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**SUMMARY OF TROUNCING OF LIFE AND
POSSESSIONS OWING TO NATURAL DISASTERS
OCCURRED IN INDIA OVER A PERIOD OF TIME**

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Abstract

India's geo-climatic conditions as well as its high degree of socio-economic vulnerability, make it one of the most disaster prone countries in the world. A disaster is an extreme disruption of the functioning of a society that causes widespread human, material, or environmental losses that exceed the ability of the affected society to cope with its own resources. India is highly exposed to floods, cyclones, avalanches, heat/cold waves, landslides, lightning, earthquake and droughts. These disasters largely affect the normal life of human beings and other living species resulting in huge losses on lives and properties. In recent times the natural disasters occurring in different parts of the country have resulted in great havoc by killing thousands of people and destroying lives and properties. An attempt is made to study the loss of lives and properties due to natural extreme events occurring in different parts of India over a period of time. Secondary data have been collected from the Annual reports of Ministry of Home Affairs from period 2001-02 to 2017-18. This study focuses on the impact of these natural disasters on human lives, cattle, houses and on agricultural crops during the above mentioned period. The statistical data have been analyzed and depicted in the form of simple graphs and interpreted accordingly.

Keywords: *Natural disasters, vulnerability, extreme events.*

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Introduction:

It is a well known fact that natural disasters strike countries, both developed and developing, causing enormous destruction and creating human sufferings and producing negative impacts on national economies. Due to diverse geo-climatic conditions prevalent in different parts of the globe, different types of natural disasters like floods, droughts, earthquakes, cyclones, landslides, volcanoes, etc. strike according to the vulnerability of the area. India is considered as the world's most disaster prone country. It has witnessed devastating natural disasters in recent past like droughts, floods, cyclones, earthquakes, landslides, etc (Gupta, 2009).

India, officially the Republic of India is one of the countries in South Asia. It is the seventh largest country by area and second most populous country with over 1.25 billion people in the world. India is one of the most disaster prone countries in the world. Due to its specific location, it is frequently affected by various hazards and disasters. A natural hazard is a naturally occurring event that might have a negative effect on people as well as on the environment. This negative effect of hazard is called disaster. There are many natural hazards which occurred in India during the last 50 years. (Prabhaker Mishra, 2016).

India is no exception as it has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena in India due to large population growth, and migration into urban areas. Tamil Nadu has witnessed havoc caused by cyclones and storm surge in the coastal regions, earthquakes, monsoon floods, landslides, and Tsunami. Increase in urban population

coupled with the construction of man-made structures often poorly built and maintained subject cities to greater levels of risk to life and property in the event of earthquakes and other natural hazards (Stephen, 2012).

Definition:

“A natural disaster is an act of nature of such magnitude as to create a catastrophic situation in which the day-to-day patterns of life are suddenly disrupted and people are plunged into helplessness and suffering, and, as a result, need food, clothing, shelter, medical and nursing care and other necessities of life, and protection against unfavourable environmental factors and conditions” (WHO, 1971).

Classification of Natural Hazards and Disasters:

Natural Hazards and the natural disasters that result can be divided into several different categories (Nelson, 2018):

Geologic Hazards - These are the main subjects of this course and include:

- Earthquakes
- Volcanic Eruptions
- Tsunami
- Landslides
- Floods
- Subsidence
- Impacts with space objects

Atmospheric Hazards - These are also natural hazards but processes operating in the atmosphere are mainly responsible. They will also be considered in this course, and include:

- Tropical Cyclones
- Tornadoes
- Droughts

- Severe Thunderstorms
- Lightning

Other Natural Hazards - These are hazards that may occur naturally, but don't fall in to either of the categories above. They will not be considered to any great extent in this course, but include:

- Insect infestations
- Disease epidemics
- Wildfires

Effects of disasters

Hazardous process of all types can have primary, secondary, and tertiary effects (Nelson, 2018).

Primary Effects occur as a result of the process itself. For example water damage during a flood or collapse of buildings during an earthquake, landslide, or hurricane.

