



Role of Natural Resource Conservation and Disaster Management in Flood Mitigation Measures: A Case Study of Chennai Flood

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: <https://doi.org/10.9734/ajee/2024/v23i7567>

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/117864>

Minireview Article

Received: 25/03/2024

Accepted: 29/05/2024

Published: 02/06/2024

ABSTRACT

Chennai the capital city of Tamil Nadu and the southernmost state of India recently got hit by cyclone Michaung, and the impact caused by the cyclone resulted in heavy rainfall. Due to global warming, the impacts of climate change have negative effects on the environment. Though Cyclones and heavy rainfall are natural disasters, the heavy floods that affect the regular lives of the Chennai people are due to inefficient disaster management. People in Chennai faced severe damage to their properties and challenges for their survival, and they almost experienced a man-made disaster. Another main factor is that natural water bodies like rivers, lakes, and ponds are under tremendous pressure due to illegal encroachments and need effective measures for their rejuvenation. This paper emphasises the importance of natural resources and disaster management which will lead to sustainable development.

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Cite as: Vijay, M. (2024). Role of Natural Resource Conservation and Disaster Management in Flood Mitigation Measures: A Case Study of Chennai Flood. *Asian Journal of Environment & Ecology*, 23(7), 110–113. <https://doi.org/10.9734/ajee/2024/v23i7567>

Keywords: Michaung; global warming; sustainable; disaster; encroachment; rejuvenation.

1. INTRODUCTION

India has traditional water bodies that are found in different parts of the country and play a vital role in maintaining and restoring the ecological balance. Their functions include providing drinking water, recharging groundwater, preventing floods, supporting biodiversity, and providing livelihood opportunities to a significant number of individuals. United Nations and Niti Ayog reported that the demand for water will reach twice the available supply, and 40 per cent of India's population will not have access to clean drinking water by 2030. This was due to increasing negligence and lack of conservation of water bodies. Furthermore, untreated effluents and sewage are polluting water bodies as they are constantly being dumped into them. Across the country, 86 water bodies are critically polluted, having a chemical oxygen demand or COD concentration of more than 250 mg/l, which is the discharge standard for a polluting source such as sewage treatment plants and industrial effluent treatment plants. In urban India, the number of water bodies is rapidly decreasing. Hyderabad's wetland has been lost by 3,245 hectares in the past 12 years. Despite the presence of sufficient policies and acts for protecting and restoring water bodies, they are still insufficient and ineffective [1]. The wetland ecosystem has changed significantly in the watershed due to the effects of urbanization in Chennai city, and its inexorable development has caused 60% loss of water bodies. Urban wetlands can minimize flood damage by storing floodwaters and protecting shorelines from erosion by absorbing storm surges. This study enumerates the importance of conserving natural resources and disaster management as the primary social responsibility.

2. CHENNAI FLOOD: NATURAL DISASTER ENDS IN MANMADE DISASTER

The cyclone Michaung badly affected the people living in Chennai, Tamil Nadu for four days, because they suffered due to non-availability of food, drinking water, power supply, medicines and also with poor sanitation. The following reasons were the main causes of the factors mentioned above, which were explained in detail.

2.1 Rapid Urbanization and Encroachment on Natural Resources

The construction and development activities caused by urbanization, such as excavation, filling, and draining, are the main destructive methods that result in significant loss of wetland spatial extent. Due to rapid urbanization, Chennai's population density has increased, making it more vulnerable to disasters. Evacuating and providing timely assistance to all people affected by a disaster is a challenge. Generally in an overpopulated environment, the number of people may exceed the available essential materials for survival, such as transport, water, shelter, food, or social amenities. Because of the vote bank politics, in Tamil Nadu political parties whoever is ruling party, whenever speaking about encroachments in Chennai, they will talk about clearing slums and also wanted to relocate them in worse, far-flung places [2].

Extreme care should be taken to protect the entire watershed areas such as (i) upper catchment area, where rain water collects, (ii) the water body itself and (iii) the drainage system which carries excess water out to the sea. The government should take actions to build resilient cities and towns with proper infrastructure and facilities to withstand disasters. Reducing population density in disaster-prone areas requires additional measures to be taken [3].

