

NATURAL DISASTERS IN INDIA: FLOOD ITS SOCIO-ECONOMIC IMPLICATIONS AND TECHNIQUES TO MITIGATE

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Abstract- In this article an attempt has been made to understand the natural disasters; flood a natural disaster and its impact and mitigation techniques. India is one of the most disastrous countries in the world. Calamities brings lot of sufferings damages, and economic loss to the society and country as well. Natural disasters are beyond human control and are often called as 'Rage of God'. In the history of mankind; India has faced some very deadly disasters and developing countries suffer the great loss when disaster hits. Natural disaster is an any odd event of nature, which affects sudden disruption to the normal life of the society and causes damage to property, region, or ecology. It is also true that; to rehabilitate and compensate the damages lot of time and money has to spend. The most common natural disasters that are known to the people like; floods, drought, viral epidemics, earth quake cyclone etc.

Flood is one of the most frequent and devastating calamities in India. Flood means; a large amount of water that spread from a river, sea, or reservoir. During southwest monsoon almost all rivers carry huge amount of water, there by posing threat to floods. Among the natural disasters, flood accounted 33 percent. Over 60 percent flood damage in the country occurs from river floods and rest of the 40% by other sources.

Flood is a disastrous act of nature, its impact on man and ecology is enormous and in a multiple way. Therefore, to mitigate such natural calamities proper planning, designing, and implementing the developmental projects in a proper and scientific ways; is the need of the hour. This type of disasters may be prevented through the application of preparedness and mitigation techniques.

Key words: Concept of disasters and its types, concept of flood, socio-economic implications of floods and mechanisms to mitigate.

Introduction:

Natural disasters are unpredictable and are the part of every nation, hence no country in the world is entirely safe. Disasters have no boundaries, it can strike at any movement, anywhere paving destruction in the present as well as in the future. The human losses in disasters in developing countries like India tend to high compared to developed nations.

Geographical and climatic conditions made, India as one of the most disaster-prone countries in the world. The calamities may be natural or manmade brings a lot of sufferings and pain to the people's life of the affected region and it take years to rehabilitate and compensate the damages. According to 2019 Global Climate Risk Index Report (GLRIR), India is the 14th most vulnerable country in the world.

The situation of natural disasters is also called Natural hazards because it poses a potential threat to life, property, shelter, environment and availability of food and water. Natural disasters are beyond human control and are often called as 'Rage of God.' In human history and at present day situation; India has faced some very deadly and noxious natural disasters. The most common natural disasters that are known to the mankind are; floods, hurricanes, droughts, wildfires, earthquakes, cyclones, cloudburst, heatwaves, viral epidemics, pest attack, hailstones, very snowfall, heat and cold waves, volcanic eruptions, etc., cause great loss to property and life.

These calamities are the result of man's dreadful exploitation of natural resources like water, land, minerals, mountains, forest etc., for his selfishness. Developing countries suffer the great costs when a disaster hits. Orissa is the disaster capital of India. The other most sensitive Indian states face Natural calamities are – Assam, Andra Pradesh, Maharashtra, Karnataka, Bihar, Odisha, Uttarakhand, Himachal Kerala etc. are highly vulnerable to extreme disasters like floods, droughts, and cyclones.

Among the natural disasters; floods accounted 33 percent, 24% heatwaves, about 22% percent drought, cold waves 16%, cyclones 5% percent. India witnesses floods due to overflow of dams and cause for heavy loss to life, damage to property /economy, livelihood systems, infrastructure etc. India is highly vulnerable to floods and is the most frequent type of natural calamity. Out of the total geographical area of 329 million hectares, more than 40 million hectares is flooding prone region. Thus, floods are one of the most devastating natural disaster.

India has got two very distinct monsoons viz; southwest monsoon and Northeast monsoon. The south west monsoon starts from June to September and the Northeast monsoon covers the period from October to December. India gets 75 percent of its annual total rainfall and the remaining rest of the seasons. As a result of heavy Southwest monsoon, almost all the rivers carry huge amount of water thereby posing threat to floods. The frequency of major floods is more than once in 5 years. Thus, floods are the most frequent calamities in India accounting for 52% of total occurrence of disasters followed by cyclone 30%, landslides 10%, earthquake 5% and droughts 2 percent.