Secondary Effects occur only because a primary effect has caused them. For example, fires ignited as a result of earthquakes, disruption of electrical power and water service as a result of an earthquake, flood, or hurricane, or flooding caused by a landslide into a lake or river.

Tertiary Effects are long-term effects that are set off as a result of a primary event. These include things like loss of habitat caused by a flood, permanent changes in the position of river channel caused by flood, crop failure caused by a volcanic eruption etc.

Statistical Data:

Disasters - natural or human-made are common throughout the world. Disasters continue to occur without warning and are

perceived to be on an increase in their magnitude, complexity, frequency and economic impact. Hazards pose threats to people and assume serious proportions in the under developed countries with dense population. During the second half of the 20th century, more than 200 worst natural disasters occurred in the different parts of the world and claimed lives of around 1.4 million people. Losses due to natural disasters are 20 times greater (as % of GDP) in the developing countries than in industrialized ones. Asia tops the list of casualties due to natural disasters.

India is no exception as it has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena in India due to large population growth, and migration into urban areas. Here is the list of natural disaster occurred over the period of 1990 to 2018 in different kind of natural disasters and affected in various location of India.

Statement : Major natural disasters in India			
Sl. No.	Year	Type	Affected Population Location/Area
1	1990	Cyclone	Andhra Pradesh
2	1993	Earthquake	Latur, Marathwada region of Maharashtra
3	1996	Cyclone	Andhra Pradesh
4	1999	Cyclone	Odisha
5	2001	Earthquake	Rapar, Bhuj, Bhachau, Anjar, Ahmedabad and Surat in Gujarat State
6	2004	Tsunami	Coastline of Tamil Nadu, Kerala, Andhra Pradesh, Puducherry and Andaman and Nicobar Islands of India
7	2005	Earthquake	Mostly Pakistan, Partially Kashmir
8	2005	Floods	Maharashtra State
9	2008	Cyclone Nisha	Tamil Nadu
10	2008	Kosi Floods	North Bihar
11	2009	Floods	Andhra Pradesh, Karnataka
12	2009	Drought	252 Districts in 10 States
13	2010	Cloudburst	Leh, Ladakh in Jammu & Kashmir
14	2011	Earthquake	North Eastern India with epicenter near Nepal Border and Sikkim
15	2011	Floods	19 Districts of Odisha
16	2011	Earthquake	Sikkim, West Bengal, Bihar
17	2011	Cyclone Thane	Tamil Nadu, Puducherry
18	2012	Floods	Assam
19	2012	Floods	Uttarkashi, Rudraprayag and Bageshwar Districts of Uttarakhand
20	2012	Cyclone Nilam	Tamil Nadu
21	2013	Cyclone Mahasen	Tamil Nadu
22	2013	Floods/Landslides	Uttarakhand and Himachal Pradesh
23	2013	Cyclone Phailin	Odisha and Andhra Pradesh
24	2013	Floods	Andhra Pradesh
25	2013	Floods	Odisha
26	2014	Cyclone Hud Hud	Andhra Pradesh & Odisha
27	2014	Floods	Jammu & Kashmir
28	2015	Cyclonic Storms	West Bengal
29	2015	Floods and Heavy Rains	Tamil Nadu
30	2015	Floods and Heavy Rains	Rajasthan
31	2015	Floods and Heavy Rains	Andhra Pradesh

32	2015	Floods and Heavy Rains	Gujarat
33	2016	Cyclonic Storms	Tamil Nadu
34	2017	Lightning	Odisha & Maharashtra
35	2018	Floods and Heavy Rains	Kerala & Uttar Pradesh

Source: India Meteorological Department, Ministry of Earth Sciences

Significance of the study:

Every year natural disasters kill around 90 000 people and affect close to 160 million people worldwide. Natural disasters include earthquakes, tsunamis, volcanic eruptions, landslides, hurricanes, floods, wildfires, heat waves and droughts. They have an immediate impact on human lives and often result in the destruction of the physical, biological and social environment of the affected people, thereby having a longer-term impact on their health, well-being and survival (World Health Organization).

