

# INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & MANAGEMENT

## DISASTER AND ITS IMPACT IN INDIA

N. Venkatachalam\*<sup>1</sup> and Dr. S. Ganesan<sup>2</sup>

\*<sup>1</sup>Research Scholar in Management, R&D Department, Bharathiyar University, Coimbatore, India

<sup>2</sup>Director, KPR School of Business, Coimbatore, India

---

### ABSTRACT

Over the centuries there have been many natural disasters that have stolen human lives and left destruction and havoc for the survivors. Sometimes these incidents are ranked based on damage, loss of lives or the amount of money that it cost to rebuild. Every year, millions of people are affected by both natural and human-caused disasters. Disaster is a sudden event of natural or manmade hazards such as earthquakes, floods, tsunamis, cyclones, droughts and accidents that seriously disrupts the functioning of a community or society. The losses caused by the disaster exceed the community's or society's ability to cope using its own resources. India is one of the most disaster affected countries in the world. The damage caused by the disaster varies with the geographical location, climate and types of the earth surface.

**Keywords-** Disaster, Cyclone, Drought, Earthquake, Flood, Impacts.

---

### I. INTRODUCTION

The mental social economic and cultural state of the affected area are influenced by the natural hazards. Effects in the concerned areas are

- i) Basic needs of the human beings such as food, shelter, etc.
- ii) Day to day life of the people
- iii) Communication, net work, transportation and other infrastructures of the country.
- iv) Socio economic conditions of the country.

India is among the world's most disaster prone areas. India support 1/6<sup>th</sup> of the world's population on just 2% of it landmass. Nearly 59% of India's land area is prone to earthquakes of moderate to very high intensity, over 40 million hectares (12% of land), is prone to floods, close to 5700 kms of its 7516 km coast line (about 8%), is cyclone prone and exposed to tsunamis and storm surges, 2% of land is landslide prone, and 68% of India's arable land is affected by droughts. Of the 36 States and Union Territories, as many as 27 are disaster prone. Most disasters in India are water related.

Generally disaster classified into two types – Natural and Manmade. A natural disaster is the effect of a natural hazard that affects the environment, and leads to financial, environmental and human losses. Man-made disasters are events which either intentionally or by accident cause severe threats to public health and well-being. Because their occurrence is unpredictable, man-made disasters pose an especially challenging threat that must be dealt with through vigilance and proper preparedness and response. Based on the devastation these are further classified into major/minor natural disaster and major/minor man made disaster.

Major Natural Disasters:

- Flood
- Cyclone
- Drought
- Earthquake

Minor Natural Disasters:

- Cold Wave
- Thunderstorms
- Heat Waves
- Mud Slides
- Strom

Major Manmade Disasters:

- Setting of Fires
- Epidemic
- Deforestation
- Pollution due to prawn cultivation
- Chemical pollution

Minor Manmade Disaster:

- Road or train accidents , riots
- Food poisoning
- Industrial disaster
- Environmental pollution

Among these types of disasters, the present paper focuses only the major natural disasters such as Flood, Cyclone, Drought, and Earthquakes.

## II. FLOOD

India is one of the most flood prone countries in the world. On an average, the area affected by floods annually is about eight million ha, out of which the cropped area affected is about 3.7 million ha. Rashtriya Barh Ayog has assessed the maximum area prone to the floods in the country to be about 40 million ha, out of which 32 million ha is the predictable area. The maximum area damaged in any one year was 17.5 million ha in 1978. The average (period 1953-91) annual total damage to crops, houses and public utilities is about Rs.9,500/- million, while the maximum annual damage was Rs. 46,300 million in 1988. Floods in India adversely affect the lives of the citizens and destroy large amounts of properties. Lack of proper drainage system is one major reason that causes floods in India. Floods in India also have a drastic effect on the agricultural sphere. Flood refer to huge amount of water reaching land in a short span of time, causing land surface to be submerged underwater- at places, where land surface is usually not covered with water. Floods are caused by discharge of huge volume of water in a short span of time, at a rate such that the water cannot be carried away from the scene of discharge. High degree of predictability is possible both in the short term as well as long term. The areas which are prone to flood are, coastal area, receiving heavy rainfall, area downstream of dams. . A flood is an overflow of water that submerges land which is usually dry. Floods can also occur in rivers when the flow rate exceeds the capacity of the river channel, particularly at bends in the waterway. Floods often cause damage to homes and businesses if they are in the natural flood plains of rivers

