

Disasters and emergencies: definitions, impacts and response

The number of reported natural disasters is increasing and there is an apparent ongoing need to provide international humanitarian aid to people affected by conflict and war. Understanding the factors that influence the decision to intervene is important in the management of disaster relief and in the prevention of future crises.

This guide examines the key issues, sets out the definitions of disasters and emergencies, briefly looks at the changing causes and consequences of disasters and discusses some of the factors that influence people in deciding if they should respond to the need for help.

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This guide covers a broad range of natural, technological, social and complex disasters, including failed states. Whilst it cannot provide ready solutions for particular situations, it raises important issues to consider when aid interventions are being planned.

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Introduction

In many discussions about disasters and emergencies, a common assertion is that it is the *disaster* that gives rise to the *emergency*, but more often than not, these terms are used interchangeably.

This booklet explores some of the factors that turn an event into a disaster and motivate humanitarian agencies to provide an emergency response.

Types of disasters

Disasters are often categorized by their cause, which can be divided into four main groups as follows:

1. Natural disasters
2. Technological disasters
3. Social disasters
4. Complex disasters and failed states

Natural disasters

These result from environmental impacts. There are geophysical events such as volcanoes and earthquakes. These events can be very concentrated, with their impact felt only in a localized area. Other environmental events are hydro-metrological. These are experienced over a much wider area and include:

- windstorms (hurricanes, typhoons, cyclones);
- heavy rain or snow;
- drought; and
- excessive high or low temperatures.

Biological events are another type of natural disaster. These include:

- insect plagues; and
- disease epidemics.

In turn these natural events may trigger:

- floods;
- tsunamis;
- landslides or mudslides;
- avalanches (snow slides);
- excessive erosion;
- wildfires; and
- crop failure.

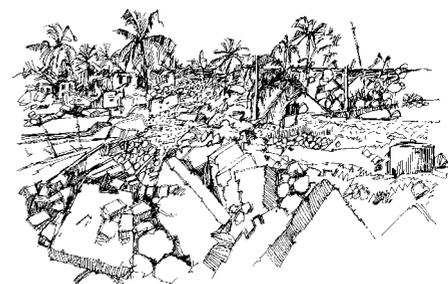


Figure 1. The consequences of an earthquake (above) and a tsunami (below)

Technological disasters

Adverse physical events can also be caused by human activity, such as

- industrial and technological incidents involving explosions or chemical and radiation emissions;
- accidents during the transportation of hazardous materials;
- structural failures of bridges, buildings, power lines, dams or mines;
- vehicle and train accidents; and
- unexploded ordinance.

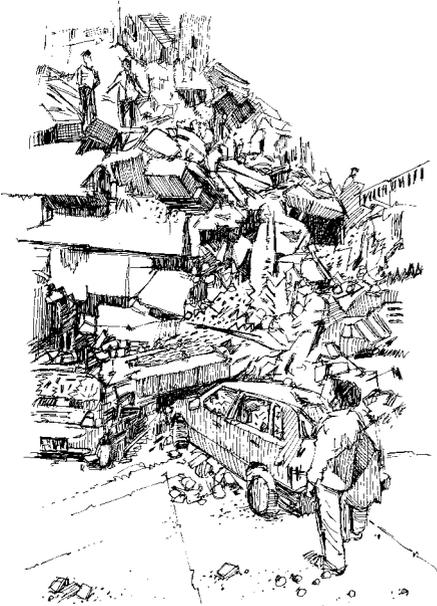


Figure 2. Structural collapse of buildings

Social disasters

Technological disasters are accidental failures of man-made facilities. There are also failures of the social order, where community behaviour breaks-down, for example, in order of increasing magnitude:

- demonstrations;
- stampedes;
- riots;
- terrorism;
- conflict; and
- war.



Figure 3. War: a social disaster

Complex disasters and failed states

The final category of disaster recognizes the importance of good governance and the rule of law in a stable society. When this fails, perhaps due to war or a major natural disaster, a complex set of failures occurs, with economic, social, physical and environmental consequences, all within a state of insecurity.

