



THE IMPACT OF NATURAL DISASTERS ON DEVELOPMENT OF INDIA

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ABSTRACT

This paper focuses on the linkage between India's economic development and natural disasters, and ventures to outline a framework for thinking about this connection. The short-term effects of natural disasters are well documented, however the long-run impact of disasters on economic growth and development continue to be a subject of debate. The paper outlines the available knowledge of the long-term economic impact of natural disasters on the Indian economic development. It also extract links between disasters, resource management and conflict. The paper argues that India being a developing country, where disasters happen to occur with remarkable frequency, need to develop more sturdy adaptation and responding capability to natural disasters as part of development planning. The paper highlights the need for more work on the relation between climate change and the frequency of disasters (climate change being the ultimate disaster, aggravates natural disasters and its frequency) and a brand new way of looking at natural disaster resilience as an essential part of, rather than as an add-on to economic growth and development strategy.

KEYWORDS: *Development of India, Natural Disasters, economic development*

INTRODUCTION

The rising Costs and Frequency of Natural Disasters in India, the risks related to natural hazards have increased alarmingly in recent years, with the number of recorded natural disasters having increased exponentially since 1947. Since the year 2000 more than 300 disasters including earthquake, drought, epidemics, floods, storms, landslides and extreme temperatures have occurred in India, leading to 76,031 casualties till 2017, according to the International Disaster Database(IDD). More than 1 billion people have suffered owing to disasters. The estimated damage in these 17 years amounts to USD 63.6 billion(Rs 4,06,035 crore), based on the data. Natural disasters are an increasing hindrance to the growth and development of the many developing countries, and must be addressed. It has always been a subject of debate that how much of the growing vulnerability to disasters is due to the actions of humans and how much due to nature itself. This paper states that disasters are largely man-made and that development and disasters are highly interlinked. Moreover, while much attention is placed on very visible catastrophic events such as earthquakes, tsunamis and floods, we should be more aware that disasters are also often the slow escalation of human pressure on natural resources which leads to natural resource degradation and higher frequency of disasters such as famines or floods. And while many disasters are often considered a result of under-development, many are also the product of decisions made on growth and development strategies. The frequency of disasters caused by other categories, volcano, earthquakes, pest-infestation, slides has not changed remarkably, although there is a small but perceivable increase in droughts. The migration of people into more disaster-prone regions could be one reason for an increase in natural disasters and casualties. More vexatious is the speculation that one testimony of climate change is an increased frequency of natural disasters. Over the years, Category 4 and 5 windstorms have been increasing. Their disastrous power has also surged because of shifts in the concentration of communities to the coastal areas and as a consequence of haphazard coastal development and also due to loss of natural shelter from mangroves. Rising Sea level is also a significant cause of coastal erosion. Sea level is increasing rapidly due to the melting of ice caps and also because of rising temperature of the Ocean itself. Rising floods are a hydro-metrological phenomenon but are also associated to human developmental behaviour like deforestation, and peri-urban settlement in areas without sufficient drainage, etc. There is also rising proof that there are connections among conflict, preservation and calamities. As we know that our resources are limited, so there is a huge burden on them which many a times lead to



conflicts. While enough focus has been on the rush for natural riches like forests, diamonds, valuable oils, etc as an origin of conflict. Rivalry and uncertainty arise from the calamities which take place because as a result of them, we face lack of resources and expanded susceptibility. It is simple to explain the short-term economic impacts of the natural disasters whereas the long-term economic impact of these stands ambiguous. There is a mutual impact of growth and susceptibility displaying the probability of heinous circle: a highly weak and poverty-stricken country may go through frequent disasters due to which its growth takes place very slowly and thus prevents it from developing its resilience.

THE SHORT-TERM AND LONG-TERM IMPACT OF NATURAL DISASTERS

Natural Disasters have a catastrophic effect on people, property and economy.

They tend to have a physical, mental and economical impact on the country and its population. As far as the short term impact is concerned, disasters have both positive and negative effects on an economy. In the long term, natural disasters come with the pain of loss of life as well as economic hardships.

Short Term Impact

Disasters may destroy various assets of businesses varying from buildings and equipment to even their workforce. When businesses suffer, they tend to impact market trade and buying power of consumers as well. After getting hit by a natural disaster, it takes months for a business to return to its normal functioning as they have to wait for insurance claims and for its cash flow to return to normal.

