

Counting the cost 2020

A year of climate breakdown

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Executive summary

Covid-19 may have dominated the news agenda in 2020, but for many people the ongoing climate crisis compounded that into an even bigger danger to their lives and livelihoods. Be they fires in Australia and the United States, floods in China, India and Japan or storms in Europe and the Americas, almost every part of the globe was touched by climate-related disasters in 2020, with catastrophic results for millions of people.

This report examines the ten most financially devastating events, each of which racked up losses of more than a billion dollars. Most of these estimates are based on insured losses so the true figure is likely to be much higher. The report also highlights five additional events, which while having lower financial losses were just as damaging, such as floods in South Sudan and Pakistan which killed more than 500 people and devastated livelihoods.

Although emissions dipped in 2020 due to Covid-19 restrictions, this has proved little more than a blip, and is projected to reduce global heating by only 0.01°C by 2050. The UN 'Emissions Gap' report published in November showed that the world is heading for global temperature rise of 3°C, which would bring mass extinctions and leave swathes of the planet uninhabitable. For example, an estimated 275 million people would be at risk in areas flooded by sea-level rise.

In the companion 'Production Gap' report, also published last month, the UN Environment Programme said that to reach the Paris Agreement target of keeping global warming to 1.5°C the world needs to reduce fossil fuel production by 6% a year between 2020 and 2030. It warns that currently countries are planning an annual increase of 2%.

However, 2021 offers a major opportunity to get the world on track through a global green and rights-based recovery, where Governments use their post-Covid stimulus packages to rebuild economies on green jobs and social protection, and accelerate the zero-carbon transition. 2021 will also see the COP26 UN climate summit taking place in Glasgow, where countries must bring updated pledges to tackle climate change and support vulnerable communities on the front line of the crisis.

Most expensive, chronologically:

1. **Australia bushfires** (Australia, \$5 billion)
2. **Locust swarms** (East Africa, \$8.5 billion)
3. **Windstorms Ciara and Alex** (Europe, \$5.9 billion)
4. **Cyclone Amphan** (India, Sri Lanka, Bangladesh, \$13 billion)

5. **Atlantic Hurricane season** (US, Central America, \$40 billion)
6. **China floods** (China, \$32 billion)
7. **India floods** (India, \$10 billion)
8. **Kyushu floods** (Japan, \$5 billion)
9. **Pakistan floods** (Pakistan, \$1.5 billion)
10. **US West Coast fires** (US, \$20 billion)

Other major disasters:

11. **Siberian heatwave** (Russia)
12. **South Sudan floods** (South Sudan)
13. **South American fires** (Brazil, Uruguay, Argentina, Paraguay)
14. **Typhoons Goni and Vamco** (Philippines)
15. **Vietnam floods** (Vietnam)

Most expensive, month by month:

Date	Location	Impact	Estimated cost (\$US billion)	People killed	Number of people displaced (where available)
January	Australia	Bushfires	5	34	65K ¹
January-June	East Africa	Locust swarms	8.5		
February & October	Europe	Windstorms	5.9	30	
May	Bay of Bengal	Cyclone Amphan	13	128	4.9m ²
May-November	US, Central America, Caribbean	Hurricanes	41	400+	200K+ ³
June-October	China	Floods	32	278	3.7m ⁴
June-October	India	Floods	10	2,067	4m ⁵

July	Japan	Floods	8.5	82	3.6m advised to evacuate ^a
July-September	Pakistan	Floods	1.5	410	68K ^z
July-November	West coast US	Fires	20	42	500K under evacuation order ^a

Other major disasters

Date	Location	Impact
January-June	Siberia	Heatwave
July-September	South Sudan	Floods
August-November	South America	Fires
October-November	Philippines	Typhoons
October-November	Vietnam	Floods

1. Australia: Bushfires



Flame heights reached 70m in places during the Australian bushfires

Starting in late 2019, and affecting more than 18 million hectares,⁹ the Australian bushfires made headlines around the world. The fires destroyed thousands of buildings, killed more than a billion wild animals¹⁰ and caused at least 34 deaths.¹¹ The smoke from the fires travelled long distances and affected millions of people, covering the skies of cities like Sydney, Melbourne and Canberra. The cost of smoke-related health issues alone has been estimated at \$1.4 billion¹² and insured losses were estimated at \$3.6 billion¹³, although other estimates have put the total costs as high as AUS\$100 billion (US\$70 billion).¹⁴