The common factor for large scale floods in India is heavy rainfall followed by others factors like inadequate dams' capacity, blockage in the river because of landslides, earthquakes, and blasting. Of the annual rainfall 75 percent concentrated over 4 months

i.e., June to September and as a result all the rivers carry heavy discharge of water. The average area affected by floods annually is about 25 percent (8 million hectares). Every year 1.75 million people and 30,000 cattle are adversely affected by floods. The annual average cropped area affected is approximately 3.7 million hectares. The annual total damage to houses and public utilities is about 972.00 crores.

Between 1980 to 2017; India experienced 235 incidents of floods. The National Commission on Floods assessed (1980) that; the total flood prone area of India is around 40 million hectares which is equalling to 12% of the total area of India. The most flood prone and flood affected regions of the country are; Uttar Pradesh, Assam, Bihar, West Bengal, Odisha, Uttarakhand, Himachal Pradesh, and Andhra Pradesh together accounts 62 percent of the total loss and damages by floods.

Methodology and Data collection:

Secondary data has been used to extract the information with related to natural disaster. The secondary sources like books, Journals, News Papers, Magazines, Research articles, Periodicals, Government of India data sources, T. V News, Ph.D. Thesis, websites, e-journals etc., are used in this article for assessing the flood implications and mechanisms to combat.

Objectives: The following are the important objectives of the research paper are-

- ❖ To know the various kinds of Natural disasters at national level
- ❖ To understand the flood a natural calamity
- ❖ To investigate flood impact on man and ecology
- ❖ To suggest flood mitigation techniques

The Concept & Definition of Natural Disasters and Flood: Landsman defines – “disaster is an any incident typically occurring suddenly that causes damage, ecological disruption, loss of human life, deterioration of health and health services often combined with damage to property and livelihood and which exceeds the capacity of the affected community on a scale sufficient to require outside assistance”.

Flood means a large amount of water that spread from a river, the sea or reservoir etc., that covers an area which should be dry. In other words, flood is a natural disaster that is caused due to the accumulation of excessive water in a region. Centre for Research on Epidemiology of Disasters (CRED) defines “flood Means, it is a significant rise of water level in a stream, lake, reservoir or coastal region.”

THE MOST SEVERE AND DESTRUCTIVE NATURAL DISASTERS ARE DURING 1737 TO 2022 ARE AS SHOWN IN THE TABLE

TABLE -1: MOST DANGEROUS NATURAL DISASTERS IN INDIAN HISTORY

Year	Type of Disaster	State	Nature of Loss
1737	Cyclone	Calcutta	More than 3 lakh deaths, majority of houses are destroyed and unrepairable, 8 boats along with their crews lost, 3 ships went down lakhs of people died.
1770-1943	Famine	Bengal/Odisha & Bihar	Terrible famine death toll of 10 million people due to hunger thrust & diseases.
1839	Coring cyclone	Andhra Pradesh	More than 3.2 lakh people killed, 25,000 vessels ruined & destroyed entire coring village.
1876-1878	Great Famine	Madras, Mysore, Hyderabad & Bombay (Southern India Famine)	Famine affected an area of 6,70,000 sq km., distress/ suffering to a 58,500,000 population, 5.6 million to 9.6 million human fatalities/deaths.
1950	Earth quake	Assam	More than 1526 fatalities, 2000 homes perished, moderately but wide spread damage to buildings, widespread socio-economic and environment destruction in the state.
1970	Bhola cyclone	West Bengal	It was deadliest cyclone ever recorded and world's deadliest disaster around 3 lakhs to 5 lakhs people killed.
1993	Earthquake	Maharashtra (Latur & Osmanabad)	Death toll 20 thousand+, Injured 30 thousand +, Huge loss to property, Thousands of buildings turned into rubble, and more than 50 villages destroyed.
1999	Super-Cyclone	Odisha	10000 + people died, 1.67 million people left homes, 2,75,000 homes destroyed, 1535 km ² of crops destroyed, 90 million trees ruined, 2.5 million domestic animals killed.

