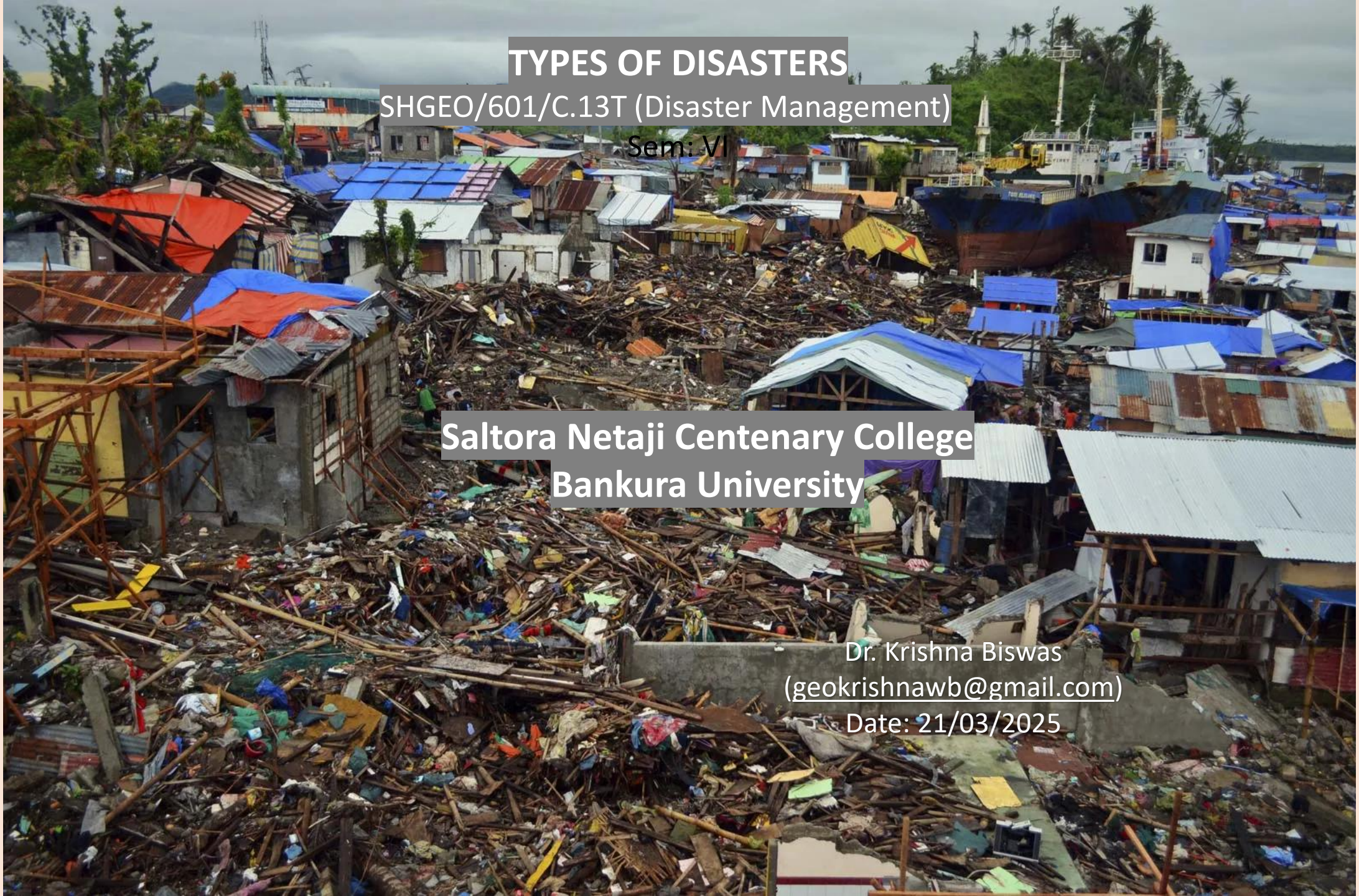

TYPES OF DISASTERS

SHGEO/601/C.13T (Disaster Management)

Sem: VI

Saltora Netaji Centenary College

Bankura University

Dr. Krishna Biswas

(geokrishnawb@gmail.com)

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WHAT IS DISASTER?