The basic reason for the high vulnerability of the country to natural disasters is its unique geographical and geological situations. As far as the vulnerability to disaster is concerned, the four distinctive regions of the country i.e. Himalayan region, the alluvial plains, the hilly part of the peninsula, and the coastal zone have their own specific problems. While on one hand the Himalayan region is prone to disasters like earthquakes and landslides, the plain is affected by floods almost every year. The desert part of the country is affected by droughts and famine while the coastal zone susceptible to cyclones and storms (Affairs, 2011).

Statement of the problem:

A natural hazard is a threat of a naturally occurring event that will have a negative effect on humans. This negative effect is what we call a natural disaster. In other words

when the hazardous threat actually happens and harms humans, we call the event a natural disaster. Disasters affect communities in multiple ways that is, cause an unexpected number of deaths and wounded or sick people that exceed the local resources capacity to respond and require external aid, destroy health infrastructure not only affecting the immediate response, but also disrupting preventive activities, leading to long-term consequences with increased morbidity and mortality, have adverse effects on the environment that will increase the risk for infectious transmissible diseases and environmental hazards. This will impact morbidity, premature death, and future quality of life, affect the psychological and social behavior of the community, cause shortages of food, with severe nutritional consequences, cause large movements of the population, both spontaneous and organized, to areas where health services might not be able to handle the excessive requirement. The country is prone to disasters due to number of factors; both natural and human induced, including adverse geo climatic conditions, topographic features, environmental degradation, population growth, urbanization, industrialization, non scientific development practices etc. The factors either in original or by accelerating the intensity and frequency of disasters are responsible for heavy toll of human lives and disrupting the life supporting system in the country. In general, less developed countries are more vulnerable to natural hazards than are industrialized countries because of lack of understanding,

education, infrastructure, building codes, etc. Poverty also plays a role - since poverty leads to poor building structure, increased population density, and lack of communication and infrastructure.

Objective:

- To analyse the loss of humans life and property due to the Natural Disasters in India.

Related Studies:

A natural disaster is defined as an event of nature, which overwhelms local resources and threatens the function and safety of the community. Generally, disasters are the ultimate test of a community's emergency response capability. A thoughtful and well-organised emergency strategy will be able to quickly adjust and adapt to unforeseen situations and complications. An emergency strategy that is myopic and static in nature is doomed to fail as the disaster situation grows, becoming both complex and unpredictable (March, 2002).

It is a well known fact that natural disasters strike countries, both developed and developing, causing enormous destruction and creating human sufferings and producing negative impacts on national economies. Due to diverse geo-climatic conditions prevalent in different parts of the globe, different types of natural disasters like floods, droughts, earthquakes, cyclones, landslides, volcanoes, etc. strike according to the vulnerability of the area. India is considered as the world's most disaster prone country. It has witnessed devastating natural disasters in recent past

like droughts, floods, cyclones, earthquakes, landslides, etc (Gupta, 2009).

Natural disasters in India, many of them related to the climate of India, cause massive losses of Indian life and property. Droughts, flash floods, cyclones, avalanches, landslides brought on by torrential rains and snowstorms pose the greatest threats. Landslides are common in the Lower Himalayas. Parts of the Western Ghats also suffer from low-intensity landslides. Floods are the most common natural disaster in India. The heavy southwest monsoon rains cause the Brahmaputra and other rivers to distend their banks, often flooding surrounding areas. Though the floods provide rice paddy farmers with a largely dependable source of natural irrigation and fertilization, they can kill thousands and displace millions (Stephen, 2012).

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclone, earthquakes and landslides have been a recurrent phenomenon. The vulnerability in India is more compared to developed countries. This is resulting in huge loss in terms of human, financial, environmental and livelihood. At global level, there has been considerable concern over natural disasters. After Orissa super cyclone and Bhuj earthquake we realized the need to adopt multi disciplinary and multi sectoral approach and incorporation of risk reduction in the development plans and strategies. The new approach of Government of India proceeds from the conviction that development cannot be sustainable unless disaster mitigation is built in to the development process (Patil, 2012).