Cause and effect

Similar outcomes can result from a variety of different causes. A catastrophic flood might result from heavy rain breaking a dam due to an excessive amount of water in a reservoir, or the rain may create a mudslide that causes the dam to collapse. An earthquake could damage the dam, or it may be the result of poor design, an accidental explosion, a terrorist attack or war. Poor management may mean that the dam is not properly operated or maintained, leading to its eventual failure and a sudden flood.

Events may have different consequences and effects depending on their locations. An earthquake in a poor country, with poor building practices, sub-standard construction and minimal emergency services will have a greater adverse impact than the same strength of earthquake in a nation that is well prepared for such an event.

Consequences of disasters

Rather than defining disasters by their *cause*, another method of categorization is to look at their *impact*, such as:

- the number of deaths;
- the number of displaced people;
- the cost of repairs; or
- the wider economic impact.

Comparing two disasters is not straightforward. For example, the extent of injury, death and damage caused by a local, sudden disaster such as an earthquake will be easier to determine than that of a slow, gradual famine which may have no clear start or finish date and where casualties may be wide-spread geographically. A heat wave may kill elderly and young people who were weak anyway and so the direct cause of death may not be clear. A flood may directly cause a number of deaths by drowning, but it might also contaminate water supplies and destroy crops, leading indirectly to many deaths at a later date.

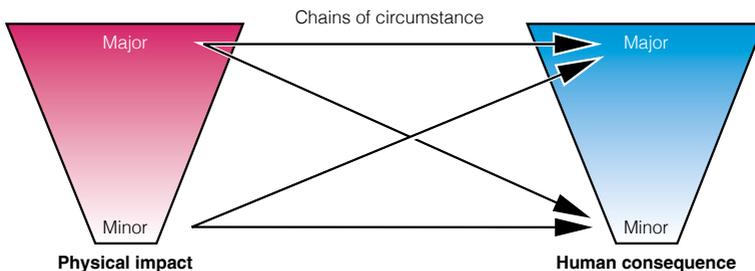


Figure 4. The impact of a disaster can be variable depending on the circumstances (Adapted from Alexander D. (2002) *Principles of Emergency Planning and Management*)

Economic consequences

The cost of repair and rebuilding relates to the standard of infrastructure that existed before the disaster. A disaster in an industrialized nation may cause millions of dollars worth of damage, whilst the same disaster in a low-income nation may not, as the rebuilding costs may be less.

However, the proportional economic impact may be larger in the low-income nation. A minor event may have major adverse consequences for a poor community. A rich nation with many and varied resources may be more robust and more able to recover from what might otherwise have been a major disaster in a poorer country.

Some of the characteristics of disasters include substantial destruction and / or mass casualties, but whatever the scale

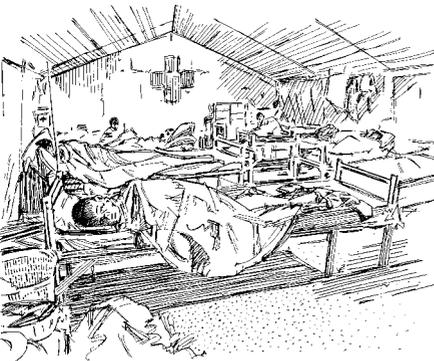


Figure 5. Mass casualties are a characteristic of disasters

of the disaster, “small monetary losses can lead to major suffering and hardship or, conversely, large losses can be fairly sustainable...” depending on the chain of circumstances (Alexander, 2002).

Box 1. A definition of a disaster

A disaster is “an exceptional event that exceeds the capacity of normal resources and organization to cope with it. Physical extremes are involved and the outcome is at least potentially and often actually, dangerous, damaging or lethal.”

Alexander, D. (2002) *Principles of Emergency Planning and Management*

Box 2. The UN definition

The United Nations define a disaster as “a serious disruption of the functioning of a society, causing widespread human, material, or environmental losses which exceed the ability of the affected society to cope using its own resources.”

