1989  International Decade for Natural Disaster Reduction (IDNDR)

1994  Yokohama Strategy and Plans on Action

1999  International Strategy for Disaster Reduction


2015  Sendai Framework for Disaster Risk Reduction 2015-2030
Sendai Framework for Disaster Risk Reduction 2015 - 2030
Sendai Framework for Disaster Risk Reduction 2015-2030

1 Global Outcome
13 Guiding Principles
4 Priorities for Action at all levels
7 Global Targets

Reduce
- Mortality/
global population
  2020-2030 Average << 2005-2015 Average
- Affected people/
global population
  2020-2030 Average << 2005-2015 Average
- Economic loss/
global GDP
  2030 Ratio << 2015 Ratio
- Damage to critical infrastructure & disruption of basic services
  2030 Values << 2015 Values

Increase
- Countries with national & local DRR strategies
  2020 Value >> 2015 Value
- International cooperation to developing countries
  2030 Value >> 2015 Value
- Availability and access to multi-hazard early warning systems & disaster risk information and assessments
  2030 Values >> 2015 Values
MEASURING IMPLEMENTATION OF THE SENDAI FRAMEWORK

ANNOUNCEMENT

The Sendai Framework Monitor system is now live!

After the adoption of Sendai Framework in 2015, 38 indicators were defined to measure progress in achieving its 7 Global targets. This system is the official tool to report these indicators to both the Sendai Framework and SDG's reporting processes.
Sendai Framework for Disaster Risk Reduction 2015-2030

- To strengthen technical and scientific capacity to capitalize on and consolidate existing knowledge and to develop and apply methodologies and models to assess disaster risks, vulnerabilities and exposure to all hazards; (paragraph 24 j)
The reason for the project

- Many hazard definition lists exist or are under development in different sectors and are informed from different risk contexts (e.g., economic, social, political)
  - Annex 4 lists the many scientific glossaries
  - Annex 5 lists the many UN glossaries
- The need for a single technical review identified:
  - to provide a comprehensive picture of hazards to help inform policy, practice and reporting of disaster risk reduction
  - to enable implementation of global and regional framework agreements such as the Sendai Framework, the SDGs, the Paris Agreement and the International Health Regulations
A critical, fundamental and urgent re-examination of how we deal with risk is needed. The past is not a sufficient indicator for the future. An interconnected approach is required to address systemic risks supported by multi-hazard and multidisciplinary risk assessment. The Global Risk Assessment Framework will facilitate this approach. Experts from science, the United Nations, and the private sector launched a new technical working group to develop a definitions’ list of the Sendai Framework Hazards. These, amongst others, will contribute to enhancing understanding of risk, inform decision making, and transform behaviour. (paragraph 14)
UNDRR/ISC Technical Working Group on the Hazard Terminology Review and Classification

Aim of project

To provide a review of Sendai Framework hazard terminology and classification for partners addressing the all hazards paradigm
UNDRR
UN Agencies partners
WMO, WHO, UNECE and others

ISC partners including
IRDR, CODATA, GEO, GEM and others

International Science Partners
Insurance Development Forum

International Humanitarian Organisation
IFRC
The Hazard Review and Classification Project: the process

Expanded scope of hazards of the Sendai Framework

The data sources:
- Scientific hazard glossaries
- IRDR Peril Classification
- UN glossaries
- Sendai Monitor hazard list
- Survey of scientists on hazards relevant for Sendai
- Consultations of expert communities within the UN and scientific community

Inclusion criteria:
1. The hazard has the potential to impact on a community
2. Proactive and reactive measures are available
3. The hazard has measurable spatial and temporal components

Hazard list:
302 hazards across these hazard types: hydromet, extraterrestrial, geological, environmental, biological, chemical, technological and societal.

Recommendations:
1. Regular review and update
2. Facilitate the development of a multi-hazard information system
3. Standardise definitions across users and sectors
5. Conduct further work to operationalise parameters for exposure, vulnerability and capacity, building on the UNGA definitions
6. Address cascading and complex hazards and risks

Dialogue towards a more holistic and consistent approach to hazards identification and definition
The Hazard Review and Classification Project: the process
Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction

Note by the Secretary-General

The Secretary-General has the honour to transmit herewith the report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction established by the General Assembly in its resolution 69/284 for the development of a set of possible indicators to measure global progress in the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, coherent with the work of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators, and the update of the publication entitled “2009 UNISDR Terminology on Disaster Risk Reduction”.
United Nations
General Assembly

https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf

Seventy-first session
Agenda item 19 (c)
Sustainable development: disaster risk reduction

Report of the open-ended intergovernmental expert working group on indicators for measuring progress at the national level on the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, coherent with the 2030 Agenda for Sustainable Development

Note by the Secretary-General

The Secretary-General has the honour to transmit to the General Assembly the report of the open-ended intergovernmental expert working group on indicators for measuring progress at the national level on the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, coherent with the 2030 Agenda for Sustainable Development, which the group completed at its first session, held from 12 to 14 June 2017, in Geneva, Switzerland.