Natural disasters have severe impacts on the health and well-being of affected households. However, we find evidence that official damage cost assessments for floods and other natural disasters in Vietnam, where households have little or no insurance, clearly underestimate the total economic damage costs of these events as they do not include the welfare loss from mortality, morbidity and reduced well-being experienced by the households affected by the floods. This should send a message to the local communities and national authorities that higher investments in flood alleviation, reduction and adaptive measures can be justified since the social benefits of these measures in terms of avoided damage costs are higher than previously thought (**Ståle Navrud, 2012**).

In this study, human deaths due to six major natural hazards were analyzed for the period of 50 years, i.e., 1965–2014. In India, despite many preventive measures for natural hazards and disasters, its annual as well as decadal human casualties show increasing trend in the period of 1965–2004, although in last decades, it shows a decline trend, a matter of relief for policymakers as well as for disaster managers (**Prabhaker Mishra, 2016**).

A natural hazard is a threat of a naturally occurring that have a negative effect on humans. This negative effect is what we call a natural disaster. In other words when the hazardous threat actually happens and harms humans, we call the event a natural disaster. Natural Hazards (and the resulting disasters) are the result of naturally occurring processes that have operated throughout Earth's history (**Nelson, 2018**).

Natural disasters are not uncommon events, though they are very much unpredictable. Droughts, earthquakes, extreme temperatures, floods, cyclones, volcanic eruptions, wildfires and landslides are natural phenomena that occur from time to time. For example, the A.D.R.C. (A.D.R.C., 2009) reported that 399 natural disasters occurred worldwide in 2009, killing almost 16,000 people and affecting over 220 million people. The estimated amount of economic damage came close to US\$50 billion. By geographical region, Asia is the highest in all four accounts: 35.8 percent of the occurrence of disasters; 52.1 percent of the total number of people killed; 78.3 percent of the total number of people affected; and 44.9 percent of the amount of economic damage (**Jaharudin Padli, 2018**).

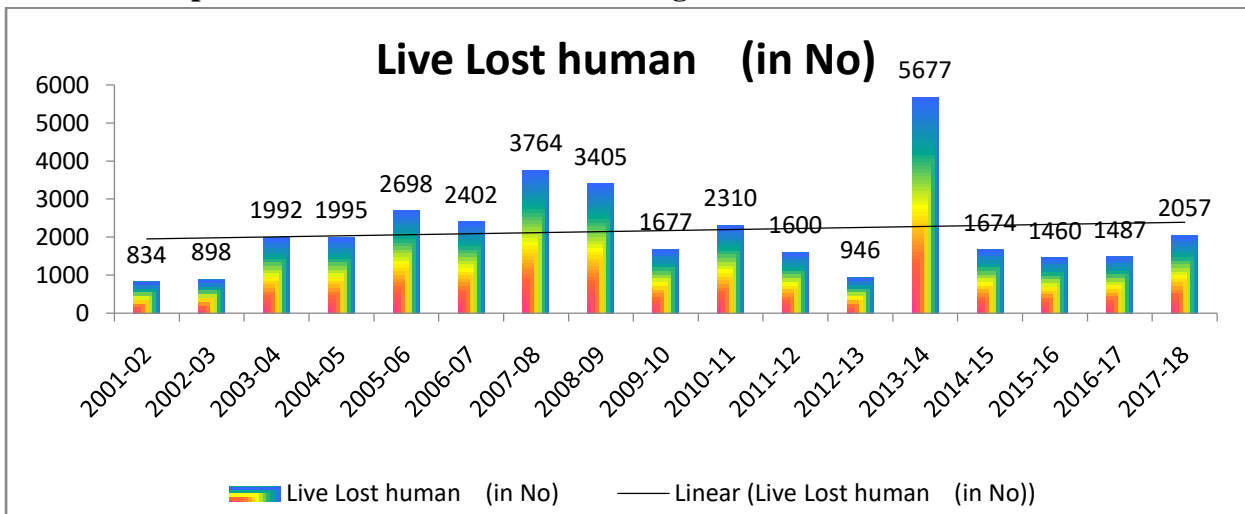
Methodology:

In order to fulfill the objectives of the study, the secondary data with respect to Major natural disasters in India, for the years (2001-2002 to 2017-2018) were obtained from India Meteorological Department, Ministry of Earth Sciences. The compiled data were arranged and analyzed for different statistical methods in the form of graphs which have been presented in subsequent pages with the help of MS-Excel Software.

