

# DISASTERS IN INDIA: AN ANTHROPOLOGICAL INSIGHT

Prasant Kumar Sahoo\* and Upali Aparajita\*\*

## Abstract

India, occupying 2.4 % of the geography of the earth and contributing 17.7 % to world population, is itself a subcontinent having possessed features of majority of the climatic zones found in the map of the world and all the landform structures including mountains, rivers, lakes, deserts, vast coastal lands and islands. It is this geomorphologic and climatic exposure of the country that is associated with major disasters in India. In this pretext, this paper is an analytical study based on secondary resources which highlight the vulnerabilities and disaster-prone areas of the country incorporating the dreaded disasters that have struck and devastated millions of lives and properties in different parts of India. It is here that an anthropological linkage has been established in that when disasters strike it's the human beings who suffer the most and it's also the humans who are the leading cause for these disasters to occur, for the anthropogenic factors contributed by the 'anthropos' in this anthropocene epoch are no less disastrous than the disaster themselves. In this context the major objective of this paper has been to holistically analyze the socio-cultural and politico-economic facets that exacerbate the human sufferings including the loss of precious human and animal lives; the culture loss in the midst of disasters; disaster displacement and migration; break-down of social structure; receding power of people to strike back etc. It concludes with a strong message to the society, especially those in the decision-making, to learn the lessons quickly and act accordingly.

\* Asst. Professor of Anthropology, FM (Autonomous) College, Balasore, Odisha.  
Email: sahoopk1989@gmail.com

\* Professor of Anthropology, Utkal University, Bhubaneswar. Email: Upali11@yahoo.com

Keywords: disasters, culture, vulnerability, climate, hazards, anthropogenic factors

## Introduction

India, due to its unique geo-climatic and socio-economic conditions, is vulnerable, in varying degrees, to floods, droughts, cyclones, tsunamis, earthquakes, urban flooding, landslides, avalanches and forest fire. Out of 36 States and Union Territories (UTs) in the country, 27 are disaster prone. 58.6% landmass is prone to earthquakes of moderate to very high intensity; 12% land is prone to flood and river erosion; out of 7,516 km coastline, 5,700 km is prone to cyclones and tsunamis; 68% of the cultivable land is vulnerable to drought, hilly areas are at risk from landslides and avalanches, and 15% of landmass is prone to landslides. A total of 5,161 Urban Local Bodies (ULBs) are prone to urban flooding. Fire incidents, industrial accidents and other manmade disasters involving chemical, biological and radioactive materials are additional hazards, which have underscored the need for strengthening mitigation, preparedness and response measures (NDMA, 2019).

Disaster risks in India are further compounded by increasing vulnerabilities related to changing demographics and socio-economic conditions, unplanned urbanization, and development within high risk zones, environmental degradation, climate change, geological hazards, epidemics and pandemics. Clearly, all these contribute to a situation where disasters seriously threaten India's economy, its population and sustainable development (NDMA, 2019).

## Vulnerability Profile of Disasters in India

India has been vulnerable, in varying degrees, to a large number of natural, as well as, human-made disasters on account of its unique geo-climatic and socio-economic conditions. India is one of the ten most disaster prone countries of the world. The country is prone to disasters due to a 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, accelerating the intensity and frequency of disasters are responsible for heavy toll of human lives and disrupting the life support system in the country.