Environment Experts pointed that most of the private educational institutions in and around Chennai as well as various government owned structures within the city that are actually encroachments, many built upon water bodies themselves. The second runway of Chennai airport, Koyembedu bus terminus, the entire corridor, ring roads flanking the city and the Adyar Eco Park are some examples cited by them and also the state government has ignored existing rules and given permission for private developers to build in catchments areas of water bodies and along the rivers. The Chennai Metropolitan Development Authority (CMDA) which is responsible for planning and development of Chennai Metropolitan Area must strictly follow relevant environmental laws and there should not be any violation of law thus eradicating corruption [4].

2.2 Lack of Disaster Mitigation Measures

The lack of preparedness and awareness among people and authorities is a major obstacle in disaster management in India. In an emergency or disaster, many people have no idea what to do, and authorities are often not adequately trained to handle disasters. Confusion and delays in providing aid to those affected are often caused by this lack of preparedness. Raising awareness about disasters and how to respond to them is necessary to address this challenge. Disaster preparedness training programs, such as drills and simulations, are necessary for authorities to prepare people and authorities for potential disasters. Public awareness is a key factor in effective disaster and conflict risk reduction. Communities that are aware and participate in disaster-response activities have been shown to have lower losses from disaster events. Developing countries such as India, where resources are limited, communities can play a very important role in disaster risk reduction (DRR). Communities play a crucial role in providing help and relief to victims of disasters through their participation and support. Building people's capacities requires awareness creation and imparting skills and training for relief and rescue operations to manage disasters. The population's preparedness level to face disasters will be enhanced through these skill-improvement and training programs [5,6].

2.3 Role of Chennai Municipal Corporation

Poor governance and lack of town planning by the Chennai Municipality Corporation make Chennai vulnerable to disasters. Moreover, people from the rest of Tamil Nadu are moving towards Chennai city in search of livelihood every year. Chennai Corporation was under pressure in water supply, drainage, solid waste management, and transport, and was also unable to deliver normal services [7]. Flooding in cities such as Mumbai, Ahmedabad, Hyderabad, Kolkata, Bengaluru and Chennai are on the rise every year[8]. In the past few decades, Chennai experienced severe flood in 2015 and most of the people got suffered and some died. Chennai Municipal Corporation should have taken necessary disaster prevention measures based on past lessons learned. But this was not done, and the same conditions prevailed as in 2015 without any improvement in the administration of the Corporation. In order to overcome the problem, the state government should give more

autonomy to the functioning of municipalities so that they can deliver good services[9].

2.4 Lack of Disaster Rescue Operations

People, who were trapped in the Chennai flood, never get any help from the government side. Contamination of water due to stagnancy of water throughout the streets and houses became a major problem. Basic essential commodities like milk, bread, medicines were not available and it was accessible at rate higher than the normal price. These situations were not properly handled by authorities. The Severity of Cyclone Michaung was an expected one because it was already cautioned by meteorological department about its impact. Though lessons have been learnt from past Chennai flood in the year 2015, disaster preparedness as well as preventive measures was not given importance. Generally more number of volunteers, emergency shelters, rescue teams, NGO units will be formed and involved in rescue operations during floods [10]. The most important step to follow during a disaster occurrence was to follow this routine procedure, but it was not implemented in advance [11-15].

3. CONCLUSION

The impact of global warming results in climate change, and the frequent occurrence of disasters like cyclones, heavy rainfall, earthquakes, floods, and drought conditions in the future is unavoidable. Earthquakes, floods, hurricanes, volcanic eruptions, landslides, etc. are all natural phenomena that have occurred throughout the history of humankind. However, rapid population growth, environmental pollution and degradation, and increased poverty have all contributed to turning these natural phenomena into disasters that cause enormous losses in human lives, infrastructure, and material belongings. Economic losses caused by natural disasters have tripled in the past 30 years, resulting in the deaths of a million people and leaving several millions more homeless. Working together continually as a community can help reduce the impact of disasters. A community that loses waterbodies may need to invest more in drinking water treatment and storm water management. An interdisciplinary decision-making system is needed to eradicate the adverse impact of urbanisation on water bodies, and it should be a primary concern for policymakers to mitigate risks from flash floods in major cities like Chennai, etc. People should value the

importance of water bodies by neglecting illegal encroachments, and conservation of existing ecosystems is always a better solution than investing in flood control infrastructure.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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