Extreme drought and high temperatures brought about by climate change contributed to the severity of the fires. A study¹⁵ by the World Weather Attribution group estimated that global warming increased the risk of the fires by at least 30% - and this may be a conservative estimate.¹⁶

Australia's climate targets are "insufficient" to meet the Paris Agreement, according to Climate Action Tracker.¹⁷ Its energy sector still relies heavily on coal, with 60% of the country's electricity¹⁸ coming from coal-fired power stations. It is also the world's biggest exporter of coal and gas.¹⁹ Coal is the fuel that contributes the most to global warming and gas, while cleaner, is no friend to the climate.²⁰

2. East Africa: Locust swarms



Kiaruni, Kenya. A man shows two desert locust, part of a swarm which destroyed the crop in his village. Photo: Nicole Macheroux-Denault

Following an unusual rainy season at the end 2019, many countries in East Africa such as Eritrea, Ethiopia, Kenya, Somalia and Uganda, experienced a locust invasion during the first months of 2020.

The locust swarms attacked vast areas of the region, destroying crops, trees and pastures, and threatening food security. According to the UN Food and Agriculture Organization (FAO), this was the worst outbreak in 25 years for the Horn of Africa and in 70 years for Kenya.²¹ The World Bank estimates that losses could amount to \$8.5 billion due to crop losses and other “economic, human, and environmental impacts”.²²

Climate change and extreme weather events were relevant factors behind the outbreak. Locusts thrive in wet conditions²³, and outbreaks often follow floods and cyclones, which were very frequent in East Africa during 2019.²⁴ The Horn of Africa was hit by eight cyclones²⁵ and Mozambique by two.²⁶ These events were linked to changes in the Indian Ocean Dipole (IOD), an ocean circulation pattern that affects the climate in the region. The positive phase of the IOD in 2019 was the strongest for six decades, and was responsible for the extreme rains experienced in East Africa.²⁷ Scientists predict that, as the planet warms, these strong positive phases of the IOD will become more common, bringing more flooding, cyclones and pests, to already vulnerable and food insecure regions.²⁸

Africa is the continent that has contributed the least to global warming, but also the most vulnerable to the impacts of climate change.²⁹

3. Europe: Windstorms Ciara and Alex



Renault car destroyed during Storm Alex in the town of Breil-Sur-Roya, France. Photo: Sibuet Benjamin

This year, Europe was hit by several windstorms (or extratropical cyclones). The two with the highest costs were Ciara and Alex, whose combined damage amounts to more than \$5.9 billion. These are just the latest examples in a trend of extreme weather events which are now occurring regularly in Europe.

Windstorm Ciara hit the United Kingdom and Ireland in early February and continued moving eastwards over the following weeks. It caused 14 fatalities in eight countries and had an estimated cost of \$2.7 billion.³⁰

In October, floods caused by windstorm Alex in Southeast France and Northwest Italy killed 16 people and destroyed infrastructure valued at \$3.2 billion.³¹ The Italian region of Piedmont experienced its highest rainfall since 1958, with one station recording 630mm of rain in 24 hours.³²

Extratropical cyclones will become more common and damaging in Europe as temperatures rise due to global warming.³³ Storm-related

losses are expected to increase over the next few years in several European countries.³⁴

The EU's climate targets are still "insufficient" to meet the Paris Agreement, according to Climate Action Tracker.³⁵ Despite a substantial decrease in emissions in the last decades,³⁶ Europe is responsible for more than one in five human-caused greenhouse gases in the atmosphere,³⁷ but plans an 'at least' 55% cut by 2030 on 1990 levels. The UK has been historically one of the biggest emitters of the continent, having released more than 75 billion metric tons of CO₂ since 1750³⁸ – nearly 5% of total cumulative emissions.³⁹ The country has recently announced that it will cut its greenhouse gas emissions to at least 68% by 2030, compared to 1990 levels, and to become net zero by 2050.⁴⁰