As far as the vulnerability to disaster is concerned, the five

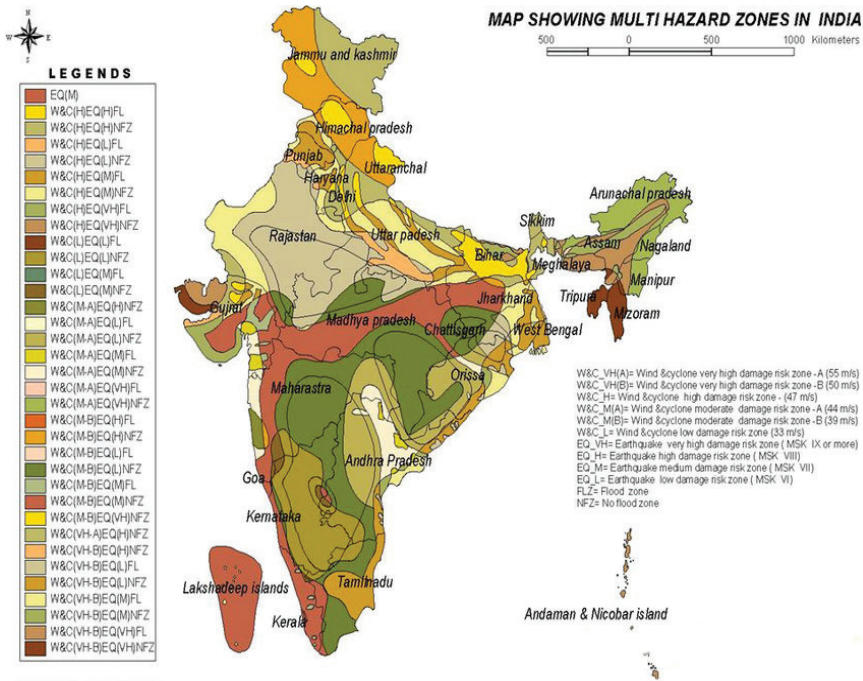


Fig. 1: Multi-hazard map of India

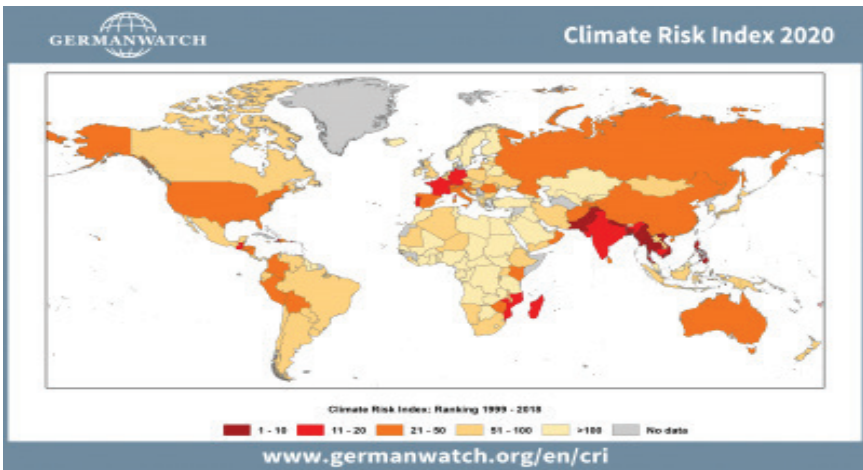


Fig. 2: Disaster-prone areas of the world  
(Source: www.germanwatch.org)

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. The natural geological setting of the country is the primary basic reason for its increased vulnerability. The geotectonic features of the Himalayan region and adjacent alluvial plains make the region susceptible to earthquakes, landslides, water erosion, etc. Though peninsular India is considered to be the most stable portions, but occasional earthquakes in the region show that geotectonic movements are still going on within its depth.

The tectonic features, characteristics of the Himalaya are prevalent in the alluvial plains of Indus, Ganges and Brahmaputra too, as the rocks lying below the alluvial plains are just extension of the Himalayan ranges only. Thus this region is also quite prone to seismic activities. As a result of various major river systems flowing from Himalaya and huge quantity of sediment brought by them, the area is also suffering from river channel siltation, resulting into frequent floods, especially in the plains of Uttar Pradesh and Bihar. The western part of the country, including Rajasthan, Gujarat and some parts of Maharashtra are hit very frequently by drought situation. If Monsoon worsens the situation spreads in other parts of the country too. The disturbance in the pressure conditions over oceans, results into cyclones in coastal regions. The Geotectonic movements going on in the ocean floor make the coastal region prone to tsunami disaster too.

The extreme weather conditions, huge quantity of ice and snow stored in the glaciers, etc. are other natural factors which make the country prone to various forms of disasters. Along with the natural factors discussed in the preceding text, various human induced activities like increasing demographic pressure, deteriorating environmental conditions, deforestation, unscientific development, faulty agricultural practices and grazing, unplanned urbanization, construction of large dams on river channels etc. are also responsible for accelerated impact and increase in frequency of disasters in the country.

### Common Types of Disasters in India

A High Power Committee on Disaster Management identified 32 types of disasters while Tsunami has been added in 2005 in this list. List of disasters as follows:

Table 1: Common type of disasters in India

<i>Water and climate related disasters</i>	<i>Geological related disasters</i>	<i>Chemical, industrial and nuclear related disasters</i>	<i>Accident related disasters</i>	<i>Biological related disasters</i>
Floods and drainage management	Landslides and mudflows	Chemical and industrial disasters	Forest fires	Biological disasters and epidemics
Cyclones	Earthquakes	Nuclear disasters	Urban fires	Pest attacks
Tornadoes and Hurricanes	Dam failure/ Dam bursts		Mine flooding	Cattle epidemics
Hailstorms	Mine disasters		Oil spills	Food poisoning
Cloud burst			Major building collapse	
Heat wave and Cold wave			Serial bomb blasts	
Snow avalanches			Festival related disasters	
Droughts			Electrical disasters and fires	
Sea erosion			Air, road and rail accidents	
Thunder and lightning			Boat Capsizing	
Tsunami			Village fire	

### Major Disasters in India

Besides, the proneness to several natural disasters, India too suffers from many man-made disasters like the Bhopal gas tragedy and other accidents. In this section, some major disasters have been highlighted to stress upon the myriad impacts these disasters put on the people and the country as a whole. For a better understanding

and to assess economic damage in current terms, recent incidents of disaster events have been incorporated.