According to United Nations Office for Disaster Risk Reduction (UNDRR) disaster is "a **serious disruption** of the functioning of a community or a society at any scale **due to hazardous events** interacting with conditions of **exposure**, **vulnerability** and **capacity**, leading to one or more of the following: **human, material, economic and environmental losses and impacts**.." (https://www.undrr.org/terminology/disaster)

In other words "Disasters are serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources. Disasters can be caused by **natural, man-made and technological hazards**, as well as various factors that influence the exposure and vulnerability of a community." (https://www.ifrc.org/our-work/disasters-climate-and-crises/what-disaster)

In general a disaster is a result of **either a natural hazard impacting a vulnerable community**, **or poor planning or development or a lack of preparation are human failures** which make communities vulnerable to climate hazards. When the impact of these events becomes too extreme, they are often called disasters. Disasters are defined by their influence on people: if a hazard overwhelms or negatively affects a community, it is considered a disaster. From this point of view **disasters are routinely divided into natural or human-made**.

Difficulties in Classifying Disaster:

- In modern times, the divide between **natural**, **man-made** and **man-accelerated** disasters is quite difficult to draw. Because in the present world the complex human interaction have modified the natural world in a great extant. Natural hazards become more destructive due to human activities therefore the term **quasi-natural (arise through the interaction of natural processes and human activities.)** is more applicable. As the severity of the damage depends on the affected population's resilience and on the infrastructure available, scholars have been saying that the term natural disaster is unsuitable and should be abandoned. Instead, the simpler term disaster could be used, while also specifying the category (or type) of hazard. A disaster is a result of a natural or human-made hazard impacting a vulnerable community. **It is the combination of the hazard along with exposure of a vulnerable society that results in a disaster.**
- On the other hand, disasters become complex, when there is no single root cause. This **Complex disasters** are more common particularly in developing countries. **A specific disaster may spawn a secondary disaster that increases the impact**. A classic **example** is an earthquake that causes a tsunami, resulting in coastal flooding, resulting in damage to a nuclear power plant (such as the Fukushima nuclear disaster). Some disaster are associated with natural process but manufactured by human action, such as smog and acid rain.

TYPES OF DISASTER:

Based on the source or origin, disasters can be classified into two broad categories, namely,

- natural and
- human made disasters.

NATURAL DISASTER:

A natural disaster is the highly harmful impact on a society or community following a natural hazard event. Natural disaster, any calamitous occurrence generated by the effects of natural, rather than human-driven, phenomena that produces great loss of human life or destruction of the natural environment, private property, or public infrastructure. A natural disaster may be caused by **weather** and **climate events** or by **earthquakes**, **landslides**, and other occurrences that originate at **Earth's surface or within the planet itself**. No spot on Earth is immune from a natural disaster; however, certain types of disasters are often limited to or occur more frequently in specific geographic regions.