Statement : Year-wise damage due to natural extreme events in India				
Year	Live Lost human (in No)	Cattle Lost (in No)	Houses damaged (in No)	Cropped areas affected (in Lakh hectares)
2001-02	834	21269	346878	18.72
2002-03	898	3729	462700	21.00
2003-04	1992	25393	682209	31.98
2004-05	1995	12389	1603300	32.53
2005-06	2698	110997	2120012	35.52
2006-07	2402	455619	1934680	70.87
2007-08	3764	119218	3527041	85.13
2008-09	3405	53833	1646905	35.56
2009-10	1677	128452	1359726	47.13
2010-11	2310	48778	1338619	46.25
2011-12	1600	9126	876168	18.87
2012-13	946	24293	667319	14.44
2013-14	5677	102998	1210227	63.75
2014-15	1674	92180	725390	26.85
2015-16	1460	59057	1313371	31.09
2016-17 (P)	1487	41965	546518	25.49
2017-18 (P)	2057	46488	915878	47.44
Source: Annual Reports 2016-17 & 2017-18, Ministry of Home Affairs				
(P) Provisional/अनंतिम as on 31.12.2016 and 31.12.2017				

The above table shows the statement of year-wise damage due to natural extreme events in India during the year 2001-2002 to 2017-2018.

Graph 1- No. of Live lost Human during the Year 2001-2002 to 2017-2018

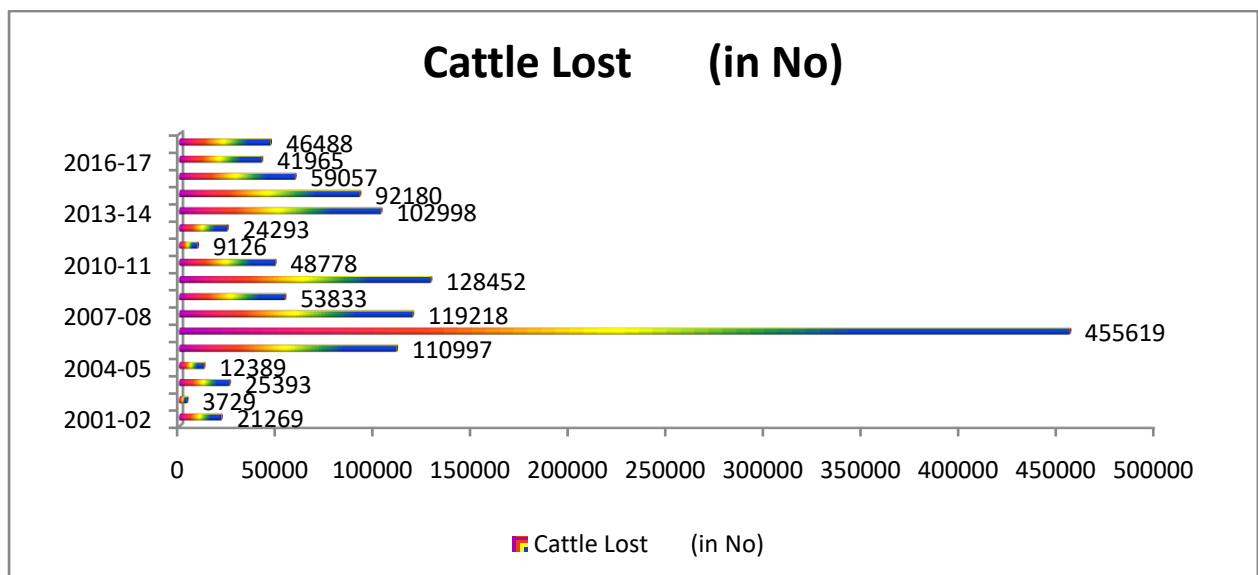


Source: India Meteorological Department, Ministry of Earth Sciences.