Table 2: Major disaster events in India

<i>Sl no.</i>	<i>Year</i>	<i>Disasters</i>	<i>State</i>	<i>Impacts</i>
1.	1982	Bhopal gas tragedy	M.P	Over 500,000 people were exposed to methyl isocyanate gas. Immediate death toll was 2,259 and M.P Govt. in 2008 compensated to 3,787 killed (16,000 claimed) and 574,366 injured. A Govt. affidavit in 2006 stated the leak caused 558,125 injuries including 38,478 temporary and approximately 3,900 severely or permanently disabling injuries.
2.	1991	Uttarkashi earthquake	Uttarakhand	An earthquake of 6.8 magnitudes in Richter scale struck in Uttarkashi dist. of 45 sec. and killed app. 768 – 2,000 with more than 2000 injured. The total damage was at the cost of USD 60 million to the economy.
3.	1993	Latur earthquake	Maharashtra	A 6.2 magnitude earthquake in Richter scale damaged 52 villages in the Dist. of Latur and Osmanabad killing 9,748 people and injuring another 30,000. It cost the economy app. USD 280 million – 1.3 billion.
4.	1999	Super cyclone	Odisha	The most intense recorded tropical cyclone in the history of North Indian Ocean with a maximum wind speed of 260 km/h, this 5 – 6 m. surge brought sea water up to 35 km inland, inundating towns and villages and causing massive flooding including damaging 1.6 mn houses in Odisha. As per Govt. of India record, it took 9,887 lives while other estimates hold at 30,000 lives. It cost the economy USD 4.4 bn.

5.	2001	Bhuj earthquake	Gujarat	A strong earthquake with 7.7 magnitudes in Richter scale continuing for 22 seconds caused havoc in the dist. of Kutch, Bhuj and even Ahmadabad. It killed between 13,805 – 20023 people and injuring 166,800 with demolition of 340000 buildings. total property damaged was estimated at USD 7.5 bn.
6.	2004	Tsunami	Tamil Nadu, A.P, Kerala	An undersea mega thrust earthquake with a registered magnitude of 9.1 – 9.3 in Richter scale struck Indonesia and adjoining areas of India. A series of massive tsunami waves grew up as much as 100. The estimated death toll was 227,898 of which 12,405 were in India. Similarly the no. of missing population was 43,786 including 3874 in India and displaced around 1,740,000 people, with billions of economic loss.
7.	2005	Avalanche	J&K	The February winter, known as <i>Chila-e-Khored</i> , turned to be devastating and resulted in avalanches with a 10 – 16 ft high receding snow killing around 300 people and many feared to have been buried and hundreds missing, including many soldiers of ITBP and Rashtriya Rifles.
8.	2005	Mumbai flood	Maharashtra	A record 944 mm rainfall caused distress in Mumbai creating artificial flooding in the roads, railway tracks and choked the sewage system. It killed 1094 people with an economic loss of Rs. 5.5 bn.
9.	2013	Cloud burst and flash flood	Uttarakhand	Hailed as the country's worst natural disaster since 2004 tsunami, the mid-day cloudburst struck Uttarakhand and adjoining

				states when two glaciers – <i>Chorabari</i> and <i>Milan</i> glaciers burst, causing flash floods and killed 6,054 lives. In all 4,550 villages were severely affected with over 300000 pilgrims trapped in the valleys. The damage estimated to be around Rs. 50,000 crore in infrastructure alone.
10.	2014	Floods	J&K	Torrential rains led to flash flooding killing 277 people in Kashmir region. A total of 390 villages were completely submerged while 2,600 villages were affected overall.
11.	2017	Floods	Assam, Bihar and Gujarat	One of the worst floods in 29 years in the state of Assam struck, it killed 154 people. As the most flood-prone state, the 2017 flood in Bihar had broken the 9-year record in the state with loss of 514 deaths as more than 76 % population in north Bihar lives under the recurring threat of flood devastation. Similarly, 224 people were killed in Gujarat. In all, the year 2017 killed more than 1000 people in flooding events in the country.
12.	2018	Floods	Kerala	Heavy monsoonal rain created the worst flood sine the 1924 great flood in state. Over 483 people died and 140 went missing. More than 1 million people evacuated. Property damaged estimated to be of USD 5.6 bn.
13.	2019	Cyclone <i>Fani</i>	Odisha	The strongest tropical cyclone to strike since the 1999 super cyclone, the extremely severe cyclonic storm <i>Fani</i> , with max. wind speed of 280 km/h killed 89 lives in total but cost the economy a colossal loss of USD 8.1 bn.
14.	2019	Heat waves	Bihar	Mid-May to mid-June 2019 recorded highest ever temperature in India (highest - 50.8° C at Churu,



				Rajasthan). By 12 June 2019, 32 days were classified as heat waves. 184 people died in Bihar only.
15.	2020	Covid- 19 pandemic	Pan-India	With the spread of SARS-Cov-2, this has been the most disastrous event in history of the world having being killed 3,453,111 worldwide including 195,484 in India by 26 April, 2021. Global GDP was estimated to be around 87.55 trillion USD in 2019. Covid-19 led to a 4.5 % drop in economic growth amounting to almost 3.94 trillion USD in 2020 and to cost 2 trillion in 2021 as per UNCTAD. In India, for the first time, the GDP slumped to minus 24 % in Q1 FY21, costing it with 26 billion USD during the lockdown period.