2001	Earthquake	Gujarat	Around 20,000 deaths, injured nearly 1,67,000 and 4 lakhs homeless.
2004	Tsunami	Andaman & Nicobar Islands, South India	More than 2 lakh people lost their life & destroyed 2.57 lakh houses and property.
2013	Floods (Cloud Burst)	Uttarakhand	Death toll 5700+1000 people reported missing, 1 lakh pilgrims were trapped in valleys, damaged several houses.
2014	Flood	Jammu & Kashmir	More than 500 people died, total number of houses damaged 1,67,236, severely affected road network.
2015	Flood	South India Floods (Tamil Nadu & Andra Pradesh)	18 lakh people displaced and more than 500 people killed, damages and losses about 13 billion.
2016- 2021	Wild Fires	Karnataka	38,114.6 hectares affected across Karnataka, harming local wild life, Flora, and Fauna, causing economic losses.
2018	Flood	Kerala	More than 400 people died, 280679 people are displaced, around 600 villages were affected, 390 villages submerged in water, 50 bridges damaged, around 5000-6000 crores property damaged.
2019	Flood	Bihar	88.4 lakh people from 13 Bihari districts affected, death counts around 130.
2020	Super Cyclone (Amphion)	West Bengal, Odisha & Bangladesh	90 people lost their life, many trees and houses uprooted, 5lakh people evacuated.
2021	Flood	Uttarakhand	About 1600 lives lost and 206 went missing, 75 lakh hectares land affected most, crops & houses are damaged and Rs. 1805 crores lost public utility & property.
2022	Cyclone	Odisha, W.B., A.P., T.N.	66,000 displaced in Orissa and W.B., 1500 displaced in A.P., and 9500 in T.N.
As of 2023	Covid-19 Epidemic	Maharastra, Kerala & Karnataka (3Highest deaths & confirmed Cases)	Deceased 1,48,441 (Maharashtra) 71,617 (Kerala) and 40,322 (Karnataka)

Top Natural Disasters in the History of India-<https://www.mapsofindia.com/my-india/travel/top-nathavocnatural-disasters-in-the-history-of-India> & other sources

Natural Disaster Photo's



Photo 1. Wild Fire

Photo 2. Tsunami



Photo 3. Famine



Photo 4. Cyclone



Photo 5. Earthquake



Photo 6. Covid Pandemic

SOCIO-ECONOMIC IMPLICATIONS OF FLOODS IN INDIA:

Floods are common and natural phenomena. It is one of the most disastrous acts of nature and impact on human life and ecology in multiple ways. Flood is one of the deadliest natural disasters that can cause havoc in the society and nature. Flood occurs during the period of heavy rainfall and it is immensely painful and leaves unequal effects on different spheres of an individual's life.

There are many adverse effects of floods on human settlements and economic activities. Floods can have a considerable impact on population, properties, business, public utility, destroy belongings, prevent to access of essential services, damage and loss to infrastructure, animals, aquatic animals, wild animals, flora and fauna, water pollution climate change, soil erosion etc. Thus, the effects of flood disaster are caused for many adverse impacts on man and society directly and indirectly.

❖ **Loss to human life:** Flood is the major cause of natural disaster and human can be affected in number of ways from flooding. Flash flooding is the most dangerous for human life, lose friends and family members. People can often get caught unwarily in flash floods and difficult to get escape from the hazardous situation. Asia is the most flood affected region, accounting about 50 percent of flood related fatalities in the 20 th century. India accounts 1/5 of global flood deaths and an average of 1650 for every year and gets injured. From 1980 to 2017 flood caused death about 1,26,286 and affected 1.93 billion Indian population.

❖ **Economic loss and property damage:** Empirical studies shown that; flood damage has negative impact on economic growth in the long run period and considerably reduces female employment opportunities in agricultural sector. Owing to disasters whole community can be uprooted, destroy homes and lively hoods. Declined in business, income, productive capital, loss of agricultural crops, public utilities, and Gross Domestic Product. Government data reveals that; between 1953 and 2011 crop and property damage (including house property) is of Rs. 3612 crores every year. In case of severe floods, the affected regions take years to re-build.

❖ **Loss of crops:** There are many factors which affects the crop production such as; wind, microbes, temperature pest attacks, heavy/ shortage of rainfall, (hydro -meteorological calamities) unseasonal rains etc. Among these, heavy rains, and flooding caused to submerge crop land into water and it paves loss to crops and quantum of yield. As per ministry of agriculture, between 2015-

2016 and 2021-2022 heavy rains and floods have damaged 33.9 million hectares of India's cropped area. The excess loss of crops of the farmers some times leads to suicidal cases too.

❖ **Health problems like waterborne diseases & epidemics:** Floods result in the breeding of mosquitoes and other insects that are the cause of various diseases like dengue, dysentery, pneumonic plague, water, and vector -borne diseases like cholera, typhoid malaria etc. There is the problem of sanitation and contaminated drinking water cause the health problems. Apart from these, there is physical and mental health impacts due to loss of property and loss family or family members.

