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**Research Paper****Analysis of Disaster's and its Management Using Big Data Analytics****Nirbhay Mishra<sup>1\*</sup>**, **Dharmpal Singh<sup>2</sup>**, **Amit Majumdar<sup>3</sup>**, **Radha krishna Jana<sup>4</sup>**, **Shinjini Nag<sup>5</sup>**, **Manish Gupta<sup>6</sup>**<sup>1</sup>CSE /Assistant Professor, JIS University, Kolkata, India<sup>2</sup>CSE /Professor, JIS University, Kolkata, India<sup>3</sup>CSE /Assistant Professor, NIT Jamshedpur, Jamshedpur, India<sup>4</sup>CSE /Assistant Professor, JIS University, Kolkata, India<sup>5</sup>CSE /Student, JIS University, Kolkata, India<sup>6</sup>CSE /Student, JIS University, Kolkata, India*\*Corresponding Author: [nirbhay.mishra@jisuniversity.ac.in](mailto:nirbhay.mishra@jisuniversity.ac.in)*

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**Abstract:** Disaster means a calamity which ruins the human civilization time to time at a bigger platform in many ways, it may be natural or it may be manmade, now days we are observing that almost all part of the world is suffering from CORONA a deadliest virus seems to be made by china as report and all countries corps are assuming or predicting the exact reason from year 2019 to till date. Above problem is the example of manmade disaster but apart from this we know the different types of disaster and their consequences in terms of loss in various ways. Its shows bad impact in almost all part of life from bottom to top as it influences life on all three platform i.e. socially, economically, and politically as a result peoples are start dying in lack of food and all various things which they need to survive their life on daily basis. Some of them will not only lose their family they will lose their shelter also by keeping all scenarios, Here we will try to build a completely different model which not only save the human life rather it will provides strength economically in such way that if happened such things then we all together can face any kind of problem and find a way to get out of it and also predict the future disaster in advance by applying Machine learning methods.

**Keywords:** Disaster, Earthquake, drought, Covid19, epidemic, AI, big data, etc.

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**1. Introduction**

If any one of the disaster mentioned above will happen it will comes up with sorrows in every part of life and hits the human life in almost every sector i.e. physically, socially, politically & economically. Sometimes the condition is very drastic in such cases the concept of DISASTER MANAGEMENT will play a vital Role in it. According to me Disaster Management is techniques which not completely avoid the after effect problem 100% rather it will tries to mold the situation to normal way by all best possible way. We will explore here all types of disaster.

**1.1) Natural Disaster:** - A Natural disaster is a phenomenon which occurs automatically by nature & causing loss of human life at a huge rate. There are many natural disasters in past that human civilization faced off, which are as follows.

**1.1.1) Earthquake:** - when tectonic plate gets displaced within the earth it causes earthquake and creates low to high frequencies, such frequencies can be detected with the help of Richter scale. Some of the earthquake magnitude will be detected on Richter scale and some may not be detected because some time it has very high speed and very high

intensity too. The most dangerous earthquake of all time is listed below are as follows.

-Valdivia, Chile, 22 May in 1960 which has the intensity on Richter scale was 9.5 which cause lots of life loss, those who has been saved by any means lost their houses, family, business and the impact of that earthquake has left his foot print up to all ages to come.

-Tangshan, China, July 27, 1976 which has intensity of 7.5 on Richter scale.

-Aleppo, Syria, Aug. 9, in 1138, actually magnitude is not known and death toll is about 2, 50,000.

-Sumatra, Indonesia, Dec. 26, in 2004 and it has the magnitude of 9.1 and causing 2, 27,000 deaths.

-Haiti, Jan 10, in 2010 many are dead and those who survived has faced a lot of problem in reshaping their live.



Fig (1) Earthquake

**1.1.2) Tsunami:** - When the earthquake happens on surface of sea and forms abnormal wave it is called as Tsunami. Recently in India we have also faced Tsunami in 2004, 26 December in which thousand have been homeless and more than 12000 are died. It impact in almost all part of the Asian region, especially the areas near ocean is almost destroyed. Almost 15 countries has been affected by this Tsunami including Bangladesh, India, Indonesia, Kenya, Madagascar, Malaysia, Maldives, Myanmar, Seychelles, Somalia, South-Africa, Sri-Lanka, Tanzania, Thailand & Yemen. The expected death toll was about 2, 30,000, almost 50,000 people are in a missing list & 17, 40,000 were displaced. The effected country and region has negative impression as far as economic and environmental impact is concerned. The most dangerous Tsunami of all time is as follows.

-Messina Earthquake in Italy has been occurred in 28 December 1908 and causing death toll around 1, 25,000 people.

-Eruption of Krakatau from Indonesia has been occurred in 26 August 1883 causing a total death of 1, 20,000 people.

-Lisbon earthquake of Portugal has been occurred in 1st November 1755 causing 50,000 deaths.

-Minoan Eruption of Greece has been occurred in 2nd millennium BC and causing 1, 00,000 death of people.

-Meiō Nankaidō earthquake of Japan occurred in 20 September 1498 and causing 31,000 deaths.



Fig (2) Tsunami

**1.1.3) Flood:** - Flood occurs when the extra volume of water has not been drained by any means which is a result of more rain and sometimes the dam water has been released and sometimes dam gets broken by which causing many of the people to loss their live and houses. Those who will survive

have to fight for food, shelter and other things which have the need on daily basis. Heavy floods will cause landslide, loss of grains in fields and they affect most the transportation system. Some of floods outbreak has been shown here as follows.

