



DISASTER MANAGEMENT: A COMPREHENSIVE ANALYSIS OF KERALA FLOODS

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Abstract

Disaster management is essential in India due to the country's vulnerability to natural calamities, large and densely populated population, and vulnerable communities. Kerala has a diverse geography, including rivers, backwaters, coastal plains, Western Ghats, and tropical monsoon climate, making it prone to floods during the monsoon season. The heavy rainfall in Kerala during August 2018 was caused by a combination of meteorological, hydrological, and geological factors, including the steep topography of the Western Ghats and laterite soil. The Kerala floods of 2018 were a complex disaster caused by a range of socio-economic factors, including lack of preparedness, poor urban planning, socio-economic inequality, and economic impact. Government relief efforts and policies in response to Kerala floods were extensive, with key factors to consider. Military and NGOs provided relief to affected communities. Sustainable development principles should be integrated into disaster management practices to ensure positive impacts. Effective disaster management in India requires a comprehensive approach that prioritizes safety and well-being.

Key Words: *Disaster Management, Kerala, Topography, Sustainable Development, Preparedness.*

Introduction

The Kerala floods of 2021 were a natural calamity that occurred in Kerala, affecting millions of people and causing widespread damage to infrastructure and property. The flooding caused the displacement of millions of people, with many losing their homes and livelihoods. The state government, along with the Indian Army and NGOs, launched a relief operation to provide food, shelter, and medical aid to affected communities. The disaster highlighted the importance of disaster management in India and the need for effective planning and preparedness measures to minimize the impact of natural calamities.

Disaster management is essential in India for several reasons. Firstly, the country is prone to natural calamities such as floods, cyclones, earthquakes, and droughts, which can cause widespread damage to infrastructure, property, and human life.

Secondly, the country is large and densely populated, which increases the vulnerability. Thirdly, many poor and marginalized communities in India are dependent on natural resources and are highly exposed to environmental risks, which can have a severe impact on their livelihoods.

Effective disaster management can help minimize the impact of natural disasters. In India, the government has established a National Disaster Management Authority (NDMA) to coordinate disaster management efforts at the national level. ^[1] The NDMA works with state disaster management authorities and local governments to develop disaster management plans, implement preparedness measures, and respond to disasters. Additionally, several non-governmental organizations and community-based organizations work in India to support disaster management efforts, particularly in marginalized and remote communities.

Therefore, disaster management is critical for India, as it can help save lives, minimize the economic and social costs of disasters, and ensure that communities are better prepared to face future disasters.



Geographical Location of the Area

Kerala is a state located on the southwestern coast of India with a long coastline and a tropical monsoon climate. The state has a diverse geography, ranging from the rugged Western Ghats in the east to the low-lying coastal plains in the west. The major geographical features of Kerala include:

Rivers and Backwaters: Kerala is known for its numerous rivers and backwaters, which form an intricate network of waterways. The rivers and backwaters provide a vital source of irrigation and drinking water, but they are also prone to flooding during heavy rainfall.

Coastal Plains: The coastal plains of Kerala are narrow and low-lying, with a sandy beach that stretches along the Arabian Sea coast. The coastal plains are highly susceptible to storm surges and tsunamis.

Western Ghats: The Western Ghats are a mountain range that runs along the western coast of India and passes through Kerala. The Western Ghats act as a natural barrier, blocking rain-bearing clouds from moving northwards into Kerala. However, during the monsoon season, the Western Ghats trap the moisture-laden clouds, resulting in heavy rainfall and floods.

Climate: Kerala has a tropical monsoon climate, which means that it receives most of its rainfall during the summer months from June to September. The heavy rainfall during the monsoon season can cause flooding and landslides.

The combination of these geographical features makes Kerala prone to floods during the monsoon season. The narrow coastal plains, the Western Ghats, and the heavy rainfall during the monsoon season all contribute to the state's susceptibility to floods. Therefore, it is essential to have effective disaster management plans in place to minimize the impact.

Natural Factors Leading to the Disaster

Meteorological Analysis

The heavy rainfall in Kerala during August 2018 was caused by a low-pressure area that developed over the southern Bay of Bengal and moved towards the southern part of the Indian peninsula. The low-pressure area interacted with a cyclonic circulation over the southern Arabian Sea, resulting in heavy rainfall over Kerala. The rains continued for several days, leading to floods and landslides in the state.

Hydrological Analysis

The heavy rainfall led to the overflow of rivers and dams in Kerala. The state has a network of rivers, including the Periyar, Muvattupuzha, and Bharatapuzha, which are major sources of water for irrigation and drinking purposes. The heavy rainfall caused the rivers to overflow their banks, leading to flooding in low-lying areas. Additionally, the release of excess water from dams, including the Mullaperiyar and Idukki dams, also contributed to the flooding.