Small businesses suffer from severe negative impact of natural disasters as compared to large businesses since they do not have large capital resources to fund themselves. They take longer to recover and even lose customer trust. This is a major reason behind the shutting off of small businesses just within a short span of time after being hit by a disaster leading to a loss in GDP of India.

For example: In Chennai, where waterlogging affected many areas for a long time, businesses began staggered operations after 1–2 weeks. SMEs were without power, water, and other basic services for 10–15 days, impacting business continuity. A few SMEs that had opted for flood insurance received less than the claimed amount after months of delay. As the losses from floods were unexpected, businesses took a long time to recover. Some of these businesses could not even repay the loans which they took from financial institutions. This increased the stress of some of these businesses and as a repercussion they sold their assets and even closed operations.

Long Term Impact

In the long run, economic hardship is caused by loss of livestock, crops, industries, etc. The tourism industry is the one which is impacted by the negative effects of disasters in the long run as tourists tend to avoid disaster-prone areas.

For example: Cyclone Gaja affected more than 14 districts in Kerala. Kerala- a place of beauty where there are 418 hotels and 12,672 rooms and 30% of income for the state is from tourism. After the cyclone, the economy of the state had fallen as many bookings were cancelled and the tourism-related industries were closed for months. Ernakulam district, Idukki district (Munnar, Thekkady) were the most affected.

It is the social and economic factors that seem to aid and hinder growth in the long run for developing countries such as India. However, studies show that such disasters provide nations with opportunities to update their capital stock and adopt new technologies. This is significant as this improves the country's potential to expand and increase output within the economy. However, the drawbacks from this study were that neither did they use inflation nor access to credit as a proxy for economic stability.

It was expected that such natural disasters would have a severe impact on the GDP per capita growth of India but no such result was found in the short and long term. Electric power consumption played a major role in stimulating growth in the short run while having a high private credit to GDP ratio seemed to hinder economic growth. The fact that India is not dependent on international debt for its disaster management unlike other lower income countries provided a relief to the Indian economy as well.



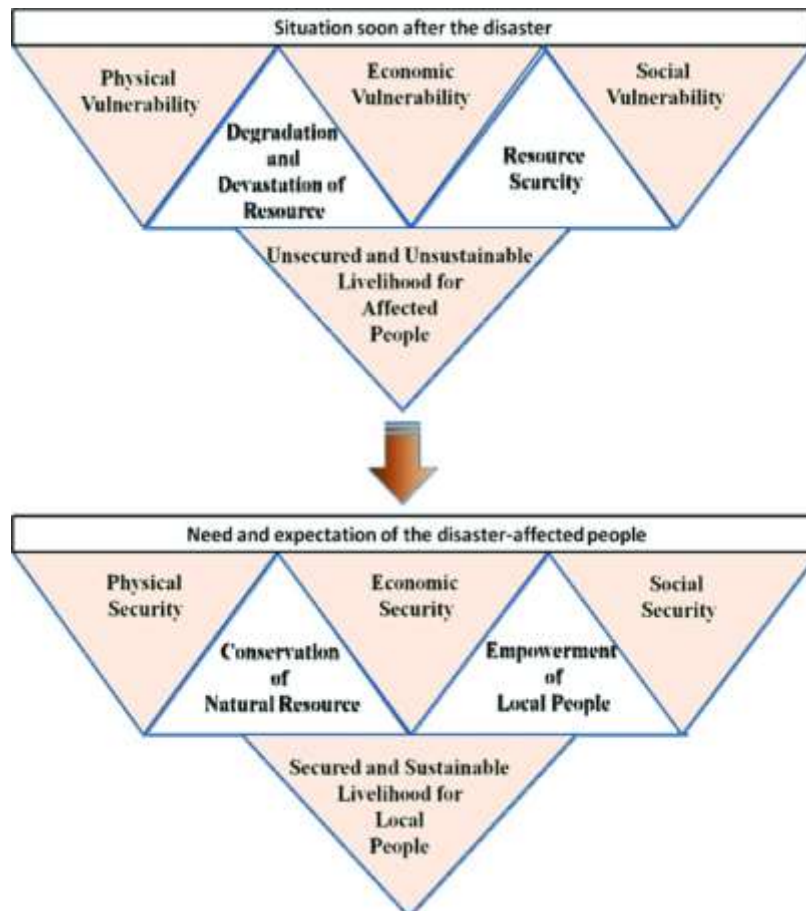
INTERACTION BETWEEN DEVELOPMENT AND VULNERABILITY

Vulnerability to disaster and weather extrude is connected immediately to the socio-monetary development of the people in addition to the community. The risks are real objectively however its chance is continually mediated through social and cultural procedures which might be additionally actual however tougher to quantify.