### Some major floods in India

- In October 1943, Chennai saw the worst flood to hit the city. Flood occurred due to excessive rains that lasted for 6 days and overflowed Coovum and the Adyar rivers. Damage caused to life and property was immense however estimate figure is unknown.
- On 11 August 1979, the Machchu-2 dam situated on the Machhu river burst, thus flooding the town of Morbi in the Rajkot district of Gujarat. Exact figure of loss of lives is unknown, but it is estimated between 1800 and 2500 people.
- In 1987, Bihar state of India witnessed one of its worst flood till then. Flood occurred due to overflow of the Koshi river; which claimed lives of 1,399 humans, 302 animals and public property worth INR ₹68 billion (US\$1.0 billion).
- Heavy rains across the state of Maharashtra, including large areas of the metropolis Mumbai which received 994 mm (39.1 inches) alone on 26 July 2005 killed at-least 5,000 people. The day is still remembered as the day Mumbai came to a standstill, as the city faced worst ever rain. Mumbai International Airport remained closed for 30 hours, Mumbai-Pune Expressway was closed for 24 hours with public property loss was estimated at ₹550 crore (US\$82 million).
- June 2015 Gujarat flood: Heavy rain in June 2015 resulted in widespread flood in Saurashtra region of Gujarat resulting in more than 70 deaths. The wild life of Gir Forest National Park and adjoining area was also affected.
- July 2015 Gujarat flood: Heavy rain in July 2015 resulted in widespread flood in north Gujarat resulting in more than 70 deaths.

- 2015 South Indian floods: Heavy rain in Nov-Dec 2015 resulted in flooding of Adyar, Cooum rivers in Chennai, Tamil Nadu resulting in financial loss and human lives.
- 2016 Assam floods: Heavy rains in July–August resulted in floods affecting 1.8 million people and flooding the Kaziranga National Park killing around 200 wild animals.

Causes	Factors leading to causes of flood	
	Natural factors	Man-made factors
Silting of the river bed	Due to bank erosion Earthquake loosening the soil	Due to dams, embankments and bunds
Inadequate capacity within the banks	High runoff or rise in the water level Silting of river bed due to bank erosion	High discharge from the river due to silting. Decrease in bank height – deforestation
River bank erosion	High discharge of water due to rain Shifting river courses	Decrease in vegetative cover due to deforestation
Flow obstruction and change in river course	Landslides Falling of the trees	Construction activities in the river bed
Common floods in the main and tributary rivers	Flash flood due to high discharge in the main river	Breaking of bunds constructed on the tributary rivers for irrigation purposes
Poor natural drainage	Obstruction of the natural drainage Absorbing capacity of the soil	High rate of urbanization – pressure on the drainage system
Cyclones	High precipitation Absorbing capacity of the soil	
Retardation of flow and back water effect	High runoff Topography and obstruction of the natural drainage	Inadequate drainage capacity and; Urbanization in the low lying areas
Heavy rainfall	Same as above	Decreasing vegetative cover High urbanization leads to high runoff

**Impacts of Flood**

- Major impacts of flooding include loss of human life, damage to property, destruction of crops, loss of livestock, non-functioning of infrastructure facilities.
- Prone waterborne diseases
- Damage of communication links and infrastructure such as roads, bridges which leads to dysfunction of routine life.
- Loss of livelihoods during flood
- Effect of loss of livelihoods can be seen in business and commercial activities
- Long term effects such as disruptions of clean water and electricity supply, communication, transport due to damage of infrastructures.
- Production power and purchasing gets decreased due to the damage caused by the flood.
- Rehabilitation, relocation of people and removal of property from flood-affected areas.
- Lack of food and water , even crops could be damaged causing long-term food shortage.
- People, livestock, goods might get drowned.
- Vehicles and other equipments might get permanently damaged as they remain submerged under water for long duration.
- Dangerous creatures which stay underground might come up during flood and which is dangerous to human beings.
- Lack of proper drinking water and sanitation causes diseases.
- Mass migration of people from flood affected area cfeates few social problems.

