th</sup> spot in the list had 3 countries tied with 8 events, therefore the list actually comprises 12 countries.

<sup>5</sup> Includes 2 Glacial Lake Outburst events.

# Human impact: total deaths<sup>6</sup>

Figure 3

Share of deaths (%)  
by continent in 2021

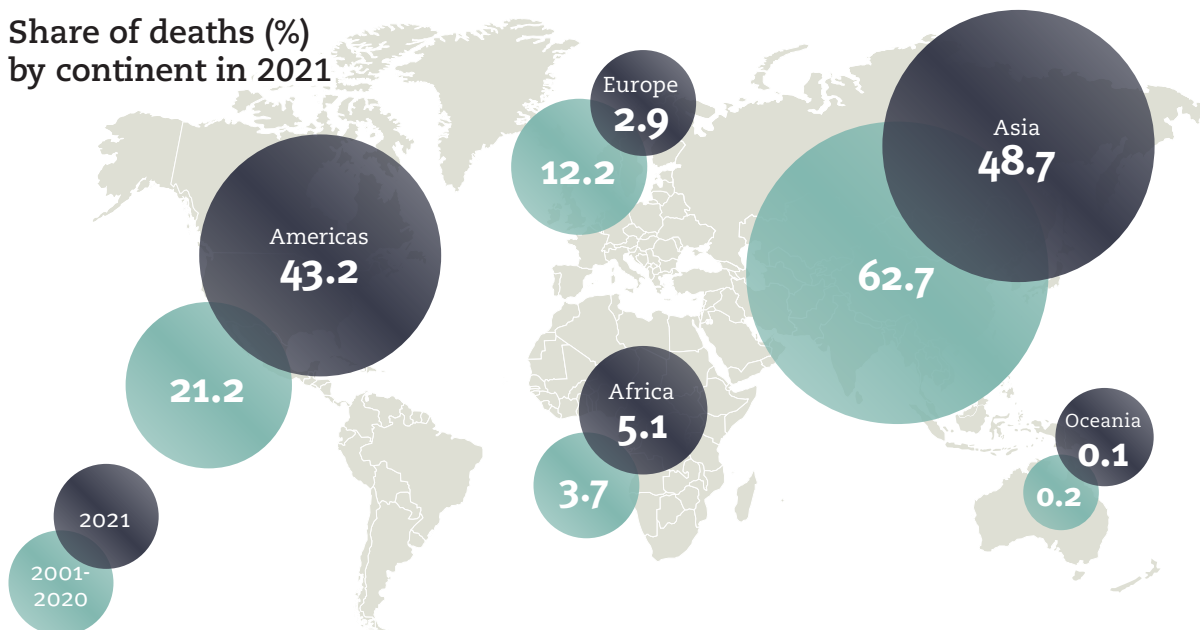


Figure 4

Number of deaths by disaster type: 2021  
compared to the 2001-2020 annual average