Extreme weather- associated catastrophes stand up because of the interplay of weather associated dangerous events with the human and natural vulnerability, and their exposure and coping ability. Rising rates of such negative changes in the climate system will increase the chance of disasters, influences of that are in maximum instances irreversible and detrimental.

A situational evaluation of the disaster vulnerability of the Kedarnath flood found out that tons of losses might have been prevented by placing a check on unlawful constructions specifically on or close to riverbeds. Actually, all the townships at Kedarnath and downstream (Sonprayag, Ruddraprayad, Rambara etc) have been evolved and built with little regard to the ever-converting direction of the rivers that broke the houses and businesses.

Climate security of vulnerable sectors, natural systems and communities by integrating adaptation and mitigation options into planning processes is becoming an integral part of development processes around the world . Vulnerability and adapting and mitigating capacities are strongly influenced by various characteristics of local communities such as livelihoods, lifestyles and cultures. Adapting to vulnerabilities can contribute to community well-being by ensuring community security.





2001- Gujarat Earthquake

On the morning of January 26, 2001, an earthquake of 6.9 intensity on the Richter scale hit the western state of Gujarat, Bhuj. Bhuj is the headquarters of the district of Kutch. Kutch, with a population of 1.47 million, extends over 45,662 sq. kms. The quake devastated Kutch, and wreaked extensive damage in the adjoining districts of Ahmedabad, Rajkot, Jamnagar, Surendra Nagar, and Patan. Practically all buildings and structures in five talukas of Kutch, namely Bhuj, Bhuchar, Rapper, Ajar and Gandhi Dham have been brought down by the quake. The death toll in Kutch was a staggering 11.5 per 1,000 people. Based on body count, until midday February 15, 2001, the total casualty was 18,602.7. As of February 15, 2001, the number of deaths reported in Kutch itself was 17,030. Extensive losses have been reported from the affected areas. On the basis of preliminary estimates, the severity of the quake and its devastation can be judged by a comparison of some natural disasters in recent times.

Impact on GDP and growth

Gujarat is one of the most developed states of India. Among the major States of India, it ranks third in per capita income after Maharashtra and Punjab. Furthermore, the State along with its neighbour Maharashtra, grew at 9.57 per cent and 8.01 per cent, respectively – rates normally associated with ‘miracle growth’ economies – in the period of 1991 to 1998.

i) Short-Run Impact

The potential impact of the calamitous earthquake on Gujarat GSDP in the wake of two consecutive droughts is a matter of serious concern. Taking the disaster loss to be Rs.9,900 crore and ICOR to be approximately 4, yields an annual loss of GSDP of Rs.2,475 crore.

Out of Rs.9,900 crore, assuming a third of the losses of Rs.2,047 crore in the productive sectors to be on account of loss of current value added, adjusting for loss of current value added in the productive sectors, with an ICOR of 4, we get an annual loss of GSDP of Rs.2,304.4 crore.

The productivity of all components of the capital lost, a heterogeneous lot, has been assumed to be uniform. Social capital and infrastructural capital may be assumed to have a lower bearing on output in the short run than fixed capital in the productive sectors. Assuming that the short-run ICOR for social, infrastructural and ‘productive’ capital to be 5, 4, and 3, the annual loss of GSDP in the short-run is estimated to be Rs.2,116.9 crore. This loss of output assumes that no excess capacity exists elsewhere in the country to make up for the output loss in the affected areas.

Damage to the structure where business is located, including damage to manufacturing equipment, loss of input supply or output demand due to structural damages suffered by input supplier or output buyer, lack of power or water supply or other lifeline services, disruption in transport facilities, loss of employees because of death, injury or migration can lead to business interruption in the affected areas. But, such losses can be made up by gains in other parts of the country, where excess capacity exists.