TERMINOLOGY ON DISASTER RISK REDUCTION

Basic definitions on disaster risk reduction to promote a common understanding on the subject for use by the public, authorities and practitioners.

https://www.unisdr.org/we/inform/terminology#letter-h

The open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction was established by the General Assembly in its resolution 69/284 for the development of a set of possible indicators to measure global progress in the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, coherent with the work of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators, and the update of the publication entitled “2009 UNISDR Terminology on Disaster Risk Reduction”. The report was adopted by the United Nations General Assembly on February 2nd, 2017.
Hazard
A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

https://www.unisdr.org/we/inform/terminology#letter-h
The open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction was established by the General Assembly in its resolution 69/284 for the development of a set of possible indicators to measure global progress in the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, coherent with the work of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators, and the update of the publication entitled “2009 UNISDR Terminology on Disaster Risk Reduction”. The report was adopted by the United Nations General Assembly on February 2nd, 2017.
Hazard

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

Annotations: Hazards may be natural, anthropogenic or socionatural in origin. **Natural hazards** are predominantly associated with natural processes and phenomena. **Anthropogenic hazards**, or human-induced hazards, are induced entirely or predominantly by human activities and choices. This term does not include the occurrence or risk of armed conflicts and other situations of social instability or tension which are subject to international humanitarian law and national legislation. Several hazards are **socionatural**, in that they are associated with a combination of natural and anthropogenic factors, including environmental degradation and climate change.

Hazards may be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity or magnitude, frequency and probability. Biological hazards are also defined by their infectiousness or toxicity, or other characteristics of the pathogen such as dose-response, incubation period, case fatality rate and estimation of the pathogen for transmission.

**Multi-hazard** means (1) the selection of multiple major hazards that the country faces, and (2) the specific contexts where hazardous events may occur simultaneously, cascadingly or cumulatively over time, and taking into account the potential interrelated effects.

Hazards include (as mentioned in the Sendai Framework for Disaster Risk Reduction 2015-2030, and listed in alphabetical order) biological, environmental, geological, hydrometeorological and technological processes and phenomena.

**Biological hazards** are of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxins and bioactive substances. Examples are bacteria, viruses or parasites, as well as venomous wildlife and insects, poisonous plants and mosquitoes carrying disease-causing agents.
Hazard

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

Annotations: Hazards may be natural, human induced or industrial in origin and may be associated with a single hazard or with multiple hazards. As a complex environment, hazards may be the result of the occurrence or risk of a combination of a number of conditions subject to international humanitarian law, and they may be associated with a combination of environmental degradation and climate change.

Hazard may be single, sequential, or multiple, depending on location, intensity or magnitude, from which may derive the infectiousness or toxicity, or other characteristic such as case fatality rate and estimation of occurrence.

Multi-hazard means (1) the selection of hazardous events in contexts where hazardous events are identified, and (2) taking into account the potential in hazard relationships.

Hazard may include all (as mentioned in alphabetical order) biological, environmental, geological, and phenomena.

Biological hazards are of organic origin, including microorganisms, toxins and bioagents, and phenomena of venomous wildlife and insects, including plagues, diseases and pandemics.

Environmental hazards may include chemical, natural and biological hazards. They can be created by environmental degradation or physical or chemical pollution in the air, water and soil. However, many of the processes and phenomena that fall into this category may be termed drivers of hazard and risk rather than hazards in themselves, such as soil degradation, deforestation, loss of biodiversity, salinization and sea-level rise.

Geological or geophysical hazards originate from internal earth processes. Examples are earthquakes, volcanic activity and emissions, and related geophysical processes such as mass movements, landslides, rockslides, surface collapses and debris or mud flows. Hydrometeorological factors are important contributors to some of these processes. Tsunamis are difficult to categorize: although they are triggered by undersea earthquakes and other geological events, they essentially become an oceanic process that is manifested as a coastal water-related hazard.

Hydrometeorological hazards are of atmospheric, hydrological or oceanographic origin. Examples are tropical cyclones (also known as typhoons and hurricanes); floods, including flash floods; drought; heatwaves and cold spells; and coastal storm surges. Hydrometeorological conditions may also be a factor in other hazards such as landslides, wildland fires, locust plagues, epidemics and in the transport and dispersal of toxic substances and volcanic eruption material.