61,212 2001 to 2020 > 10,492 in 2021

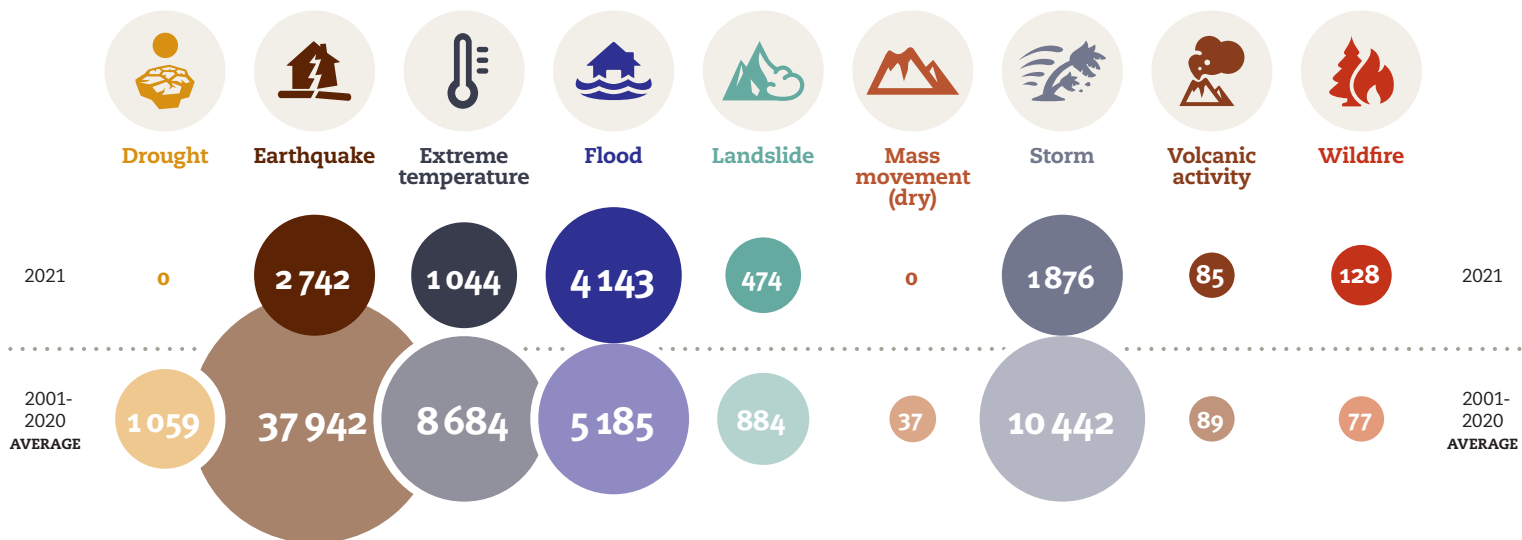


Table 1

Top 10  
mortality  
– 2021

Haiti	<b>Earthquake</b>	2,575	Afghanistan	<b>Flood</b>	260
India	<b>Flood</b>	1,282	USA	<b>Winter Storm</b>	235
Canada	<b>Heat Wave</b>	815	India	<b>Landslide</b>	234
Philippines	<b>Typhoon Rai</b>	457	USA	<b>Heat Wave</b>	229
China	<b>Flood</b>	352	Indonesia	<b>Cyclone Seroja</b>	226

<sup>6</sup> Persons confirmed as dead and persons missing and presumed dead.

