

Natural disaster

A **natural disaster** is a major [adverse event](#) resulting from [natural processes](#) of the [Earth](#); examples are [floods](#), [hurricanes](#), [tornadoes](#), [volcanic eruptions](#), [earthquakes](#), [tsunamis](#), [storms](#), and other geologic processes. A natural disaster can cause loss of life or damage property and typically leaves some economic damage in its wake, the severity of which depends on the affected population's [resilience](#) (ability to recover) and also on the infrastructure available.

An adverse event will not rise to the level of a disaster if it occurs in an area without [vulnerable](#) population. In a vulnerable area, however, such as [Nepal during the 2015 earthquake](#), an earthquake can have disastrous consequences and leave lasting damage, which can require years to repair.



Geological disasters

Avalanches and landslides

A [landslide](#) is described as an outward and downward slope movement of an abundance of slope-forming materials including rock, soil, artificial, or even a combination of these things.^[6]

During [World War I](#), an estimated 40,000 to 80,000 soldiers died as a result of [avalanches](#) during the mountain campaign in the [Alps](#) at the [Austrian-Italian](#) front. Many of the avalanches were caused by artillery fire.

Earthquakes

An [earthquake](#) is the result of a sudden release of energy in the [Earth's crust](#) that creates [seismic waves](#). At the Earth's surface, earthquakes manifest themselves by vibration, shaking, and sometimes displacement of the ground. Earthquakes are caused by slippage within geological [faults](#). The underground point of origin of the earthquake is called the *seismic focus*. The point directly above the focus on the surface is called the *epicenter*. Earthquakes by themselves rarely kill people or wildlife. It is usually the secondary events that they trigger such as building collapse, fires, [tsunamis](#) (seismic sea waves) and volcanoes. Many of these could possibly be avoided by better construction, safety systems, early warning and planning.

Sinkholes

When natural erosion, human mining or underground excavation makes the ground too weak to support the structures built on it, the ground can collapse and produce a [sinkhole](#). For example, the [2010 Guatemala City sinkhole](#), which killed fifteen people, was caused when heavy rain from [Tropical Storm Agatha](#), diverted by leaking pipes into a [pumice](#) bedrock, led to the sudden collapse of the ground beneath a factory building.

Volcanic eruptions

[Volcanoes](#) can cause widespread destruction and consequent disaster in several ways. The effects include the [volcanic eruption](#) itself that may cause harm following the explosion of the volcano or falling rocks. Secondly, [lava](#) may be produced during the eruption of a volcano, and so as it leaves the volcano the lava destroys many buildings, plants and animals due to its extreme heat. Thirdly, [volcanic ash](#), generally meaning the cooled ash, may form a cloud, and settle thickly in nearby locations. When mixed with water this forms a concrete-like material. In sufficient quantities, ash may cause roofs to collapse under its weight but even small quantities will harm humans if inhaled. Since the ash has the consistency of ground glass, it causes abrasion damage to moving parts such as engines. The main killer of humans in the immediate surroundings of a volcanic eruption is the [pyroclastic flows](#), which consist of a cloud of hot volcanic ash which builds up in the air above the volcano and rushes down the slopes when the eruption no longer supports the lifting of the gases. It is believed that [Pompeii](#) was destroyed by a pyroclastic flow. A [lahar](#) is a volcanic mudflow or landslide. The 1953 [Tangiwai disaster](#) was caused by a lahar, as was the 1985 [Armero tragedy](#) in which the town of Armero was buried and an estimated 23,000 people were killed.

Volcanoes rated at 8 (the highest level) on the [Volcanic Explosivity Index](#) are known as [supervolcanoes](#). According to the [Toba catastrophe theory](#), 75,000 to 80,000 years ago a supervolcanic eruption at what is now [Lake Toba](#) in [Sumatra](#) reduced the human population to 10,000 or even 1,000 breeding pairs,

creating a bottleneck in human evolution,^[9] and killed three-quarters of all plant life in the northern hemisphere. However, there is considerable debate regarding the veracity of this theory. The main danger from a supervolcano is the immense cloud of ash, which has a disastrous global effect on climate and temperature for many years.