United National International Strategy for Disaster Reduction (2004) *Living with risk: a global review of disaster reduction initiatives*

Definitions of disasters

Trying to define a disaster by its cause is limited, as one cause can have different effects depending on the local context. Similarly, trying to use standard benchmarks based on the impacts of a disaster also has its faults, again due to the local context. The impact is related to the individual, community or nation that experiences the event. Boxes 1 and 2 give two definitions of a disaster.

Disasters can be categorized by other factors such as spatial variation (widespread or concentrated) or temporal variation (rapid onset or slow onset).

Defining emergencies

Box 3 and 4 give definitions of emergencies. Generally, the term suggests a sense of urgency and immediacy, often related to disasters that occur suddenly. A slow onset disaster such as a drought, a complex



Figure 6. The term ‘emergency’ suggests a sense of urgency, but is this right?

Box 3. An emergency

“Emergency – the situation arising in the aftermath of a disaster.”

Davis and Lambert (2002)
Engineering in Emergencies

Box 4. A broader definition of an emergency

Generally, an emergency may be considered to be the result of a man-made and/or natural disaster, whereby there is a serious, often sudden, threat to the health of the affected community which has great difficulty in coping without external assistance.

Harvey, Baghri and Reed (2002)
Emergency Sanitation: Assessment and Programme Design

emergency that develops over time, or a refugee crisis that accelerates may not have the same sense of urgency as a sudden disaster like an earthquake, but the response required may be similar. Box 5 gives a definition of a complex emergency, whilst Box 6 describes a refugee emergency. Note, not all refugees require emergency support, so the emergency is defined by the need for a response rather than the presence of refugees.

Box 5. Complex emergencies

The Inter-Agency Standing Committee defined complex emergencies as:

“A humanitarian crisis in a country, region or society where there is total or considerable breakdown of authority resulting from internal or external conflict and which requires an international response that goes beyond the mandate or capacity of any single agency and/ or the ongoing United Nations country program.”

UN Office for the Coordination of Humanitarian Affairs (1999)
OCHA Orientation Handbook on Complex Emergencies

Box 6. A definition of a refugee emergency

“A situation in which the life or well-being of refugees will be threatened unless immediate and appropriate action is taken, and which demands an extraordinary response and exceptional measures.”

UNHCR (2000) *A Handy Guide to UNHCR Emergency Standards and Indicators*

Disaster response

The Sphere Project has produced the handbook *Humanitarian Charter and Minimum Standards for Disaster Response* that does not use the term ‘emergency’ but uses the concept of ‘disaster response’, focusing on the relief provided rather than the disaster itself. Box 7 defines the objectives of humanitarian

action. Humanitarian ideals of relieving suffering are usually applied to the aftermath or prevention of disasters rather than development activities aimed at relieving longer-term deprivation, but the distinction between these activities is not well defined.

Factors influencing disaster responses

Deciding what a disaster is and when help should be provided is not subject to exact rules. The following series of factors raises issues to be considered before declaring an event to be a disaster.

Scale

An individual seriously injured in an accident is a disaster for the individual and perhaps their family, but will not necessarily impact on the wider community unless he or she was a key worker, for example a doctor: the community can cope with this incident

Box 7. Objectives and definition of humanitarian action

1. The objectives of humanitarian action are to save lives, alleviate suffering and maintain human dignity during and in the aftermath of man-made crises and natural disasters, as well as to prevent and strengthen preparedness for the occurrence of such situations.
2. Humanitarian action should be guided by the humanitarian principles of humanity, meaning the centrality of saving human lives and alleviating suffering wherever it is found; impartiality, meaning the implementation of actions solely on the basis of need, without discrimination between or within affected populations; neutrality, meaning that humanitarian action must not favour any side in an armed conflict or other dispute where such action is carried out; and independence, meaning the autonomy of humanitarian objectives from the political, economic, military or other objectives that any actor may hold with regard to areas where humanitarian action is being implemented.
3. Humanitarian action includes the protection of civilians and those no longer taking part in hostilities, and the provision of food, water and sanitation, shelter, health services and other items of assistance, undertaken for the benefit of affected people and to facilitate the return to normal lives and livelihoods.'

