



“STUDY ON DISASTERS MANAGEMENT IN INDIA”

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ABSTRACT

Disaster management is a critical field aimed at mitigating the impact of natural and man-made catastrophes on communities and infrastructure. This abstract provides a comprehensive overview of effective strategies in disaster management, focusing on preparedness, response, recovery, and resilience-building measures.

This paper articulates disaster management in India as a problem which in turn is a huge loss for human resource.

India has been usually susceptible to natural disasters on account of its unique geo climatic conditions. Indian sub-continent is among the world's most disaster-prone areas Almost 85% of India's area is vulnerable to one or more multiple hazards.23 out of 30 states of our country are prone to disasters like earthquakes, floods, drought, cyclone, cold waves ,fires etc

In the event of a disaster, a prompt and coordinated response is essential to minimize loss of life and property damage. Response efforts typically involve mobilizing emergency services, conducting search and rescue operations, providing medical assistance, and ensuring the timely distribution of aid to affected populations. Effective coordination among government agencies, non-governmental organizations, and international partners is crucial for successful response operations.

Once the immediate crisis has passed, recovery efforts focus on restoring essential services, rebuilding infrastructure, and supporting affected communities in returning to normalcy. Long-term recovery requires comprehensive planning, resource mobilization, and community engagement to address the physical, economic, and psychological impacts of the disaster.

Building resilience is an ongoing process that aims to reduce vulnerability and enhance adaptive capacity in the face of future disasters. Resilience-building measures include investing in infrastructure upgrades, promoting sustainable development practices, and fostering community cohesion and social networks.

In conclusion, effective disaster management requires a multi-dimensional approach that encompasses preparedness, response, recovery, and resilience-building strategies. By implementing these measures, communities can mitigate the impact of disasters and build a more resilient future.

1.1 INTRODUCTION

Disaster management in India is a multifaceted approach aimed at mitigating the impact of natural and man-made disasters on human life, property, and the environment. Given India's geographical diversity and susceptibility to various hazards such as earthquakes, cyclones, floods, droughts, landslides, and industrial accidents, effective disaster management is crucial.

The Disaster Management Act of 2005 provides the legal framework for disaster management in India. The act establishes institutional mechanisms for disaster response, mitigation, and preparedness at the national, state, and district levels. The National Disaster Management Authority (NDMA) at the central level and State Disaster Management Authorities (SDMAs) at the state level are responsible for policy formulation, coordination, and implementation.

The NDMA, headed by the Prime Minister, formulates policies, plans, and guidelines for disaster management. Each state has its SDMA chaired by the Chief Minister. At the district level, District Disaster Management Authorities (DDMAs) coordinate disaster response and preparedness activities. Additionally, various ministries, departments, and agencies are involved in disaster management, depending on the nature of the disaster.

India emphasizes a proactive approach to disaster management, focusing on preparedness and mitigation measures. This includes risk assessment, early warning systems, capacity building, community-based disaster preparedness programs, and infrastructure development to reduce vulnerability.

In the event of a disaster, response and relief efforts are coordinated by the NDMA and SDMAs. This involves search and rescue operations, medical assistance, distribution of relief materials, temporary shelter, and restoration of essential services. The National Disaster Response Force (NDRF) plays a crucial role in conducting rescue and relief operations.

Despite significant progress in disaster management, challenges such as resource constraints, urbanization, climate change, and the complexity of managing large-scale disasters remain. Continuous efforts are required to strengthen institutional capacities, enhance preparedness, and build resilience to emerging threats.

1.2 EXISTING SYSTEM IN DISASTER MANAGEMENT IN INDIA

The Disaster Management Act, 2005, provides the legal basis for disaster management in India. It establishes the institutional mechanisms, roles, and responsibilities of different stakeholders at the national, state, and district levels. The National Disaster Management Policy, 2019, outlines the overarching policy framework for disaster risk reduction and management.

The apex body for disaster management in India is the National Disaster Management Authority (NDMA), chaired by the Prime Minister. The NDMA formulates policies, plans, and guidelines for disaster management at the national level. State Disaster Management Authorities (SDMAs) and District Disaster Management Authorities (DDMAs) are responsible for implementing disaster management activities at the state and district levels, respectively.