### An Anthropological Analysis

The above discussion on various aspects of disasters has emphasized upon the different dimensions of the natural hazards and its geo-physical vulnerabilities. But disasters occur in societies and not in nature (Oliver-Smith and Hoffman, 1999) manifesting clearly the intimate linkage between the causal factors of disasters and the societal-environmental relations. Taking a political ecological approach, Oliver-Smith and Hoffman view that the conjunction of a human population and a potentially destructive agent does not inevitably produce a disaster; rather the society's vulnerability – its adaptive failure – is an essential element of a disaster. Consequently, a disaster is made inevitable by a historically produced pattern of vulnerability, evidenced in the location, infrastructure, socio-political structure, production patterns, and ideology that characterizes a society. In other words, 'disasters are not bolts from the blue but take place through the conjuncture of two factors: a human population and a potentially destructive agent that is a part of the total ecological system, including all natural, modified and constructed features' (Oliver-Smith and Hoffman, 2002). Thus the crux of their argument is that it's through the conditioned conjuncture of a community and hazard that a disaster takes place. Anthropology seeks to examine how risks and disasters both influence and are products of human

systems, rather than representing simply isolated, spontaneous, or unpredictable events. There is especial concern with how cultural systems figure at the center of that society's disaster vulnerability, preparedness, mobilization, and prevention. Understanding these cultural systems figures at the center of understanding both the contributing causes to disasters as well as the collective responses to them (Henry, 2005). The detailed analysis would mainly concentrate on five broad areas where anthropological contribution can be highlighted from myriad dimensions, such as loss of human and animal lives, cultural loss, break-down of social structural norms, receding power of the communities to subsequent hazardous events, disaster displacement and migration and the refugee crisis etc.

The first and foremost damage that a disaster results into is the loss of precious human lives. If we analyse the deaths accruing due to the disasters in the last decade we find that thousands of people have lost their lives per year. This is not at all acceptable to a country aiming to be a super power where the disaster preparedness has not been up to mark and several lacunae exists. The data also shows that the poor states lagging in various socio-economic indicators and those that are hilly and inaccessible are the major laggards in disaster preparedness. The statistics given below vindicates the sorry state of affairs resulting in to high no of deaths from different disastrous events.

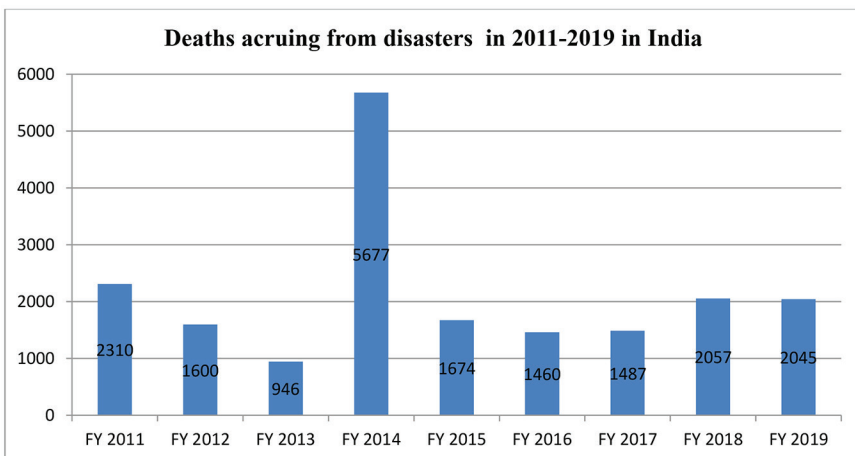


Fig. 3: No of deaths due to various disasters in India from 2011 to 2019  
(Source: [www.statista.com](http://www.statista.com))

Not only loss of human lives, the disastrous consequences also result in prominent economic damages to properties and other losses like livestock, structures, buildings etc. The table below indicates a huge loss of national property on disaster events. It's estimated that a total of Rs. 91,086 million has been washed away from the national income of the country in the 1951-2017 period which also accounts 1,723,126 deaths from various disasters, one of the highest in the world. On the other hand, millions of affected people are pushed to abject poverty and economic marginalization. This leads to gross social inequality and increase in criminal activities.

Table 3: An overall picture of disasters and its impact in India from 1951-2017

<i>Disasters</i>	<i>Events count</i>	<i>Total deaths</i>	<i>Total affected</i>	<i>Total damage (in millions)</i>
Drought	13	1,500,320	1,391,841,000	5441
Earthquake	29	51,915	285,656,623	5297
Epidemics	63	20,874	421,473	
Extreme temperature	59	17,600		544
Floods	283	70,343	861,462,744	58,332
Landslide/ avalanches	51	5,083	3,848,421	54
Storm	166	56,991	106,839,232	21,416
Total	664	1,723,126	2,650,069,743	91,086

(Source: www.moneycontrol.com)