# Human impact: total affected<sup>7</sup>

Figure 5

Share of affected (%) by continent in 2021

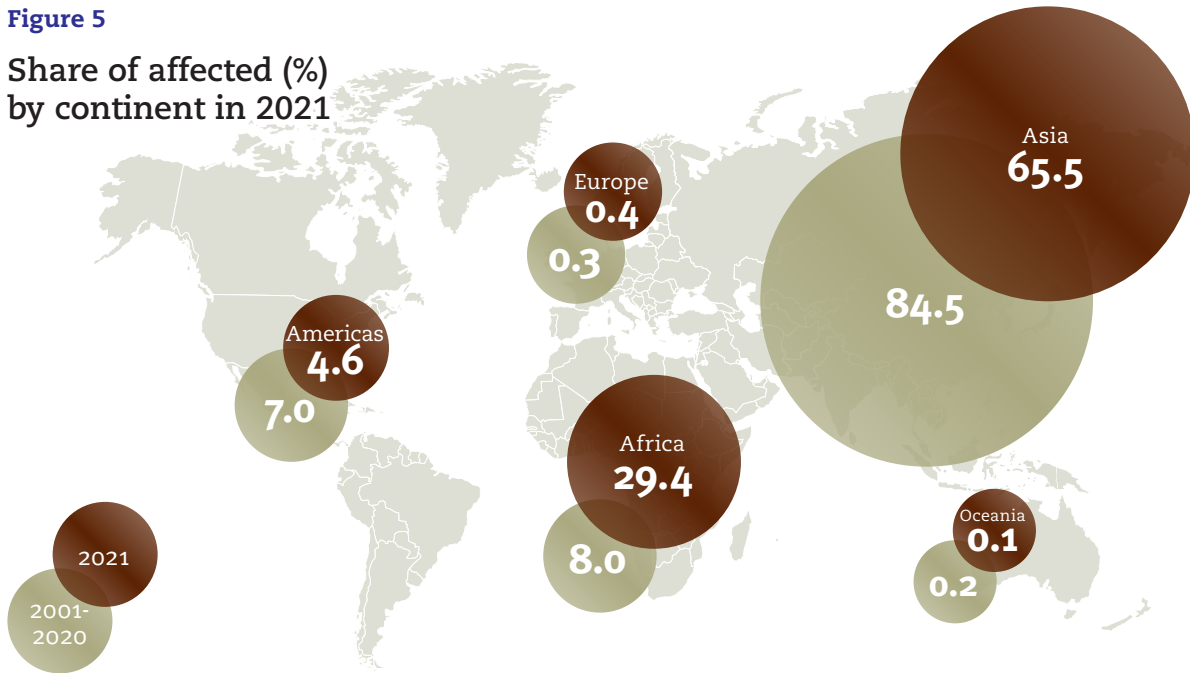


Figure 6

Number of affected (million) by disaster type: 2021 compared to the 2001-2020 annual average