Technological hazards originate from technological or industrial conditions, dangerous procedures, infrastructure failures or specific human activities. Examples include industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires and chemical spills. Technological hazards also may arise directly as a result of the impacts of a natural hazard event.
The Hazard Review and Classification Project: the process

The data sources:

- Scientific hazard glossaries
- IRDR Peril Classification
- UN glossaries
- Sendai Monitor hazard list
- Survey of scientists on hazards relevant for Sendai
- Consultations of expert communities within the UN and scientific community
The Hazard Review and Classification Project: the process

Expanded scope of hazards of the Sendai Framework

UNGA definition of hazard as a process, phenomenon, or human activity that may cause harm or damage

The data sources:
- Scientific hazard glossaries
- IRDR Peril Classification
- UN glossaries
- Sendai Monitor hazard list
- Survey of scientists on hazards relevant for Sendai
- Consultations of expert communities within the UN and scientific community

Inclusion criteria:
1. The hazard has the potential to impact on a community
2. Proactive and reactive measures are available
3. The hazard has measurable spatial and temporal components

Hazard list:
302 hazards across these hazard types: hydromet, extraterrestrial, geological, environmental, biological, chemical, technological and societal.
In total 302 hazards are currently included in the Hazard List

- Biological hazards - 88
- Hydrometeorological hazards - 60
- Technological hazards - 53
- Geohazards - 35
- Chemical hazards - 25
- Environmental hazards - 24
- Extraterrestrial hazards - 9
- Societal hazards - 8
Primary definition
Brief Definition of hazard: this should be no more than 3 lines/2 sentences.
This should be sourced from the highest possible authority and be applicable to all parties and is preferably a
simple UN definition but also recognised as the highest level that UN member states can use and apply.
REFERENCE/ hyperlink/Web site
**Primary definition**

Brief Definition of hazard: this should be no more than 3 lines/2 sentences. This should be sourced from the highest possible authority and be applicable to all parties and is preferably a simple UN definition but also recognised as the highest level that UN member states can use and apply.

REFERENCE/ hyperlink/Web site

**Scientific definition**

Expanded scientific definition that is preferably measurable, modellable and statistically relevant

REFERENCE/ hyperlink/Web site
**Primary definition**
Brief Definition of hazard: this should be no more than 3 lines/2 sentences. This should be sourced from the highest possible authority and be applicable to all parties and is preferably a simple UN definition but also recognised as the highest level that UN member states can use and apply. REFERENCE/ hyperlink/Web site

**Scientific definition**
Expanded scientific definition that is preferably measurable, modellable and statistically relevant REFERENCE/ hyperlink/Web site

**Metrics, numerical limits or defined guidelines**
Any globally agreed metrics, numerical limits or guidelines defined Should be globally agreed as a recognised standard, if it is only at a regional level than state this as a reference. REFERENCE/ hyperlink/Web site
<table>
<thead>
<tr>
<th>Number</th>
<th>HAZARD</th>
</tr>
</thead>
</table>

**Primary definition**
Brief Definition of hazard: this should be no more than 3 lines/2 sentences. This should be sourced from the highest possible authority and be applicable to all parties and is preferably a simple UN definition but also recognised as the highest level that UN member states can use and apply. REFERENCE/ hyperlink/Web site

**Scientific definition**
Expanded scientific definition that is preferably measurable, modellable and statistically relevant REFERENCE/ hyperlink/Web site

**Metrics, numerical limits or defined guidelines**
Any globally agreed metrics, numerical limits or guidelines defined Should be globally agreed as a recognised standard, if it is only at a regional level than state this as a reference. REFERENCE/ hyperlink/Web site

**Any essential annotations**
Such as ‘drivers’ to cause the hazard and any secondary hazards which may be caused by this hazard (if applicable) REFERENCE/ hyperlink/Web site
**Primary definition**
Brief Definition of hazard: this should be no more than 3 lines/2 sentences. This should be sourced from the highest possible authority and be applicable to all parties and is preferably a simple UN definition but also recognised as the highest level that UN member states can use and apply.
REFERENCE/ hyperlink/Web site

**Scientific definition**
Expanded scientific definition that is preferably measurable, modellable and statistically relevant
REFERENCE/ hyperlink/Web site

**Metrics, numerical limits or defined guidelines**
Any globally agreed metrics, numerical limits or guidelines defined
Should be globally agreed as a recognised standard, if it is only at a regional level than state this as a reference.
REFERENCE/ hyperlink/Web site

**Any essential annotations**
Such as ‘drivers’ to cause the hazard and any secondary hazards which may be caused by this hazard (if applicable)
REFERENCE/ hyperlink/Web site