### *Differential exposure to disasters*

It is the culture that determines that some people within the social system are more vulnerable to disasters than others as per ethnic communities, religious or linguistics groups, etc. For example, the mortality from the 1976 earthquake in Guatemala so disproportionately impacted the poor that the disaster was called a "class-quake" (Blaikie et al. 1994). Pre-disaster inequalities within social relationships have been shown to exacerbate tensions and discrimination during times of crisis or relief (Jackson 2003). Torry (1986), for instance, showed how pre-disaster religiously sanctioned inequality existing in India structured the provision of relief during famine in such ways that reinforced the cultural model of customary

discrimination. Anthropology has sought ways to call attention to (and alleviate) structural conditions of pre disaster vulnerability that predispose some communities to experience disaster or that increase the severity of disaster impact. Such conditions include gender inequality, global inequities, endemic poverty, racism, a history of colonial exploitation, imbalances of trade, and underdevelopment. The developing world experiences three times the disaster-induced death rates of the developed world (UNDRO 1984).

*Break down of the social structural norms (pre and post disaster)*

Hazards and disasters challenge the structure and organization of society. Anthropology, therefore, examines the behaviors of individual actors and groups within the events surrounding a disaster. The anthropology of disaster response has focused on changes occurring within cultural institutions like religion, ritual, economic organization, and politics, especially concerning the relative degrees of local cooperation or conflict, the ability of local institutions to mitigate the impact of a disaster, and the differential capabilities of response due to ethnicity, gender, age, and socioeconomic status (Das 1997). Anthropologists have come to use the analytical term “embodiment” to focus on the complex meanings of disaster-related trauma that become manifest in individuals, as they lived experiences of disaster, and the creative ways that survivors use to comprehend the trauma done to their lives, and attempt to move on (Kleinman et al. 1997).

*Receding power of the people to strike back in subsequent disasters*

Anthropologists have highlighted psychological traumas such as Post-Traumatic-Stress-Disorder (PTSD) to represent universal “human” responses to extremely traumatic situations (Henry, 2005). Torry (1986), for example, studying Hindu responses to famine, notes that social inequalities situated within caste or other sanctioned structures can produce marked inequalities in access to resources, and the unequal distribution of relief items. Oliver-Smith (1979), writing about immediate responses to avalanche and earthquake in Peru, notes that previously existing stratifications like class and ethnicity can temporarily disappear in a short-lived wave of altruism. All these indicate that faced with repeated disasters, as in India, it contracts the fighting spirit of the natives and again to stand out to withstand the subsequent disasters is not easy. The capability of

community vis-s-vis disaster gradually lessens the resilience and this forms the most ill effects and negative ramifications.

### *Post-disaster cultural change*

Since the beginning of the discipline, anthropologists have been interested in how people draw upon and alter their belief systems in efforts to come to terms with events of catastrophic change, violence, loss, resettlement, and even humanitarian relief (Lindstrom, 1993). These events can involve changes in social institutions like religious beliefs or customs, social organization, attitudes and values, even marriage institutions (Henry, 2005). Suffering results not so much from a “breakdown” in the proper functioning of the social order, but rather is itself a painful part of the social organization. In Sudan, for example, Van Arsdale (1989) coins the term “adaptive flux” to refer to the indigenous self-help tactics and long-term coping strategies that have evolved to enable people to survive under fluctuating, harsh, and erratic conditions in what is a socio-economically and geographically peripheral area. People may activate migration networks that send some family members to urban areas, farmers may enact systems of crop rotations or sharing of draft animals to increase the chance of a successful harvest, or they may rely on grassroots political councils to mobilize food resources or security during scarcity or political instability.

### *Disaster displacement and migration*

One of the most important corollaries post disaster is the people displaced due to these events. It’s a situation where people are forced to leave their homes or places of habitual residence as a result of a disaster or in order to avoid the impact of an immediate and foreseeable natural hazard. Such displacement results from the fact that affected persons are either exposed to a natural hazard in a situation where they are too vulnerable and lack the resilience to withstand the impacts of that hazard. ‘Climate Refuge’ is often being used in the media to define a person displaced in the context of disasters like droughts, sea level rise as well as extreme weather events like hurricanes, tsunamis or earthquakes. Climate change and natural disasters cause people to migrate if they do not have alternative mitigation strategies, are forced to move because of the shock, and can afford migration costs. Consequently, disaster management requires a holistic approach, where migration and

remittances, which are private mechanisms, should be considered along with public intervention. In addition to helping households build resilience by, for example, investing in infrastructure in vulnerable areas, providing social protection, and allocating aid rapidly and efficiently, better world governance is needed to reduce the human impact on climate change.

Infectious disease rates may be higher in camps, despite aggressive, centralized public health interventions; nutritional problems may be higher, especially where there is no individual access to means of subsistence, and environmental damage is greater. Morbidity and mortality may be underreported, as camp dwellers have an interest in concealing any drop in their numbers in order to maintain relief-supply entitlements. There may be further “invisible” damages from introducing a foreign aid system, which undermines local values of sharing, cooperation, or hospitality that hold society together. Yet despite this research, local and international agencies, usually under UN auspices, use relief supplies to encourage the settlement of displaced people into camps, with the rationale that centralized groups of displaced people are easier to distinguish from the general population and manage.