International Meeting on Good Humanitarian Donorship Stockholm, June 2003

and not be adversely affected. If more people were killed or injured, the community may suffer as a whole and require help.

In the case of a global event such as the impact of a large meteor, there is no 'outside' agency to provide assistance. Pandemics such as the influenza outbreak that occurred after the First World War in 1918 are also of such an international scale to render the disaster response limited as everybody is affected.



Figure 7. Scale is a factor which can determine a disaster response

Boundaries

The need for outside assistance requires consideration of what is 'inside' and what is 'outside'. A fire in somebody's house may require assistance from neighbours; an extensive urban fire may require help from surrounding towns; a wildfire burning large areas of forest could be treated as a national problem.

Disasters like the HIV/AIDS epidemic or a heat wave do not have boundaries, as people affected are usually integrated within the general population.

Resources

A large nation may have resources within its borders to cope with a disaster, bringing in people and supplies from elsewhere in the country. However, a small nation facing the same disaster may require external assistance.

Similarly, two communities of the same size may experience the same event, but if one has more resources (or a more diverse range of resources – or both) then it may be more resilient than the community with limited resources or one with a high dependency on a single resource.

Location

As suggested earlier, the location of a disaster will have an effect on its impact. Disasters in densely populated urban areas will be more catastrophic than a similar incident occurring in a remote rural area. However, assessing the

disaster, generating media coverage, delivering external assistance and accessing local resources and skills will be more difficult in a rural area, particularly if the area already lacks basic infrastructure and communication services.

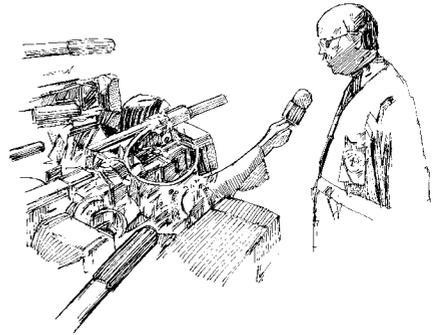


Figure 8. Generating media coverage is more difficult in a rural area

Development of infrastructure

The response to a disaster is further complicated by factors relating to the level of development within the affected area. A fire in a simple wooden thatched hut may destroy the building entirely, but most likely it would have been made of local materials, by local labour using local skills. The 'needs' of the affected population are for a house, but that house is simple to replace. A house fire in an industrialized country may not totally destroy the house, but the householder is less likely to be able to repair the damage using local resources; the cost of replacing houses is many times higher than for a low-income

community. So the disaster may be the same, but the economic cost is higher in a more industrialized country. Good transport links may help the rescue effort; a lack of basic infrastructure delays aid and compounds the impact of the disaster. Alternatively, good transport may make people dependent on long supply chains for food and basic commodities and less able to cope if this infrastructure breaks down.

Governance and capacity

The level of development is not just determined by physical infrastructure, but the ability of the local and national governments to cope with a disaster, how prepared they are, how much capacity they have to respond to an emergency and their access to emergency services.

Concentration of impact

A disaster is concentrated in both place and time. Hundreds of people dying in car accidents all over a country throughout

the year is not considered a disaster, whereas an accident involving a bus full of people may well be considered a disaster. The focus on a single newsworthy incident (albeit tragic in its own right) can divert attention away from larger but less conspicuous problems. The media and the public can comprehend the enormity of a single, sudden disaster. A sequence of individual disasters, of deaths due to diarrhoea or isolated industrial accidents does not have the same impact as, for example, a virulent plague or the explosion of a factory.

Timing

A drought lasting many years may be perceived by some to be no longer an 'emergency' even though the impact may be the same as during the first year of drought, if not worse. Similarly, floods that occur every year can become a part of everyday life. A sudden landslide may destroy a hillside in seconds,



Figure 9. The location of a disaster in an urban area can concentrate the impact (left); a long duration might make the disaster appear less acute when this is not the case (right).

whilst deforestation may lead to the slow erosion of the soil. A storm that hits without warning allows no time to prepare, whilst even a few hours notice enables people to prepare and limit the damage. An earthquake that occurs at night when people are at home and asleep may cause more casualties than one occurring during the day. Similar events can have very different impacts due to the time they occur, how fast they happen and how much warning is given.