- Psychological effects on victims and their families can be a huge impact for long period of time
- Displacement of home, loss of property, loss of family members can cause stress.
- Loss of trust in authorities at the time of ineffective response during flooding.

**III. CYCLONE**

A cyclone is a vast, violent whirl in the atmosphere which moves from the high seas towards the coastal areas. A cyclone will often bring with it heavy rains that can cause flooding. In order for a cyclone to form, the ocean waters need to be warm, at least 26°C. Above the warm ocean, water evaporates and forms clouds. If there is low air pressure where the clouds are formed, it pulls them in and they begin to rotate. It is the earth rotating and spinning on its axis that causes the cyclone’s clouds to rotate. Cyclones are caused by atmospheric disturbances around a low-pressure area distinguished by swift and often destructive air circulation. Cyclones are usually accompanied by violent storms and bad weather. The air circulates inward in an anticlockwise direction in the Northern hemisphere and clockwise in the Southern hemisphere. Cyclones are classified as: (i) extra tropical cyclones (also called temperate cyclones); and (ii) tropical cyclones. The word Cyclone is derived from the Greek word Cyclones meaning the coils of a snake. It was coined by Henry Peddington because the tropical storms in the Bay of Bengal and the Arabian Sea appear like coiled serpents of the sea. Cyclones are given many names in different regions of the world – They are known as typhoons in the China Sea and Pacific Ocean; hurricanes in the West Indian islands in the Caribbean Sea and Atlantic Ocean; tornados in the Guinea lands of West Africa and southern USA.; willy-willies in north-western Australia and tropical cyclones in the Indian Ocean.

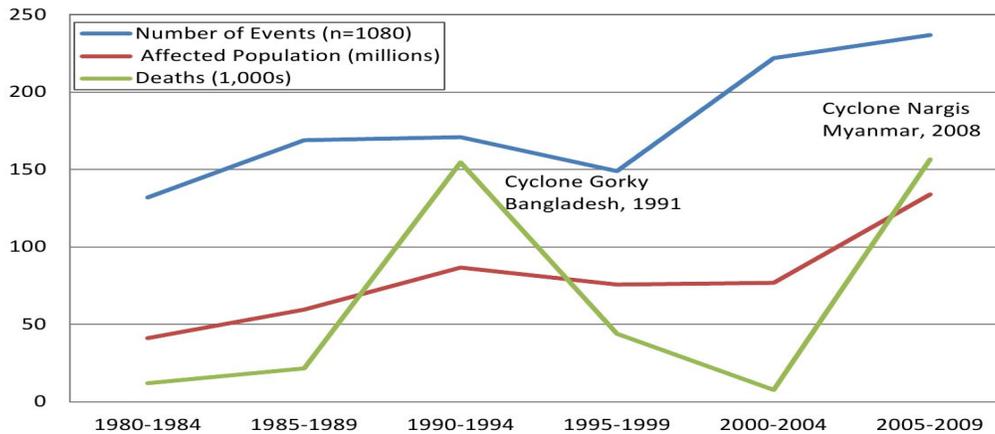


Fig. 1 Cyclone in the past

In India, cyclones are classified by:

- Strength of associated winds,
- Storm surges
- Exceptional rainfall occurrences

**Cyclones in India**

State Name	Cyclones Name	Lowest Pressure (mbar)	Year	Date
Andhra Pradesh	06B	919	1977	Nov 1977
Andhra Pradesh	BOB 01	920	1990	May 7, 1990
Tamil Nadu	BOB 09	998	1991	Nov14, 1991
Kerala	BOB 06	994	1992	
Karnataka	BOB 06	994	1992	
Tamil Nadu	BOB 06	994	1992	