India has established early warning systems for various hazards, including cyclones, floods, earthquakes, tsunamis, and landslides. These systems utilize meteorological monitoring, satellite imaging, seismological data, and communication networks to provide timely alerts to communities and authorities.

Disaster risk assessment and mapping are conducted to identify hazards, vulnerabilities, and exposure to disasters. The National Disaster Management Authority (NDMA) and other agencies undertake risk assessments to inform disaster preparedness, mitigation, and response strategies.

When a disaster occurs, response and relief operations are coordinated by the respective State Disaster Response Forces (SDRFs) and National Disaster Response Force (NDRF). These specialized forces are trained in search and rescue, medical assistance, evacuation, and relief distribution.

Capacity building and training programs are conducted at various levels to enhance the skills and knowledge of disaster management professionals, emergency responders, government officials, and community volunteers. These programs cover areas such as disaster risk reduction, emergency response, search and rescue, first aid, and psychosocial support.

Public awareness and education campaigns are conducted to increase awareness about disaster risks, preparedness measures, and response protocols. These campaigns utilize various media channels, educational materials, and community engagement initiatives to promote a culture of safety and resilience.

India collaborates with international organizations, regional bodies, and bilateral partners to strengthen disaster management capabilities, share best practices, and mobilize support during emergencies. Cooperation includes participation in joint exercises, sharing of technical expertise, and contributing to regional initiatives for disaster risk reduction and response.

Overall, the existing system of disaster management in India emphasizes a proactive approach to disaster risk reduction, preparedness, response, and recovery, with a focus on building resilience at all levels of society.

1.3 NATURAL DISASTERS IN INDIA

India has faced several natural disasters after 2015. Some significant events include:

1. Kerala Floods (2018 and 2019): Kerala experienced devastating floods in both 2018 and 2019 due to heavy rainfall during the monsoon season. The floods led to widespread destruction of infrastructure, loss of lives, and displacement of people.
2. Cyclone Fani (2019): Cyclone Fani, one of the strongest tropical cyclones to hit the Indian subcontinent in decades, struck the eastern coast of India in May 2019. It caused extensive damage to infrastructure, particularly in the states of Odisha and West Bengal.
3. Cyclone Amphan (2020): Cyclone Amphan made landfall in West Bengal and Bangladesh in May 2020, causing significant damage to property, infrastructure, and agriculture. It was one of the strongest cyclones ever recorded in the Bay of Bengal.
4. Assam Floods (2016-2023): Assam, a state in northeastern India, experiences annual floods during the monsoon season. Floods in Assam have been a recurring problem, affecting millions of people and causing widespread damage to homes, crops, and infrastructure.
5. Uttarakhand Floods (2016): Uttarakhand faced flash floods in 2016 due to heavy rainfall and landslides. The floods caused loss of lives and extensive damage to roads, bridges, and buildings in the region.

India has faced several man-made disasters since 2015, including industrial accidents, environmental degradation, and social unrest. Some notable events include:

1.4 MAN MADE DISASTERS IN INDIA

1. Visakhapatnam Gas Leak (2020): In May 2020, a styrene gas leak occurred at the LG Polymers chemical plant in Visakhapatnam, Andhra Pradesh. The leak led to the deaths of several people and caused injuries to many others. Thousands of residents were evacuated from nearby areas.
2. Baghjan Oil Well Blowout (2020): In May 2020, an oil well blowout occurred at the Baghjan oil field in Assam, resulting in a massive fire and subsequent environmental damage. The blowout led to the evacuation of thousands of villagers and caused significant harm to the biodiversity of the region.
3. Delhi Air Pollution Crisis (Annual): Delhi and its surrounding regions face severe air pollution every year, particularly during the winter months. Factors contributing to the pollution include vehicular emissions, industrial pollution, construction activities, and agricultural burning. The pollution levels often reach hazardous levels, leading to adverse health effects for residents.
4. Chennai Oil Spill (2017): In January 2017, two ships collided near the Kamarajar Port in Chennai, Tamil Nadu, causing an oil spill. The spill polluted the coastline, affecting marine life and coastal ecosystems. Cleanup efforts were undertaken, but the incident highlighted the risks associated with maritime transportation.
5. Kerala Floods (2018 and 2019 - Human Factors): While the floods in Kerala were primarily natural disasters, some human factors exacerbated the situation. These included deforestation, improper land use practices, and inadequate water management, which contributed to increased vulnerability to flooding.
6. Social Unrest and Communal Violence: India has also witnessed instances of social unrest and communal violence in various parts of the country, leading to loss of lives, property damage, and displacement of communities. These incidents often have complex socio-political dynamics and can be triggered by religious, ethnic, or political tensions.