4. Bay of Bengal: Cyclone Amphan



Cyclone Amphan was one of the strongest storms on record in the Bay of Bengal, with sustained wind speeds of 270 km/h.⁴¹ It was also the costliest tropical cyclone of the year, with losses amounting to more than \$13 billion.⁴² At least 128 people were killed by the cyclone, which caused great damage in cities in India, Bangladesh, Sri Lanka and Bhutan.⁴³

A man surveys the damage caused by Cyclone Amphan in Deshbandhu Park, Kolkata, India. Photo: Indrajit Das

The strength of cyclones affecting the countries bordering the North Indian Ocean has been increasing as the planet has warmed, according to multiple studies.^{44,45} In addition, a warmer atmosphere can hold more water, driving extreme rainfall during cyclones, which increases the threat of flooding.⁴⁶ Scientists have directly linked the increase in atmospheric moisture with human-caused climate change.⁴⁷ Global sea levels have already increased about 23cm as a result of human carbon emissions - dramatically increasing the distance that storm surges can reach.⁴⁸

The Bay of Bengal is one of the world's most vulnerable regions to climate change. In addition to being densely populated, the conditions in the bay are ideal for tropical cyclone formation. Also, the lowlands in the Ganges delta are prone to flooding and saltwater intrusion.

India is currently one of the few countries that has set targets to reduce carbon emissions that are “compatible” with keeping the planet’s temperature increase below 2°C compared to pre-industrial times, according to Climate Action Tracker.⁴⁹ India is currently the third largest emitter of greenhouse gases in the world, while carbon emissions from Bangladesh and Sri Lanka are small. In cumulative terms, the three countries have contributed little to global warming.

5. United States & Central America: Atlantic Hurricane Season



The 2020 Atlantic hurricane season was record-breaking, with 30 named storms. It caused at least 400 fatalities and a combined cost of \$41 billion.⁵⁰ Hurricane Eta alone, killed 153 people in Central America, most of them in Honduras and Guatemala.⁵¹ In the US, Hurricanes Laura and Sally caused the most damage.

A pregnant woman is carried out of an area flooded by water brought by Hurricane Eta in Planeta, Honduras. Photo: Alex Gakos

Laura, a Category 4 hurricane, made landfall in Louisiana in August. It killed 77 people⁵², forced thousands of people to move and had an estimated cost of over \$16 billion.⁵³ After two months, more than 6,500 affected people were still living in shelters.⁵⁴

Two weeks after Laura, Hurricane Sally struck Alabama, also affecting Florida, Mississippi and Louisiana. It caused eight deaths and damages of more than \$6.25 billion.⁵⁵

Both hurricanes affected the state of Louisiana, which was struck by five named storms throughout the season, setting a new record. Many of those storms made landfall with only a few weeks apart between them.

Central America was hit in November by Hurricane Eta (one of nine storms named from Greek alphabet after other names were exhausted), a Category 4 hurricane. It made landfall in Nicaragua

and affected several countries in the region, including Honduras, Panama and Guatemala.

Just a few weeks later, the region was slammed again by Hurricane Iota, which became the strongest hurricane of the 2020 season, and the strongest storm to have hit Nicaragua since records began.⁵⁶

While the number of tropical cyclones around the world has remained largely constant globally over the last century, in the Atlantic basin there has been an increase in the number of named storms since 1980.⁵⁷ At least nine of the season's tropical storms experienced 'rapid intensification', a phenomenon by which tropical cyclones acquire high wind speeds in a short period of time and which is becoming more common due to global warming.⁵⁸ Climate change is also causing tropical storms to have stronger winds and cause more intense downpours.⁵⁹

Despite having contributed minimally to global warming, countries in Central America are amongst the most vulnerable to its effects. The region is especially prone to hurricanes, tropical storms and drought.