The above graph stated that the number of people who lost their lives due to the various natural disasters occurred during the year 2001-2002 to 2017-2018. In this context 2013-2014 caused by continuous torrential rainfall, the Kashmir region in September 2014 suffered from massive floods, leading to the death of around 500 people. Hundreds of people were trapped in their homes for days, without food and water. According to reports, around 2600 villages were affected in Jammu

and Kashmir. In Kashmir itself, 390 villages were completely submerged in water. Many parts of Srinagar were also submerged by the floods. Around 50 bridges were damaged across the state, and the damage of properties was estimated between Rs. 5000 cr and 6000 cr

Graph 2- No. of Cattle Lost during the Year 2001-2002 to 2017-2018

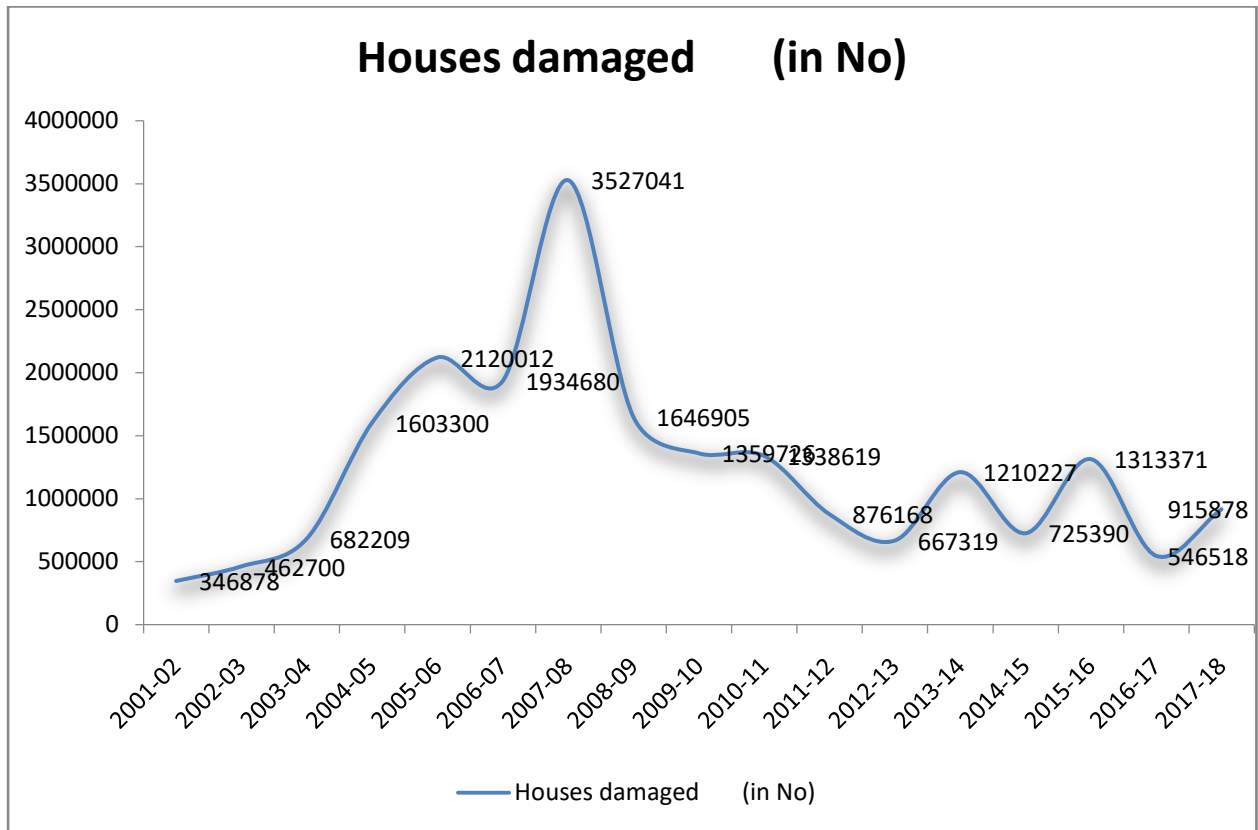


Source: India Meteorological Department, Ministry of Earth Sciences.