Karnataka	BOB 03	968	1993	
Tamil Nadu	BOB 03	968	1993	
Kerala	BOB 05	968	1993	
Maharashtra	ARB 02	994	1994	
Tamil Nadu	08B	967	1996	
Gujarat	ARB 01	976	1996	
Andhra Pradesh	BOB 05	982	1998	
Gujarat	ARB 05	996	1998	
Gujarat	ARB 02	958	1998	
Odisha	BOB 05	968	1999	Oct 17, 1999
Odisha	BOB 06	912	1999	
Kerala	BOB 06	970	2000	
Tamil Nadu	BOB 05	958	2000	
Gujarat	ARB 01	932	2001	May 24, 2001
Andhra Pradesh	03B	992	2003	
Gujarat	Onil	990	2004	Oct 2, 2004
Tamil Nadu	Fanoos	998	2005	Dec 8, 2005
Kerala	Fanoos	999	2005	
Gujarat	Yemyin	986	2007	
Andhra Pradesh	Yemyin	986	2007	Jun 26, 2007
Tamil Nadu	Nisha	996	2008	Nov 26, 2008
Andhra Pradesh	Khai-Muk	996	2008	Nov 14, 2008
Maharashtra	Phyan	988	2009	
Maharashtra	Jal	988	2010	
Andhra Pradesh	Laila	986	2010	Aug 9, 2008
Tamil Nadu	Jal	988	2010	Jul 11, 2010
Tamil Nadu	Thane	972	2011	Dec 29, 2007
Andhra Pradesh	Nilam	982	2012	Oct 31, 2012
Tamil Nadu	Nilam	992	2012	Oct 31, 2012
Tamil Nadu	Madi	986	2013	
Odisha	Phailin	940	2013	Oct 11, 2013
Andhra Pradesh	Lehar	980	2013	Nov 25, 2013
Andhra Pradesh	Helen	990	2013	Nov 21, 2013
Odisha	Hudhud	960	2014	Oct 12, 2014
Andhra Pradesh	Hudhud	940	2014	Oct 12, 2014
Gujarat	Nilofar		2014	Oct 31, 2014

### Impacts of Cyclone

The impact of tropical cyclone destruction on the society as been so large and do not affect people equally. Cyclone cannot be prevented, but their impact on people's lives can be reduced to a considerable extent. Disaster management covers all aspects of preventive and protective measures, preparedness, rescue, relief and rehabilitation operations. Impacts of cyclone effects economy, social and cultural activities of people and county. Some of the major impacts are as follows,

- Several tropical cyclones are responsible for large number of damage to properties and resources of the country.
- Cyclone mostly affects coastal districts. Several people in coastal villages who depended only on fishing had lost access to food and clean drinking water as fishing was prohibited.
- Cyclone, which is responsible for much loss of life, damage to property and deterioration of day to day life.
- Collapse of buildings, accidents and disease from contaminated food in the post cyclone period is also the reason for loss of life.

- Abnormal rise in sea level caused by cyclone is known as storm surge.
- Cyclones cause a lot of damage on the human environment.
- Cyclone may result in heavy rainfall and floods which is the next devastation to the environment.
- Due to flood caused by the cyclone can cause water log in unwanted places which causes many diseases.
- Almost everything is destroyed and thousands of people are left homeless due to cyclone.
- Coastal areas finds difficult without power supply, communication, emergency responses due to cyclones.
- Large scale evacuations are common, when countries are severely damaged by powerful forces of nature, many people have to abandon their homes and seek shelter in other regions.
- Damage to infrastructures such as roads, bridges, revetment results in loss to both public and Government.
- Health complications among survivors of natural disasters without emergency relief from the organizations can also rise the death rate even after danger has passed.
- Food scarcity is the main impact of cyclone as they loss their agricultural supplies.
- Devastation of crop may result in reduced income for farmers, increased prices for food, unemployment, increased crimes which in turn human populations are at higher level of risk.
- The impact of a natural disaster may also cause inequalities. The poor, who suffer from income fluctuations, and also have limited access to financial services, in the aftermath of a disaster, may be more prone to scarcity.
- There is no health without mental health. Confronted with scenes of destruction and death of friends and loved ones many children develop post-traumatic stress disorder.
- Physical impacts of disaster includes causalities and property damage. Losses of structures, animals also are important measures of physical impacts, and these are rising exponentially in developing countries such as India.
- Social impacts, which include psychosocial, sociodemographic, socioeconomic, and sociopolitical impacts, which can develop over a long period of time. Sociodemographic impact of a disaster is the destruction of households. Such an impact can be a very long process of disaster recovery for some population segments.
- Impacts of cyclone cause direct economic losses such as loss in asset value, reduction in investments which is a socioeconomic impact of a disaster.
- Effects of a cyclone on the economy leads to less income from exports and general economic turndown.