Who is affected?

Images of disasters typically focus on children and the sick. Consider what the public response would be if a mine spoil heap collapsed on a school full of children compared with a mine collapse, trapping (adult male) miners underground?

The response of outsiders may be stronger when there is a cultural or other recognizable link between the affected population and the donor community.

Victims

The control that people have changes the way disasters are perceived. Road accidents kill many thousands, but do not attract the same attention as people killed in train and plane crashes, even though far fewer people die in this way. This is partly due to the scattered nature of road accidents, but also the fact that somebody else is in control of a plane or a train and so the passengers are perceived as helpless victims.

Increase in disasters

The number of recorded disasters is increasing and there are several factors behind this trend.

Population growth

One clear reason for the growth in the number of people affected is the increase in the global population. Simple arithmetic is only one aspect of this, however. With increasingly limited resources, people have to adapt their living conditions and accept higher risks in order to survive.

More children are being born and people are living longer. This is increasing the proportion of old and young people in society, people who may not be able to cope so well when disaster strikes.

Migration and competition

Population numbers also change locally due to movements of people. If all suitable and marginal land is occupied in one area, people will have to move elsewhere to find somewhere to live and work, bringing them into competition with the local population. This may bring them into contact with new diseases. Ideas spread with migration too, and whilst there are positive aspects to this, new but perhaps less appropriate styles of building or farming techniques, for example, may not be as well suited to a different environment and climate.

Conversely, some people may not be able to move, as their assets are tied up in

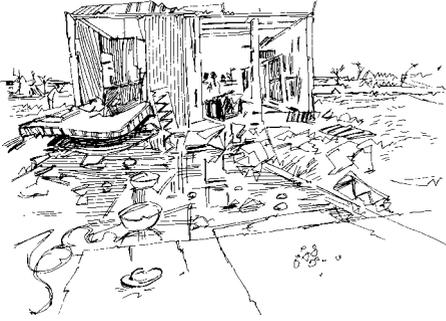


Figure 10. Styles of buildings may not be suitable for different climates

land and buildings, which discourages them from moving to a safer location.

Urbanization

Population growth, economic growth, competition for rural land and the perception of opportunities in the cities has led to an increase in urbanization. This concentration of people means that if a disaster does occur, more people will be affected. This includes both natural and technological hazards, especially as people will want to live near factories to reduce the travel costs of getting to work. In many areas, these expanding cities are situated on the coast – a legacy of the increase in global trade over the last century, as well as drivers such as tourism, oil exploration and fishing. Shanghai, Manila and Karachi are all built by the sea and so are vulnerable to rising sea levels and storms. These cities are expanding rapidly, and poor regulation means that land use planning

and building standards are not enforced. The flat alluvial lands may make building easy, but do not provide refuge from floods.

The concentration of people in one place also makes the impact of an earthquake or cyclone greater. If a disaster hits a sparsely populated rural area, the number of people affected will be less. High population densities mean that diseases, fires and social unrest can spread more rapidly, especially in slums and squatter areas.

Urban people have to rely on others to supply necessities such as food and water. A collapse in the supply chain will leave them without these essentials, whereas people in rural areas are more likely to have natural sources to fall back on.

Marginal land

In both rural and urban areas, competition for land is a problem. Many people have to live on or farm steep slopes that are prone to landslides. Flat areas that flood or are in the shadow of a volcano provide short-term advantages of fertile soils and may be unoccupied at present – but they are vacant for very good long-term reasons. Regions that are prone to drought are used for farmland, even though they are not suitable for permanent agriculture. In Bangladesh, people settle along the coast in areas subject to storm surges, but the banks of silt deposited by the annual river floods

provide fertile and unclaimed land in a densely populated country. The marginal nature of these settlements in social and economic as well as environmental terms means that physical investments in good housing and basic infrastructure are low.