Hydrological disasters

A violent, sudden and destructive change either in the quality of Earth's water or in the distribution or movement of water on land below the surface or in the atmosphere.

Floods

A [flood](#) is an overflow of water that 'submerges' land.^[9] The EU [Floods Directive](#) defines a flood as a temporary covering the land with water which is usually not covered by water.^[10] In the sense of 'flowing water', the word may also be applied to the inflow of the [tides](#). Flooding may result from the volume of water within a body of water, such as a [river](#) or [lake](#), which overflows, causing some of the water to escape its usual boundaries.^[11] While the size of a lake or other body of water will vary with seasonal changes in precipitation and snow melt, it is not a significant flood unless the water covers land used by man, like a village, city or other inhabited area, roads, expanses of farmland, etc.

Tsunami

A tsunami (plural: tsunamis or tsunami; from Japanese: 津波, lit. "harbour wave"; English pronunciation: /tsuːˈnɑːmi/), also known as a seismic sea wave or as a tidal wave, is a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or a large lake. Tsunamis can be caused by undersea earthquakes such as the [2004 Boxing Day tsunami](#), or by landslides such as the [one in 1958 at Lituya Bay, Alaska](#), or by volcanic eruptions such as the [ancient eruption of Santorini](#). On March 11, 2011, a [tsunami occurred near Fukushima, Japan](#) and spread through the Pacific Ocean.

Limnic eruptions

A [limnic eruption](#) occurs when a gas, usually [CO₂](#), suddenly erupts from deep lake water, posing the threat of suffocating wildlife, livestock and humans. Such an eruption may also cause [tsunamis](#) in the lake as the rising gas displaces water. Scientists believe [landslides](#), [volcanic](#) activity, or explosions can trigger such an eruption. To date, only two limnic eruptions have been observed and recorded. In 1984, in [Cameroon](#), a limnic eruption in [Lake Monoun](#) caused the deaths of 37 nearby residents, and at nearby [Lake Nyos](#) in 1986 a much larger eruption killed between 1,700 and 1,800 people by [asphyxiation](#).

Meteorological disasters

Cyclonic storms

[Cyclone](#), [tropical cyclone](#), [hurricane](#), and [typhoon](#) are different names for the same phenomenon, which is a cyclonic storm system that forms over the oceans. The determining factor on which term is used is based on where they originate. In the Atlantic and Northeast Pacific, the term "hurricane" is used; in the Northwest Pacific it is referred to as a "typhoon" and "cyclones" occur in the South Pacific and Indian Ocean.

The deadliest hurricane ever was the [1970 Bhola cyclone](#); the deadliest Atlantic hurricane was the [Great Hurricane of 1780](#) which devastated Martinique, St. Eustatius and Barbados. Another notable hurricane is [Hurricane Katrina](#), which devastated the Gulf Coast of the United States in 2005.

Blizzards

Blizzards are severe [winter storms](#) characterized by heavy snow and strong winds. When high winds stir up snow that has already fallen, it is known as a [ground blizzard](#). Blizzards can impact local economic activities, especially in regions where snowfall is rare. The [Great Blizzard of 1888](#) affected the United States, when many tons of wheat crops were destroyed, and in Asia, [2008 Afghanistan blizzard](#) and the [1972 Iran blizzard](#) were also significant events. The [1993 Superstorm](#) originated in the Gulf of Mexico and traveled north, causing damage in 26 states as well as Canada and leading to more than 300 deaths.^[12]

Hailstorms

Hailstorms are precipitation in the form of ice, with the ice not melting before it hits the ground. Hailstones usually measure between 0.2-inch (5 millimetres) and 6 inches (15 centimetres) in diameter. A particularly damaging hailstorm hit [Munich](#), Germany, on July 12, 1984, causing about \$2 billion in [insurance](#) claims.