-In 2019 Bihar has already experienced the taste of heavy rainfall such rainfall has not been seen in last 50 years and as a result of this the river Kosi, Baghmati, Kama balan, Gandak, Budhi Gandak it causes huge bad impact to all people of Bihar.

-In august 2019 Odisha is also seen danger flood causing threat to lives of human and faced a bit of loss as death is concerned. It happens because of huge rainfall and after this situation is gets controlled by the rapid action force of disaster management.

-In August 2019 Kerala is also the another victim of the more powerful flood than he faced ever , the rain is started from august 8 and continued up to few days at regular basis on high frequency causing flood and landslide by which people of Kerala affected badly. It causes many deaths and transportation is completely abandoned by this. At last NDRF and forces will be deployed to rescue people.

-Maharashtra and Karnataka flood in 2019 was also suffered by impact of floods and which causes many death tolls in different regions.



Fig (3) Flood

**1.1.4) Epidemic & Pandemic:** - Actually Epidemic and pandemic is the after effect of Earthquake, Tsunami & Floods. The different disease like fever and cholera will outbreak from death bodies, as after death the bodies gets started decaying. People started gathering at one single and safe place resulting lack in proper management of sewage which in turn causes a plenty of diseases to be outbreak like cholera, diarrhea and fever. At other end as a result of any of above disaster causing failure of electricity by which water treatment plant gets shut down and the person started taking contaminated water causing diarrhea and kidney failure. Some common diseases after natural disaster are as mentioned below.

- \*Fever
- \*Diarrhea
- \*Vomit.
- \*Lack of water in body.
- \*Kidney Failure.





Fig (4) Pandemic treatment

**1.1.5) Drought :** - The areas which are far away from rivers and local dam specially in village are depend on rain water for everything including cultivations of crops and proper drinking from hand pump and daily uses water in their lives. Drought occurs when there is lack of rain in those areas because of

-Land and water temperature.

-Climate change

-Global warming

-Sometime the area exceeded the amount of supplied water.

-At the time of cultivation when water is needed there is no water in repository and when there is no water needed there is huge amount of water. So there is mismatch in condition like when, how much water is needed causing drought? Year which really impacts as droughts are as follows.

-1873,

1877,1899,1901,1904,1905,1911,1918,1920,1941,1951,1965,1966,

-1968, 1972, 1974,1979,1982,1985,1986,

-1987, and 2002 and five of them were severe.



Fig (5) Drought

**1.1.5) Cyclone:** - India is highly error prone to natural disaster and cyclone plays a major part in it. The major and strong cyclone formed in hot and humid section. When temperature increases it produces strong upward wind and such upward wind freezes and fall again as rain drops. The convection causes warm and moist air to rise above which causes cyclone. There are number of cyclone in India which ruins the life completely. Cyclone brings devastation in all areas of life specially the life who is connected with coastal

areas are mostly affected, the 2019 bulbul cyclone of West Bengal has completely ruin the life in such a way that the people of affected areas are still not get out of it, here I will sight some latest cyclone.

-Titli in 2018 in Andhra Pradesh which has lowest pressure (mbar) was 978.

-The cyclone Fani of Odisha in 2019 which has low pressure (mbar) was 932 and wind speed was 250 km/h.

-The cyclone Bulbul of West Bengal in 2019 which has low pressure (mbar) was 980 and wind speed was 145 km/h.

-The cyclone GAJA of Tamilnadu 2018 which has low pressure (mbar) was 995 and wind speed was 128 km/h.

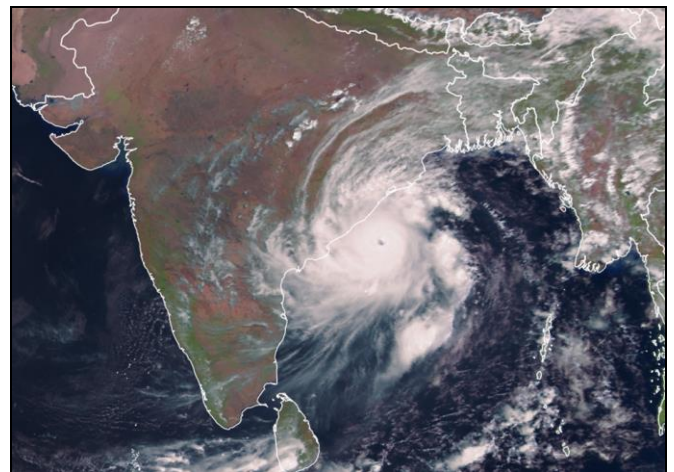


Fig (6) Cyclone

**1.2) Man Made Disaster:** - Man Made disaster includes material spills, water contamination, accident and some creating condition for dangerous epidemic and pandemic.

**1.2.1) Bhopal gas tragedy:** - we all know that this tragedy was the worst disaster ever the people of India faced. It happens on 3<sup>rd</sup> December 1984 at Bhopal pesticide industry in Madhya Pradesh. After this tragedy almost 16000 people were dead as per report and has left a biggest bad impact , as for example after this tragedy the deadliest methyl isocyanate spread in air which in turn result polio in new born baby which regulates up to 3 decades and even now some time people of Bhopal faces breathing problem.



Fig (7) Bhopal Gas tragedy



**1.2.2) Vishakhapatnam Gas Leak:** - When Vishakhapatnam is sleeping on 07/05/2019 early 3:00 AM in Morning then styrene gas gets leaked from LG Polymers factory. All of sudden people are facing problems like headache, vomit, rashes on skin, stomach issues and the most difficult one they are having high respiratory problem. The people started running to the hospitals but because of COVID-19 situation for admitting new patient were the daunting task the local person along with relief team started saving other infected people and trying to pull them out to the Hospitals. This gas is very dangerous, it can spread in environment at a very fast speed, and can remain in air for next 72 hours but situation will depend upon temperature and humidity of environment, it caused more than 10 deaths and 500 people are hospitalized and 1000 are severe. Picture of this gas tragedy is really not good, peoples are started lying down on roads and soil means all of sudden they are reaching unconscious. There is short and long term effect of this on people, they are as follows.