#### IV. DROUGHT

Along with floods India also suffers acute water shortage. Of the net area sown in the country, 68 percent is prone to drought, and of this 33 percent is chronically drought-prone, receiving rainfall of less than 750mm per annum, while 35 percent receives rainfall between 750-1, 125mm per annum. A drought is a period of below-average precipitation in a given region, resulting in prolonged shortages in its water supply, whether atmospheric, surface water or ground water. A drought can last for months or years, or may be declared after as few as 15 days. A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance, causing for example, crop damage and shortages in the water supply. The severity of drought depends on the degree of moisture deficiency, the duration and the size of the affected area. As a drought persists the condition surrounding gradually worsen and its impact on the local population gradually increases. People tend to define droughts in four main ways

1. Meteorological drought is brought about when there is a prolonged time with less than average precipitation. Meteorological drought usually precedes the other kinds of drought.
2. Agricultural droughts are droughts that affect crop production or the ecology of the range. This condition can also arise independently from any change in precipitation levels when soil conditions and erosion triggered by poorly planned agricultural endeavors cause a shortfall in water available to the crops. However, in a traditional drought, it is caused by an extended period of below average precipitation.<sup>[38]</sup>
3. Hydrological drought is brought about when the water reserves available in sources such as aquifers, lakes and reservoirs fall below the statistical average. Hydrological drought tends to show up more slowly because it involves stored water that is used but not replenished. Like an agricultural drought, this can be triggered by more than just a loss of rainfall.
4. Socio-economic drought when water supply is unable to meet human and environmental needs can upset the balance between demand and supply.

**Impacts of Drought**

Impacts of drought can be divided into : 1. Environmental effects which leads to lower flow level , larger fires , drying out of wetlands , worse health of trees and losing biodiversity. 2. Economic losses which causes lower agricultural , forest , fishing output, higher food production cost lower energy production levels in hydro plants, losses caused by depleted water tourism and transport revenue, problems with water supply for the energy sector and technological processes in metallurgy, mining, the chemical, paper, wood, foodstuff industries etc., disruption of water supplies for municipal economies and 3. Social costs include the negative effect on the health of people directly exposed to this phenomenon (excessive heat waves), possible limitation of water supplies and its increased pollution levels, high food costs, stress caused by failed harvests, etc.

**V. EARTHQUAKE**

Earthquake refers to shaking of earth. There is a continuous activity going on below the surface of the earth. Earthquakes are caused by the abrupt release of strain that has built up in the earth's crust.

The Indian subcontinent has a history of earthquakes. The reason for the intensity and high frequency of earthquakes is the Indian plate driving into Asia at a rate of approximately 47 mm/year. The following is a list of major earthquakes which have occurred in India.

Date	Location	M		I	Deaths	Injuries	Total damage / notes
2016-01-03	India, Myanmar, Bangladesh	6.7	M <sub>w</sub>	VII	11	200	
2015-10-26	Afghanistan, India, Pakistan	7.7	M <sub>w</sub>	VII	399	2,536	
2015-05-12	Nepal, India	7.3	M <sub>w</sub>	VIII	218	3,500+	
2015-04-25	Nepal, India	7.8	M <sub>w</sub>	IX	8,964	21,952	\$10 billion
2013-05-01	Kashmir	5.7	M <sub>w</sub>		3	90	\$19.5 million
2011-09-18	Gangtok, Sikkim	6.9	M <sub>w</sub>	VII	>111		
2009-08-10	Andaman Islands	7.5	M <sub>w</sub>	VIII			Tsunami warning issued
2008-02-06	West Bengal	4.3	M <sub>b</sub>		1	50	Buildings damaged
2007-11-06	Gujarat	5.1	M <sub>w</sub>	V	1	5	Buildings damaged
2006-03-07	Gujarat	5.5	M <sub>w</sub>	VI		7	Buildings damaged
2006-02-14	Sikkim	5.3	M <sub>w</sub>	V	2	2	Landslide
2005-12-14	Uttarakhand	5.1	M <sub>w</sub>	VI	1	3	Building destroyed
2005-10-08	Kashmir	7.6	M <sub>w</sub>	VIII	86,000–87,351	69,000–75,266	2.8 million displaced
2005-03-15	Maharashtra	4.9	M <sub>w</sub>	VII		45	Buildings damaged
2004-12-26	off northern Sumatra	9.1–9.3	M <sub>w</sub>	IX	230,000–280,000		Destructive tsunami
2002-09-13	Andaman Islands	6.5	M <sub>w</sub>		2		Destructive tsunami
2001-01-26	Gujarat	7.7	M <sub>w</sub>	X	13,805–20,023	~166,800	Republic Day (India)
1999-03-29	Chamoli district-Uttarakhand	6.8	M <sub>w</sub>	VIII	~103		