❖ **Loss of livestock and affect aquatic animals:** Disasters not only posed threat to mankind but have also taken livestock into consideration. The livestock sector plays a pivotal role in nature resource-based livelihood of most of the Indian population and is subsidiary occupation to agriculture. It is often called as the poor people's source of employment, revenue, wealth, and ATM. Flooding causes the animals to drown. Due to flood the aquatic animals get displaced from their own nets.

❖ **Price hike of the commodities:** There is a shortage of supply and high demand, this results in increased prices of the goods and commodities. Moreover, the supply of materials and goods in the flood affected region lowers the transport facilities due to damage of roads and connectivity services. Many a time the stored commodities are also get spoiled owing to floods, this caused for price hikes.

❖ **Soil erosion during flood conditions:** Floods can have negative impact on the environment by eroding the soil. Soil erosion is a process that occurs when the impact of water or wind detaches and removes particles and caused for soil deterioration. Due to heavy rains and water flow the soil cannot absorb entire water and resulted into soil erosion and which in turn horrible consequences. In addition to this the quality of soil is also degraded.

❖ **Floods damages to the flora and fauna:** Floods not only threat to human beings and animals or property but it also destroys the flora and fauna. Flood damages for plants and creatures which surrounded in the environment. At the time of heavy rains, it accompanied lightning and thunder and storms all these; cause for uprooting the trees. In this situation crops and other several plants and herbs are eroded and destroyed.

❖ **Displacement and evacuation problem:** Displacement caused mainly due to climatic conditions and natural calamities or sometimes owing to developmental projects. Displacement is a social phenomenon which requires preventive strategies within the frame work of social and economic development. In flooding situations people are forced to leave their habitual places and homes in order to avoid the adverse impact of an immediate and foreseeable natural calamities. Such forcibly displaced population is vulnerable to food insecurity and other civic amenities.

❖ **Loss of homes and other utilities:** Floods cause permanent structural damage to shelters/homes. The constructional design of house floor or roof can collapse due to its excessive water pressure. Thus, after floods it is very harder for affected population to survive. Apart from these, floods also result in damage to electrical and other utilities.

❖ **Stress reaction situations during and after floods:** Natural calamities like floods expose people to several health-related problems from morbidity to mortality. Sometimes, floods can lead to a range of negative mental health impacts. A review of some studies reveals that risk of experiencing post-traumatic stress disorder (PTSD), depression, psychological distress, pain, anxiety, and social dysfunctions are more in flood affected regions compared with unaffected areas.

❖ **Loss of livelihood services and assets:** Floods directly affects crop production and farmers livelihood. It also threatens farmers sources of income and living conditions and push into poverty situation conditions. This natural disasters often destroy the agricultural assets and infrastructure, disrupting production cycles, trade flow and livelihood means. Apart from all these, people unable to find work, disruption of production strategies, loss of land to erosion waterlogging, fisheries getting washed away, loss of livestock, agricultural tools, and equipment's etc.

❖ **Damage to flora and fauna:** Extreme floods seriously affect the biodiversity. Several natural disasters and human activities cause for depletion of flora and fauna. Sedimentation can destroy habitats and aquatic animals by decreasing the level of oxygen available. Microorganisms gives nitrogen to the plants and in return the plants give the organisms their shelter. Floods can also threaten, the survival of endangered species.

❖ **Loss of bridges, road ways and canals:** Floods effect on transportation network through physical damage to infrastructure. Along with loss of life; the floods also damage the buildings, bridges, roads, and canals. Bridges are key assets of the transport infrastructure upon which economy and societies are dependent. During the flash flooding many bridges got damaged and caused for problems like disruption for road network and property damage. Natural disaster cause for damage and loss of roads and this paves for socio-economic problems.