In other countries, people have settled along the coast to develop areas for fishing, tourists or retirement. This exposes them to storm surges and tsunamis too, as the sea views that are sought are not sheltered from the impact of hurricanes and cyclones.

Deforestation and land degradation

Many areas that are settlements now were once forested. Cutting down trees not only changes the stability of slopes, it also alters the flow of water downstream contributing to floods and droughts, and it increases erosion and deposition of soil and silt downstream too. Along many coasts, mangrove forests are uprooted to provide land but this removes the protection the forests provided from the sea, as well as removing valuable natural resources and habitat.

Increasingly, farmers are forced to farm in marginal areas, where there is a climatic, environmental or physical risk. Competition for grazing land brings pastoral farmers into conflict, both with other pastoralists and agricultural farmers. Dependence on a few cash crops or a single crop, reliance on imported

fertilizers and pesticides and the need for a transport system to access markets all increase the risk to the farmer.

Furthermore, farmers may maximize the short-term outputs from the land at the expense of long-term fertility of the soil.

Economics

Many of these factors are about economics, but there are economic factors that contribute to disasters in their own right. The world trading system promotes cash crops, which are often monocultures. When prices fluctuate, the income from the crop can drop significantly, resulting in an economic drought, where the value of the crop has fallen for financial reasons rather than climatic ones. Economic policies can also constrain health and infrastructure budgets when governments are obliged to limit spending. Changes in financial markets can create economic disasters, such as the depression in the 1930s, which had adverse social, physical and environmental impacts.

Climate change

Most commentators now accept that the world's climate is changing. The frequency and intensity of windstorms, floods, extreme temperatures and droughts is increasing, along with the incidence of landslides, avalanches, fires and crop disease that can be triggered by these climatic events. Areas like Bangladesh are likely to suffer from increased flooding due to a rapid spring thaw of the Himalayan glaciers, followed by drought, as the

base flow of snowmelt water will not be sustained throughout the summer. Levels of uncertainty will increase, and the weather will be less predictable, making farming more difficult. Sea levels are anticipated to rise, threatening coastal cities, delta areas and small island states.

A likely consequence of climate change is the increase number of environmental refugees, as people are forced to leave their homes, as land becomes no longer viable.

Perceptions

The perception that the number of disasters is increasing is also a factor. Due to better communications, especially for news coverage, images of disasters are transmitted around the world in hours. This increase in publicity is used by aid agencies as they need to raise awareness in order to gain funds from the public directly and to influence governments.

From response to prevention

The increasing impacts of 'natural' and 'man-made' disasters is to a greater or lesser extent a human-induced phenomenon. Poor people in sub-standard housing living in disaster-prone areas seem to be more vulnerable to adverse impacts, but with many hazards, there are benefits as well as costs associated with them. Land that may be at risk of flooding or landslips, can also provide employment opportunities: land that floods or is near a volcano is often

fertile as floods and cyclones provide water for crops. These positive aspects have to be weighed alongside the dangers.

Understanding the risks and the perceptions of risk is important in trying to reduce the occurrence and severity of future disasters, to prevent – or at least reduce – the need for humanitarian responses to emergencies in the future.

In conclusion

In defining disasters, many factors need to be taken into consideration. However, two factors are constant in every situation; the people offering help and the people needing help. This relationship needs to be balanced, with the provision of aid governed by those requiring it, not those imposing it.

Is aid wanted?

Some countries may not request external aid as they do not want foreign intervention for political reasons, such as international status. The area experiencing the disaster may be in dispute or even at war with the government and aid may be viewed as helping rebels.

Further information

The Sphere Project

<http://www.sphereproject.org/>

International Disaster Database (EM-DAT) <http://www.emdat.be/>

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The Water, Engineering and Development Centre is one of the world's leading education and research institutes for developing knowledge and capacity in water and sanitation for sustainable development and emergency relief.

We are committed to the provision of effective, evidence-based and appropriate solutions for the improvement of basic infrastructure and essential services for people living in low- and middle-income countries. With over 45 years of experience, we offer expert advice and quality learning opportunities for sector professionals.

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