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Natural Hazards and Its Effect on the System

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ABSTRACT: Natural hazards are "those aspects of the built elements that are dangerous to man and are caused by forces beyond his control." All atmospheric, hydrologic, and geophysical dangers are referred to as "natural hazards" in this study. When a danger overwhelms a susceptible population, a natural catastrophe occurs, resulting in widespread death and sickness. In the previous decade, over 300 natural disasters shook the world each year, affecting millions of workers and costing hundreds of billions of dollars. In the event of an accident, the catastrophe cycle offers a framework for coordinating a coordinated response, recovery, preventive, and anticipatory approach. Clean water, proper sanitation, food/nutrition, shelter, and the risk of bacterial infections are all factors to consider. Just a few of the challenges that might stymie recovery following a natural catastrophe. The many forms of environmental hazards and their consequences on individuals and the environment were covered in this article. Financial services in the aftermath of natural calamities, there was also some investigation. This study's long-term objective is to give extensive and up-to-date information on environmental threats.

KEYWORDS: Earthquakes, Flood, Landslides, Natural hazards, Tsunami.

1. INTRODUCTION

Natural hazards are significant natural events that may cause mortality, serious property damage, and business interruption. Floods and other natural calamities may occur everywhere on the earth. Tornadoes, for example, are a naturally occurring phenomenon that may occur exclusively in certain locations.

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Thunderstorms and volcanic activities, for example, need certain meteorological and geophysical conditions in order to form. Human activities may influence the frequency and severity of natural catastrophes. Understanding when, what, and how natural catastrophes strike might help us reduce their impact on our lives (Nuzzo et al., 2019; Shim & Kim, 2015).

1.1. Earthquake

An earthquake (sometimes referred to as a shaking, tremor, or magnitude earthquake) is the shifting of the Earth's crust caused by a vibrating object in the lithosphere, which causes seismic waves. Earthquakes come in a variety of sizes, from those that are too little to be felt to those strong enough to fling items into the air and demolish whole cities. Seismology, or seismic activity, refers to the quantity, kind, and magnitude of tremors felt at a certain place. Tremor is a term used to describe non-earthquake seismic rumbling. Earthquakes induce ground shaking, shifting, and disturbance at the Earth's surface. Because the centre if a major earthquake strikes off the coast, the bottom may shift enough to cause a tsunami. Mudslides and, in rare cases, volcanic activity may occur as a result of earthquakes. The word earthquake, any seismic event that creates seismic waves, whether large or little, is referred to as a "seismic event" in its broadest definition. Natural or man-made. Geological fault rupture is the most common cause of earthquakes, although they may also be caused by geological eruptions, landslides, mine explosions, and nuclear testing. The hypocentre, or epicentre, of an earthquake is where the initial rupture occurs. The epicentre is the point on the ground level that is directly above the hypocentre (Astafyeva, 2019).

1.2. Tectonic Earthquake

When enough tectonic earthquakes may happen everywhere on the planet because elastic bending moment is retained to facilitate fracture initiation along a fault plane. If there are no additional faults on either side of a fault, they can only slip past another and easily and seismically. Anomalies or persistent and sustained frictional resistance along the surface. On most fault surfaces, such asperities may be observed, resulting in a kind of stick-slip performance. An earthquake occurs when this potential is released in the form of transmitted compressive straining seismic waves, frictional warming of the slipup plane, and rock fracture. The elastic-rebound concept outlines the gradual accumulation of strains and stresses that is sometimes interrupted by catastrophic seismic failure. According to estimates, only around 10% the majority of the energy produced by an earthquake is released as seismic energy. The majority of an earthquake's radiation is utilized to stimulate the formation of seismic fractures or is changed to heat via friction. As a result, earthquakes reduce the Earth's kinetic resources and enhance its temperature, although these changes are minor in comparison to the effects of other natural disasters. The deep core's conductivity and convective heat flow (Bronfman et al., 2016; Ilbeigi & Jagupilla, 2020; Monte et al., 2021; Montz & Tobin, 2011; Paul et al., 2019).