**SHORT TERM: -**

- Headache
- Vomit
- Fever
- Itching
- Rashes on Skin
- Breathing Problem

**LONG TERM: -**

- Brain damage
- Eye damage
- Lung damage
- Kidney damage
- DNA damage
- Can cause cancer

Who is responsible for this gas leakage, obviously the all the staff members of this LG Polymers and hence FIR has been lodged and further steps will be taken.



Fig (8)

**1.2.3) Accident:** - Accident such by Railway, Road and airways is all happened because of failure in technology invented by men. Sometime accident happens because of

train gets derailed and sometime people are hilted by train. The biggest ever rail accident has been occurred at 6 June 1981 between Mansi & Sahrasa. Road accident causes more than 100000 deaths per year where the number of bike accident is more. We just can't neglect the danger and accident of air crash, there are number of air crash in India.

- In 2009 Andhra Pradesh Chief Minister helicopter crash
- In 2015 Indian boarder security force king air had crashed.
- In 2019 at bengaluru two jets of IAF collide during air show.
- In 2002 May 4, Mig 21 crashes into bank and 8 dies.
- In 2019 Sahara airlines crashes.

So if we consider and take a deep glance of above all kinds of accident then we observe few very common things in it they are not proper maintenances, negligence in controlling the things, avoiding restricted boundaries & so on.



Fig (9) Accidents

On June 2/2023, at about 7 p.m., a train derailed near the Bahanaga Bazaar station in the Balasore district, roughly 250 kilometres south of Kolkata and 170 kilometres north of Bhubaneswar, was believed to have killed at least 238 people and wounded over 900 others. One of the worst recent accidents is being made to sound like the train tragedy. About 50 miles from the current disaster location, in the Odisha district of Jajpur, the Coramandel Express had experienced an accident in 2013.



Fig: 10

**1.2.4) Epidemic:** - some time epidemic or dangerous disease will be spread all over in world and people started dying at a huge rate. Such example of epidemic is CORONA and it's been made in lab of Wuhan of china which is an artificial virus and spread from one person to another via spit and cough droplets. The first case is found in 31<sup>st</sup> December 2019 in china and started spreading all over the world. Almost all countries around the world are infected by this. The big countries like America, Russia, Italy, and Australia are completely bow down in front of CORONA. Till date almost 2, 44,761 people were died in all over the world. And in India there is 27000 active cases and 1500 are died. This COVID-19 will start decaying the functionality of lungs by which patient are sufferings from multiple disorder including fever, vomit, breathing problem, nausea, sneezing and sometime kidney failure. In total CORONA is responsible for multi organ failure and people with less immune will die in within 7 days. Still there is no vaccine for this epidemic. When it will come in contact with bodies' protein and fat, it will start the process of mutation. When it spread to other person and generate other mutant with some extra add one, still there is 20 different kind of mutation found which is a outcome of transformation from one person to another. The scientist are regularly trying to break the formation of RNA structure of CORONA but only they found that out of 20 mutant form modern medical science will know only 8 of them hence there is no outcome as how to win over the situation . Only one thing scientist assured till date is the person which has more immune system and by somehow he gets infected and recovered himself quickly then plasma therapy may be a hope. Many organization and Research Centre are working on finding to get a way out of it by inventing vaccine but possibilities and findings are at an ongoing node



Fig (11)

## 2. Related Work

1) S.H.Potter et al in article [1] says that the local architectural, economic, social, and ecological ecosystems sustained significant damage as a result of the 2010 and 2011 Canterbury earthquakes. Two massive office block collapses, masonry and brick falls and rock falls in city suburbs combined resulted in 185 fatalities. This essay will describe the types of earthquakes that have occurred and give a brief overview of the ongoing consequences they have had on the regional surroundings.

2) Rufat S et al in [2] states that Demographic traits, socioeconomic position, and health are identified as the primary determinants of societal vulnerability to floods in this article. While extensively included, risk perception and coping skills are also inadequately reflected in many social vulnerability measures.

3) Whittaker, J et al in article [3] considers the role of informal volunteers in emergency and disaster management. It argues that there is an overemphasis on volunteering within, and for, state and formal organizations. Two broad types of informal volunteerism are identified - emergent and extending - and their implications for emergency and disaster management are considered. Culture and legal liability are key barriers to greater participation of informal volunteers. More adaptive and inclusive models of emergency and disaster management are needed to harness the capacities and resilience of communities.

4) This study by Kifle Woldemichael Hajito et al in [4] examined rural populations' perceptions of their susceptibility to catastrophes and their degree of understanding of natural and man-made risks. The majority of respondents (85.5%) had knowledge of at least one risk or disaster; however those over 50 were less likely to be alert. Education and training were positively correlated with awareness of catastrophes and perceived disaster preparedness.

5) Based on both data modeling kinds and problem types, this article by Chawis Boonmee et al in [5] seeks to perform a survey on the facility location issues associated with emergency humanitarian logistics. It will focus on the four primary issues—deterministic, dynamic, stochastic, and robust—those were emphasized in the literature study. Case studies and real-world applications will be discussed, and any remaining research gaps will be filled.