The loss of output of Rs.2,000 crore in the first twelve months given above assumes that no reconstruction started in the meantime. The Government declared its resolve to start reconstruction with immediate effect. 18 Reconstruction activities in the affected areas can not only lead to a restoration of much of the lost assets, but also lead to a boost to the resumption of economic activity and growth in income in the affected areas. The loss of income for the affected people was induced from the supply side through a loss in productive capacity, while investment for reconstruction gave a boost to income by building up supply capabilities as well as stimulating demand. Furthermore, upgrades of capital resulted in an increase in capital productivity and reduction in ICOR. For all these reasons, the compensatory investment required to make up for the disaster loss in terms of loss of income in the short run may well be considerably less than Rs.10,675 crore.

The quake-induced impact on income of people in the affected areas of Gujarat is likely to be in the neighbourhood of about Rs.1,500 crore in the first twelve months. On a monthly basis, this loss being higher in the initial months, the loss in the current year is likely to be in the region of Rs.300-400 crore. This loss, however, ignores the transfers that are going to accrue to the affected people. With relief effort in full swing, loss of income inclusive of transfers may be somewhat less. The loss of income during the first ten months of 2001-02, exclusive of transfers, will be in the region of Rs.1,100-1,200 crore. The stock market reaction to the quake confirms this conclusion.

This entire discussion assumes that the loss in production is directly related to the size of capital stock damaged and/or destroyed. To the extent the earthquake could have disrupted production in units without damages to capital, the extent of loss in GDP due to the earthquake is underestimated.



Impact on Prices and Balance of Payments

The earthquake has not had a perceptible effect on prices or the balance of payments of the country. With buffer stocks of food grains at 45.7 million tonnes in January, 2001, far above the norm of 16.8 million tonnes, the comfortable supply position of essential commodities contributed to the maintenance of inflation stability. Furthermore, reportedly, prices even in the affected areas did not spiral up in the aftermath of the quake. While the people in the affected areas were left with little purchasing power, rapid delivery of relief materials and restoration of transportation and communication channels helped to maintain price stability.

Impact of the Earthquake and Measures Taken

As many as 68 branches of commercial banks were fully damaged by the earthquake. The number of branches sustaining partial damage was 80. The disruption of banking services in the aftermath of the quake added to the misery of the traumatised people in the affected districts.

The Reserve Bank of India (RBI) delegated special powers to its Regional

Director for the State of Gujarat to permit banks setting up of satellite offices, extension counters, mobile banking facilities, or shifting branches to nearby suitable places for immediate resumption of banking services at affected branches. As of February 14, 2001, operations in all but 7 of these 148 branches had been fully restored. Furthermore, RBI instructed the banks to settle claims made by nominees of depositors who have lost their lives in the earthquake within 48 hours and in other cases, on the bank being satisfied about the legality of the claim.³⁷ The successor has to be notified by the State agencies. According to RBI instructions, payment up to Rs.50,000 in deceased claims may be released against indemnity and affidavit. A control room for directing and monitoring relief measures was set up in Dena Bank, Ahmedabad supported at all times by officers specially designated for the purpose from SIDBI, National Housing Bank (NHB), NABARD, Dena Bank and Bank of Baroda. Nodal offices were set up by banks in affected areas to monitor and report on the implementation of relief measures to the control room on an ongoing basis.

2004 - Indian Ocean Earthquake and Tsunami

The Indo-Australian plate slipped under the Eurasian plate. The US Geological Survey measured the earthquake, and it was 9.1 on Richter Scale. If one tectonic plate is dragged beneath another, the stress on the boundary causes the edges of the plates to deform. Bending of the plates causes the entire water column to move vertically. Quickly the water column splits into two with one travelling out to sea and the other towards the coast. A tsunami can land and penetrate far inland. Secondary waves are often much stronger than the first wave.

An effective undersea earthquake that struck off the coast of Sumatra Island, Indonesia, set off the 2004 Indian Ocean tsunami, also known as Boxing Day Tsunami, on Sunday morning of 26th December 2004. The magnitude 9.1 ruptured a 900-mile stretch of fault line wherein the Indian and Australian tectonic plates meet. It becomes an effective megathrust, going on wherein a heavy ocean plate slips below a lighter continental plate. The earthquake suddenly raised the sea floor up to 40m, creating a massive tsunami.

Short-Term Responses

In many areas, communities were divided and had to fend for themselves. Authorities ordered the speedy cremation of the dead to prevent the spread of the disease. Millions of people are receiving food aid from the world food programme. Foreign government have pledged \$7 Billion in aid for her, but there have been complaints that all money promised has not been delivered. The British public gave £330 million through charities.