### Anthropological Measures

Anthropology offers the field of disaster studies broad, comparative, contextual, and cross-cultural perspectives, particularly from its extensive work in the developing world (Henry, 2005). Its holistic approach frames disasters within their social, cultural, political, economic, and environmental relationships, from the human behaviors that can cause or influence the severity of disaster, to culturally informed adaptations and responses, to the relative social vulnerabilities that mitigate or magnify a disaster’s impact. Anthropologists have emphasized local models of risk construction, and stressed the importance of understanding the socio-cultural context of judgments and indigenous linguistic categories and behaviors about what is dangerous and what is not. They note that public perceptions about risk and acceptability are shared constructs; therefore, understanding how people think about and choose between risks must be based on the study of culturally-informed values as well as their social context of poverty or power (Cernea 2000). Below are some of the anthropologically based measures that can be taken into consideration.

First, it is pertinent to highlight here that many tribal and

indigenous societies have better adapted to the local environmental set up based on the practice of their own knowledge, also known as ethno-science or ethno-semantics or people's knowledge. What we need to emphasize that this knowledge should be more systematically explored and documented by trained social and environmental scientists before they get vanished from the store of knowledge and incorporating this in the modern day scientific parlance would go a long way in adapting and mitigating some of the deadly natural hazards. The successful models of local adaptation should be made more popular and can be transferred and implemented to similar environmental circumstances for disaster risk reductions making it imperative that no one-size-fit-all mechanism works for different social and ecological situations. Moreover the incorporation of indigenous models into the science based models would encourage the community participation as the locals are well versed and acquainted with their own knowledge systems. Village level expert groups on local knowledge should be set up which will be the first point of giving response to any disasters and they can better mobilize their people during pre and post disasters periods. Thus there would be no forced evacuation and people would *suo moto* organize themselves and it will be a demand driven process of disaster management and mitigation. Lastly formalizing this knowledge in the school and college curricula is the most vital aspect of environmental education. Also self defense courses in schools and colleges against disasters and simulated drills would help materialize an enhanced understanding of disasters by students as they too can be helping hands during disasters.

Second, in this hue and cry, if one community who has least contribution to global warming, it's the tribal and indigenous population. The historical and socio-cultural-politico-economic marginalization of the indigenous communities has added a new type of marginalization, called environmental/ecological marginalization. For the forests and mountains, the rivers and streams are not only the life-support system but also constitute the very part of the culture. In this context, having the views of these people, in this discourse, has become more significant, due to their: least contribution to the emission of GHGs, the indigenous knowledge (IK) system to counter climate change and biodiversity conservation. For instance, the FAO has accorded Globally Important Agricultural Heritage System (GIAHS) status to the traditional agricultural system being practiced in Koraput of Odisha. Besides, under the CBD Nagoya protocol tribal are not properly compensated on IK leading to bio-piracy and bio-

prospecting. They can play greater roles in the Clean Development Mechanisms (CDMs) and carbon credits under UNFCCC.

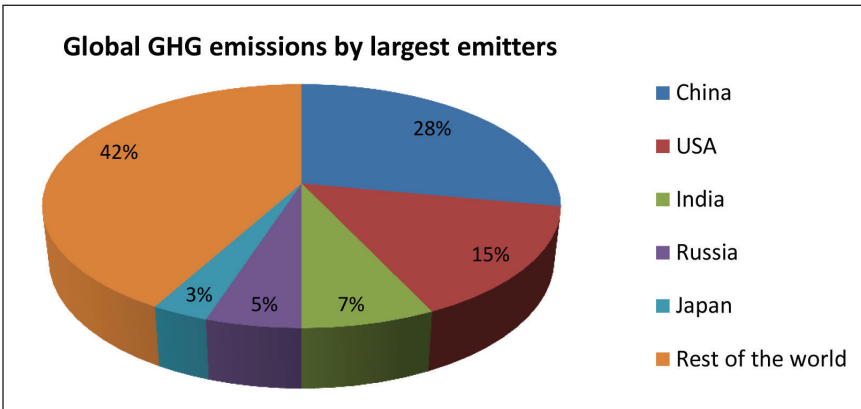
Third, culture, in some cases, is a factor for the survival of the communities from disasters, whereas in other situations, culture act as a barrier for effective Disaster Risk Reduction (DRR) activities (Kalatunga, 2006). Hence community-based disaster risk reduction activities as a mechanism to integrate disaster with culture for effectively managing disaster risks and holds that anthropologists can greatly contribute in such an endeavour. Odisha, for instance, is synonymous as a land of frequent disasters including cyclones, sea storms, floods, coastal erosion and droughts. Having been geographically situated in the eastern coast with three geomorphologic divisions, the state withstands at least one of the severe natural disasters every year. Of these which is of utmost important are the recent frequent cyclones – starting from very severe cyclonic storm *Phailin* to the extremely severe cyclonic storm *Fani*, reminding the Super Cyclone of 1999 and making the capital city of Bhubaneswar again dark for days after a long twenty years. However, all the people with oneness have withstood the vagaries of nature and have shown remarkable resistance to this ‘New Normal’. At the same time the people have developed a sound coping mechanism to adapt and to some extent mitigate the erratic climatic phenomena thanks to the developed weather forecasting, real time warning, advanced planning, evacuation process and restoration operations. All this teaches us one thing, “Yes, we as a community can”.