In the above graph it is mentioned that number of Cattle Lost during the Year 2001-2002 to 2017-2018. Natural disasters, mostly related to India’s climate, cause massive losses of life and property. Droughts, floods, cyclones, avalanches, landslides and snowstorms pose the greatest threats. Some reports say that every year nearly **1million cattle** are lost in floods through heavy rains. Around 55% of India’s buffaloes, 38% of its cattle, 41% of its goats and 47% of its pigs are vulnerable to floods, which regularly devastate farmlands. At the other extreme,

44% of the country’s livestock are perpetually affected by droughts. Cyclones also cause huge losses of animal life in India. Especially between the years 2006 to 2008 many cattle were lost as shown in data it is mainly due to the cause of flood.

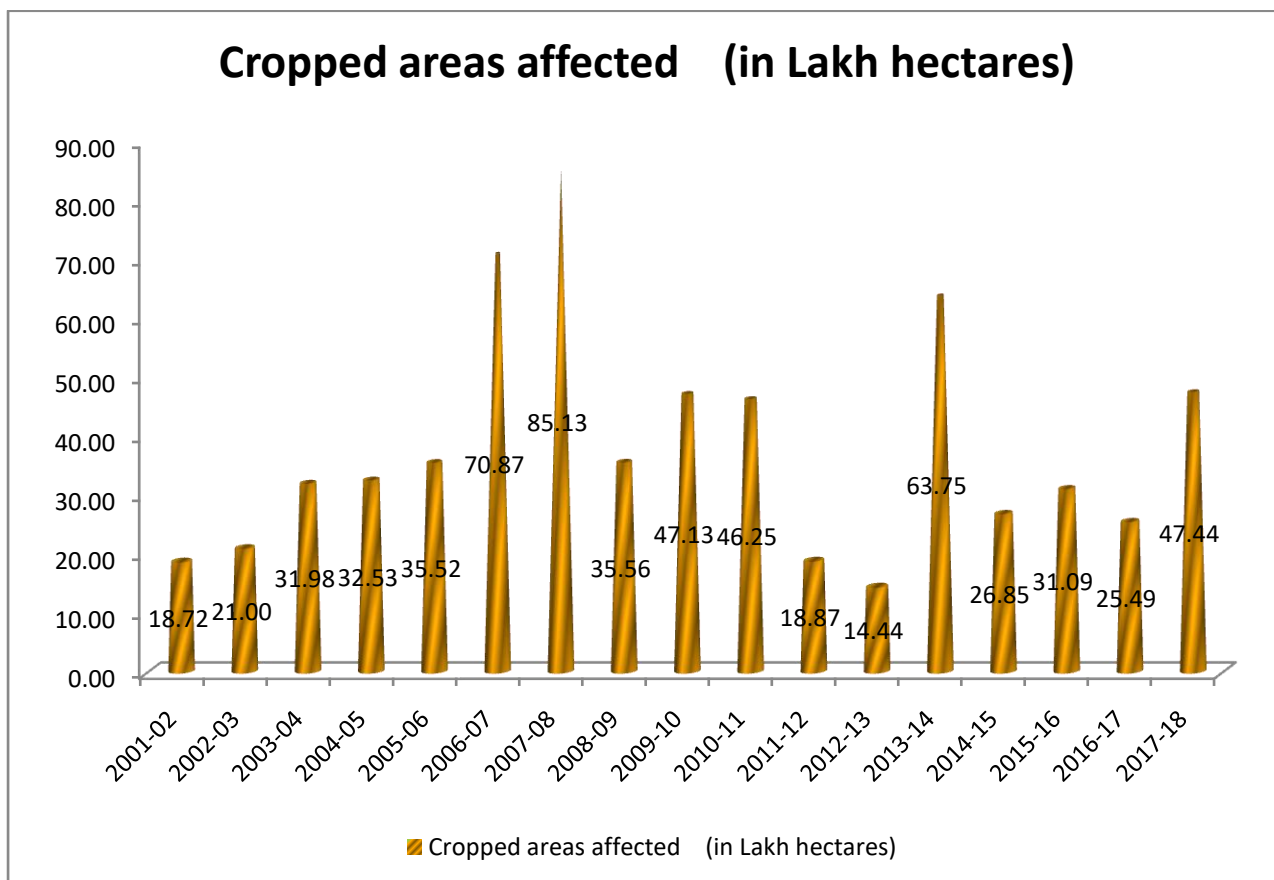
Graph 3- No. of Houses Damaged During the Year 2001-2002 to 2017-2018