6) Elena Skryabina in [6] highlights the usefulness and advantages of exercises to train medical emergency personnel for reacting to crises and catastrophes are reviewed and summarized in this work. In order to find pertinent papers, a literature search strategy was developed using Medline, Embase, Global Health, and CINAHL—four of the most important medical databases. Thematic analysis and a descriptive summary were both used in data analysis. Exercises in health emergency preparation have been demonstrated to be beneficial at boosting participants' general competence and confidence as well as their knowledge of



emergency activities, policies, and procedures. The most often mentioned post-exercise organizational advantages included chances to communicate lessons learned and the identification of gaps or limits in plans, protocols, or processes. Only a small number of studies could be found that examined how exercises affected work procedures and actual emergency responses over time.

7) Parmeshwar Udmale et al in [7] comprehend how the rural farming community saw the effects of the drought on their socioeconomic activities and environment, how they adjusted at the household level, and what they thought of the government's drought mitigation policies. The findings indicated that the most direct economic effects of the drought were on the output of cattle, horticulture crops, grain yields, and employment. There have also been reports of social effects include population migration, effects on children's health and education, hopelessness and a sense of loss, Conflicts over access to water in society, and hunger as a result of altered dietary choices. Farmers had a strong perception of environmental effects such rising average ambient temperatures, grassland and woodland degradation, declining water quality, harm to fish habitat and wildlife, and groundwater depletion. Although the government offered a number of mitigating measures, farmers weren't very happy with them. This study is anticipated to assist policymakers in India in creating more suitable drought adaptation policies.

8) Muhammad Al-Amin Hoque et al in [8] brief in the context of response, recovery, prevention/reduction, and preparedness, this paper covers current research on the management of on-ground cyclone disasters utilizing remote sensing and spatial analysis. The study evaluated the previous 21 years of research using a methodical quantitative literature review strategy. The results indicated that North and Central America (40%) and Asia (55%) accounted for the majority of the study locations. After 2004, remote sensing and spatial analysis became widely employed, with a strong emphasis on the stages of preparation and prevention/reduction. The majority of research employed optical imaging, while post-classification comparison methods seldom used the object-based categorization strategy. Analytical hierarchy process (AHP)-based tropical cyclone risk assessment studies employing mitigation capacity and geographical multi-criteria are extremely rare. To create detailed cyclone risk models, a straightforward modeling methodology is needed. To fill acknowledged knowledge gaps for better cyclone catastrophe management, further study is required.

9) Slack et al in [9] in this study, the Reynolds Stress Turbulence model and Large Eddy Simulation are used to examine the use of computational fluid dynamics (CFD) for simulating cyclones on three-dimensional unstructured meshes. The results of the ensuing numerical simulations are in consistent accord with Laser Doppler Anemometry measurements made along the length of a Stairmand high efficiency cyclone at a number of axial sites.

[10]. Christopher G. Myers et al in [10] finds and explains that Sea surface temperature (SST) anomalies centered in the

central or eastern equatorial Pacific help to distinguish between two different types of El Nio episodes. The Central Pacific El Nio occurrences (CP-El Nio) are associated with decadal Pacific climate variability and have a stronger correlation with a weakening of the central Indian Summer Monsoon. We provide a 50-year, sub-annually resolved speleothem 18O record from northeast India that shows a strong association with central equatorial Pacific SSTs and northern Pacific decadal variability. According to back trajectory analysis, the distance of moisture transport to northeast India is shortened during CP-El Nio occurrences, indicating that changes in moisture transport are what essentially regulate 18O in the area.

[11]. Georges Ramalanjaona et al in [11] observed that the tsunami of 2004 was the worst in modern times, hitting 18 countries in Southeast Asia and Southern Africa, killing more than 250,000 people in a single day, and leaving more than 1.7 million homeless. It was triggered by a 9.0 magnitude earthquake. As a result of the presence of a tectonic interactive plate, the lack of a tsunami warning system, and the absence of an established communication network providing timely information to that region, this paper is the first peer-reviewed paper on the 2004 tsunami events specifically in the eleven nations bordering the Indian Ocean. The paper's dual goals are to report on the 2004 tsunami incident in respect to the 11 countries that border the Indian Ocean and to go into further detail on the lessons that may be drawn from it.

12) Vidusha Vijay et al in [12] briefs about One of the biggest rail networks in the world was founded by the Indian Railways more than 167 years ago. At the Department of Forensic Medicine and Toxicology, Bowring and Lady Curzon Hospital affiliated with Shri Atal Bihari Vajpayee Medical College and Research Institute, Bangalore, a seven-month prospective and descriptive autopsy research was carried out. The majority of the 98 railway fatalities (88 occurrences, or 89.79%), or deaths, included men between the ages of 21 and 30. Of the 54 cases, the Hindu community was involved in 55.10%. Ninety cases (91.83%) of the victims were discovered dead at the scene. Suicide was the primary cause of death in 49 cases (or 50%), whereas shock and hemorrhage accounted for 53 cases (54.08%) of all fatalities. the study found

13) Pawan deshpane et al in [13] briefs that Road accidents are a human tragedy that results in significant human suffering as well as financial expenses due to premature deaths, injuries, and lost economic opportunities. More than 1.3 lakh people died in road accidents in India in 2010, which were close to 5 lakh in number. The loss of the primary provider can be disastrous since more than half of the casualties are in the 25–65 age bracket, which is the most economically engaged. Road traffic incidents are preventable, and many nations have chosen a multifaceted strategy for promoting road safety. To encourage policy reform and the execution of road safety measures, all stakeholders must actively participate as the government cannot address the issues with road safety on its own. The analysis of road

accidents in this study will serve to raise awareness, offer direction, and inspire action to prevent road accidents. The present study describes the scope and many aspects of road accidents in India.

### 3. Theory/Calculation

In below analysis we have shown the impact of different types of disaster such as manmade or natural in different parts of human life.