Fourth, this adaptation to disaster has myriad linkages with socio-economic-political factors and govt. intervention. During cyclone *Phailin*, the State Govt. evacuated over a million people, the highest ever evacuation in India in last three decades thereby minimizing the casualties as compared to the Super cyclone of 1999. But how could the Govt. able to persuade the people to shift to safer places during the time of pre and post cyclonic phases? According to Das (2019), cyclone evacuation being a socio-cultural process, public response to risk communication is linked to perceived risk (understanding, belief, and personalization), where perceived risk is defined to be a function of the features of warning information received (specificity, consistency, certainty, accuracy, clarity, channel, frequency, source) and personal characteristics of the warning recipient (demographics, knowledge, experience, resources, social network, cognition). Empirical observations show that literacy levels, presence of children, disaster awareness and better economic conditions and female head of the family propel more compliance and acceptance in



evacuation process. Govt. intervention such as formation of Cyclone Shelter Management and Maintenance Committee (CSMMC) in Odisha in each shelter village to manage the shelters and mobilize the community members for annual awareness-generating cyclone drills has been guiding policy and innovative instrument for both administration and people at large. Other village level groups like village task force, village volunteers and disaster management teams also help mobilize people.

Fifth, in the politics of global climate change discourse, the majority of the human populations were not responsible for the dramatic resurgence in Green House Gases (GHGs) neither is they emitting now; rather it's the result of Industrial Revolution post 1850s. Taking this historically disproportionate account of emission into consideration, today the developing countries, including India, demand common but differentiated responsibilities (CBDRs). And they are perfectly right in demanding so. However with Paris Climate Pact, 2015, countries have submitted their own Intended Nationally Determined Contributions (INDCs) thereby subverting the equality principle that has been figured out here as per the largest emitters.



Having said that, the current pace of reducing the GHGs emission is not enough to keep the average temperature down to 2° C by the end of this century. It is estimated that even a rise of 1 to 1.5 ° C would be disastrous due to the potential global warming and the consequent sea level rise which will submerge millions of hectare of lands in coastal and island nations. Global average long-term concentration of CO<sub>2</sub> measured in parts per million (ppm) was 417.64 ppm in March 2021 which it was 414.74 ppm in March 2010 making the March of 2021 the 8th warmest March since 1880. With

this high rise of CO<sub>2</sub> concentrations, global temperature would in all probability cross 2 ° C by end of this century. The world needs to act on urgent basis to save the civilization.

Lastly, prioritizing the areas where we lack predominantly. In India, though disasters occur frequently due to geo-climatological as well as anthropogenic factors, why we suffer more in comparison to other developing countries is that here exist severe governance issues. Attacked by regular cyclones, for instance, we have not yet able to reduce the colossal loss of lives and property in managing the cyclones. List 10 most disastrous cyclones are given with their economic impact on the country.

Table 4: 10 Disastrous cyclones in India and its economic damage

<i>Sl. no.</i>	<i>Cyclones</i>	<i>Year</i>	<i>Economic damage (in 2019 USD)</i>
1.	<i>Amphan</i>	2020	13.9 billion
2.	<i>Nargis</i>	2018	15.3 billion
3.	<i>Fani</i>	2019	8.1 billion
4.	<i>BOB 06</i>	1999	6.81 billion
5.	<i>Gonu</i>	2007	5.43 billion
6.	<i>Phailin</i>	2013	4.68 billion
7.	<i>Huhud</i>	2014	3.87 billion
8.	<i>Vardah</i>	2016	3.6 billion
9.	<i>ARB 02</i>	1998	4.71 billion
10.	<i>Sidr</i>	2007	2.93 billion
	Total		69.33 billion

The above statistic shows that in the last two decades, around 69.33 billion USD has been destroyed in 10 cyclones only, let alone the regular floods and other disasters in India. This leads to asymmetrical effect on the poor and the downtrodden because the coping mechanism for them has been found to be inadequate. Hence what's being suggested is that we need improve the physical and social infrastructure development in the disaster prone areas and proper information should be supplied to them for an informed decision making on real time basis. its estimated that a small amount of expenditure in mitigation measures would protect thousands of lives and save billions worth of property.