6. China: Floods



China experienced intense floods starting in June. The floods affected more than 35 million people⁶⁰, and left at least 278 dead or missing.⁶¹ The cost of the floods has been estimated at \$32 billion.⁶²

A man struggles to salvage his belongings as floods sweep through a market in Caiyuanba, Chongqing, China in July. Photo: dyl0807

Some of the most affected areas were around the densely populated Yangtze river basin, including the provinces of Sichuan and Guizhou, and the city of Chongqing, where more than 30 million people live.

This year's floods are consistent with projections that, as the planet warms, a greater proportion of China's rain would fall as more concentrated downpours.⁶³ A 2016 study found that China is the country with the highest risk of floods in the world - a situation that will worsen if carbon emissions continue to rise unchecked.⁶⁴

China's climate targets were "highly insufficient" to meet the Paris Agreement, according to Climate Action Tracker⁶⁵ - but recently President Xi Jinping announced that the country's emissions will peak by 2030 and it will become carbon neutral by 2060.

7. India: Floods



A flooded street in Hyderabad, India, October. Photo: Strike Eagle.

The monsoon season brought extreme rainfall to India, causing floods and landslides. Between June and October, there were at least 2,067 deaths and damages amounting to \$10 billion.⁶⁶

In Kerala, a single landslide in a tea plantation killed 49 people.⁶⁷ And in Assam, the floods affected more than 60,000 between May and October, with 149 deaths.⁶⁸ The city of Hyderabad, where almost 10 million people live, saw a record rainfall of 29.8cm in 24 hours - almost 6cm more than the previous record.⁶⁹ The floods submerged cars and houses, killing at least 50 people.⁷⁰

This is the second consecutive year where India experienced abnormally high rainfalls during the monsoon season. And over the last 65 years, the country has seen a three-fold increase in extreme rain events.⁷¹ Climate change is likely one of the causes, with models showing that flood frequency in India would be twice as high in a high carbon emissions scenario, as compared to a low carbon emissions scenario.⁷²

8. Japan: Kyushu floods



Extreme rains in July in the island of Kyushu, in Japan, during the region's rainy season, caused 82 fatalities and had an estimated cost of more than \$8.5 billion.⁷³ The record-breaking intensity of the rains caused floods and landslides. More than 250,000 people had to be evacuated.⁷⁴

3.6 million people were advised to evacuate their homes during the extreme rains.

At least 14 people were killed in a single event, in which a care home was flooded.⁷⁵ In some parts of the island, rainfall exceeded 410mm in 24 hours. Several cities, such as Kuma and Kanoya, saw record downpours, exceeding 80 and 100mm of rain in just one hour, respectively.⁷⁶

Japan's rainfall pattern has been changing over the last decades, according to a recent report by Japan's Meteorological Agency.⁷⁷ There are now more days with heavy rain and fewer days with light rain, and extreme downpours are becoming more common.

Intense rainfalls are one of the best-established consequences of climate change. As global temperatures increase, the atmosphere can hold more water vapour.⁷⁸ The number of record-breaking rainfall events globally has significantly increased in recent decades.⁷⁹

Japan's plans to cut carbon emissions are currently classified as "highly insufficient" by Climate Action Tracker.⁸⁰ Although the country is one of the world's largest greenhouse gas emitters in Asia, it has recently committed to become carbon neutral by 2050 and will announce a new 2030 target in 2021.

9. Pakistan: Floods



Heavy rains during the monsoon caused 410 deaths in Pakistan. The cost of the damage caused by the floods and landslides has been estimated at more than \$1.5 billion.⁸¹ In the Sindh province, extreme rainfall events took place almost back-to-back during July and August.⁸² In Karachi, the downpours were the most intense on record since 1931.⁸³

A man carries his child through the flooded streets of Karachi, Pakistan in August. Photo: Asianet-Pakistan

Similar to what happened in 2019, this year's monsoon season has been abnormally rainy in Asia.⁸⁴ However, this increased rainfall is consistent with climate predictions.⁸⁵ Scientists note that as the planet warms, the total monsoon rain will increase, though some areas will receive less rainfall due to changes in wind patterns.⁸⁶ This means that heavy rainfall events such as those seen in Pakistan this year will likely become more frequent.

