History of Natural Disasters in India and Its Type

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Abstract

Natural disasters in India, many of which are caused by the country's climate, cause widespread devastation of life and property. Droughts, flash floods, cyclones, avalanches, landslides caused by torrential rains, and snowstorms are the most serious threats. Natural disasters include earthquakes, flooding, volcanic eruptions, landslides, and hurricanes. An event must have a significant environmental impact, cause human loss, and frequently result in financial loss to qualify as a disaster. Furthermore, frequent summer dust storms that track north to south cause extensive property damage in North India and deposit massive amounts of dust and dirt from arid regions. Hail is also common in parts of India, causing damage to standing crops like rice and wheat, as well as a variety of other crops.

1. INTRODUCTION

The worst famine disasters in Indian history were the Doji bara famine, the Indian famine, the Bengal famine, and the Deccan famine. Each of these famines killed 11, 6, 3, and 2 million people. Because India was covered in the skulls of the unburied dead at the time, the Doji bara famine was also known as the "Skull Famine." Between 1791 and 1792, there was a famine.It was caused by a major El-niño that lasted from 1789-1795 CE. The El-niño caused a failure of the South Asian monsoon wind for four years resulting in prolonged droughts. In spite of the British having surplus grain supplies, they refused to supply it to those who needed it most. The worst affected areas as indicated by the widespread mortalities were Hyderabad, Deccan, Marwar, Gujarat, and Maratha Kingdom[1].

2. Landslides and Avalanches

Landslides are extremely common in the Lower Himalayas. The region's hills have rock formations that are prone to slippage due to the region's young age. Increased population and development pressures, particularly from logging and tourism, contribute to deforestation. As a result, as tree cover obstructs water flow downhill, denuded hillsides exacerbate the severity of landslides. [3] Low-intensity landslides also suffer in parts of the Western Ghats. Avalanches are common in places like Kashmir, Himachal Pradesh, and Sikkim, among others.

Landslides are also a major risk in India, where many Indian families and farmers reside in the hills or mountains [2].

3. Floods in India

Floods are the most common natural disaster in India. The southwest monsoon rains swell the banks of the Brahmaputra and other rivers, frequently flooding the surrounding areas. While floods provide rice paddy farmers with a relatively consistent source of natural irrigation and fertilisation, they also have the potential to kill thousands and destroy millions of crops. Excess, erratic, or untimely monsoon rainfall may also wash away or otherwise ruin crops.[4][5] Flooding affects nearly the entire country of India, and extreme precipitation events like flash floods and torrential rains have become more common in central India in recent decades, coinciding with rising temperatures. Meanwhile, annual precipitation totals have been steadily decreasing due to a weakening monsoon circulation caused by rapid warming in the Indian Ocean and a narrowing land-sea temperature differential. This means that there have been more extreme rainfall events interspersed with longer dry spells over central India in recent decades [3].

4. Cyclones in India

The Intertropical Convergence Zone may have an impact on thousands of Indians who live along the coast. Tropical cyclogenesis is particularly common in the Indian Ocean's northern reaches, particularly in and around the Bay of Bengal. Cyclones bring torrential rains, storm surges, and gale-force winds, which frequently isolate affected areas from relief and supplies. The North Indian Ocean Basin experiences cyclone season from April to December, with peak activity occurring between May and November. Every year, eight storms with sustained winds of more than 63 kilometres per hour (39 miles per hour) form; two of these strengthen into true tropical cyclones with sustained gusts of more than 117 kilometres per hour (73 mph). A major cyclone (Category 3 or higher) develops every other year on average[4].

During the summer, the Bay of Bengal experiences intense heating, resulting in humid and unstable air masses that produce cyclones. Throughout history, numerous powerful cyclones have occurred, including the 1737 Calcutta cyclone, the 1970 Bhola cyclone, the 1991 Bangladesh cyclone, the 1999 Odisha cyclone Have wreaked havoc on widespread swaths of India's eastern coast as well as neighbouring Bangladesh. Every year, widespread death and property destruction are reported in exposed Tamil Nadu and West Bengal. Cyclones rarely hit India's western coast, which is bounded by the calmer Arabian Sea; instead, they mostly hit Gujarat, Kerala, and, less frequently, Odisha. In terms of damage and fatalities, the 1999 Odisha cyclone, a super cyclone that hit Odisha on October 29, 1999, was the worst in more than a quarter-century. It reached 160 mph (257 winds) and was the equivalent of a Category 5 hurricane. Almost two million people were displaced, and the cyclone disrupted the lives of an additional 20 million people. Officially, 9,803 people were killed by the storm; unofficial estimates put the death toll at more than 10,100.[5].