Long-Term Responses

Reconstruction is still taking place even after the 18 years of tsunami. On an international scale: an Indian ocean tsunami warning system has now been set up. On a local scale: some small-scale sustainable development projects have now been set up by charities to aid recovery and help local people help themselves to rebuild and set up small businesses. The Indonesian government decided to relocate the people from the refugee camps straight into homes. The building of these new homes took a lot longer than expected due to lack of building materials and destruction of main transport routes.



Economic Impact

The World Bank, using a standard assessment technique, has estimated that the total damage and losses caused by the earthquake and tsunami amounted to approximately US\$4.45 billion, or almost 100 percent of Aceh's GDP in 2003. Of this total, 60 percent is from damage 40 percent is from losses of income owed to the economy. Around 78 percent of the total damage and losses were borne by the public sector. Around one-third of the road networks, schools were destroyed by the tsunami.

Social Impact

The Indian Ocean Tsunami killed an estimation of 230,000 lives and left 1.7 million people shelter less. In northern Sumatra, the epicentre of the event, 1500 villages were destroyed. More than 5 million people were injured and needed emergency relief, food and water. In addition to the immediate effects there was also the risk of illness from mixing fresh, sewage and saltwater. After the tsunami, the rates for cholera, hepatitis and other problems increased.

2013- North India Floods

On June 16, 2013 the banks of Chorabari lake overflowed as Uttarakhand had received unusually large amount of rainfall since June 13, resulting in melting of the Chorabari lake and eruption of Mandakini river. The silt and rocks in the flood destroyed livelihood, housing settlements and everything else that came in its way.

More than 5,700 people were presumed dead according to the Uttarakhand's Government. The death toll was later updated to 6,054 including 934 local residents. Most of the casualties were pilgrims.

As the upper Himalayan territories mostly comprises forests and snow covered mountains, they remain relatively inaccessible. Several major and historic Sikh and Hindu pilgrimage sites are based there. Heavy downfall of water for four consecutive days and the melting of snow aggravated the rainfall.

The Indian Meteorological Department did not give wide publicity to the warning of heavy rains, leading to huge loss of life and property.

How It Happened

The heavy rain caused extensive flash floods and landslides resulting in the loss of lives of residents, tourists and pilgrims as well as massive damage to property. Reportedly, the Kedarnath valley popular for the 8th century temple dedicated to Lord Shiva was the worst hit. Although, heavy rain and cloudbursts were natural causes for the Kedarnath floods and landslides, environmentalists believe that the catastrophic flood of 2013 was a manmade one.

In India, none of the ecologically fragile areas abide by the environmental laws. Planning of 427 dams was done to be built on rivers, out of which roughly 70 projects were built or proposed on the Ganga for generation of 10,000 MW power. This has affected 65% of the Alakanda and 80% of Bhagirathi.

There was an alarming increase in the number of vehicles plying mountain roads due to mismanaged tourism. As per the Uttarakhand state transport department, there were 83,000 vehicles in 2005-2006 which rose to approx. 1,80,000 in 2012-2013.

It is a fact that there is a straight co-relation between an increase in tourism and frequent occurrence of landslides. Intensive mining in this fragile ecosystem was also one of the reasons behind this disaster.

Impact of the Kedarnath Flood

The Kedarnath flood disaster had the unfavourable impact on the Kedarnath region and even it sceptically impacted the other districts of the Uttarakhand. Sonpariyag, Jungle Chatti, Gaurikund, and Rambara were worst affected by the destructive flood. Ramabara, a hamlet which was situated between Kedarnath and Guarikund was fully demolished. Many landslides had occurred in the Uttarakhand state due to this tragic incident. Uttarkashi, Pithoragarh, Rudraprayag, Chamoli, and Bageshwar, these 5 districts were among the worst affected areas as a result of unplanned construction works in the respective areas.



Table-1

TYPE OF LOSSES	TOTAL NUMBER
Human and Animals	15,454
Destroyed Village	4,200
Damaged Bridges	145
Worst Hit Districts	5
Houses Destroyed (Kuccha house + Pucca house)	3,360
Roads Destroyed	2,302
Landslides	2,395

Table-1 shows the losses that were incurred due to the Kedarnath flood. 15,454 humans and animals were lost in the flood collectively, 4,200 villages and 145 bridges were damaged. 5 districts were worst hit by the flood namely, Uttarkashi, Pithoragarh, Rudraprayag, Chamoli, and Bageshwar. Total 3,360 houses were demolished. 2,302 roads were destroyed during the tragic incident. 2,395 Landslides were also caused.