**3.1) Accumulated cyclone energy of North Atlantic hurricanes:** - Around the world, 45,000 people each year are killed by natural catastrophes. Over the previous ten years, calamities have killed 0.1% of people worldwide. There was a wide range in this, from 0.01% to 0.4%. Natural disaster-related mortality have significantly decreased over the previous century, from millions in certain years to an average of 60,000 during the last ten years. The most deadly catastrophic occurrences in the past were floods and droughts. These catastrophes no longer cause many deaths; earthquakes are now frequently the worst ones. The poor are the most severely impacted by disasters; nations with low to moderate incomes typically have the highest death tolls because they lack the necessary infrastructure for protection and emergency response. A cyclone/hurricane season's activity is gauged using metric called accumulated cyclone energy (ACE). It takes into account the quantity, duration, and intensity of hurricane systems. Every six hours that the cyclone is a named storm, the highest sustained surface wind in the system is squared, and the season's total is then computed. [14].

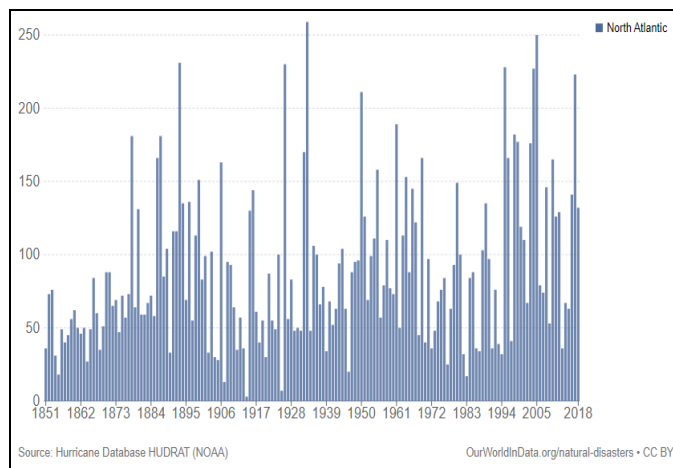


Fig: 12

**3.2) Adoption and implementation of policies to reduce disaster risk, 2021:** - Disaster risk reduction strategies adoption and implementation, 2021 reduced impact and danger of catastrophe are the goals of the Sendai Framework for catastrophe danger Reduction. A higher number implies more DRR policies have been developed and put into practise. This index assesses the degree to which countries have built disaster risk reduction (DRR) plans.

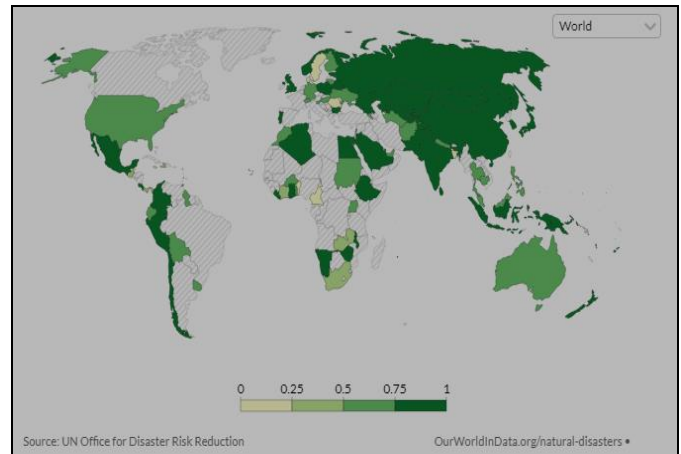


Fig: 13

### 3.3) Annual Heat wave Index of US

According to this indicator, a heat wave is a stretch of time that lasts at least four days and has an average temperature that, according to historical data, only happens around once every ten years. The frequency and size of heat waves affect the index value for a particular year.

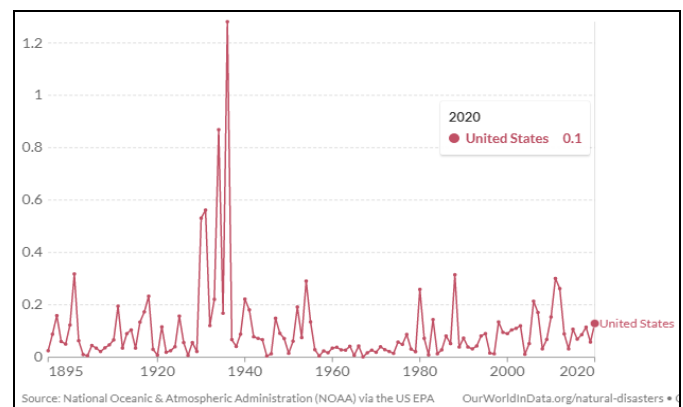


Fig: 14

**3.3) Death rates from 1990 to 2019 are shown below in fig [15].**

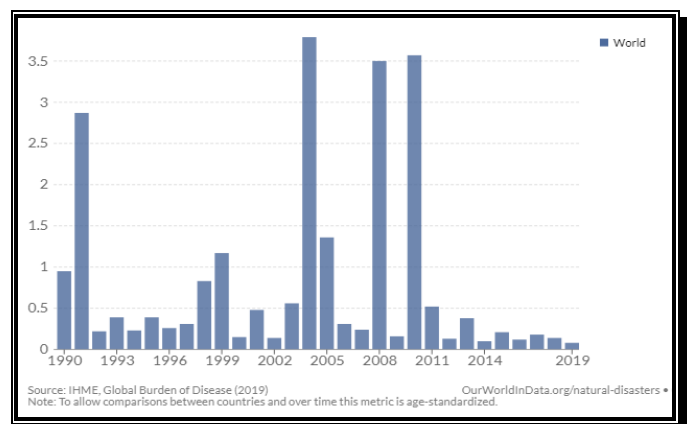


Fig: 15

### 3.4) Deaths from earthquakes, 1500 to 2017

Deaths caused by earthquakes include both those directly caused by the event as well as deaths from its secondary

effects (such as a tsunami). It is anticipated that more current data will be more thorough than the extensive historical record due to data accessibility, reporting, and evidence. Therefore, a trend in reported estimates may not accurately represent actual changes over time. Earthquake happen because of much reason which is predictable here in below fig 15 shows only the death happen from year 1500 to 2017 because of earthquake.