## Summary and Conclusion

We can't change our geography but can modify the socio-cultural parameters to safeguard the lives and livelihood of the millions of people. The above described disasters along with the geo-bio-psycho-social vulnerabilities that India currently faced with can be to a large extent subverted and necessary capacity building and infrastructural development can be strengthened at community level with their participation. Therefore a holistic approach is needed to examine the complex interrelationships between humans, culture, and their environment, from the human actions that may cause or influence the severity of disaster, to the position of social vulnerability that defines disaster impact, to the range of socio-cultural adaptations and responses, including the impact of aid and the infusion of donor money. In this context, anthropology has sought ways to alleviate the structural conditions of pre-disaster vulnerability that predispose individuals, groups, or societies to experience disaster, or that increase the severity of disaster's impact. The relief paradigm is criticized for being externally managed and non-participatory, or for failing to recognize and affirm local institutions or skills with which communities might be involved in the management of their own disasters. They posit that a more developmental approach is ultimately more beneficial in helping prevent future disasters, in that development is more likely to target the structural forces attributed to be at the root causes of vulnerability (Henry, 2005). What's more worrisome is that the State has given least priority to the role of indigenous knowledge. The govt. should formulate an expert Council of Indigenous Knowledge System consisting of anthropologists, ecologists, environmental experts, social activists and representatives from NGOs as members under the Ministry of Science and Technology. Lastly, more critical research is the need of the hour to as to how social scientists can professionally yet ethically conduct research during and in the midst of disasters which would go a long way to precisely devise plans for better mitigation and management of disasters effectively.

## References

- Anandha Kumar, K. J, A. Walia and S. Chaturvedi. 2012. *India Disaster Report, 2011*. NIDM, New Delhi.
- Blaikie, P., T. Cannon, I. Davis and B. Wisner. 1994. *At Risk: Natural Hazards, People's Vulnerability, and Disasters*. London: Routledge.
- Cernea, M. 2000. "Risks, Safeguards, and Reconstruction: a Model for

- Population Displacement and Resettlement.” Pp. 11-55 in *Risk and Reconstruction Experiences of Settlers and Refugees*, edited by M. Cernea and C. McDowell. Washington, D.C.: The World Bank.
- Das, V. 1997. *Social Suffering*. Berkeley: University of California Press.
- Das, s. 2019. Evaluating climate Change Adaptation through Evacuation Decisions: a case study of Cyclone Management of India. *Climate Change*, 151: 291-305
- Jackson, S. 2003 Freeze/ Thaw: Aid, Intervention, Uncertainty, and Violence in the Kivus, Eastern DR Congo. Paper presented at the annual meetings of the American Anthropological Society, 102<sup>nd</sup>. November 19, 2003. Chicago, IL.
- Henry, D. 2005. Anthropological Contributions to the Study of Disasters. In *Disciplines, Disasters and Emergency Management: The Convergence and Divergence of Concepts, Issues and Trends from the Research Literature*. D. McEntire and W. Blanchard, eds. Emmitsburg, Maryland: Federal Emergency Management Agency. <http://training.fema.gov/emiweb/edu/ddemtextbook.asp>.
- Kleinman, A. and J. Kleinman. 1997. “The Appeal of Experience; the Dismay of Images: Cultural Appropriations of Suffering in Out Times.” Pp. 1-24 in *Social Suffering*, edited by A. Kleinman, V. Das, and M. Lock. Berkeley: University of California Press.
- Lindstrom L. 1993. *Cargo Cult: Strange Stories of Desire from Melanesia and Beyond*. Honolulu: University of Hawaii Press.
- NDMA. 2011. *India Disaster Profile*. GoI, New Delhi.
- NDMA. 2019. *Annual Report 2018-2019*. GoI, New Delhi.
- Torry, W. 1986. “Morality and Harm: Hindu Peasant Adjustments to Famines.” *Social Science Information* 25: 125-160.
- Patankar, A. 2019. *Impacts of Natural Disasters on Households and Small Businesses in India*. ADB, Manila.
- Torry, W. 1986. “Morality and Harm: Hindu Peasant Adjustments to Famines.” *Social Science Information* 25: 125-160.
- United Nations Disaster-Relief Coordinator (UNDRO). 1984. *Disaster Prevention and Mitigation, Vol. II, Preparedness Aspects*. New York: United Nations.
- Viswanathan, V. and A. Sharma. 2019. *The Face of Disasters 2019*. New Delhi: SEEDS.
- <https://disasterdisplacement.org/the-platform/key-definitions>
- <https://www.moneycontrol.com/news/india/data-story-over-75000-deaths-rs-4-lakh-crore-lost-the-cost-of-natural-disasters-in-india-since-2000-2456611.html>.
- <https://www.internal-displacement.org/sites/default/files/publications/documents/201905-disaster-displacement-global-review-2008-2018.pdf>
- <https://www.nrc.no/globalassets/pdf/briefing-notes/disaster-displacement-and-disaster-risk-reduction/disaster-displacement-and-disaster-risk-reduction-2019.pdf>

<https://reliefweb.int/report/world/disaster-displacement-and-disaster-risk-reduction-briefing-paper-may-2019>

<https://www.statista.com/statistics/1007056/india-number-of-deaths-due-to-natural-disasters/>.

<https://www.statista.com/chart/2736/people-displaced-by-disasters/>

<https://www.germanwatch.org/en/17307>

<https://wol.iza.org/articles/climate-change-natural-disasters-and-migration/long>