**Ownership of Definition(s)**
UN or Scientific Agency or Organisation who holds the updating responsibility for the Primary Definition
**Primary definition**
Brief Definition of hazard: this should be no more than 3 lines/2 sentences. This should be sourced from the highest possible authority and be applicable to all parties and is preferably a simple UN definition but also recognised as the highest level that UN member states can use and apply.
REFERENCE/ hyperlink/Web site

**Scientific definition**
Expanded scientific definition that is preferably measurable, modellable and statistically relevant
REFERENCE/ hyperlink/Web site

**Metrics, numerical limits or defined guidelines**
Any globally agreed metrics, numerical limits or guidelines defined
Should be globally agreed as a recognised standard, if it is only at a regional level than state this as a reference.
REFERENCE/ hyperlink/Web site

**Any essential annotations**
Such as ‘drivers’ to cause the hazard and any secondary hazards which may be caused by this hazard (if applicable)
REFERENCE/ hyperlink/Web site

**Ownership of Definition(s)**
UN or Scientific Agency or Organisation who holds the updating responsibility for the Primary Definition

**Name of Contributor/s to hazard definition and dates**, updating using version control
**DEFINITION:**
Liquefaction [soil]. In saturated, cohesionless soil, the transformation from a solid to a liquid state as a result of increased pore pressure and reduced effective stress. It is typically caused by rapid loading of the soil during earthquake shaking (American Geosciences Institute 2017).

**REFERENCE:**

**ANNOTATIONS:**
Additional scientific description:
For liquefaction to occur, the shear strength of the soil volume (e.g., the strength due to contact between individual soil grains) must be reduced to near-zero. In the case of earthquakes, strong shaking applies a cyclic load to the soil body. If the soil body compresses under this load, the pore-water pressure will increase, causing the grains to separate thus reducing the soil strength (Kramer 1996).

Soil compression increases the pore-water pressure, causing the water to move toward the Earth’s surface where pressure is lower. Under typical loading (e.g., from temperature changes, increased groundwater), the water then drains, and contact between grains retain their strength. However, when loading cycles occur rapidly, such as during an earthquake, intermittent drainage is prohibited and liquefaction may initiate (Kramer 1996).

The following characteristics are common to deposits most susceptible to liquefaction (Kramer 1996):
- Loose, sandy soils (but liquefaction has occasionally been observed in gravels and coarse silts)
- Rounded, well-sorted grains (e.g., uniform grain size), these compact most easily
- Recently deposited, especially of Holocene age (<11.7 ky), uncompacted soils including human-made deposits
- Soils that are saturated, below sea level, or within a few meters of groundwater

Some of the most common landforms in which liquefaction occurs are marshlands, riverbanks, beaches, and floodplains. Post-earthquake field studies have shown that earthquake-triggered liquefaction often recurs at the same locations (Kramer 1996). Earthquake-induced liquefaction can have varied effects on the surrounding built environment. Buildings, infrastructure, and utilities normally supported by the soil may sink, or undergo cracking or other structural damage; pile foundations may buckle or tilt; and lightweight buried masses such as pipelines may become buoyant and float to the surface. Liquefaction can also cause rapid settling of sediments, flooding (including breaches of earthen embankments or other retaining structures), and lateral spreading of soils (Kramer 1996).

**Metrics and numeric limits:**
In general, sites closer to an earthquake’s epicenter are more likely to liquefy, while the distance at which sites are susceptible to liquefaction increases with moment magnitude ($M_w$) and the duration (or number of cycles) of ground motion. The smallest earthquake for which liquefaction records exist was $M_w \approx 5$, with the most distant observed liquefaction reaching only ~2 km. By contrast, the most distant liquefaction for an earthquake of $M_w > 7$, may exceed 100 km (Ambraseys 1988). During the 2011 $M_w 9.0$ Tohoku earthquake, liquefaction was observed at distances exceeding 200 km (Kramer 2013).
Liquefaction [soil]. In saturated, cohesionless soil, liquefaction is a result of increased pore pressure and reduced soil strength during earthquake shaking (American Geosciences Institute, 2017). Liquefaction occurs when the effective stress in the soil is reduced to zero, causing the soil to behave like a fluid. This can lead to significant ground deformations, damage to infrastructure, and economic losses.

**Annex:**

**Additional scientific description:**

For liquefaction to occur, the shear strength of individual soil grains must be reduced to near-zero values due to the build-up of pore-water pressure. Under typical loading conditions, the water then drains, and contact between grains occurs rapidly, such as during an earthquake, initiating liquefaction (Kramer, 1996).

The following characteristics are common to different liquefied soils:

- Loose, sandy soils (but liquefaction has also been observed in clay soils).
- Rounded, well-sorted grains (e.g., unsorted sand).
- Recently deposited, especially of Holocene deposits.
- Soils that are saturated, below sea level.