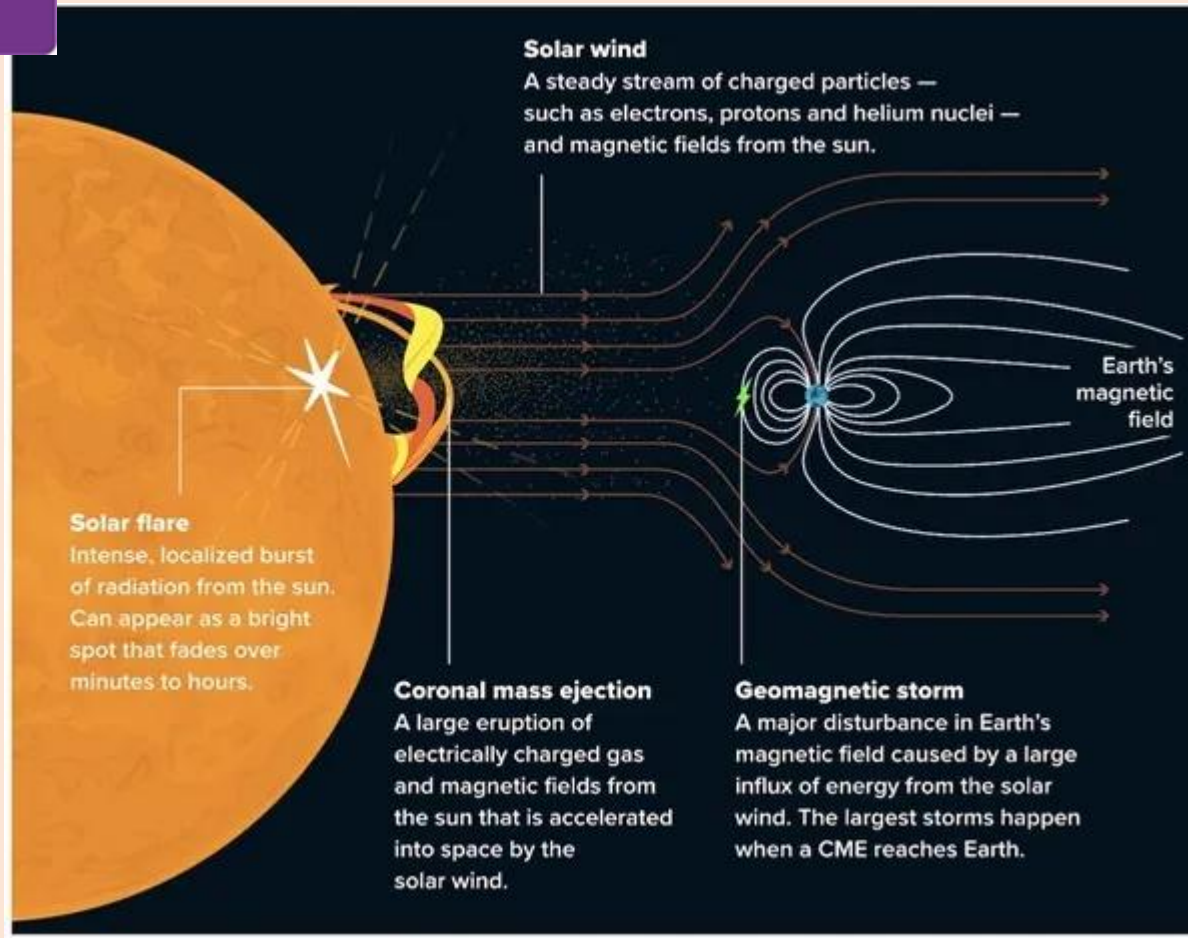
TYPES OF NATURAL DISASTER:

- **EXTRA-TERRESTRIAL**
- **METEOROLOGICAL**
- **CLIMATOLOGICAL DISASTERS**
- **GEOPHYSICAL**
- **HYDROLOGICAL**
- **BIOLOGICAL**

Geophysical	Hydrological	Meteorological	Climatological	Biological	Extra-terrestrial
Earthquake	Flood	Storm	Drought	Animal accident	Impact
Mass Movement (dry)	Landslide	Extreme temperature	Glacial lake outburst	Epidemic	Space weather
Volcanic activity	Wave action	Fog	Wildfire	Insect infestation	

EXTRA-TERRESTRIAL: A disaster caused by asteroids, meteoroids, and comets as they pass near-earth, enter the Earth's atmosphere, and/or strike the Earth, and by changes in interplanetary conditions that effect the Earth's magnetosphere, ionosphere, and thermosphere.