1.3. *Volcanic Eruptions*

A volcano is a crack or hole in the earth's surface that allows basaltic lava (hot liquid or semi-liquid rock), blast furnace slag, and gases to escape. They're most prevalent when tectonic plates collide or break, although volcanic spikes may also cause them in the centre of plates. A volcanic eruption occurs when a volcano explodes violently, producing lava and gas. A 'glowing avalanche,' typically occurs when newly erupted lava flows down the walls of a volcano, is the most deadly kind of eruption. They have the ability to move swiftly and achieve temperatures of exceeding 1,200°F. Ash fall but instead lahars are two more dangers. Human displacement and food shortages are common consequences of volcanoes (Aksha et al., 2019).

2. DISCUSSION

2.1. Tsunami

A sequence of vibrations produced by the movements of a huge volume (usually a seafloor or a large lake) in some kind of a body of water, lit. A succession of vibrations produced by the movements of a huge volume (usually a seafloor or a large lake) in some kind of a body of water Tsunamis may be triggered by earthquakes, volcanic eruptions, and other undersea phenomena that occur above or below water (such as detonations, earthquakes, glacier calving, meteorite

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impacts, and other disturbances). In contrast to typical ocean waves created A tsunami is created by the fluid flow initiated by a huge event, and is caused by weather or tides driven by the gravitational effect of the Moon and Sun. Tsunamis are natural disasters. Have a far longer wavelength than ordinary subsurface currents or sea waves. A calamity may seem to be a rapidly rising tide rather than breaking like a wave. As a consequence, it's often referred to as a tidal wave, despite the scientific community's condemnation of the word since it implies a direct relationship between floods and tsunamis, which is incorrect. Tsunamis are composed of a series of waves that arrive in a "wave train" over a period of minutes to hours. The amplitudes of large events might reach tens of meters (Gautam et al., 2021; Schirninger et al., 2021).

Tsunamis have only a little impact on coastal towns, but their destructive potential is enormous, and they have the capacity to destroy whole ocean basins. The 2004 Tsunami was one of the worst natural catastrophes in human history, claiming the lives of at least 230,000 people in 14 countries across the Indian Ocean. Tsunamis were linked to subsurface earthquake, thus according Greek Historian Herodotus Thucydides in their History of something like the Peloponnesian in the fifth century, but tsunami knowledge remained limited until the 19th and 20th centuries, but much remains unknown. One of the main goals of current study is to figure out why certain major earthquakes don't cause storm surges but most do. Several current studies are attempting to improve the accuracy of inundation forecasting spanning seas, as well as the contact of giant waves with shorelines.(Edwards et al., 2021; Papathoma-Köhle et al., 2019).

2.2. Landslide

Landslides, often called as landslips, are a sort of mass wasting that may occur as a consequence of a variety of ground movements, such as rock falls, subsurface slope collapses, mudflows, and debris flows. Landslides may occur in a variety of environments, including mountain ranges, coastal cliffs, and even underwater (where they are referred to as submarine landslides), and are defined by either acute or gentle slope gradients. Gravity is the primary driver of a landslide, but there are other factors that affect slope stability and create conditions that make a

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slope prone to collapse. A landslide is typically triggered by a specific event (such as heavy rainfall, a tremor, a slope dug to construct a road, and so on), although this is not always clear.

2.3. Floods

When water overflows and submerges typically dry ground, a flood ensues. The word "flowing water" may also apply to the flood of water caused by the tide. Floods are a serious they are a research issue in hydrology and are a problem in horticulture, civil engineering, including public health. Land use changes like logging and loss of natural habitat, changes in river courses or flood barriers like levees, and bigger environmental problems like sea level rise all contribute to increased flooding severity and frequency. Increased rainfall and severe weather events as a consequence of climate change exacerbate the intensity of other flooding ingredients, resulted in more destructive floods and enhanced flood risk. Inundation may occur as a consequence of storm water from an aquatic environment, such as a watercourse, lake, or ocean, because when waters overtop or break levees, allowing part of the water to escape its usual confines, or as a function of rainfall gathering on wet soil in a floodplain (Guikema, 2020; Lee, 2020).

While seasonal weather Although snowmelt may alter the size of something like a lake or other water source, these changes are probably to be regarded important unless they result in floods or the mortality of domestic animals. Because flooding may happen when a river's flow rate exceeds the available capacity something like the flood, especially around bends or meanders. Floods on organic flat lands of rivers may cause damage to homes and businesses. Despite the fact that relocating away from torrents, lakes, including rivers may reduce flood impacts, people have historically lived and studied near rivers since the ground is frequently flat and productive, and waterways give easy transit and access to trade and industry. Flooding may result in long-term population relocation as well as an increase in the development of waterborne infections and mosquito-borne diseases (de Loyola Hummell et al., 2016; Howell & Elliott, 2019; Noy & Yonson, 2018).