Some of the most common landforms in which liquefaction occurs are those that are floodplains. Post-earthquake field studies have shown that liquefaction can affect a wide range of structures, including buildings, roads, and pipelines. The event can cause significant damage to infrastructure and can lead to economic losses.

**Metrics and numeric limits:**

In general, sites closer to an earthquake’s epicenter are more susceptible to liquefaction, while sites farther away may experience less severe effects. The smallest earthquake that can cause liquefaction is typically magnitude 4.5, but larger earthquakes can cause more significant damage. The distance from the epicenter to the liquefaction site plays a significant role in determining the extent of the seismic effects.

**Annotated definitions:**

- **Definition:** In the electric power domain, especially in power transmission and distribution, a power failure (PF) usually refers to a partial or total loss of power supply to some end user (e.g., population, enterprises, critical systems). PFs can spark from both the supply and demand side, due to triggers such as accidents, equipment breakdowns, malicious acts, organisational failures, or natural hazards. Finally, cascading effects can occur inside the electric system and beyond, with potential socio-economic consequences due to pre-existing vulnerabilities, technological and infrastructure dependencies.

- **Reference:** The definition has been derived by a cross-comparison of the state of art scientific literature, institutional glossaries and policy documents.

**Annotations:**

- **Terminology and definitions may vary, even significantly, with context:** Among the many examples, FEMA (2018) indicates that “a power outage is when the electrical power goes out unexpectedly.” Moreover, closely related concepts are those of power disruption, usually referring to the reduction in supply or supply capacity, and power damage/destruction, which are about the impact of the infrastructure, in itself a potential cause of disservice.

- **Synonyms:** electricity failure, power cut, power loss, power outage.

**Additional scientific description:**

Power failures can manifest in various forms, including transient faults, brownouts, and blackouts. In some cases, PFs also materialize as the result of situational response, such as in order to prevent worse consequences (e.g., rolling blackouts). Event severity of PFs may sometimes exceed the ordinary by far; for instance, the Electric Infrastructure Security Council (2019) defines a Black Sky hazard as “a catastrophic event that severely disrupts the normal functioning of our critical infrastructures in multiple regions for long durations.” The process of full restoration of the electric network after the total or partial shutdown of the grid is sometimes termed as black start (UK Risk Register, 2017).

In time, power failure avoidance strategies have to deal with the change in technologies, markets, and many other factors. Since the early 2000s, larger impacts of power outages have been associated with growing and varying demand, power network size and complexity, as well as market deregulation (Heldig et al., 2005). The steady availability of electricity is key to sectors such as transport, communication and healthcare (Little, 2002; Rimoldi et al., 2013; Klinger et al., 2014). Among others, Dobson et al. (2007) studied how large blackouts can be followed by a sequence of cascading events, impacting the system as a whole and increasing the possibility of subsequent disturbance and failures. Also, references such as Petermann et al. (2011), RAE (2016), and Pescaroli et al. (2017) illustrated how PFs can heavily disrupt societal and economic functions both directly (due to the lack of energy they rely on) and indirectly (e.g., through dependencies). The concurrence of weather extremes and climate change may exacerbate such impacts.

**Metrics and numeric limits:**

Various metrics are in place to capture and combine the many facets of a PF, for objectives ranging from reliability evaluation, to impact quantification and policy specification. Some of these metrics come from standards such as IEEE 1366-2012 (“IEEE Guide for Electric Power Distribution Reliability Indices”), energy security assessments (Sovacool & Mukherjee, 2013; Willner, 2012), or PF reports such as (Muir & Iopps, 2004). The literature is also assessing the broader impact spectrum of events from the past. Next, we encompass some of the key aspects.
## Liquefaction from Earthquakes

**Definition:** Liquefaction refers to a process in which saturated, cohesionless soil behaves like a liquid when subjected to shaking. This occurs under certain conditions, such as those present during earthquakes. The phenomenon is characterized by a rapid loss of shear strength, which can lead to significant ground deformations.

**Reference:**

**Annotations:**
- Additional scientific description: Liquefaction is a type of soil failure that occurs when a soil with a high water content is subjected to shaking, causing it to behave like a liquid. This can lead to significant ground movements, which can cause damage to buildings and infrastructure.
- Synonym(s): None.

## Ebola Virus Disease

**Definition:** Ebola Virus Disease (EVD) is a rare but severe viral hemorrhagic fever caused by the Ebola virus. It is known for its high case-fatality rates and can lead to severe bleeding and death.