Like many other countries in the region, Pakistan has contributed little to climate change, yet it is highly vulnerable to extreme events caused by global warming. The country's current climate commitments include a 20% reduction in emissions by 2030, as compared to business-as-usual. However, plans to expand coal production and coal-fired power are seen with concern.⁸⁷

10. US: West Coast Fires



The 2020 fire season in the West coast of the United States was one of the most destructive on record. Dozens of wildfires across California, Colorado, Arizona, Washington and Oregon burned more than 8 million acres of land⁸⁸ and caused damages amounting to \$20 billion.⁸⁹ About half of the burnt area is within the borders of California, setting a new record for the state.⁹⁰ At least 42 people were killed by the fires.⁹¹

Flames from the LNU Lightning Complex fires burn in Napa County, California. The fires went on to destroy many homes near Lake Berryessa. Photo Wikimedia commons

The smoke from the fires, containing dangerous particulate matter and ozone, caused a surge in hospital admissions in the region.⁹² And spread by the wind, it also affected neighbouring states and Canada.⁹³

While fires are a natural part of some of the region' ecosystems, changes in climate caused by human activities are affecting the extent of these fires. Temperatures in the region have been increasing over the last century, which favours evaporation, creating drier fuel.⁹⁴ In August, when the fires were at their most intense, the region was experiencing a record-breaking heat wave.⁹⁵ In Death Valley, a temperature of 54.4°C was recorded - provisionally the hottest temperature ever on record.

The US has currently withdrawn from the Paris Agreement. Before that, its climate targets were classified as "critically insufficient" by Climate Action Tracker.⁹⁶ The US is the largest cumulative

greenhouse gas emitter and thus the country that has contributed the most to global warming. However, the election of Joe Biden could be a turning point, as the president-elect has pledged to re-join the Paris Agreement and make the US a leader in tackling climate change.

While the above disasters all brought financial costs worth over \$1.5 billion, other disasters of 2020 caused widespread damage to people or ecosystems without such high financial costs,

11. Russia: Siberian heatwave



The Russian region of Siberia experienced extremely high temperatures during the first half of the year. The city of Verkhoyansk saw temperatures of 38°C on June 20, setting a new record for the Arctic Circle.⁹⁷

Temperatures rose to record levels for the Arctic Circle, reaching 38C.

While the region has a very low population density and the event didn't cause widespread physical damage, the heatwave has alarming global implications. The impacts of a warmer Arctic have ripple effects across the world. Accelerated ice sheet melting in the Arctic has been linked to increased air pollution in China⁹⁸ and the Tibetan plateau⁹⁹, food production in the US and Canada¹⁰⁰, and sea-level rise.¹⁰¹ Warming of the permafrost also risks vast emissions of the greenhouse gas methane trapped in the icy soils, a feedback that could contribute to runaway climate change.

An attribution study by the World Weather Attribution group noted that the heatwave would have been "almost impossible without climate change".¹⁰²

12. South Sudan: Floods



More than a million people have been affected by floods in South Sudan this year. The floods started in July, after intense rainfalls that caused overflows of several rivers, including the Nile. Two months later, the government declared a state of emergency.¹⁰³ Officials said that these had been the most intense rainfalls in the last decades, worse than other historical floods such as those from 1946 and 1988.¹⁰⁴ The water level of the Blue Nile river rose to 17.58 meters in September, setting a new record. At least 138 were killed by the floods¹⁰⁵ and the cost to respond to the situation has been estimated at \$81.9 million.¹⁰⁶

Displaced people in South Sudan seek shelter from the floods in July.

As the planet warms, scientists expect more downpours such as those seen in South Sudan, which can lead to floods and landslides.¹⁰⁷ Intense rainfall and drought can also destroy crops and cause land erosion, causing food insecurity.

13. South America: Fires



Between August and November, several fires destroyed large swathes of forests across South America. The fires affected areas rich in unique wildlife such as the Amazon rainforest, the Pantanal wetlands, the Parana delta, and the Gran Chaco forest. Regions in Brazil¹⁰⁸, Paraguay¹⁰⁹, Argentina¹¹⁰ and Bolivia¹¹¹ were forced to declare a state of emergency due to the intensity of the fires.