Economic Impact of Flood

Due to the flood, huge loss was incurred by the Uttarakhand Tourism Industry. PHD Chamber of Commerce and Industry Survey estimated a loss of Rs.12,000 Crores to the Uttarakhand Tourism Sector. The Survey also estimated that approximately 11 per cent of Uttarakhand's Gross State Domestic Product (GSDP) for the respective fiscal year has been destroyed in terms of expected tourism earnings as a result of the floods.

"Uttarakhand was expected to generate Rs 25,000 crore from tourism in 2013-14. Although Rs 5,000-6,000 crore have been generated from the first three months alone, the State is expected to realize only Rs 5,000-6,000 crore in the coming months as major tourism destinations have been washed away by recent floods," S.P. Sharma, Chief Economist at the PHD Chamber, said citing the survey.

In Uttarakhand, Tourism sector contributes 25-30 per cent in Gross State Domestic Product (GSDP) and due to the flood in 2013, the State's treasury took a major hit. In addition to this, the reconstruction of affected tourist places is expected to put a strain on the State Government as per the survey. The flood also degraded the soil which was also a major setback for farm economy which also contributes 11 per cent to Gross State Domestic Product(GSDP).

The economic condition of the area took time to recover as the reconstruction of roads and clearance of debris takes a lot of time and finances. However, the six month long Kedarnath yatra resumed in 2014 itself (one year after the flash floods). The government had to start it as soon as possible as it being a part of the tourism sector was a major contributor to Uttarakhand's economy.

2020 - Odisha Cyclone Amphan

There might be a decrease in the loss of lives with each cyclone, however the economic losses remain the same. According to a UN Report, the economic losses that were incurred in India due to cyclone Amphan amounts to 14.7 billion dollars approximately. This was the costliest tropical cyclone for the North Indian Ocean. There was a total of 128 fatalities out of which 98 were recorded in India itself. This directly affected the lives of 70 percent of the population in West Bengal. As per the Calcutta Municipal Corporation, over 4000 poles were toppled over by Amphan which led to a power cut for most parts of the city. Furthermore, the cyclone also resulted in triggering floods around the city.

Economic Impact

The cyclone Amphan damaged 0.2 million hectares of agricultural land and fish farms. Thousands of trees were uprooted, hundreds of fresh water sources were swamped by saline water and hundreds of kilometres of embankment was destroyed. There was an infrastructural damage of 55000 houses, schools, bridges, road networks, culverts and electricity networks. Amphan's passage through densely populated urban areas with intense physical infrastructure such as Kolkata was a major contributor to the economic losses that were caused by it.



Amphan cyclone occurred at a time when the Indian economy was already shaken by the coronavirus pandemic, further worsening the condition. The national lockdown already resulted in a loss of \$4.5 billion to the Indian GDP per day. When it comes to West Bengal, the state's daily loss was about \$0.25 billion per day. Now, if we compute these losses for a period of 2 months and add up the economic damage resulting from the cyclone, then we arrive at an appalling figure of about \$28 billion. It can be said that the value of this loss is more than the entire GDP of Iceland (2019) or the combined GDP values of Afghanistan and Rwanda (2019).

Social Impact

Apart from the human and livestock fatalities, Amphan has also impacted the lives of farmers severely by destroying their crops of mangoes, paddy and lychee at the time of harvest. The coronavirus pandemic along with Cyclone Amphan have impacted the lives of the mango growers in several districts of West Bengal severely. The livelihood of at least 0.4 million farmers and traders in the district of Malda alone is affected.

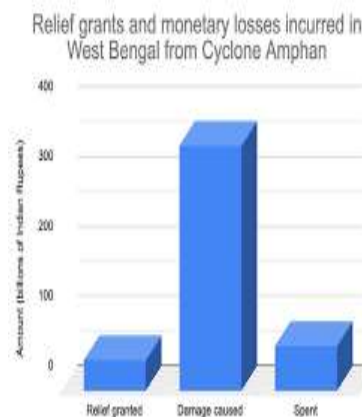
Malda - A district which produces around 0.5 million tonnes of mangoes every year over a land of 31,000 hectares - most of which has been destroyed due to cyclone Amphan.

Burdwan (East) - The largest paddy growing district of West Bengal suffered a loss of approximately Rs. 3 billion.