1997-11-21	Bangladesh, India	6.1	M <sub>w</sub>		23	200	
1997-05-22	Jabalpur, Madhya Pradesh	5.8	M <sub>w</sub>	VIII	38–56	1,000–1,500	\$37–143 million
1993-09-30	Latur, Maharashtra	6.2	M <sub>w</sub>	VIII	9,748	30,000	
1991-10-20	Uttarkashi, Uttarakhand	6.8	M <sub>w</sub>	IX	768–2,000	1,383–1,800	
1988-08-21	Udayapur, Nepal	6.9	M <sub>w</sub>	VIII	709–1,450		
1988-08-06	Myanmar, India	7.3	M <sub>w</sub>	VII	3	12	
1988-02-06	Bangladesh, India	5.9	M <sub>w</sub>		2	100	
1986-04-26	India, Pakistan	5.3	M <sub>s</sub>		6	30	Severe damage
1984-12-30	Cachar district	5.6	M <sub>b</sub>		20	100	Severe damage
1982-01-20	Little Nicobar	6.3	M <sub>s</sub>			Some	Moderate damage
1980-08-23	Kashmir	4.8	M <sub>s</sub>		Few		Limited damage / doublet
1980-08-23	Kashmir	4.9	M <sub>s</sub>		15	40	Moderate damage / doublet
1980-07-29	Nepal, Pithoragarh district	6.5	M <sub>s</sub>		200	Many	\$245 million
1975-01-19	Himachal Pradesh	6.8	M <sub>s</sub>	IX	47		
1970-03-23	Bharuch district	5.4	M <sub>b</sub>		26	200	Moderate damage
1967-12-10		6.5	Unknown	VIII	180		\$400,000
1966-08-15	North India	5.6	Unknown		15		Limited damage
1966-06-27	Nepal, India	5.3	M <sub>s</sub>	VIII	80	100	\$1 million
1963-09-02	Kashmir	5.3	Unknown		80		Moderate damage
1960-08-27	North India						Moderate damage
1956-07-21	Gujarat	6.1	M <sub>s</sub>	IX	115	254	
1954-03-21	India, Myanmar	7.4	M <sub>s</sub>				Moderate damage
1950-08-15	Arunachal Pradesh	8.6	M <sub>w</sub>	XI	1,500–3,300		
1947-07-29	India, China	7.3	M <sub>w</sub>				
1941-06-26	Andaman Islands	7.7–8.1	M <sub>w</sub>		8,000		Destructive tsunami
1935-05-31	Quetta, Baluchistan	7.7	M <sub>w</sub>	X	30,000–60,000		
1934-01-15	Nepal	8.0	M <sub>w</sub>	XI	6,000–10,700		
1932-08-14	Assam, Myanmar	7.0	M <sub>s</sub>				Moderate damage
1905-04-04	Kangra	7.8	M <sub>s</sub>		>20,000		
1897-06-12	Shillong, India	8.0	M <sub>w</sub>	X	1,542		
1885-06-06	Kashmir						Severe damage
1885-05-30	Srinagar				3,000		Extreme damage