DAMAGE DUE TO FLOOD IN INDIA FROM 1953- 2016
TABLE -2

Year	Area affected in m.ha	Population affected in million	Damage to Crops		Damage to House		Cattle lost No's	Human lives lost in No's damage to public utilities	Damage to public utilities Rs. Crore	Total Damage in Rs. Crore(5+7+10)
			Area in m.ha	Values in Rs. Crores	No's	Val. In Rs. Crore				
1	2	3	4	5	6	7	8	9	10	11

1953-55	19.22	62.47	8.85	160.4	2131697	34.93	141596	1181	17.03	212.36
1956-60	33.66	55.18	6.77	196.15	2684881	40.65	128579	2332	33.53	270.33
1961-65	22.53	53.04	10.17	200.13	1836319	20.03	703.63	2923	16.45	236.61
1966-70	33.67	121.08	15.87	802.75	4170658	160.95	434729	6516	183.52	1147.24
1971-75	42.01	211.32	19.6	1632.85	5745543	251.71	366304	3960	515.77	2400.33
1976-80	56.32	243.98	30.56	2763.07	1077652 2	793.48	1552983	21635	1443.45	5000
1981-85	43.1	263.67	21.4	4731.27	9917125	1640.99	666415	8792	3125.56	11297.82
1986-90	51.35	237.8	25.86	6549.47	9047460	2104.05	549414 table	10860	6064.96	15062.88
1991-95	30.67	147.03	14.86	5518.63	6664510	2488.13	445705	9476	5605.49	13612.24
1996-00	36.61	194.83	18.91	10508.9	7406916	3417.88	422601	9445	12404.91	27174.95
2001-05	37.26	162.64	25.61	12058.42	4634195	3432.46	323178	7879	16273.01	32200.03
2006-10	18.14	114.5	22.39	19493.75	7873928	18577.5 9	561151	10791	56666.05	75642.34
2011-16	35.9	142.85	30.19	37657.86	6575325	11427.5	359658	9637	95580.44	144665.79

Source: Data compiled from Flood Forecast monitoring directorate, Central water commission, Government of India (2018)

MAJOR FLOODS IN INDIA

TABLE-3

Sr.No.	State	Year	Loss and Damages
1	Maharashtra	2005	419 people and 16000 cattle were killed, over 1 lakh commercial establishments and 30000 vehicles damaged.
2	Surat	2006	120 and above deaths, property damage ranging from 9500 to 21000 crores.
3	Bihar	2007	Affected 10 million people, 4822 villages and 1 crore farm land were affected, 44,000 houses damaged, 29,000 houses destroyed, thousands of people were displaced in relief camps.
4	Bihar	2008	Affected to 3 million people and 250 deaths, 3,40,000 ha. crops damaged, more than 3,00,000 houses destroyed loss of public facilities, and raw rice and flour mixed with polluted water, hunger and spread of deceases.
5	Andra Pradesh	2009	Over 13 lakh people affected, 37 deaths, 6295 livestock perished, 6189 cattle loss, 478 villages severely hit, 42000 houses damaged.
6	Tamil Nadu & Pondicherry	2010	203 lives lost, 8000 shelters fully damaged, 40,000 huts partially damaged, around 5068 livestock lost and 15 lakh acres of crops submerged.
7	Kerala, W.B & Bihar	2011	Affected 2,5,00,00 population and killed more than 130 people.
8	Assam	2012	124 lost their life, land slides 16 people killed & affected 2.2 million people.
9	Uttarakhand	2013	4000 deaths and affected 1 million people, evacuated more than 10000 people washed away bridges and roads.
10	Kashmir	2014	Affected 1000 villages, death of 300 people, 2 million families affected, 1.4 million people lost their household assets and livelihood, 67000 houses fully damaged, 66,000 partially damaged and few cities were submerged.
11	Chennai (T.N.)	2015	Death toll of 470, 12000 cattle were lost, 18 lakh people displaced and about 4.92 lakh houses were damaged in addition to heavy loss of property about Rs. 200 billion to 1 trillion.
12	Assam	2016	More than 1.6 million people affected, Damaged crop area of 2,770 hectares, 49.535 animals affected, property damage and many people displaced the, affected to Pobitora Wildlife & Kaziranga National Park around 300 wild animals reported drowned, largescale damage to homes, threats to livelihood etc.
13	Gujarat	2017	More 224 people died, heavy loss to livestock, crops, durable assets, damage to public & private infrastructure.
14	West Bengal	2017	20 lakh people affected over 60 villages, 50 people died, 2301 people evacuated from their houses, 1,79,321 hectares paddy seedbeds

			damaged, 2,02,957 hectare of land was submerged, about 7868 houses entirely destroyed and 44361 partially damaged, around Rs. 553 crores lost.
15	Bihar	2017	Around 1.71 crore people hit by the flood, affected 19 districts, death of 514 people.
16	Kerala	2018	445 deaths, 36,000 people displaced & affected 14 districts.
17	Odisha	2019	1,30,000 were affected more than 14000 people were evacuated, more than 2000 houses were damaged.
18	Karnataka	2019	61 people killed, 14 people missing, 7 lakh people evacuated from their homes, about 60.000 houses damaged.
19	Hyderabad	2020	37,000 families affected, 40,000 families displaced, 80 lost their lives.
20	Uttarakhand	2021	Around 121 people missing, 83 were killed, most houses damaged.
21	Northern India	2022	318 deaths, more than 4000 villages submerged and 113000 hectares crop area lost.