EXAMPLE: **Geomagnetic Storm, Solar Strom** (A type of extraterrestrial hazard caused by solar wind shockwaves that temporarily disturb the Earth's magnetosphere. Geomagnetic storms can disrupt power grids, spacecraft operations, and satellite communications.), **Impact – Collision** (A type of extraterrestrial hazard caused by the collision of the Earth with a meteoroid, asteroid or comet.),



METEOROLOGICAL DISASTER

Violent, sudden and destructive change to the environment related to, produced by, or affecting the earth's atmosphere, especially the weather-forming processes. (Source: ISEP) Meteorological disasters are events triggered by short lived or small to meso-scale atmospheric processes that last from minutes to days.

Example:

Convective Storm: A type of meteorological hazard generated by the heating of air and the availability of moist and unstable air masses. Convective storms range from localized thunderstorms (with heavy rain and/or hail, lightning, high winds, tornadoes) to meso-scale, multi-day events.

Extratropical Storm: A type of low-pressure cyclonic system in the middle and high latitudes (also called mid-latitude cyclone) that primarily gets its energy from the horizontal temperature contrasts (fronts) in the atmosphere. When associated with cold fronts, extratropical cyclones may be particularly damaging (e.g., European winter/windstorm, Nor'easter).

Tornado: A violently rotating column of air that reaches the ground or open water (waterspout).

Tropical Cyclone: A tropical cyclone originates over tropical or subtropical waters. It is characterized by a warm-core, non-frontal synoptic-scale cyclone with a low pressure center, spiral rain bands and strong winds. Depending on their location, tropical cyclones are referred to as hurricanes (Atlantic, Northeast Pacific), typhoons (Northwest Pacific), or cyclones (South Pacific and Indian Ocean) etc.

CLIMATOLOGICAL DISASTER:

A hazard caused by long-lived, meso- to macro-scale atmospheric processes ranging from intra-seasonal to multi-decadal climate variability. Many natural disaster events are tied to normal weather and seasonal functions. These functions can be pushed to an extreme level by nature to the point where they present a risk towards the environment and human populations. Such conditions are tied to climate and are classified as climatological disasters once they reach extreme or dangerous levels.

Example: **Drought, Cloud Burst** (On 4 October 2023, a cloudburst over Lhonak Lake in North Sikkim triggered a glacial lake outburst flood (GLOF) in the Teesta river basin, which claimed over 30 lives, destroyed the 1,200 MW Urja Hydroelectric Chungthang dam and caused widespread damage downstream), **wildfire** (Wildfire near Yosemite National Park, United States, in 2013. The Rim Fire burned more than 250,000 acres (1,000 km2) of forest.) , **extreme temperature (heat wave, cold wave)**

GEOPHYSICAL DISASTERS are defined as hazards originating from solid earth. This term is used interchangeably with the term geological hazard. They are classified as: Earthquakes, Mass Movements and Volcanic Activities. Such hazards are sub-classified as: Drought; Glacial Lake Outburst; Wildfire.

Earthquake: sudden movement of a block of the Earth's crust along a geological fault and associated ground shaking. **The April 2015 Nepal earthquake killed 8,962 people in Nepal and injured 21,952 more**.

Mass movement: any type of downslope movement of earth materials (rockfall, Landslide, subsidence, avalanche etc.). **The 1970 Huascarán Debris Avalanche occurred on May 31, 1970, when a debris avalanche and mudflow triggered by the Ancash earthquake destroyed the Peruvian town of Yungay and ten nearby villages, leaving up to 30,000 people dead.**

Volcanic activity: a type of volcanic event near an opening/vent in the Earth's surface including volcanic eruptions of lava, ash, hot vapor, gas, and pyroclastic material. Two-thirds of the original Krakatoa Island was obliterated by the 1883 eruption. The explosion of the Krakatau Volcano in Indonesia generated a 30-m tsunami in the Sundra Strait that destroyed numerous towns and killed about 36,000 people.