1881-12-31	Andaman Islands	7.9	$M_w$				Significant in seismology
1869-01-10	Assam				2		Severe damage
1845-06-19	Rann of Kutch	6.3	$M_s$	VIII	Few		Limited damage / tsunami
1843-04-01	Deccan Plateau						Moderate damage
1833-08-26	Bihar, Kathmandu	8.0	$M_s$				Severe damage
1828-06-06	Kashmir				1,000		Severe damage
1819-06-16	Gujarat	7.7–8.2	$M_w$	XI	>1,543		Formed the Allah Bund
1618-05-26	Bombay			IX	2,000		Severe damage
1505-06-06	Saldang, Karnali zone	8.2–8.8			6,000		
<p>Note: The inclusion criteria for adding events are based on Wiki Project Earthquakes' notability guideline that was developed for stand alone articles. The principles described also apply to lists. In summary, only damaging, injurious, or deadly events should be recorded.</p> <p>Note: <math>M_w</math> – Moment magnitude scale, <math>M_b</math> – Body wave magnitude, <math>M_s</math> – Surface wave magnitude,</p>							

### Effects of earthquakes

Earthquakes typically impact a huge area, spanning whole city, and many times, several cities. The impact due to this is that besides the instantaneous damage to life and property at the time of the event, there is a long-drawn suffering.

### Shaking and ground rupture

Shaking and ground rupture are the main effects created by earthquakes, principally resulting in more or less severe damage to buildings and other rigid structures. The severity of the local effects depends on the complex combination of the earthquake magnitude, the distance from the epicenter, and the local geological and geomorphologic conditions, which may amplify or reduce wave propagation. The ground-shaking is measured by ground acceleration. Ground rupture is a major risk for large engineering structures such as dams, bridges and nuclear power stations and requires careful mapping of existing faults to identify any which are likely to break the ground surface within the life of the structure.

### Landslides and Avalanches

Earthquakes, along with severe storms, volcanic activity, coastal wave attack, and wildfires, can produce slope instability leading to landslides, a major geological hazard. Landslide danger may persist while emergency personnel are attempting rescue. Landslides can affect large areas of the country every year during monsoons. They can also be caused by earthquakes. The areas that suffer from landslide hazards are located in the hilly tracts of the Himalayas, Northeast India, Nilgiris, Eastern Ghats and Western Ghats. With the melting of the glaciers in the Hindukush-Karakorum-Himalaya region, and the foreseeable increase in heavy rain events and intensity of tropical cyclones, the incidences of landslides are likely to increase.

### Fires

Earthquakes can cause fires by damaging electrical power or gas lines. In the event of water mains rupturing and a loss of pressure, it may also become difficult to stop the spread of a fire once it has started. For example, more deaths in the 1906 San Francisco earthquake were caused by fire than by the earthquake itself.

### **Tsunami**

Tsunamis are long-wavelength, long-period sea waves produced by the sudden or abrupt movement of large volumes of water. In the open ocean the distance between wave crests can surpass 100 kilometers (62 mi), and the wave periods can vary from five minutes to one hour. Such tsunamis travel 600-800 kilometers per hour (373–497 miles per hour), depending on water depth. Large waves produced by an earthquake or a submarine landslide can overrun nearby coastal areas in a matter of minutes. Tsunamis can also travel thousands of kilometers across open ocean and wreak destruction on far shores hours after the earthquake that generated them. Ordinarily, subduction earthquakes under magnitude 7.5 on the Richter magnitude scale do not cause tsunamis, although some instances of this have been recorded. Most destructive tsunamis are caused by earthquakes of magnitude 7.5 or more.

### **Floods**

A flood is an overflow of any amount of water that reaches land. Floods occur usually when the volume of water within a body of water, such as a river or lake, exceeds the total capacity of the formation, and as a result some of the water flows or sits outside of the normal perimeter of the body. However, floods may be secondary effects of earthquakes, if dams are damaged. Earthquakes may cause landslips to dam rivers, which collapse and cause floods.

### **Human impacts**

An earthquake may cause injury and loss of life, road and bridge damage, general property damage, and collapse or destabilization (potentially leading to future collapse) of buildings. The aftermath may bring disease, lack of basic necessities, mental consequences such as panic attacks, depression to survivors, and higher insurance premiums.