**Reference:**

**Annotations:**
- Synonym(s): Ebola, Ebola hemorrhagic fever
- Additional scientific description: The Ebola virus is a filovirus that causes hemorrhagic fever in humans. It is transmitted through contact with infected individuals or their bodily fluids, such as blood, urine, or semen. The virus can cause severe symptoms, including fever, vomiting, diarrhea, headache, and rash, which can lead to death if untreated.
- Methods and numeric limits:
  - Antibody-capture enzyme-linked immunosorbent assay (ELISA)
  - Antigen-capture detection tests
  - Serum neutralization test
  - Reverse transcriptase polymerase chain reaction (RT-PCR) assay
  - Electron microscopy
  - Virus isolation by cell culture.
### Power failure

**Definition:**
In the electric power domain, especially in power systems, it refers to a partial or total loss of power systems. PFs can spark from both the supply breakdowns, malicious acts, organisational failures inside the electric system and beyond, with a large existing vulnerability, technological and infrastructure.

**Reference:**
The definition has been derived by a cross-disciplinary glossaries and policy documents.

### Ebola virus disease

**Definition:**
Ebola Virus Disease (EVD) is a rare but severe haemorrhagic fever and is often fatal in (World Health Organization 2019).

**Reference:**

### Pandemic influenza

**Definition:**
An influenza pandemic is a global epidemic caused by a new influenza virus to which there are few or no pre-existing immunity in the human population (World Health Organization 2019).

**Reference:**

### ANNOTATIONS:

**Additional scientific description:**
For liquefaction to occur, the shear strength of individual soil (grains) must be reduced to near-zero load to the soil, and if the soil is subject to cyclic loading, or extremely fast, the soil may collapse. Liquefaction is a process in which the water in the soil is removed, and the soil structure disintegrates, leading to the collapse of the soil. This process is commonly referred to as a "fluidization" or "liquefaction" event. The process of full restoration of the grid is sometimes termed as "black start" (Kramer 1996).

The following characteristics are common to fluidization:
- Loose, sandy soils (but liquefaction has been known to occur in clay and other types of soil as well).
- Rounded, well-sorted grains (e.g., unsorted gravel), which are more likely to become fluidized than rounded, coarser sediments.
- Recently deposited, especially of Holocene origin, which are more likely to become fluidized than older deposits.
- Soils that are saturated, below sea level, or near flooding levels.

Some of the most common landslides in which liquefaction occurs are floodplains. Post-earthquake field studies have shown liquefaction along the coast, as well as on the slopes of the coastal mountains. Liquefaction can also occur under ice sheets and in permafrost areas.

- **.metrics and numeric limits:**
  - In general, closer to an earthquake's epicenter, sites are susceptible to liquefaction increases in the ground motion of ground vibration.
  - The smallest earthquake, a magnitude 3, can produce liquefaction in a few kilometers.
  - The smallest earthquake, a magnitude 4, can produce liquefaction in a few kilometers.
  - The smallest earthquake, a magnitude 5, can produce liquefaction in a few kilometers.

### ANNOTATIONS:

**Additional scientific description:**
The Ebola virus is from the Filoviridae family and is transmitted to humans via direct contact (the viral transmission cycle). The symptoms of EVD can be sudden and include:
- Body or body fluids of a person who is infected.
- Objects that have been contaminated by a person who is infected.

People remain infectious as long as their body fluids are infected. The symptoms of EVD can be sudden and include:
- Blood or body fluids of a person who has died.
- Objects that have been contaminated by a person who has died.

### ANNOTATIONS:

**Synonym(s):** Ebola, Ebola haemorrhagic fever, Ebola hemorrhagic fever. Additional scientific description:
The Ebola virus is from the Filoviridae family and is transmitted to humans via direct contact (the viral transmission cycle). The symptoms of EVD can be sudden and include:
- Blood or body fluids of a person who is infected.
- Objects that have been contaminated by a person who is infected.

### ANNOTATIONS:

**Synonym(s):** Pandemic flu, Pan flu

**Additional scientific description:**
The constant evolving nature of influenza virus makes influenza among the top few infectious hazards with significant impact. There will be another Influenza pandemic! A pandemic occurs when an influenza virus emerges to which there is little or no immunity in the global human population and which can transmit efficiently among people. The pandemic virus can be a virus strain jumping directly from animals or reassorted from animal viruses with or without human seasonal viruses.

Three influenza pandemics occurred at intervals of several decades during the 20th century, the most severe of which was the so-called 'Spanish Flu' (caused by A(H1N1)) virus, estimated to have caused 20–50 million deaths in 1918–19. Milder pandemics occurred subsequently in 1957–58 (the 'Asian Flu' caused by A(H2N2)) virus) and in 1968 (the 'Hong Kong Flu' caused by A(H3N2)) virus), which were estimated to have caused 1–4 million deaths each. The most recent pandemic was caused by the A(H1N1) virus in 2009.