Short Term Responses

To understand the severity of the situation, Prime Minister Narendra Modi went on an aerial survey of the region on 22 May. He immediately announced an aid of Rs.10 billion for the restoration of West Bengal and that of Rs. 5 billion for the restoration of Odisha. An initial funding of €0.5 million was provided to India as financial aid for relief efforts by the European Union (EU).

However, no amount of initial funding or relief packages could mitigate the economic losses that were incurred due to the destruction of various sources such as the Malda district's famous mango cultivation, fisheries in coastal belts, snapping of electricity lines and internet cables. The national reserve was already in a state of shock due to the COVID-19 pandemic. At a time like such, conversion of the available substantial aid into physical assets that were lost in the cyclone was a tough nut to crack especially when the GDP of West Bengal was earlier at a growth rate of 12.58 percent in 2019, the highest among all the Indian states.



In order to save property, infrastructure, livestock, agriculture, etc., from intense damage caused by cyclones and other disasters, India needs to invest in disaster management techniques and design policies. According to the latest scientific reports, the warming of the climate will only result in an increase in the frequency and intensity of such super cyclones, thus making a well - planned management strategy the need of the hour.

Climate Change Disaster and Development

India is faced with the challenge for sustaining rapid economic growth while addressing the threat posed by climate change. The Indian subcontinent is among the world's most disaster-prone area. Almost 85 percentage of



India's area is vulnerable to one or multiple hazards. India is caught in the middle of debates on historical emission cuts, legally binding commitments for emission reduction and an effective and efficient co-benefits approach to address climate change. The Indian development process is guided by the aspiration of making India prosperous and progress on the path of "Development without Destruction". Hence it is of utmost importance to mainstream the climate change mitigation and adaptation into the overall development plans of the Country.

As per the world bank climate change affects the whole world but its major impact is on developing countries. Its major effects are seen on temperature, precipitation patterns, sea levels. Weather related disasters are a huge risk for agriculture, food and water supply. World bank in its report stated that climate change can push 100 million people below the poverty line over the next fifteen years. Indian climate is the most unpredictable one with a wide range of geographical area and varied topography

Coping with and Preparing for Natural Disasters

According to the National Disaster Management Authority, around 40 million hectares of land in India is exposed to floods that is around 12 per cent of the total land area, 68 per cent of land is vulnerable to droughts, landslides and avalanches, 58.6 per cent landmass is earthquake-prone, and tsunamis and cyclones are a regular phenomenon for 5,700 km of the 7,516-km long coastal line.

Natural disasters not only adversely affect the human and physical capital but also pose a serious threat to India's economic development. Moreover, frequent disasters also increase the fiscal pressure on the Centre and State government, besides impacting the social and economic conditions of the people. Natural disasters also increase farmer distress and are responsible for farmer suicides to a great extent.

The impact of natural disasters, particularly disaster fatalities, vary across Indian states due to diverse geo-climatic conditions and relative socio-economic vulnerability. The reasons for rise in fatalities due lightning and heat waves are the increase in temperature and humidity across Indian States. Hilly states are more prone to landslides. Similarly, central and northern India are more vulnerable to cold wave disasters, while coastal states like Andhra Pradesh, Odisha.

Though it is important to work towards constraining disaster losses on all fronts, trends indicate the need for strong and swift policy measures to secure human losses due to lightning deaths. In order to mitigate natural disaster fatalities across States, we suggest few measures which can help minimise fatalities to an extent.

First it is suggested that not only higher per capita income but better Central and State political cooperation will also help in minimising disaster fatalities.

Second, higher public expenditure towards disaster resilient infrastructure such as construction of dams and drainages and for protection of river embankment and canals assume great significance.

Third, the installation of advanced disaster warning systems, particularly in low lying areas, that are accurate in predicting rainfall in coastal areas is needed.

Fourth, to mitigate death due to heat wave and lightning, public measures such as planting of palm trees, campaigns for awareness on disaster impact through media during

CONCLUSION

From 2000 to 2020 India has withhold a lot of natural calamities which has costed India a lot of money and has affected India's economy, many people have lost their business and jobs because of the destruction caused by the natural calamities as we can see in the above case study how the natural calamities have damaged the Indian economy in various ways but due to our excellent economist who have dedicated their lives to protect Indian economy by giving their full effort in the time of crisis and the only reason India is still on it's leg is because of their economic reforms applied during the time of crisis here by my team we conclude our research on the impact of natural calamities on Indian economy

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