Source: India Meteorological Department, Ministry of Earth Sciences.

The above graph shows that number of houses damaged over the period of 2001-2002 to 2017-2018. It shows that since early 2004s, the overall damages suffered due to floods and heavy rains have increased rapidly - years like 2015, 2017, 2013, 2009, 2006 and 2010 all saw damages exceeding Rs 19,000 crore. The given data show during 2001 to 2004 were number of houses damaged at low level and during 2006 to 2008 were number of houses damaged at high level. In this, high level of houses damages happened due to more floods and other natural calamities that occurred over that period of time.

Graph 4- No. of Cropped Areas Affected During the Year 2001-2002 to 2017-2018



Source: India Meteorological Department,
 Ministry of Earth Sciences.

The above graph explains that number of cropped areas affected during the year 2001-2002 to 2017-2018. As unseasonal showers affect cereal and vegetable crops in several parts of the country, a study by the United Nations’ Food and Agriculture Organization (FAO) shows that globally, nearly a quarter of the damage suffered because of natural disasters are borne by the agriculture sector in developing countries. Asia was the most affected region, with losses estimated at \$28 billion, followed by Africa at \$26 billion, the UN body said in the study titled The Impact of Natural Hazards and Disasters on Agriculture and Food and Nutrition Security:

A Call for Action to Build Resilient Livelihoods. The agriculture sector in India has also been under severe stress due to deficit monsoon during the kharif season and a slump in commodity prices. According to the FAO study, worldwide 2.5 billion people depend on agriculture. Small-scale farmers, herders, fishers and forest-dependent communities generate more than half of global agricultural production and are particularly at risk from disasters that destroy or damage harvests, equipment, supplies, livestock, seeds, crops and stored food. In this context 2006 to 2008 the number of cropped areas were affected by continuous torrential rainfall, massive floods and other natural disasters which occurred as high in the given data.

Conclusion:

Most of the world's worst disasters tend to occur between the Tropic of Cancer and Tropic of Capricorn. Coincidentally, this covers most of the Asian countries and some of them are poorer countries of the world. The disasters cause enormous destruction and human suffering in the developing countries. Environment degradation, which is often a result of economic development associated with human settlement pattern that ignore appropriate resource management increase the vulnerability of these countries to natural hazards and exacerbate their impact. The losses due to the natural disasters reduce the pace of sustained economic development and often lead to a heavy drain on available resources diverting them from pursuing development aims. Each country rich or poor should try to develop and maintain an effective disaster management capability appropriate to their needs. The management system must be seen as logical and desirable in the cost benefit terms and fit within the existing socio- economic system. It also underlines the necessity for co-ordinate international action in order to strengthen all aspects of disaster management wherever possible. Regional co-operation for effective disaster management system is needed broadly in the areas such as hazard and vulnerability analysis, human resource development, exchange of information through inter-net, disaster management network at the regional level, networking of the regional institutes etc., these can reduce the vulnerability, losses of life and property of humans and animals.

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