HYDROLOGICAL DISASTER:

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

Example: **Coastal Erosion** (The temporary or permanent loss of sediments or landmass in coastal margins due to the action of waves, winds, tides, or anthropogenic activities), **Coastal Flood** (Higher-than-normal water levels along the coast caused by tidal changes or thunderstorms that result in flooding, which can last from days to weeks.), **Flood** (A general term for the overflow of water from a stream channel onto normally dry land in the floodplain (riverine flooding), higher-than normal levels along the coast and in lakes or reservoirs (coastal flooding) as well as ponding of water at or near the point where the rain fell (flash floods). **Debris Flow, Mud Flow, Rock Fall** (Types of landslides that occur when heavy rain or rapid snow/ice melt send large amounts of vegetation, mud, or rock downslope by gravitational forces.) **Sinkhole** (Collapse of the land surface due to the dissolving of the subsurface rocks such as limestone or carbonate rock by water.) etc.

BIOLOGICAL DISASTERS are natural scenarios involving disease, disability or death on a large scale among humans, animals and plants due to micro-organisms like bacteria, or virus or toxins. Biological disasters may be in the form of:-

Epidemic affecting a disproportionately large number of individuals within a population, community, or region at the same time, examples being Cholera, Plague; or,

Pandemic is an epidemic that spreads across a large region, that is, a continent, or even worldwide of existing, emerging or reemerging diseases and pestilences, example being Influenza H1N1 (Swine Flu), Covid 19 etc.

HUMAN-MADE DISASTERS:

Human-made disasters are disruptions of a massive scale over a short or long period of time, caused by human action or inaction. Man-made hazards and catastrophes are events that reduces quality of life, health issues, and even fatalities. Some natural catastrophes have become more frequent and intense as a result of human influences.

Human made disasters are events that are occurred in or closed to human settlements. These disasters themselves could be unintentional, but are caused due to some intentional or unintentional activity. Most of this could have been prevented if sufficient precautionary measures were put in place.

Different approaches to classify Human-made or human-induce Disasters:

- Man-made disasters can be classified into **Sudden disasters, Continuing disasters,** and **long term Armed conflicts** depending on the **duration of the disaster**.

- Human forces are more responsible for **sudden disasters** than natural ones. Sudden hazards include the discharge of methyl isocyanate from the Union Carbide factory in Bhopal in 1984 and the 1986 emission of radioactive chemicals from the Chernobyl nuclear plant in the Soviet Union. Terrorist attacks unleashed on citizens are also sudden disasters.
- **Oil spills and pollution** over a long period of time are examples of **continuing man-made** hazards and disasters. The causal factor cannot be blocked immediately leading to a lasting impact.
- **Long term Wars and armed conflicts** have constantly mired human history. There are domestic upheavals, territorial conflicts between countries, and intervention of extra state entities like terrorist organizations

❑ Another scheme of classification is based on the **nature of the events**:

1. SOCIOLOGICAL & POLITICAL DISASTER
2. TECHNOLOGICAL DISASTER

I. Industrial Disaster
II. Transport Accident
III. Engineering Failure

3. HUMAN ERROR OF JUDGMENT

1. SOCIOLOGICAL & POLITICAL DISASTER

This type includes the **social and political roots** of disaster vulnerability and can be further divided in several types:

I. Arson:

Arson is the crime of intentionally and cruelly setting fire to buildings, wildlands, vehicles or other property with the intention to causeway damage and harm.

Example:

The Godhra train burning was an incident that occurred on the morning of 27th February 2002, in which 59 people, including 25 women and 15 children died in a fire inside the Sabarmati Express train near the Godhra railway station in the Indian state of Gujarat.