The two years with the highest yearly death tolls (reaching tens of thousands) since 2000 were 2004 and 2010. Deaths related to earthquakes made up 93% and 69% of these cases, respectively. The worst earthquake ever recorded occurred in Shaanxi, China, in 1556, with 830,000 individuals thought to have died as a result. The 2004 Sumatra earthquake and tsunami and the 2010 Port-au-Prince earthquake are among the worst in recorded human history. The earthquake in Antakya, Turkey, in the year 115 made the top three.

Near the top of the list are both extremely current and ancient items. Throughout our history, the fear of devastating earthquakes has persisted.

List of Earthquake is tabulated as follows in Table: 1.

Table: 1

Rank	Country/city	Death toll	Earthquake magnitude	Year
1	China	8,20,000	8.1	1556
2	Port-au-Prince, Haiti	3,00,000	7	2010
3	Antakya, Turkey	2,60,000	7.5	115
4	Antakya, Turkey	2,50,000	7	525
5	China	2,42,000	7.5	1976
6	Gyzndzha, Azerbaijan	2,20,000	Unknown	1139
7	Sumatra Indonesia	2,27,890	9.1	2004
8	Iran	2,10,000	7.9	856
9	China	1,50,000	N/A	893
10	Japan	1,43,000	7.9	1923

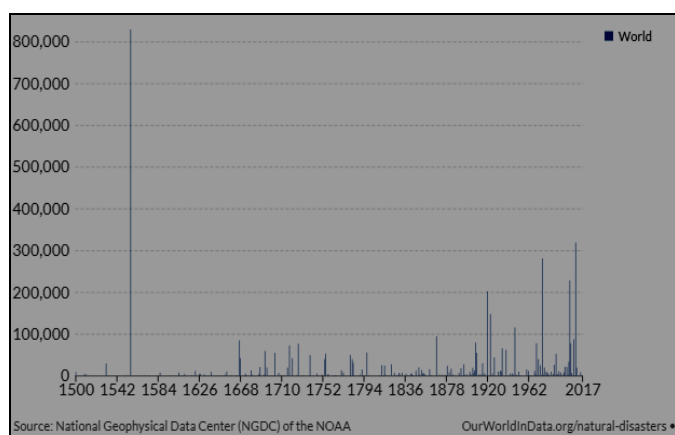


Fig: 16

3.5) Death of natural disaster by type from 1900 to 2018

We are continuously reminded of the most recent catastrophe thanks to updates that are nearly minute-by-minute on what is occurring in the world. Of course, these tales are significant, but they don't show us how disaster tolls have evolved through time. The number of fatalities from disasters

currently averages between 10,000 and 20,000 each year. This number can increase to tens of thousands in the worst years, which are typically those with significant earthquakes or cyclones.

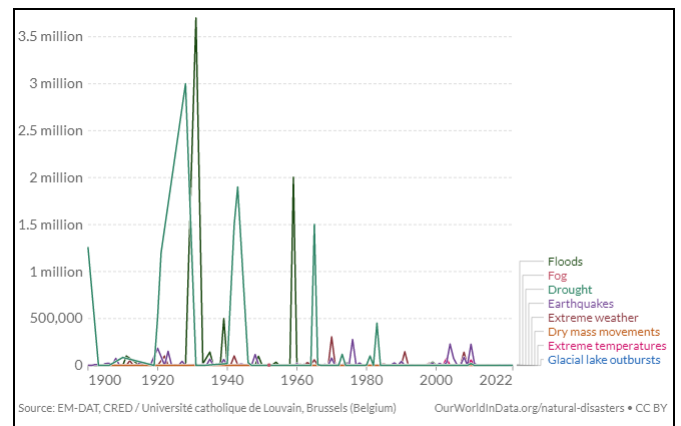


Fig: 17

3.6) Direct disaster economic loss, 2005 to 2018 the monetary worth of any physical assets destroyed completely or partially in the impacted region. Physical harm and direct economic loss are virtually identical.

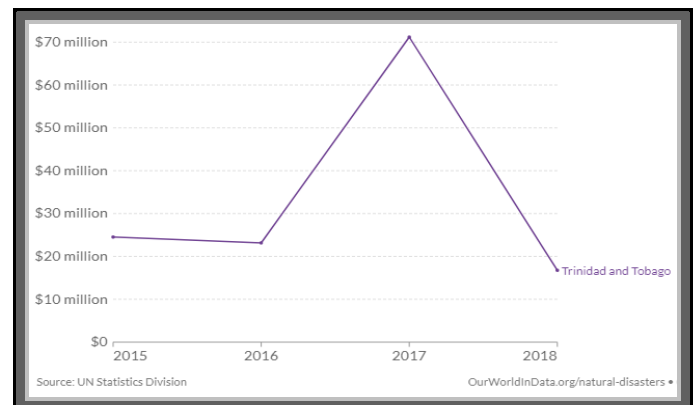


Fig: 18

3.7) Injuries and displacement from disaster

Mortality figures do not accurately reflect the effects of natural catastrophes on humans. The effects of injury, homelessness, and relocation on people can be profound. The number of individuals internally (i.e., inside a certain nation) displaced as a result of natural catastrophes is depicted in the image below. Note that these data only include new cases of displaced people; if a person must leave their home due to a natural catastrophe more than once in a given year, that individual will only be counted once in these statistics.