India's worst natural disaster in the twenty-first century at the time. It had peak winds of 260 kilometres per hour (162 mph) to 280 kilometres per hour, making it the equivalent of a Category 5 hurricane (174 mph). Nearly 5 million (50 lakh) people have been displaced in West Bengal, Odisha, and Bangladesh; Another ten million people were killed as a result of the cyclone (one crore). Officially, the storm claimed the lives of 128 people. Official damage and asset destruction estimates range from 13.40 to 13.69 billion US dollars; it is the most expensive and destructive cyclone in recorded history to hit the Bay of Bengal [6].

5. Climate change impacts on environment

Monsoon

According to the Indian Meteorological Department, the water cycle will become more intense in the future, with increased annual average rainfall and increased drought. Furthermore, the majority of states are expecting a 20% rise in monsoon rainfall. A 2°C rise in global average temperature will aggravate the unpredictability of the Indian monsoon. An extremely wet monsoon, which currently occurs once every 100 years, will occur once every ten years by 2100 if temperatures rise to 4 degrees Celsius. Extremes in maximum and minimum temperatures, as well as precipitation, will become more common, particularly along the western coast and in central and north-eastern India. Climate change will make dry years drier and wet years wetter [7].

Rivers and glaciers

The per capita availability of freshwater in India is expected to drop below 1000 cubic meters by 2025 because of population growth and climate change. River basins of Cauvery, Penna, Mahi, Sabarmati, Tapi, Luni and few others are already water scarce. Krishna and Subarnarekha may become so by 2025. High population density, coastal flooding and saltwater intrusion and exposure to storm surges makes Ganga, Godavari, Krishna and Mahanadi coastal river deltas "hotspots" of climate change vulnerability. Glaciers are the main source of water for the Himalayan Rivers such as Ganga, Brahmaputra and Indus. 67% of Himalayan glaciers have receded in the past decade and continue to diminish with increasing rates. The Ganga and the Indus are likely to become water scarce by 2025. Since 1962, the overall glacier area has reduced by 21% from 2077 km^2 to 1628 km^2. This will lead to water shortages becoming acuter with time and may endanger food security and energy generation.[8]

Sea level rise

Rise in sea temperature and sea level leads to loss of marine ecosystems and biodiversity, salination, erosion and flooding and also increases occurrence and intensity of storms along entire shoreline. Climate Change impacts are already observed in submergence of coastal lands in the Sundarbans, loss of wetlands and of coral reefs by bleaching,[24] and an estimated sea level rise of 1.06 - 1.75 mm/year. Low-end scenarios estimate sea levels in Asia will be at least 40 cm higher by 2100. The IPCC calculates that it would expose 13–94 million people to

flooding, with about 60% of this total in South Asia. A sea-level rise of 100 cm would inundate 5,763 cubic km of India's landmass. It will severely affect populations in megacities like Mumbai, Kolkata and Chennai due to land submergence and extreme weather eventsIncrease in sea surface temperature increases frequency, intensity, scale and destructive power of tropical cyclones.[9]

Droughts, heatwaves and storms

500Mha land in the Asia Pacific region is already experiencing land degradation. The summers have already become more intense in India with some regions regularly reporting temperatures around 47 °C. According to data published by India's Ministry of Earth Sciences, over 4,620 people have died in India as a result of heat waves in the last four years. The storm that hit northern India was severe, according to the Indian Meteorological Department, and their frequency may increase as a result of global warming. This is due to an increase in wind and soil intensity, both of which intensify dust storms [10-11].

Disasters response agencies

- National Disaster Management Authority (India)
- National Disaster Response Force (NDRF), a union force under NDMA.
- Odisha Disaster Rapid Action Force (ODRAF) active in the state of Odisha.