193.4 million in 2021 vs 101.8 million 2001 to 2020 average

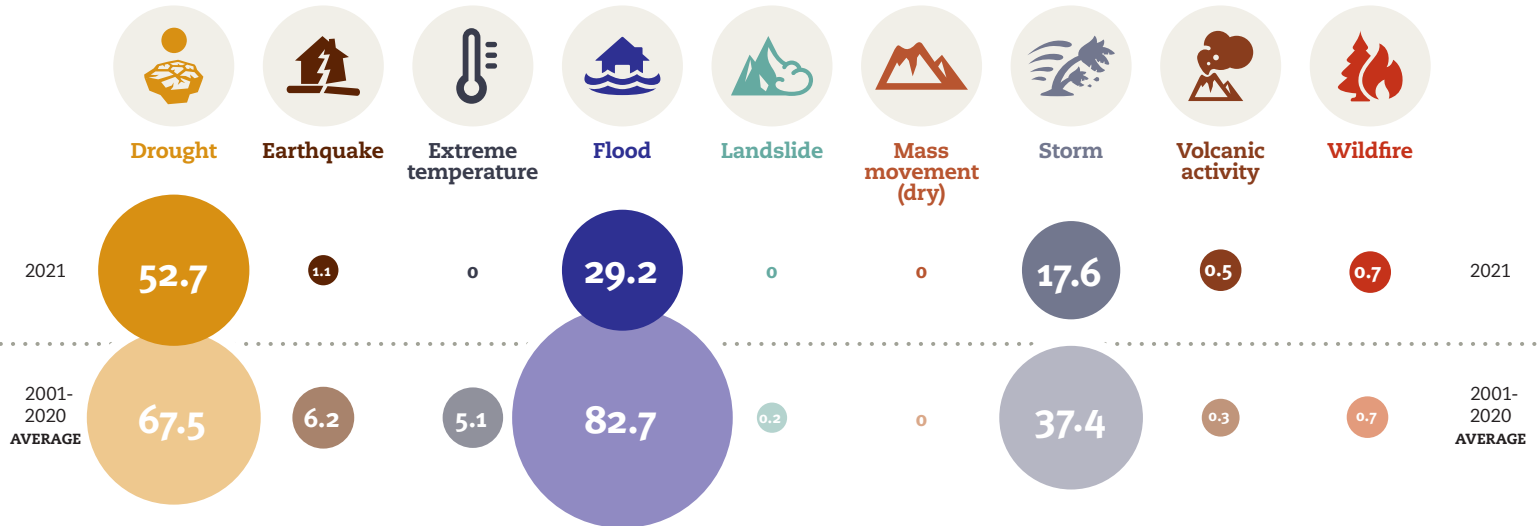


Table 2

Top 10 total affected – 2021

China	<b>Flood</b>	14.5 million	Somalia	<b>Drought</b>	5.6 million
South Africa	<b>Drought</b>	12.0 million	Ethiopia	<b>Drought</b>	5.5 million
Afghanistan	<b>Drought</b>	11.0 million	Syrian Arab Rep.	<b>Drought</b>	5.5 million
Philippines	<b>Typhoon Rai</b>	10.6 million	Iran (Islamic Rep.)	<b>Drought</b>	2.6 million
Iraq	<b>Drought</b>	7.0 million	Kenya	<b>Drought</b>	2.1 million

<sup>7</sup> Sum of injured, homeless and affected.

# Economic Losses

Figure 7

Share of economic losses (%) by continent in 2021

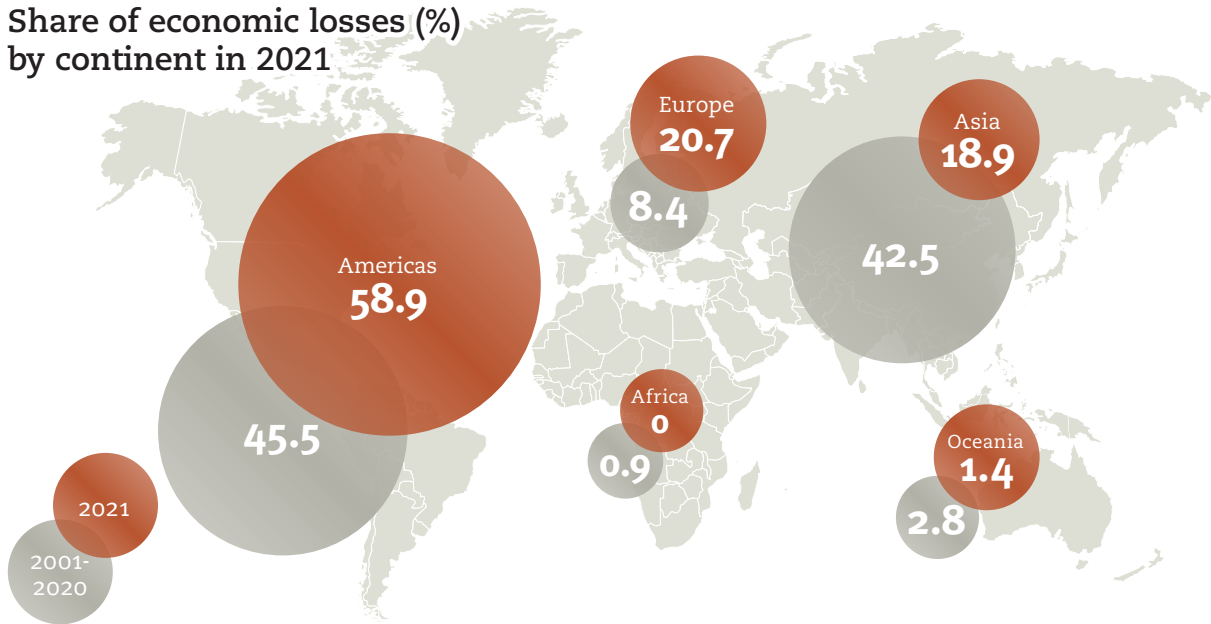


Figure 8

Economic losses (billion US\$) by disaster type: 2021 compared to the 2001-2020 annual average<sup>8</sup>