Trees in the Amazon smoulder as fires destroy large tracts of forest.

The impact of the fires was extremely high. In Bolivia, the government said that 2.7 million acres have burnt this year.¹¹² In the Pantanal, the estimate is that the fire affected 22% of the wetlands, equivalent to 8.1 million acres.¹¹³ Another 490,000 acres were burnt in the Parana River delta, in Argentina.¹¹⁴ And the Amazon forest experienced more fires this year, than in 2019, when it made global headlines.¹¹⁵

The degradation of tropical forests is especially concerning for the future of the planet. While healthy forests take up carbon dioxide, helping us curb global warming, their destruction releases large amounts of carbon dioxide that was stored as biomass, further contributing to climate change.

While many of these fires appear to be linked to land-clearing to make room for cattle ranching and plantations, drought and high temperatures made the fires worse.¹¹⁶

14. Philippines: Typhoons Goni and Vamco



The Philippines were hit by two of the most damaging tropical cyclones of 2020: Typhoon Goni and Typhoon Vamco.

The flooded streets of Santa Lutgarda, Macabebe, Philippines, following Typhoon Goni. Photo: Judgefloro

Typhoon Goni was the strongest tropical cyclone of the year globally. In late October and early November, Goni reached category 5 (the highest) and before making landfall in the Philippines. It killed 24 people, caused thousands of displacements and destroyed crops. Total economic losses, including infrastructure damages, amounted to \$400 million.¹¹⁷

Just a few weeks later, the country was hit again - this time by Typhoon Vamco. The storm impacted many of the regions that were still recovering from Goni. 73 people were killed with 19 missing.¹¹⁸ Losses are expected to pass the \$1 billion mark.¹¹⁹

Both typhoons underwent 'rapid intensification', the process by which tropical cyclones increase their strength in short periods of time and that is becoming more common due to global warming.¹²⁰ And as the planet warms and sea surface temperatures increase,¹²¹ experts expect that typhoons, in the Philippines and elsewhere, will become stronger.¹²²

The Philippines' plan to reduce greenhouse gas emissions is compatible with a 2°C world warming, compared to pre-industrial levels, according to Climate Action Tracker.¹²³ While the country bears little responsibility for global warming, it is highly at risk from typhoons, a situation that will worsen over the next years due to climate change.

15. Vietnam: Floods



The 2020 monsoon season brought massive floods across Southeast Asia, with Vietnam one of the most affected countries. In just two months, October and November, the country was hit by at least nine tropical storms and typhoons.

Residents of Hoi An are forced to move through the streets by boat due to the overflow of the Thu Bon River after Typhoon Molave struck. Photo: Marco Gallo

The most destructive of them was Typhoon Molave, which killed 35 people in the country.¹²⁴ With winds of 150 km/h and rainfall of up to 562mm in some regions,¹²⁵ it was the strongest typhoon to hit the country in 20 years.¹²⁶

According to national authorities, floods and landslides in October and November caused the death of 192 people, the disappearance of another 57, and an economic damage of \$1.3 billion.¹²⁷ Damages due to Typhoon Molave are estimated at \$430 million.¹²⁸

Vietnam's current plans to reduce carbon emissions are classified as "critically insufficient" by Climate Action Tracker - the lowest possible

rank.¹²⁹ Despite not having contributed much overall to greenhouse gas emissions in previous decades, Vietnam has been recently experiencing rapid economic development which has been largely dependent on fossil fuels. The country plans to build several new coal-fired power plants over the next few years.

Recommendations

- To prevent further disasters, countries must urgently cut greenhouse gas emissions. While some countries have put forward ambitious plans, others need to come forward. Urgent implementation must be a top political priority.
- Richer countries need to provide more funding to support vulnerable communities living in poorer countries to help them adapt and build resilience to the impacts of climate change. These countries have done the least to cause the climate crisis but suffer its effects disproportionately.
- All Governments must invest in the energy transition to renewables. Richer countries should support developing countries so they can leapfrog the fossil fuelled development path taken by richer countries.

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