1.5 PURPOSE OF DISASTER MANAGEMENT

Disaster management serves several purposes aimed at minimizing the impact of disasters on communities and enhancing resilience. Some of the key purposes include:

1. Prevention: Disaster management efforts aim to prevent or minimize the occurrence of disasters where possible. This involves implementing measures such as land-use planning, building codes, and environmental regulations to reduce the risk of disasters such as floods, earthquakes, and industrial accidents.
2. Preparedness: Disaster preparedness involves activities and measures taken in advance to ensure effective response and recovery in the event of a disaster. This includes developing emergency response plans, conducting drills and training exercises, stockpiling essential supplies, and establishing communication systems to alert and mobilize emergency responders and the public.
3. Response: When a disaster occurs, timely and coordinated response efforts are essential to save lives, reduce suffering, and minimize damage to property and infrastructure. Disaster management aims to facilitate swift and effective response operations by mobilizing emergency services, conducting search and rescue operations, providing medical care and humanitarian assistance, and restoring essential services.
4. Recovery: After the immediate response phase, disaster management focuses on the long-term process of recovery and rebuilding. This includes assessing the extent of damage, restoring infrastructure and services, providing support to affected individuals and communities, and implementing measures to enhance resilience and prevent future disasters.
5. Mitigation: Disaster management also involves measures aimed at reducing the impact of future disasters. This includes investing in infrastructure upgrades, implementing risk reduction measures, promoting sustainable development practices, and raising awareness about disaster risks and preparedness within communities.

6. Coordination and Collaboration: Effective disaster management requires coordination and collaboration among various stakeholders, including government agencies, non-governmental organizations, private sector entities, community groups, and international partners. Collaboration facilitates the sharing of resources, expertise, and information, ensuring a more comprehensive and integrated approach to disaster risk reduction and response.

1.6 Space Technology for Disaster Management Support in the country

India is prone to many natural disasters like floods, landslides, cyclones, forest fires, earthquakes, drought, etc. Satellite technology has proved to be very effective in managing the pre-disaster as well as post disaster phase.

Satellites provide synoptic observations of the natural disasters at regular intervals that helps in better planning and management of disasters. In order to better understand the risks due to such disasters, it is necessary to integrate satellite and field based observations and to work towards risk reduction principles. Satellite communication and navigation systems also play an important role in providing emergency communications during disaster management with improved technological options.

India has developed a series of high resolution Earth Observation Satellites (EOS) like Resources and Cart sat, designated as EOS satellites, which provide imagery of disaster affected areas. The Radar Imaging Satellite (RISAT) has capabilities to take the images even during cloudy climate and is of immense use for planning post disaster relief operations. The Navigation satellites constellation NSIC (Navigation satellites Indian Constellation) provides precision position data crucial for disaster management operations. Satellite based phones are deployed in the disaster areas to secure emergency communications wherein the terrestrial and conventional mobile connectivity would have been destroyed due to disaster.

Satellite data are also used for mapping and monitoring all the major floods and inundations maps are prepared in near real time to aid the relief operations. Satellites have played pivotal role in managing cyclones in the country. Indian Meteorological satellites viz., INSAT-3D and INSAT 3DR and the Ground Doppler Weather radars closely monitor the movement of cyclones after the onset. Algorithms have been developed to predict the land fall of the cyclone with reasonable accuracy. This has helped the administration to take immediate actions for evacuation of the affected areas and significantly reduced the loss of life in the cyclone hit areas. The National Remote Sensing Centre (NRSC), Hyderabad is actively engaged in monitoring all the natural disasters such as flood, cyclone, landslides, earthquakes and forest fires using satellite data and disseminating the information in a timely manner to various user agencies.