Rank	Worst Natural Disasters in Indian History
1	Doji bara famine - 11,000,000 Deaths
2	Indian Famine - 6,000,000 Deaths
3	Bengal Famine - 3,000,000 Deaths
4	Deccan Famine - 2,000,000 Deaths
5	1839 India Cyclone - 300,000 Deaths
6	1737 Calcutta Cyclone - 300,000 Deaths
7	2001 Gujarat Earthquake - 20,023 Deaths
8	2004 Indian Ocean Tsunami - 12,269 Deaths
9	1993 Latur Earthquake - 10,000 Deaths
10	1999 Odisha Cyclone - 9,899 Deaths

6. Literature Review

A.K. Dash and colleagues (2015) The recent disasters, caused by a variety of factors, necessitate a moment of reflection on accident learning. A series of recent mining disasters in India and around the world has sparked increased interest in workplace safety.Disasters in Indian coal mines have caused havoc in the past .Moreover, there have been seven disasters since 2000, with a total of 144 fatalities. In 1975, the Chasnala mine was inundated, killing 375 people, in the worst mining disaster in Indian history. Unfortunately, we have learned very little from past disasters. [1]

K. Satake and colleagues (2004) The December 2004 Indian Ocean tsunami was the world's worst tsunami disaster, killing over 200,000 people. The earthquake's enormous size (magnitude M 9, source length >1000 km), a lack of anticipation for such an earthquake, a lack of tsunami warning systems, and a lack of knowledge and preparedness for tsunamis in Indian Ocean countries all contributed to this disaster. Over the last decade, seismology and tsunami science, as well as tsunami disaster risk reduction, have advanced significantly. Implementation of early warning systems for earthquakes, real-time estimation of earthquake source parameters and tsunami potential, paleoseismological studies of past earthquakes and tsunamis, studies of probable maximum size, recurrence variability, and long-term forecasting of large earthquakes in subduction zones are all examples of seismic advancements. More accurate tsunami source modelling, such as the contribution of horizontal components or "tsunami earthquakes," development of new types of offshore and deep ocean tsunami observation systems, such as GPS buoys or bottom pressure gauges, deployment of DART gauges in the Pacific and other oceans, improvements in tsunami propagation modelling, and real-time inversion or data assimilation for tsunami warning are all examples of advances in tsunami science. [2]

K. Eshghi et al (2008) The purpose of this paper is to examine and review some of the most significant disaster impacts over the last 105 years, as well as to propose a new theoretical classification of disasters. While future disasters will undoubtedly have a different impact than previous ones, lessons learned from the past can be extremely beneficial for increasing one's knowledge about disasters and developing more effective response programmes for local and international organisations. A new scaling system will also serve as a useful guide for the development and assessment of national and international disaster planning, mitigation, and hazard reduction efforts. [3]

Athukorala, Prema-chandra, and others (2005) This article documents and analyses the immediate economic impact of the Indian Ocean tsunami caused by the Sumatra-Andaman earthquake on December 26, 2004, with a focus on Indonesia (Aceh province) and Sri Lanka, as well as the disaster management process. The preliminary findings highlight the critical importance of educating the public on simple disaster preparedness measures and enforcing coastal environmental regulations. Furthermore, the findings argue for mitigating policies and programmes to reduce the impact of natural disasters on the poor as an integral part of national development

strategies, as well as the importance of combining international aid commitments with solutions to disaster-affected countries' limited aid-absorbing capacity. [4]

C. Mathur and colleagues (2002) The Indian city of Bhopal felt the direct impact of global historical and political economic processes in one horrifying night and the nearly eighteen years of injustice that followed. With the permission and encouragement of the Indian government, Union Carbide India Limited (UCIL) set a plant in Bhopal in 1969 to manufacture the pesticide Sevin. The Green Revolution, which began in India in the mid-1960s and was based on the use of HYV (high-yielding variety) seeds, chemical fertilisers, pesticides, and vastly increased irrigation, was at its peak at this time. This was done in part to avoid the political vulnerability that comes with relying on imported foodgrains. Marshal Windmiller and one of the authors have a conversation. [5]

7. Conclusion

The process of planning for and responding to natural disasters such as floods, droughts, cyclones, earthquakes, and landslides is known as disaster management. India has traditionally been vulnerable to natural disasters due to its unique geo-climatic conditions. In this article, we will provide a comprehensive overview of disaster management in India, which will be extremely useful for competitive examinations such as UPSC-prelims, SSC, State Services, NDA, CDS, and Railways, among others. As a result, proper disaster management is essential for avoiding loss.

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