153.8 2001 to 2020 < 252.1 in 2021

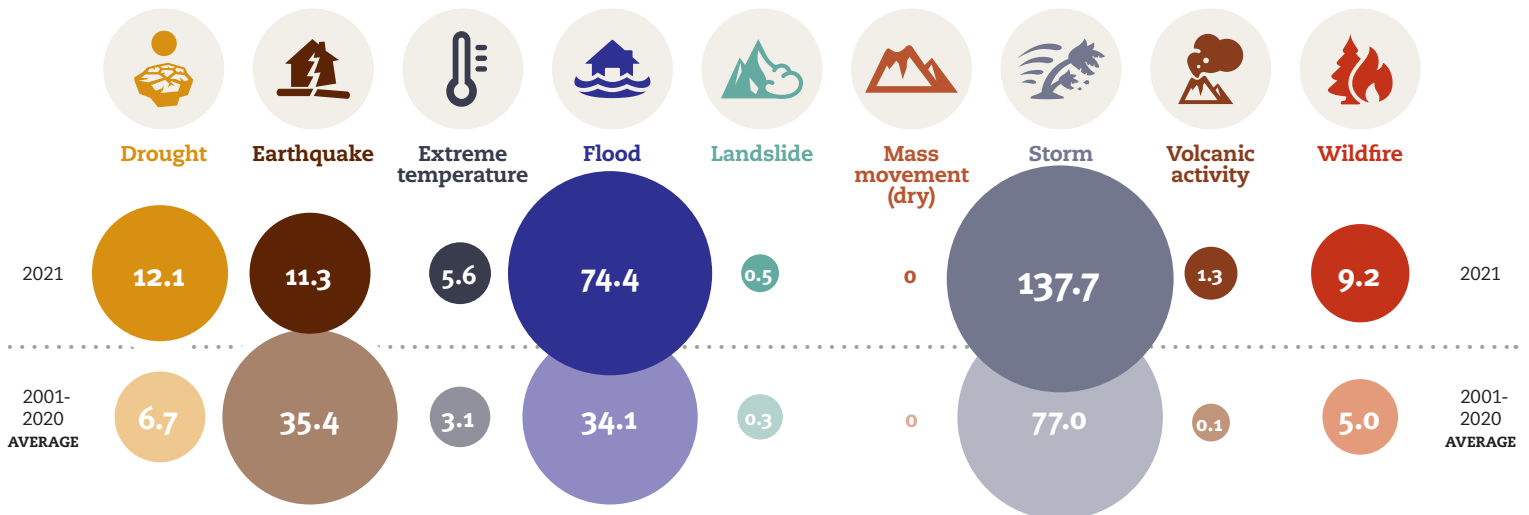


Table 3

Top 10 economic losses - 2021

USA	Hurricane Ida	65.0 billion	France	Cold Wave	5.6 billion
Germany	Flood	40.0 billion	USA	Tornado	5.2 billion
USA	Winter Storm	30.0 billion	USA	Wildfire	3.3 billion
China	Flood	16.5 billion	China	Drought	3.1 billion <sup>9</sup>
USA	Drought	9.0 billion	USA	Storm	3.1 billion <sup>9</sup>
Japan	Earthquake	7.7 billion	India	Flood	3.1 billion <sup>9</sup>

<sup>8</sup> Economic loss figures were adjusted using yearly consumer price index (CPI) data from the OECD.

<sup>9</sup> The 10<sup>th</sup> spot in the list had 3 countries tied with \$3.1B, therefore the list actually comprises 12 countries

# About EM-DAT

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Since 1988, the Centre for Research on the Epidemiology of Disasters (CRED) has maintained the Emergency Events Database (EM-DAT) with the initial support of the WHO and the Belgian government. The main objective of EM-DAT is to inform humanitarian action at the national and international levels allowing to improve rational decision-making in disaster preparedness. The database provides objective and evidence-based information to assess communities' vulnerability to disasters, assisting policymakers to set priorities.

EM-DAT holds data on the occurrence and impacts of more than 25,000 natural and technological disasters from 1900 to present. It is compiled from various sources (UN agencies, the US Office of Foreign Disaster Assistance, national governments, the International Federation of Red Cross and Red Crescent Societies, NGOs, insurance companies, research institutes and the media), where sources are prioritized by their reliability.

CRED defines a disaster as “a situation or event that overwhelms local capacity, necessitating a request at the national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering”. Only disasters attributed to natural hazards (excluding biological hazards) are included in this publication. 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

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