The current status of knowledge and technology means that prediction of the next pandemic—when, where, which virus strain, how severe—is impossible. Consequently, pandemic vaccines cannot be developed before the pandemic virus emerges. Innovative research (e.g. at www.who.int/influenza/resources/research/en/) is key to inform and advance pandemic influenza preparedness. Meanwhile, global influenza surveillance, through the WHO Global Influenza Surveillance and Response System (GISRS), timely sharing or viruses and associated information, and national capacity building via seasonal influenza programs are critical to mitigate the impact of inevitable next pandemic.

### Metrics and numeric limits:
The most recent pandemic occurred in 2009 and was caused by an influenza A(H1N1) virus. It is estimated to have caused between 100,000 and 400,000 deaths globally in the first year alone. Children and young adults were disproportionately affected in comparison to seasonal influenza, which causes severe disease mainly in the elderly, persons with chronic conditions and pregnant women (World Health Organisation 2019).

**Key relevant UN convention/multilateral treaty:**
### The Hazard Review and Classification Project: the process

#### Expanded scope of hazards of the Sendai Framework

- **UNGA definition of hazard as a process, phenomenon, or human activity that may cause harm or damage**

#### The data sources:

- Scientific hazard glossaries
- IDRR Peril Classification
- UN glossaries
- Sendai Monitor hazard list
- Survey of scientists on hazards relevant for Sendai
- Consultations of expert communities within the UN and scientific community

#### Inclusion criteria:

1. The hazard has the potential to impact on a community
2. Proactive and reactive measures are available
3. The hazard has measurable spatial and temporal components

#### Hazard list:

302 hazards across these hazard types: hydromet, extraterrestrial, geological, environmental, biological, chemical, technological and societal.

#### Recommendations:

1. Regular review and update
2. Facilitate the development of a multi-hazard information system
3. Standardise definitions across users and sectors
5. Conduct further work to operationalise parameters for exposure, vulnerability and capacity, building on the UNGA definitions
6. Address cascading and complex hazards and risks
Recommendations

1: Regular review and update

2: Facilitate the development of a multi-hazard information system

3: Engaging with users and sectors for greater alignment and consistency of hazard definitions

4: Use this hazard list to actively engage policymakers and scientists in evidence-based national risk assessment processes, disaster risk reduction and risk-informed sustainable development, and other actions aimed at managing risks of emergencies and disasters

5: Conduct further work to operationalise parameters for exposure, vulnerability and capacity, building on the UNGA definitions

6: Address cascading and complex hazards and risks
**The Hazard Review and Classification Project: the process**

**The data sources:**
- Scientific hazard glossaries
- IPDR Peril Classification
- UN glossaries
- Sendai Monitor hazard list
- Survey of scientists on hazards relevant for Sendai
- Consultations of expert communities within the UN and scientific community

**Inclusion criteria:**
1. The hazard has the potential to impact on a community
2. Proactive and reactive measures are available
3. The hazard has measurable spatial and temporal components

**Hazard list:**
- 302 hazards across these hazard types: hydromet, extraterrestrial, geological, environmental, biological, chemical, technological and societal.

**Recommendations:**
1. Regular review and update
2. Facilitate the development of a multi-hazard information system
3. Standardise definitions across users and sectors
5. Conduct further work to operationalise parameters for exposure, vulnerability and capacity, building on the UNGA definitions
6. Address cascading and complex hazards and risks

**Dialogue towards a more holistic and consistent approach to hazards identification and definition**
The Hazard Review and Classification Project: the process

Technical Working Group members
Jonathan Abrahams, World Health Organization
Chadi Abdallah, UNDRR Arab STAG (Lebanese National Council for Scientific Research)
Lucille Angles, United Nations Educational, Scientific and Cultural Organization
Djillali Benouar, UNDRR Africa STAG (University of Science & Technology Houari Boumediene)
Alonso Brenes Torres, Integrated Research for Disaster Risk
Chang Hun Choe, International Federation of Red Cross and Red Crescent Societies
Simon Cox, Committee on Data for Science and Technology (CODATA)
James Douris, World Meteorological Organization
Quinli Han, Integrated Research for Disaster Risk
John Handmer, International Institute for Applied Systems Analysis; Integrated Research on Disaster Risk programme; School of Science, RMIT, Australia University
Simon Hodson, Committee on Data for Science and Technology (CODATA)
Wirya Khim, Food and Agriculture Organization of the United Nations
Nick Moody, Insurance Development Forum Risk Modelling Steering Group
Osvaldo Luiz Leal Moraes, UNDRR Panama Office Science Group (Brazilian Early Warning Monitoring Centre for Natural Disasters)
Michael Nagy, United Nations Economic Commission for Europe
James Norris, Group on Earth Observations Secretariat
Urbano Fra Paleo, UNDRR European STAG
Pascal Peduzzi, UN Environment
Aslam Perwaiz, UNDRR Asia-Pacific STAG (Asian Disaster Preparedness Center)
Katie Peters, Overseas Development Institute
Jack Radisch, Organisation for Economic Co-operation and Development
Markus Reichstein, Knowledge Action Network on Emergent Risks and Extreme Events
John Schneider, Global Earthquake Model Foundation
Adam Smith, UNDRR North America STAG (National Oceanic and Atmospheric Administration)
Claire Souch, Insurance Development Forum Risk Modelling Steering Group
Annisa Triyanti Young Scientist, UNDRR Global STAG (Utrecht University)
Co-facilitators
Anne-Sophie Stevance, International Science Council
Irina Zodrow, United Nations Office for Disaster Risk Reduction