Ice storms

An [ice storm](#) is a type of winter storm characterized by freezing rain. The U.S. National Weather Service defines an ice storm as a storm which results in the accumulation of at least 0.25-inch (6.4 mm) of ice on exposed surfaces.

Cold waves

A cold wave (known in some regions as a cold snap or cold spell) is a weather phenomenon that is distinguished by a cooling of the air. Specifically, as used by the U.S. National Weather Service, a cold wave is a rapid fall in temperature within a 24-hour period requiring substantially increased protection to agriculture, industry, commerce, and social activities. The precise criterion for a cold wave is determined by the rate at which the temperature falls, and the minimum to which it falls. This minimum temperature is dependent on the geographical region and time of year.

Heat waves

A heat wave is a period of unusually and excessively hot weather. The worst heat wave in recent history was the [European Heat Wave of 2003](#). A summer heat wave in Victoria, Australia, created conditions which fuelled the massive [bushfires](#) in 2009. [Melbourne](#) experienced three days in a row of temperatures exceeding 40 °C (104 °F) with some regional areas sweltering through much higher temperatures. The bushfires, collectively known as "Black Saturday", were partly the act of arsonists. The [2010 Northern Hemisphere summer](#) resulted in severe heat waves, which killed over 2,000 people. It resulted in hundreds of wildfires which caused widespread air pollution, and burned thousands of square miles of forest.

Droughts

Drought is the unusual dryness of soil caused by levels of rainfall significantly below average over a prolonged period. Hot dry winds, shortage of water, high temperatures and consequent evaporation of moisture from the ground can also contribute to conditions of drought. Droughts result in crop failure and shortages of water.

Well-known historical [droughts](#) include the 1997–2009 [Millennium Drought](#) in Australia led to a water supply crisis across much of the country. As a result, many desalination plants were built for the first time ([see list](#)). In 2011, the State of [Texas](#) lived under a drought emergency declaration for the entire calendar year and severe economic losses.^[13] The drought caused the [Bastrop](#) fires.

Thunderstorms

Severe storms, dust clouds, and volcanic eruptions can generate [lightning](#). Apart from the damage typically associated with storms, such as winds, hail, and flooding, the lightning itself can damage buildings, ignite fires and kill by direct contact. Especially deadly lightning incidents include a 2007 strike in Ushari Dara, a remote mountain village in northwestern [Pakistan](#), that killed 30 people,^[14] the crash of [LANSA Flight 508](#) which killed 91 people, and a fuel explosion in Dronka, [Egypt](#) caused by lightning in 1994 which killed 469.^[15] Most lightning deaths occur in the poor countries of America and Asia, where lightning is common and [adobe mud brick](#) housing provides little protection.^[16]

A [tornado](#) is a violent and dangerous rotating column of air that is in contact with both the surface of the Earth and a [cumulonimbus cloud](#), or the base of a [cumulus cloud](#) in rare cases. It is also referred to as a *twister* or a *cyclone*,^[17] although the word [cyclone](#) is used in meteorology in a wider sense, to refer to any closed [low pressure](#) circulation. Tornadoes come in many shapes and sizes, but are typically in the form of a visible [condensation funnel](#), whose narrow end touches the Earth and is often encircled by a cloud of [debris](#) and [dust](#). Most tornadoes have wind speeds less than 110 miles per hour (177 km/h), are approximately 250 feet (80 m) across, and travel a few miles (several kilometers) before dissipating. The [most extreme](#) tornadoes can attain wind speeds of more than 300 mph (480 km/h), stretch more than two miles (3 km) across, and stay on the ground for dozens of miles (perhaps more than 100 km).^{[18][19][20]}

Wildfires

[Wildfires](#) are large fires which often start in [wildland](#) areas. Common causes include [lightning](#) and [drought](#) but wildfires may also be started by human negligence or [arson](#). They can spread to populated areas and can thus be a threat to humans and property, as well as [wildlife](#). Notable cases of [wildfires](#) were the 1871 [Peshtigo Fire](#) in the United States, which killed at least 1700 people, and the 2009 [Victorian bushfires](#) in Australia.