1.7 STRATEGIES FOR DISASTER MANAGEMENT IN INDIA

Disaster management strategies in India are multifaceted and involve various governmental, non-governmental, and community stakeholders. These strategies encompass the following key elements:

- India has enacted several laws and policies to govern disaster management, including the Disaster Management Act, 2005, and the National Disaster Management Policy, 2019. These frameworks provide the legal basis for disaster preparedness, response, recovery, and mitigation efforts.
- The National Disaster Management Authority (NDMA) is the apex body responsible for formulating policies, plans, and guidelines for disaster management at the national level. State Disaster Management Authorities (SDMAs) and District Disaster Management Authorities (DDMAs) are established at the state and district levels, respectively, to coordinate and implement disaster management activities.
- Disaster risk assessment and mapping are crucial for identifying hazards, vulnerabilities, and exposure to disasters. India undertakes risk assessments to understand the likelihood and potential impact of various hazards, including floods, cyclones, earthquakes, landslides, and industrial accidents.
- Early warning systems play a vital role in mitigating the impact of disasters by providing timely alerts to communities and authorities. India has established early warning systems for various hazards, including cyclones, floods, tsunamis, and earthquakes, utilizing technologies such as meteorological monitoring, satellite imaging, and communication networks.

- Engaging communities in disaster risk reduction and management is a fundamental strategy in India. Community-based approaches involve raising awareness, building local capacities, promoting risk-informed decision-making, and facilitating community participation in planning, response, and recovery efforts.
- Capacity building and training programs are conducted at various levels to enhance the skills and knowledge of disaster management professionals, emergency responders, government officials, and community volunteers. These programs cover areas such as emergency response, search and rescue, first aid, disaster risk reduction, and psychosocial support. Investing in resilient infrastructure and adopting risk-sensitive land-use planning are essential components of disaster management strategies in India. Measures such as retrofitting buildings, constructing cyclone shelters, strengthening embankments, and implementing flood control measures help mitigate the impact of disasters and enhance community resilience.
- India collaborates with international organizations, regional bodies, and bilateral partners to strengthen disaster management capabilities, share best practices, and mobilize support during emergencies. Cooperation includes participation in joint exercises, sharing of technical expertise, and contributing to regional initiatives for disaster risk reduction and response.

These strategies reflect India's commitment to building a comprehensive and integrated approach to disaster management, emphasizing proactive measures to reduce risks, enhance preparedness, and strengthen resilience at all levels of society.

1.8 FUTURE ENHANCEMENTS OF DISASTER MANAGEMENT IN INDIA

- Leveraging emerging technologies such as artificial intelligence, remote sensing, and geographic information systems (GIS) can enhance disaster risk assessment, early warning systems, and response coordination. Integration of drones, satellite imagery, and IoT devices can improve situational awareness and decision-making during emergencies.
- Increasing community participation and ownership in disaster management processes can improve resilience and response effectiveness. Empowering local communities through training, awareness campaigns, and participatory planning can enhance their capacity to prepare for and respond to disasters.
- With climate change exacerbating the frequency and intensity of natural hazards, integrating climate change adaptation measures into disaster management strategies is essential. This includes incorporating climate resilience into infrastructure development, land-use planning, and disaster risk reduction initiatives.
- Integrating disaster risk considerations into development planning processes at national, state, and local levels can help mainstream disaster risk reduction. Incorporating risk assessments, vulnerability mapping, and hazard zoning into urban and rural planning frameworks can minimize exposure to hazards and enhance resilience.
- Prioritizing investment in resilient infrastructure, including critical lifeline infrastructure such as transportation networks, water supply systems, and power grids, is crucial. Retrofitting existing infrastructure, incorporating green infrastructure solutions, and adopting nature-based approaches can enhance resilience to disasters.
- Continuously strengthening the capacity of disaster management professionals, emergency responders, and community volunteers is essential. Training programs should focus on emerging threats, technological advancements, and best practices in disaster response, recovery, and risk reduction.
- Enhancing coordination and collaboration among government agencies, non-governmental organizations, academia, private sector entities, and communities is vital for effective disaster management. Establishing multi-sectoral platforms for information sharing, joint planning, and resource mobilization can improve coordination and coherence in disaster response and recovery efforts.
- Ensuring inclusivity and addressing the needs of vulnerable groups, including women, children, the elderly, persons with disabilities, and marginalized communities, is essential in disaster management. Designing inclusive policies, programs, and interventions can reduce disparities in disaster risk and enhance social cohesion and resilience.

By focusing on these future enhancements, India can further strengthen its disaster management capabilities, reduce vulnerability to disasters, and build a more resilient and sustainable future for all its citizens.

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