Number of persons wounded is defined as "People suffering from physical injuries, trauma, or an illness requiring immediate medical assistance as a direct result of a disaster." Homelessness is described as the "Number of People Whose House is Destroyed or Heavily Damaged and Therefore Need Shelter After an Event."

Impacted: The number of individuals impacted is defined as "individuals in need of immediate assistance during a period



of emergency, i.e., individuals in need of basic survival needs such as food, water, shelter, sanitation, and immediate medical assistance."

Total impacted population: The phrase "total affected population" is defined as "the sum of the injured, affected, and left homeless after a disaster." The yearly average over the following 10 years is used to calculate decadal numbers. The term "disaster" refers to any geophysical, meteorological, or climatic catastrophe, such as an earthquake, a volcanic eruption, a landslide, a drought, a wildfire, a storm, or floods. Affected individuals are those that are homeless, wounded, and in need of support. The following fig 18 shows the impact of injuries and displacement happen in world and India.

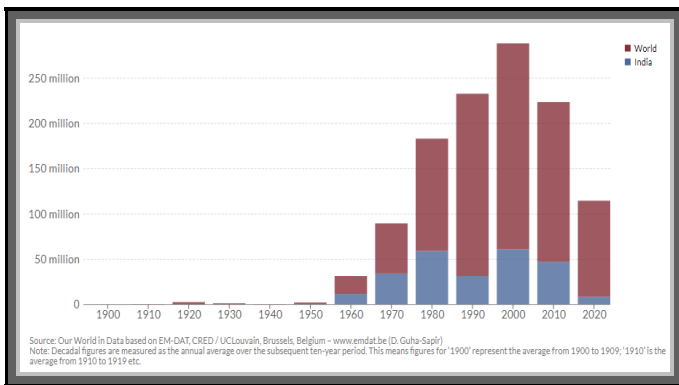


Fig: 19

People or groups that have been forced or required to leave their homes or areas of habitual residence due to natural or man-made disasters and have not crossed an international boundary are referred to as internally displaced individuals.

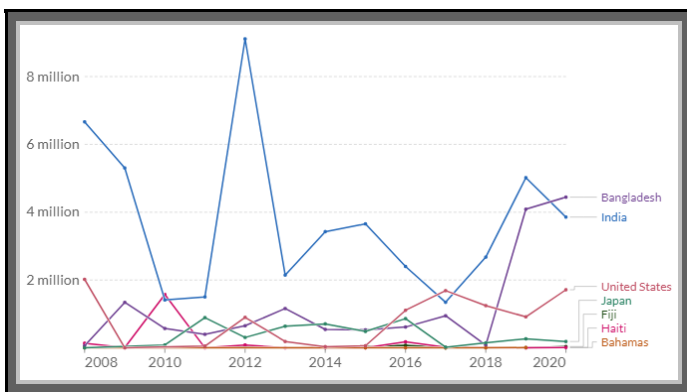


Fig: 20

### 3.8) Volcanic eruption

There are many volcanoes in the world that are volcanically active yet only show very little or extremely low activity. The number of notable volcanic eruptions that take place in each nation each year is depicted on the fig 21. An eruption is considered important if it satisfies at least one of the following requirements: produced casualties, considerable damage (about \$1 million or more), a tsunami, or was connected to a significant earthquake.6 volcanic explosively index 6 or above.

Volcanic eruption estimates go as far back as 1750 BCE, however the completeness of the data for long-term historical occurrences will be substantially lower than in the recent past. The following fig 21 shows the occurrences of volcanic eruption from 1652 to 2017.

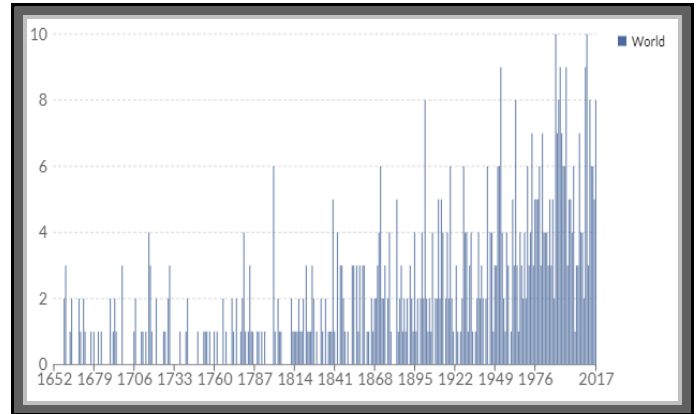


Fig: 21

The number of fatalities caused by large volcanic eruptions worldwide is depicted in the visualization. We can observe the frequency of volcanic activity deaths through time using the timeline on the map.

The 1985 Nevado del Ruiz eruption in Colombia, the 1902 Mount Pelée eruption in Martinique, and the 1883 Krakatoa eruption in Indonesia are three occurrences that had a significant influence on the number of fatalities over the previous century.

Below fig 22 shows the number of death from volcanic eruption in 1570-2017.