Space disasters

Impact events and airburst

Asteroids that impact the Earth have led to several major extinction events, including one which created the [Chicxulub crater](#) 64.9 million years ago and which is associated with the demise of the dinosaurs. Scientists estimate that the likelihood of death for a living human from a global impact event is comparable to the probability of death from an airliner crash.

No human death has been definitively attributed to an impact event, but the [1490 Ch'ing-yang event](#) in which over 10,000 people may have died has been linked to a [meteor shower](#). Even asteroids and comets that burn up in the atmosphere can cause significant destruction on the ground due to the [air burst](#) explosion: notable air bursts include the [Tunguska event](#) in June 1908, which devastated large areas of Siberian countryside, and the [Chelyabinsk meteor](#) on 15 February 2013, which caused widespread property damage in the city of [Chelyabinsk](#) and injured 1,491.

Solar flare

A solar flare is a phenomenon where the Sun suddenly releases a great amount of [solar radiation](#), much more than normal. Solar flares are unlikely to cause any direct injury, but can destroy electrical equipment. The potential of solar storms to cause disaster was seen during the 1859 [Carrington event](#), which disrupted the telegraph network, and the [March 1989 geomagnetic storm](#) which [blacked out](#) Quebec. Some major known solar flares include the X20 event on August 16, 1989,^[23] and a similar flare on April 2, 2001 The most powerful flare ever recorded occurred on November 4, 2003 (estimated at between X40 and X45).

Protection by international law

International law, for example [Geneva Conventions](#) defines [International Red Cross and Red Crescent Movement](#) the [Convention on the Rights of Persons with Disabilities](#), requires that "States shall take, in accordance with their obligations under international law, including [international humanitarian law](#) and [international human rights law](#), all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including the occurrence of natural disaster." And further [United Nations Office for the Coordination of Humanitarian Affairs](#) is formed by [General Assembly](#) Resolution 44/182. People displaced due to natural disasters are currently protected under international law (Guiding Principles of International Displacement, Campala Convention of 2009).^[24]

Location

According to the UN, Asia-Pacific is the world's most disaster prone region.^[25] According to ReliefWeb, a person in Asia-Pacific is five times more likely to be hit by a natural disaster than someone living in other regions.

Disproportionate impact on women

Direct impact

Due to the social, political and cultural context of many places throughout the world, women are often disproportionately affected by disaster.^[22] In settings where women and children are likely to remain at

home, natural disasters, such as earthquakes, can result in greater morbidity and mortality among women. For example, during the 1993 earthquake in Maharashtra, India, more women died than men as they were more likely to be in the home, due to their role as caregivers.^[27] In the 2004 Indian Ocean tsunami, more women died than men, partly due to the fact that fewer women knew how to swim.

Gender-based and sexual violence

During and after a natural disaster, women are at increased risk of being affected by [gender based violence](#) and are increasingly vulnerable to sexual violence. Disrupted police enforcement, lax regulations, and displacement all contribute to increased risk of gender based violence and sexual assault.^[27] As food, water, and shelter becomes scarce, women may be forced into sexual relations as a bargain for providing essential resources.^[27] Furthermore, health care during times of disaster often focuses on life saving & critical care.^[27] However, as a result, many health care workers are not adequately trained to respond to sexual violence, screen for appropriate complications and treating non-life/limb threatening emergencies.^[27] As a result, women who have been affected by sexual violence are at a significantly increased risk of sexually transmitted infections, unique physical injuries and long term psychological consequences.^[27] All of these long-term health outcomes can prevent successful reintegration into society after the disaster recovery period.^[27]