II. **Civil Disorder:**

Civil disorder, also known as civil disturbance, civil unrest, or turmoil, are situations when law enforcement struggle to maintain public order or tranquility. The term “civil disorder” means any public disturbance involving acts of violence by assemblages of three or more persons, which causes an immediate danger of or results in damage or injury to the property or person of any other individual.

Examples are **demonstrations, riots, strikes, public nuisances, and other form criminal activities**.

Manipur violence: On 3 May 2023, ethnic violence erupted in India's north-eastern state of Manipur between the Meitei people, a majority that lives in the Imphal Valley, and the Kuki-Zo tribal community from the surrounding hills. According to government figures, as of 28 February 2024, 219 people have been killed in the violence and 60,000 people have been displaced.

III. Terrorism:

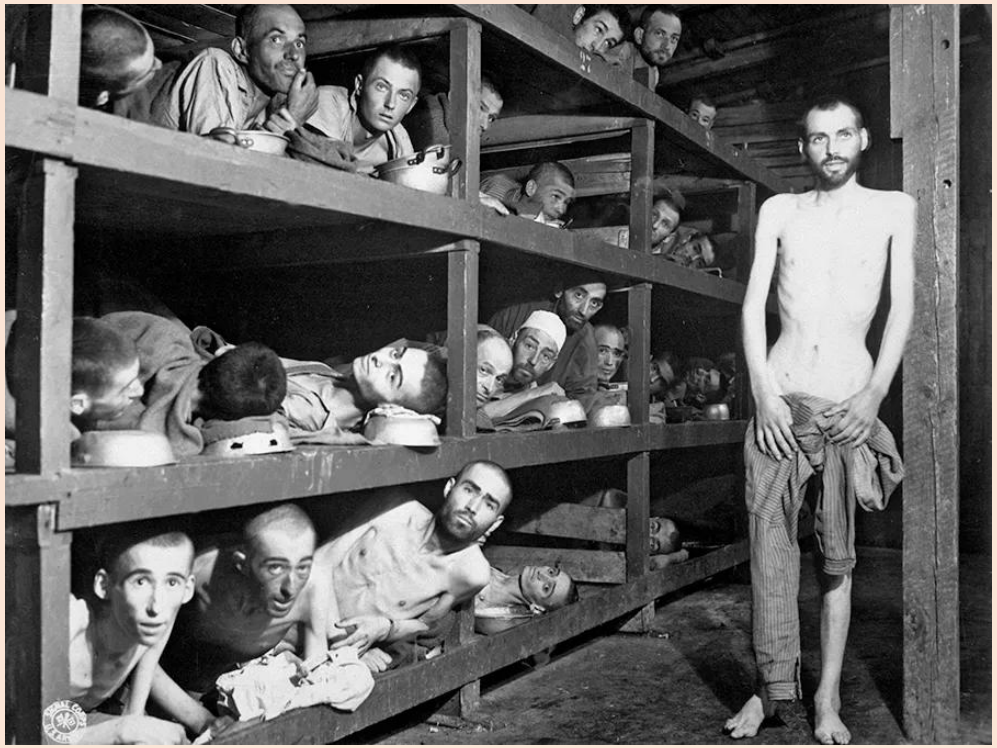
In its broadest sense, is the use of violence against non-combatants (civilians) to achieve political or ideological aims. The term is used in this regard primarily to refer to intentional violence during peacetime or in the context of war against non-combatant (mostly civilians and neutral military personnel).

Example: The 25 August 2003 Mumbai bombings were twin car bombings in the Indian city of Mumbai that killed 54, and injured 244 people. No group initially claimed responsibility for the attack, but Pakistan-based Lashkar-e-Toiba was blamed for it.

IV. WAR:

War is an intense armed conflict[a] between states, governments, societies, or paramilitary groups such as mercenaries, insurgents, and militias. It is generally characterized by extreme violence, destruction, and mortality, using regular or irregular military forces. War is not restricted to purely legitimate military targets, and can result in massive civilian or other non-combatant suffering and casualties.