2.4. Effects of Hazards

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Primary, secondary, and tertiary consequences may occur in any hazardous procedure.

Primary effects are caused by the procedure itself. For instance, water damage from a flood or building collapse from an upheaval, landslide, or storm.

Secondary effects only arise as a result of a main impact. For example, fires started by earthquakes, power outages and water supply interruptions caused by earthquakes, floods, or hurricanes, or flooding produced by an avalanche into a lake or river.

Tertiary impacts are long-term consequences that occur as a result of a main event. And included things like habitat loss as a result of flooding, irreversible changes in the location of river channels as a result of flooding, crop failure as a result of a volcanic eruption, and so on.

2.5. Hazard and Disaster Vulnerability

The way a danger or catastrophe will influence human health and the environment is referred to as vulnerability. Vulnerability to a specific hazard is determined by the following factors:

- Proximity to a potentially hazardous event
- Population density in the event area
- Scientific knowledge of the danger
- Public awareness and understanding of the harm

The presence or absence of earlier than usual systems and communication lines

- The availability and preparedness of emergency infrastructure
- Construction styles and construction rules
- Cultural variables influencing public reaction to warnings

Because of a lack of awareness, education, infrastructure, construction rules, and other factors, developing nations are more susceptible to natural disasters than developed ones. Poverty has a part as well, since substandard building structures,

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greater population density, and a lack of connection and infrastructure all contribute to the problem.

Development and occupation of areas vulnerable to hazards, as well as human interference in natural processes, may all enhance susceptibility. Building on floodplains prone to flooding, sea cliffs prone to landslides, beaches prone to storms and flooding, or volcanic slopes prone to volcanic eruptions, for example.

Making a natural calamity more severe or frequent. Overgrazing or deforestation, for example, may result in more downside to having (floods, landslides), mining groundwater can result in subsidence, road development on unstable slopes can result in landslides, or even contribute to global warming can result in more severe storms.

Affluence may also have a role, since wealth frequently determines where people live, such as near coasts or on steep slopes. Affluence is also expected to warm the planet, since rich cultures are the ones who utilize the most fossil fuels, which releases CO_2 into the atmosphere.

2.6. Hazard and Risk Assessment

The terms "hazard assessment" and "risk assessment" are not interchangeable!

The process of hazard assessment include determining the following:

When or where unsafe processes have already happened.

- The intensity of prior harmful practices' physical impacts (magnitude).
- The frequency with which dangerous procedures occur.
- The expected consequences of a procedure of a certain scale if it occurred right now.

And making all of this data accessible in a way that planners and government authorities can utilize to make choices in the case of a catastrophe.Risk assessment include not only the scientific evaluation of dangers, but also the socioeconomic consequences of a hazardous occurrence. Risk is a statement of the likelihood that an occurrence will generate x amount of harm, or a representation of the event's economic effect in monetary terms.

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- Hazard assessment, as mentioned above;
- positioning of buildings, roadways, and other equipment in hazardous locations
- Probable engagement to the physical repercussions of a dangerous scenario
- The community's susceptibility when exposed to the event's physical effects

Risk assessment assists decision-makers and scientists in comparing and evaluating potential dangers, determining what types of mitigation are available, and determining where resources and future research should be focused.

3. CONCLUSION

Ecological disasters have the potential to wreak havoc on communities well beyond the event's physical limitations. Psychological and behavioural responses are the most significant public health burden after a disaster. Community responses, as well as the cultural and environmental factors that influence their inception and evolution, must be considered in effective planning and response operations. Understanding the phases of a community's response to a devastating catastrophe helps in the planning and financing of recovery efforts. Evidence-based treatments should be conducted to increase the core qualities of safety, relaxation, self- and neighbourhood-centeredness, social connectedness, and hope or optimism. Risk and crisis communication have the potential to influence community behaviour and risk perceptions, with public health messages having a significant effect on trust and health-promoting behaviours. Effective leadership entails, among other things, connecting with important stakeholders, being present, real, and reliable, modelling self-care, and dealing with community issues such as sadness and loss.

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