### **Impacts on Earthquakes**

- Impact on Agriculture
- Impact on Commerce and Industries
- Impact on Tourism
- Impact on Finance sector
- Impact on Hydro power and Electricity
- Impact on Labour market and Employment
- Impact on Infrastructure facilities
- Impact on Lives
- Impact on Health
- Impact on Social Status
- Impact on Sociatial Assets
- Impact on Education
- Impact on Social Networking

## **VI. CONCLUSION**

There has been a dramatic increase in disasters and the damages caused by them in the recent past. Disaster can't be stopped or avoided but can be resisted. Disasters will have an economic effect on people and property. Rehabilitation and rebuilding of routine life becomes very difficult as nations socio economic status has been collapsed due to disasters. Disaster results in the combination of hazard, vulnerability and insufficient capacity to reduce the potential chance of risk. Both the technical and financial operation should be implemented in order to reduce the disaster risk.

## **REFERENCES**

1. Shannon Doocy , Anna Dick , Amy Daniels , Thomas D.Kirsch, (2013), *The Human Impact of Tropical Cyclones: a Historical Review of Events 1980-2009 and Systematic Literature Review*.
2. Puja Mondal (2015) "Essay on cyclone : Warning, Safety precautions and timely actions to reduce damage", [www.yourarticlelibrary.com](http://www.yourarticlelibrary.com)
3. [www.NIDM.gov.in](http://www.NIDM.gov.in).
4. [www.NDMA.gov.in](http://www.NDMA.gov.in).
5. K.Janardhanan (2012), "Changing perception in disaster management" ICCDM, pp84-93.
6. [www.wikipedia.com](http://www.wikipedia.com)

7. Rochelle Joseph (2010), "Disaster Preparedness".
8. S.Raghavan, Rajesh (2003), "Trends in tropical cyclone impact-A study in Andhra pradesh, India", *AMS journals online* (2015), pp 635 - 6344
9. Praveen kumar, Muthu Priya, Venkata Subramani (2009), "Disaster Management", *ICDMM*, pp721-736.
10. Jain.P.C (2010) "Flood Mitigation Practices in India", *Disaster Management*, pp38-45.
11. Frederick, Prince (2011). "Memories of Madras: Story of a submerged city". *The Hindu*. Retrieved 28 May 2015.
12. Sulaipher (2012), "Disaster Management in India - A strategic Analysis", *ICCDM*, pp396-407.
13. Noorani, A. G. (1984). "Dissolving Commissions of Inquiry". *Economic and Political Weekly*. 19 (16): pp 667-668.
14. Anil Kumar Gupta (2009), "Flood Disaster Mitigation and Management: A Synthesis and Key Lessons", *Disaster and Development, Journal of the National Institute of Disaster Management*, pp 163-175.
15. Senthil Vadivel, Bhupatthi Rav (2010), "Disaster Management: A global issue", *International journal of civil and structural engineering*, vol 1, no 1 pp80-89.
16. Naresh Dharma.Y.A (2012) "Disaster Management: Causes, Preventions and Suggestions" *ICCDM*, pp581-603.
17. Subbiah.A.R (2010), "Drought Management through Anticipatory Multidimensional Approaches - A Case Study" *Disaster Management*, pp93-109.
18. *NIDM: Journal of Disaster and development*, vol 1 no1(2006),pp1-2.
19. <http://cyclonesaffectontheenvironment.weebly.com>
20. Doshi, Vidhi (2016). "Flooding in India affects 1.6m people and submerges national park".
21. Bendick, R.; Bilham, R.; Blume, F.; Kier, G.; Molnar, P.; Sheehan, A.; Wallace, K. (2002), *Earthquake Hazards and the Collision between India and Asia*, *NOAA Science Review*, 2002, *Cooperative Institute for Research in Environmental Science*.
22. Subramaniyachary, Siddiraju "Climate change - Impact of different cyclones" *Indian Journal of research*, vol 1 issue 1 , jan 2013,pp59-61.
23. *NGDC, Significant Earthquake Database, National Geophysical Data Center, NOAA*.
24. <http://www.preservearticles.com>
25. <http://www.scidev.net>