Example: ongoing Israel–Hamas war. Since 2006, Hamas and Israel have fought five wars, the most recent of which began in 2023 and is ongoing as of April 2024.



V. Massacre:

A massacre is an event of killing people who are not engaged in hostilities or are defenseless. It is generally used to describe a targeted killing of civilians by an armed group or person.

Example: Between 1941 and 1945, Nazi Germany and its collaborators systematically murdered some six million Jews across German-occupied Europe, around two-thirds of Europe's Jewish population.

2. Technological Disaster

A technological disaster is a catastrophic event that is caused by either human error in controlling technology or a malfunction of a technology system. Technology based disasters are as serious as natural disasters.
It can be classified into the following categories:

I. Industrial disaster:

An industrial disaster is a serious event that involves hazardous materials and that can have consequences for the surrounding population and environment. Depending on the nature of the products involved, the accident can take the form of a fire, an explosion or the emission of toxic or radioactive material. Ex. Bhopal Gas Tragedy, Chernobyl Disaster etc.

II. Transport Accident:

Transport accidents refer to accidents involving mechanised modes of transport. A transport accident is any accident or incident that occurs during any type of transportation, including those occurring during road transport, rail transport, marine transport and air transport.

Examples.

- Malaysia Airlines Flight 17 (MH17) was a scheduled international passenger flight from Amsterdam to Kuala Lumpur that was shot down on July 17, 2014, in Ukraine, killing all 298 passengers.
- On 12 June, 2023 a boat carrying wedding guests capsized on the Niger River in the Pategi district of Kwara State. At least 106 people were confirmed dead while more than 100 others were rescued.
- On June 2, 2023, three trains collided in Balasore district in Odisha state of eastern India. A total of 296 people were killed in the crash and more than 1,200 others were injured.

IV. Engineering Failure: Engineering disasters often arise from shortcuts in the design process. Engineering is the science and technology used to meet the needs and demands of society. These demands include buildings, aircraft, vessels, and computer software.

Ex.:

- On 31 March 2016, a 150 m (490 ft) steel span of the under-construction Vivekananda Road flyover in the Girish Park neighborhood of Kolkata, India, collapsed. 27 people died and 80 more were injured in the accident.
- On 18 August 2008, heavy monsoon rains and poor maintenance caused a breach in the Kosi embankment. Water passed through the breach at an estimated 3675 cubic meters per second (129,800 cusecs), flooding many villages in Nepal and hundreds of villages in northern Bihar.
- The 2011 AMRI Hospital fire was a major fire at a private hospital in Dhakuria, Kolkata, that occurred in the early morning of 9 December 2011. The fire claimed 89 victims and was thought to have been caused by a short circuit in the basement.

3. HUMAN ERROR OF JUDGMENT

This kind of disasters take place due to unintentional human behaviour.

a. Stampede (The Pratapgarh stampede was a crowd crush incident that occurred on 4 March 2010, at Ram Janki temple of the Kripalu Maharaj ashram in Kunda, Uttar Pradesh, India, that killed 63 people and seriously injured 74 more.)
b. Airplane crash
c. Road Accident
d. Train Accident
e. Food Poisoning
f. Fire (2004 Kumbakonam school fire: On 16 July 2004, 94 students from the Krishna English Medium School's primary section were killed after the school's thatched roof caught fire.)etc.

Conclusion:

A disaster is an unfortunate event that causes a large number of fatalities and damages. According to published reports, economic losses from natural disasters have amplified over the last few decades. Moreover millions have made untimely death, and many rendered homeless due to these brutal disasters. The increasing trend towards losses of both lives and property can be attributed to two broad results. The first reason, the increase in the population density worldwide. It is evidenced that heavily populated large cities are growing in highly hazardous areas. Second, the standard of living have augmented, which has resulted in a huge increase in property values. These two developments amplify the economic losses from disaster manifolds.

THANK YOU