Project support team
Project support lead: Lucy Fagan, Public Health England
Lidia Mayner Flinders University, Adelaide, South Australia
Paula Gabriela Villavicencio Arciniegas, Public Health England - supported by the Universities of Excellence Scholarship from the Ecuadorian Government (November – December 2019)
Sonny Greenley, Public Health England (August 2019)
Rajinder Sagoo, supported by UNDRR (September – December 2019)
Olga Shashkina-Pescaroli, supported by International Science Council, (September – December 2019)
Zhenya Tsoy, International Science Council
Natalie Wright, Public Health England (September 2019 – March 2020)

Library services Claire Allen, Evidence Aid . Anne Brice, Public Health England, Caroline De Brún, Public Health England, Mike Clark, Queens University, Belfast, Emma Farrow, Public Health England, Benjamin Heaven Taylor, Evidence Aid, Lidia Mayner, Flinders University, Australia

Review of the technical report
Anne Bardsley, University of Auckland, Center for Informed Futures, New Zealand
Melody Brown Burkins, Dartmouth, United States
Andrew Hancock, Chair, UN Expert Group on International Statistical Classifications
Willi Harz, Federal Statistical Office of Germany
Alik Ismail-Zadeh, Karlsruhe Institute of Technology, Germany
David Johnston, Massey University, New Zealand
Coleen Vogel, University of Witwatersrand, South Africa

UNDRR Asia Pacific Science Technology and Academia Advisory Group
Thanks to Advisory Group Over 400 colleagues volunteered to join the UNDRR/ISC Sendai Hazard Definition and Classification Review Advisory Group and have been very engaged, committed and supportive of the work – we thank them for their support.
Authors of the Hazard Information Profiles (HIPs)

Thorkild Aarup, Intergovernmental Oceanographic Commission, Chadi Abdullah, UNDRR Arab STAG (Lebanese National Council for Scientific Research), Sarah Adamczyk, Overseas Development Institute, Bernadette Abela-Ridder, World Health Organization, Jonathan Abrahams, World Health Organization, Irina Ardeleanu, Coventry University, Kiran Attridge, Public Health England, Djilali Benouar, UNDRR Africa STAG (University of Science & Technology Houari Boumediene), Costanza Bonadonna, University de Geneve

Gracia Brisco, Food and Agriculture Organization of the United Nations, Sarah Cahill, Food and Agriculture Organization of the United Nations, Emily Campbell, Massey University, Zhanat Carr, World Health Organization, Denis Chang-Seng, Intergovernmental Oceanographic Commission, Callum Chapman, Public Health England, Jorcan Clarke, London School of Economics and Political Science


The Hazard Review and Classification Project: the process

The Hazard Information Profiles (HIPs) are the core components of the UNDRR Hazard Review and Classification Project. HIPs provide comprehensive information about hazards, including their characteristics, impacts, and management strategies. This information is used to inform disaster risk reduction policies and practices globally. The HIPs are developed through a collaborative process involving experts from various fields, including science, health, and policy. The HIPs serve as a valuable resource for countries and organizations working to manage and mitigate the impacts of hazards.
Review of the HIPs
Review coordinator: Anda Popovici, International Science Council

The Sendai Framework for Disaster Risk Reduction 2015–2030 (‘the Sendai Framework’) was one of three landmark agreements adopted by the United Nations in 2015. The other two being the Sustainable Development Goals of Agenda 2030 and the Paris Agreement on Climate Change.

The UNDRR/ISC Sendai Hazard Definition and Classification Review Technical Report supports all three by providing a common set of hazard definitions for monitoring and reviewing implementation which calls for “a data revolution, rigorous accountability mechanisms and renewed global partnerships”.