Flood Photo's



Photo 1 Flood Displacement/ Evacuation

Photo 2 Property submergent

Photo 3 Crop Submergent

Photo 4 Flood Devastation

FLOOD MITIGATION TECHNIQUES IN INDIA:

Since time immemorial man has been trying to control floods. In ancient times methods of flood control have been practiced and the country has integrated administrative machinery for disaster management. The mitigation techniques and machineries are at National, State and District levels for undertaking the responsibility of relief and rescue measures in disaster events. Disaster management provides opportunities for planning, designing, and implementing the developmental projects. This process contributes to the mitigating the risks of disasters.

The flood forecasting and warning systems, cyclone detector and tracking system etc., plays the significant role to mitigate natural calamities. Science and technology inputs constitute its basic thrust, which is manifested in development of forecasting and warning systems and disaster resistant construction technologies. Flooding is caused by the inadequate capacity within the banks of rivers to contain the high flows brought down from the upper catchments owing to heavy rains.

Natural Hazards may be prevented through application of careful planning, preparedness, and mitigation measures. A well thought action plan for disaster management is the need of the hour and there should be sincere efforts to manage the problems. Already, Government of India has undertaken many steps to manage flood situations such as; National Flood Management Disaster Team, Flood management by establishing the dams, National Flood Management programme (1954), National flood Commission (1976), National Commission for Water Resources (1999), National Water Policy (2012), National Hydrology Project (2016), Flood Management and Border areas Programme FMBAP- (2017-2020) etc.

Floods; can prevent or can reduce its impact with the help of following mitigation techniques such as-

- Restriction on cutting of trees
- Planned and proper construction of dams and reservoirs
- Creation of suitable drainage system and channel improvements
- Deepening of the rivers

- Massive afforestation or planting the trees
- Diversion of flood water
- Installation of flood detection systems of machinery
- Need to drainage improvements
- Smart city projects to be undertaken
- Desilting of the river beds regularly
- Early warning or introduce better flood warning device
- To know the flood zone and understanding risk of flooding
- Live in the area which is not prone to flooding
- Restore rivers and clean draining to prevent floods
- Upgrade bridges and roads
- Improved stormwater drainage systems
- Need to take proper and scientific meteorological forecasting
- Flood-proof shelters and structures are to be developed
- Take proper and in time measures to control floods
- Existing policies should be restructuring
- Creating awareness regarding disaster reduction
- Ensuring the disaster resistant construction of buildings and houses

CONCLUSION:

Floods are regular and common features in many parts of the country. It causes loss of lives property, threat and bringing untold misery to the people and society. These disasters are mainly due to natural reasons but now a days we can see an increase in floods is due to human interference. It is not possible to control floods wholly, but can prepared when it happens and what suitable measures to take to control it. Hence, depending on nature of floods, flood mitigation measures may lessen the adverse impact of flooding disaster.

Flood is the disruption to normal pattern of life, livelihood, property, injury, and health effects, effects on damage to infrastructure, buildings, communication facilities and other services. Disaster also effects on community needs like food, clothing, shelter, and medical facilities too. Though, natural disasters may happen due to natural imbalances but it is very distressing to see that; humans die; due to human induced activities. The fact of the matter is; every one of us is also responsible for destroying our environment and giving rise to such various problems.

Unless major steps from the Government and community participation the level of disasters is not mitigated. Flood calamities were mainly due to natural reasons but in recent days we can see an increase in floods due to human interference. Despite the various steps undertaken, the trend of increasing damage and loss brought by floods has posed a challenge to the Government and people. Creation of people centred early warning systems that enhances residents' awareness and preparedness to flood hazards is significantly reduce the adverse implications. Effective disaster management strategies will not only prevent loss of lives but also helps affected people in rebuilding their lives.

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