Religious scapegoating

In addition to [LGBT people](#) and [immigrants](#), women are also disproportionately victimised by [religion-based scapegoating](#) for natural disasters: fanatical religious leaders or adherents may claim that a [god or gods](#) are angry with women's independent, freethinking behaviour, such as dressing 'immodestly', having sex or abortions if they so choose. For example, [Hindutva](#) party [Hindu Makkal Katchi](#) and others blamed [women's struggle for the right to enter](#) the [Sabarimala](#) temple for the August [2018 Kerala floods](#), purportedly inflicted by the angry god [Ayyappan](#).^{[29][30]} After an [earthquake struck on 26 September 2019](#) near [Istanbul, Turkey](#), [Islamists](#) blamed the disaster on women, and harassed random women in the streets; a similar Islamist backlash against women occurred after the [1999 Izmit earthquake](#). In response to Iranian Islamic cleric [Kazem Seddigi](#)'s accusation of women dressing immodestly and spreading promiscuity being the cause of earthquakes, American student [Jennifer McCreight](#) organised the [Boobquake](#) event on 26 April 2010: she encouraged women around the world to participate in dressing immodestly all at the same time while performing regular seismographic checks to prove that such behaviour in women causes no significant increase in earthquake activity.

Reproductive and sexual health

During and after natural disasters, routine health behaviors become interrupted. Women who were taking contraceptives may forget or may no longer have access to these medications. In addition, health care systems may have broken down as a result of the disaster, further reducing access to contraceptives.^[27] Unprotected intercourse during this time can lead to increased rates of childbirth, unintended pregnancies and sexually transmitted infections (STIs).^{[27][33]} Methods used to prevent STIs (such as condom use) are often forgotten or not accessible during times surrounding a disaster. Lack of health care infrastructure and medical shortages hinder the ability to treat individuals once they acquire an STI. In addition, health efforts to prevent, monitor or treat HIV/AIDS are often disrupted, leading to increased rates of HIV complications and increased transmission of the virus through the population.

Maternal health

Pregnant women are one of the groups disproportionately affected by natural disasters. Inadequate nutrition, little access to clean water, lack of health-care services and psychological stress in the aftermath of the disaster can lead to a significant increase in maternal morbidity and mortality. Furthermore, shortage of healthcare resources during this time can convert even routine obstetric complications into emergencies.

During and after a disaster, women's prenatal, peri-natal and postpartum care can become disrupted. After disasters, there is often a significant increase in the number of women who receive late or no prenatal care. Among women affected by natural disaster, there are significantly higher rates of low birth weight infants, preterm infants and infants with low head circumference. Separation of mothers and babies as a result of poor infrastructure and displacement practices can interfere with breastfeeding and cause significant emotional stress for mom and baby. It can also lead to negative long-term health outcome mother and especially babies. In addition, it can be particularly difficult to find clean water for sterilizing

bottles for breast milk or pre-made formula. These factors can further hinder breastfeeding practices and adequate infant nutrition, resulting in long-term health consequences for the baby.

Political consequences

Natural disasters can also affect political relations with countries and vice versa.¹ Violent conflicts within states can exacerbate the impact of natural disasters by weakening the ability of states, communities and individuals to provide disaster relief. Natural disasters can also worsen ongoing conflicts within states by weakening the capacity of states to fight rebels. In developed countries like the US, studies find that incumbents lose votes when the electorate perceives them as responsible for a poor disaster response.¹³⁸¹ In Chinese and Japanese history, it has been routine for [era names](#) or capital cities and palaces of emperors to be changed after a major natural disaster, chiefly for political reasons such as association with hardships by the populace and fear of upheaval. (i.e. in East Asian government chronicles, such fears were recorded in a low profile way as an unlucky name or place requiring change.) Disasters and responses can dictate political careers; the once popular President [Benigno Aquino III](#) of Philippines, following a weak and confused response to [Typhoon Yolanda](#) which killed over 6,000 people and survivors were largely left to fend for themselves, this widely accepted sentiment carried over and the President never recovered his popularity, his hand picked successor [Mar Roxas](#) lost the subsequent election to a rival party in a landslide vote. Post-disaster mishandling can spread despair as bad news travels fast and far, and contribute to the appeal of electing a strongman out of sheer desperation.