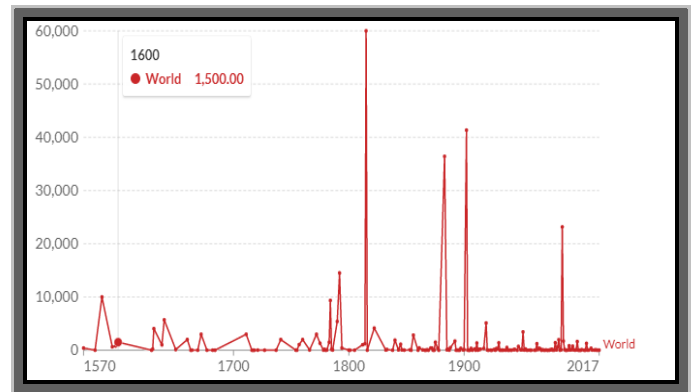


Fig 22

## 4. Proposed Model & Strategy

There is already defined law and protocols for both types of disaster Natural and manmade but some time rule is violated and neglected by state government and also by people which lead to the condition which will become more bad which increase death toll rates as because people will not get proper food, nutrition and medication. The rule is set for state that how they will tackle the condition in such situations and to accomplish the mission to help people at all level our Indian air Force, Navy, Army, BSF are deployed at affected areas. In

some situation state tried to hide the severe condition as what we are experiencing here in case of pandemic CORONA. The WB Govt. is hiding the case of infected people and has not that much proper arrangement for checking. Only Beliaghata is the authorized Centre for treatment of corona. Corona is increasing at 4x speed in all state whereas WB has very low death rate along with suspect cases. By observing above all disaster I will proposed a new model to help poor victims in near future. The defined rule is as follows.

- a) There is lack in work by GOVT. Employees so for this one we would like to set up an autonomous body who not only governs the disaster situation but apart from it they will help central govt. in all work on daily basis.
- b) The team members will be selected from each municipal area or from block in panchayat because at time of providing services to people they will aware of location so that they can deliver in better way.
- c) The opportunity will be given to unemployed graduate with certain T&C after little verification.
- d) By doing above at some extent employment will be generated.
- e) The above all activities will be powered by IOT and reports will be generated automatically to centrals.
- f) The autonomous corps will take part in social, political activities with the help of POLICE.
- g) Apart from above all when any disaster will occur then economic stairs will fall down so to stop that condition, we will proposed a model where a sum of Rupees/- month will be deducted from every one's salary. If someone wants to contribute more than that there is a facility of internet banking and other authorized transaction application of Indian govt.
- h) In these epidemic days, the people have to keep their own at home completely.
- i) The corps has to provide all necessary daily basis items like milk, food, vegetables from door to door.
- j) The Govt. has to provide the basic things in these days like antibiotic-soap and more importantly immune booster-Ayurveda medicine as it has no side effects.
- k) If above will happen then at some extent we don't have to worry about as money is concerned. Above all is basic proposal, the change in above rule will be for sure if one's it will be granted? The further modification will be made to make it better.

## 5. Result and discussion

We have seen the negative effects of both man-made and natural disasters in the discussion and analysis above. We have witnessed the after- and before-effects on society of the

tsunami, flood, various earthquakes throughout the globe, drought, volcanic eruption, accidents, etc. Above all, a great number of individuals pass away, lose their homes, and are relocated. In terms of India, the Coromondal Express was involved in a fatal train accident on June 2, 2023. Alternatively, the Bhopal gas catastrophe is one of the largest gas leaks that we have ever witnessed. Another example of a circumstance when many people die and there is a lock down is Covid-19. In 2023, the summer days are now the warmest on record, and a heat wave is killing everyone. Somewhere, the temperature is rising day by day, and man is to blame for this since people are chopping down vegetation. We need to concentrate on the root causes of all issues and disasters so that we can work together to find solutions.

In this article, we analyze the prior research that outlines the ways in which emergency drills help to strengthen public health emergency preparation. We examined research on the effects of exercises on individuals and organizations from both quantitative and qualitative perspectives.

The advantages of exercise for people, the benefits of exercise for organizations and systems, and any long-term effects of exercise were the three main research issues that this study aimed to answer. We shall cover each of these in turn in this section.

Governments, companies, and organisations working together and coordinating their initiatives with unofficial volunteers may be found in a wide variety of contexts across the world. Traditionally, this has required creating volunteer registrations and training sessions before an event. However, if volunteerism is largely unstructured and emergent, such approaches are probably not going to be successful. It is crucial that emergency managers are aware of what is taking place locally and are equipped to interact with a wide variety of volunteers. By stifling the flexibility, creativity, and responsiveness that informal volunteers offer to emergency and disaster management, attempts to "integrate" them into formal processes may prove detrimental.

The management of related legal obligations and safety problems, as well as how organizational cultures and structures are altering to cater for informal volunteers, all require more study. Such study is essential if we are to create models of emergency and disaster management that are more flexible and inclusive and that take use of the capabilities and resiliencies that exist both within and across communities.

## 6. Conclusion and future scope

This peer-reviewed article examines the effects of several disasters and how to avoid such occurrences in the future.

The purpose of this study was to examine the literature on the efficiency of public health emergency preparation drills and the short- and long-term advantages they offer to people and organizations. However, it is unclear whether these lessons are used or addressed. The most often cited advantages of emergency preparation exercises were in identifying gaps and sharing experiences from exercises. Only a small number of



studies showed that exercises had a favorable long-term influence on work procedures and actual emergency responses, while personal advantages to the staff members participated were recorded less frequently. We may learn a great deal more about how and why things happen by doing follow-up studies to examine how actions indicated via the exercise are implemented and how lessons highlighted become lessons learnt and applied.

All of the aforementioned and described disasters, including tsunamis, pose a constant and genuine threat to humanity. In order to design a disaster management programme, fund disaster projects, and maintain a research programme, disaster management should engage national, regional, and international organizations at all levels.

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