Geological Analysis

The geological factors that contributed to the Kerala floods include the steep topography of the Western Ghats and the presence of laterite soil. The Western Ghats are a rugged mountain range that runs along the western coast of India and passes through Kerala. The steep topography of the Western Ghats makes it prone to landslides and rock falls during heavy rainfall. Additionally, the laterite soil in Kerala is highly reactive and prone to erosion, which can increase the susceptibility of the region to landslides. In short, the heavy rainfall during August 2018 in Kerala was caused by a combination of meteorological factors, including the interaction of a low-pressure area with a cyclonic circulation, and



hydrological factors, such as the overflow of rivers and dams. The geological factors, such as the steep topography of the Western Ghats and the presence of laterite soil, also played a role in the floods. Effective disaster management measures, such as early warning systems, preparedness plans, and response efforts, are essential to minimize the impact of natural disasters like floods in Kerala.

Human Factors Leading to the Disaster

The affected areas of the Kerala floods experienced a high population density, with many people living in low-lying areas and along the banks of rivers and other water bodies. The high population density, combined with poor urban planning and inadequate infrastructure, made the affected areas more vulnerable to the impacts of the floods. The urbanization in the affected areas also contributed to the flooding, as the construction of buildings and infrastructure in waterlogged areas increased the risk of flooding.

The Kerala floods of 2018 were a complex disaster that was influenced by a range of socio-economic factors. Some of the key factors that contributed to the event include:

Lack of preparedness: The state government's lack of preparedness for the heavy rainfall and the resulting floods was a significant factor. This included inadequate infrastructure, such as dams and flood barriers, as well as insufficient disaster management plans and resources.

Poor urban planning: The high population density and poor urban planning in the affected areas increased the vulnerability of the population to floods. Many people lived in low-lying areas and along the banks of rivers and other water bodies, making them more susceptible to flooding.

Socio-economic inequality: Kerala floods disproportionately affected marginalized communities, including low-income households and people living in informal settlements. These communities often lacked access to the resources and support needed to cope with the disaster, such as safe shelter, food, and clean water.

Economic impact: The floods had a significant impact on the economy of Kerala, causing damage to infrastructure, agriculture, and industries. This had a ripple effect on the livelihoods of people in the state and the wider economy.

Role of State and Central Government in Relief Measures

Government relief efforts and policies in response to the Kerala floods of 2018 were extensive and included a range of measures aimed at providing support to affected communities. These efforts included:

The Indian government declared a national calamity and announced an initial aid of Rs. 100 crore for the state. The Indian Army was deployed to assist with relief and rescue operations, and the Indian Air Force airlifted supplies and personnel to affected areas.

The Central government announced financial assistance of Rs. 600 crores for the state, and the Prime Minister's Relief Fund provided additional funds for relief efforts. ^[5]

The state government launched several initiatives to support the recovery of affected communities, including the distribution of food and relief materials, the repair of damaged infrastructure, and the provision of financial assistance to affected households. Some key factors to consider in this analysis



might include the reach and coverage of assistance, the speed and efficiency of relief efforts, and the effectiveness of the measures in addressing the needs of affected communities

Role of Indian Army and NGOs in Relief Measures

In addition to government efforts, military and non-governmental organizations (NGOs) also played a significant role in providing relief to affected communities during the Kerala floods of 2018. Military forces provided logistical support and conducted rescue operations, while NGOs provided food, shelter, and other essential items to those in need. ^[2]

Relation to Sustainable Development

Sustainable development refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This concept is particularly relevant to disaster management, as natural disasters can have long-lasting impacts on communities and the environment. Effective disaster management practices should prioritize sustainable development principles, such as reducing vulnerability, promoting resilience, and protecting the environment.

In the case of the Kerala floods of 2018, it is difficult to determine the extent to which relief measures were sustainable, as this would depend on the long-term impact of these actions on affected communities and the environment. However, sustainable development principles should be integrated into disaster management practices to ensure that relief efforts are effective and have a lasting positive impact on affected communities.

Suggestions

Increasing public awareness and education on disaster risk reduction and preparedness, including through community-based initiatives and public campaigns. ^[3]

Strengthening early warning systems and disaster response mechanisms to improve the speed and efficiency of relief efforts.

Investing in disaster-resistant infrastructure and construction practices to reduce the impact of natural disasters on communities and reduce reconstruction costs.

Improving the coordination and collaboration between government agencies, non-governmental organizations, and the private sector in disaster management efforts.

Incorporating sustainable development principles into disaster management practices, such as reducing vulnerability, promoting resilience, and protecting the environment.

Encouraging the use of technology and innovation in disaster management, such as the use of drones for aerial surveys and mapping, and the development of mobile applications for disaster response and communication.

Overall, effective disaster management in India will require a comprehensive and integrated approach that involves a range of stakeholders and prioritizes the safety and well-being of affected communities.

Conclusion

Kerala's floods highlighted the importance of disaster management in India, which can prevent loss of life, reduce financial and social toll, and ensure local communities are better equipped to handle future disasters. Socioeconomic factors, such as poor urban planning, socioeconomic disparity, and a lack of preparedness, contributed to the past Kerala floods.



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