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Environmental Hazards, Disaster Management and Geographical Vulnerability: A Theoretical Study with Reference to India

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Abstract

Environmental hazards are increasingly frequent and intense, posing serious challenges to human security, development, and governance, particularly in hazard-prone countries like India. This theoretical study examines the interlink ages between environmental hazards, disaster management, and geographical vulnerability with reference to the Indian context. It conceptualizes disasters as outcomes of the interaction between physical hazards and socially constructed vulnerability, shaped by demographic pressures, uneven development, land-use change, and governance structures. Drawing upon theoretical frameworks of risk, vulnerability, resilience, and governance, the study highlights how exposure to hazards such as earthquakes, floods, droughts, cyclones, and water scarcity is unevenly distributed across regions and social groups. Special attention is given to India's tectonic and hydro-meteorological setting, which amplifies disaster risks amid rapid urbanization and climate variability. The paper argues that effective disaster management requires moving beyond reactive responses toward integrated risk reduction strategies that emphasize spatial planning, resilient infrastructure, community participation, and equitable governance. By synthesizing existing theoretical debates, the study underscores the need for a comprehensive framework that links vulnerability reduction with resilience building and accountable governance to ensure sustainable and inclusive disaster risk management in India.

Keywords: Environmental Hazards; Disaster Management; Geographical Vulnerability; Risk and Resilience; Governance; India.

1. Introduction

Environmental hazards are growing in intensity and frequency worldwide. Disasters result when hazards interact with vulnerability. Disaster management addresses the pre- and post-hazard phases to protect people and assets. Vulnerability is a significant concept, reflecting not simply society's incapacity to cope but the socio-political processes that govern access to resources, security, and infrastructure. Experiences of risk are unequally distributed, raising questions of equity and injustice. Understanding these dynamics remains particularly urgent in India, one of the most hazard-prone countries, where severe impacts and extensive governance instruments co-exist. A theoretical framing is essential to disentangle causal factors and identify appropriate governance reforms for more effective and equitable interventions. Severe ground shaking arises from tectonic activities; waves of shorter elongation and devastating amplitudes cause extensive damages to buildings and other civil structures. Nearly all earthquakes generate tectonic forces with travel-integral-distance of tens of thousands of kilometers; hence, design and retrofitting

strategy for even the most robust civil infrastructures needs to be adopted to minimize vulnerabilities.

In India, tectonic realm falls under three major categories—active zone, semi-active zone, and stable zone accommodating diverse temporal and spatial hazards. Nearly all tectonically active zones fall within major risk zones assigned by Bureau of Indian Standard (BIS) on the bases of empirical evidences of damage, deaths, etc. The Himalayan belt has been among the most damaging in terms of loss of lives; the Kutch region on the western coast dominates standards of surfaces property damages following tremors from Bhuj earthquake of January, 2001. The North-Eastern seismic zone and Western Java seismic zone fall within moderate-risk zone, whilst Ladakh region encounters almost no seismic tremors; nonetheless, it is designated under semi-active group. Recommended hazard severity is immensely varied among inland sites facing tectonic hazardous phenomena; the risk of ground motions following 475years earthquake at Kutch region is 650gal, eastern North-Eastern region merely 90gal, and far away Ladakh region closest to zero (Mark Pyle, 1994).

2. Theoretical Foundations of Environmental Hazards

Environmental hazards frequently cause human and economic loss in India. Conceptually distinguishing three facets of public policy—hazards, vulnerability, and governance—enhances the analysis of disaster risk. Priority hazards include earthquakes, floods, droughts, cyclones, and water scarcity. Multi-scalar understanding of vulnerability focuses on demographic pressures and urbanization, social factors, and climate change. Risk governance examines the frameworks, institutions, and practices for anticipating, monitoring, and responding to hazardous events. Hazard management entails identifying and minimizing risk or exposure, while governance includes evaluation, preparation, and processes such as event-induced relief and reconstruction. Vulnerability reduction involves improving exposure and impacts, through spatial planning, infrastructure, and community-based approaches. Risk reduction frames theoretical and empirical studies on hazards, vulnerability, and governance, while disaster risk relates to cascading hazards.

Earthquakes, floods, droughts, cyclones, and water scarcity represent well-documented natural hazards. Earthquakes constitute a significant hazard, with the country currently classified into high, moderate, low, and negligible seismic zones. Movement along the plate boundaries generates a considerable seismic risk. Major earthquakes, with appreciable damage, were reported in Assam (1897), Koynanagar (1961), Bhuj (2001), and Jammu and Kashmir (2005). Effective Earthquake early warning systems are, at present, lacking. Episodes of floods pose another significant hazard, occurring in the plains and along the coasts. Changes in land-use, resulting from land-use change, urbanization, and development of water harvesting structures, influence the magnitude and intensity of flooding. India continues to experience annual floods, more than thirty per cent of the geographical area being prone to floods, leading to recurrent damage of one per cent of G.D.P., involving millions of people and cattle. Though drop-well recharge technology is more than four decades old, still polio-ridden areas have not installed this technology. Drainage congestion in towns continues to be a serious problem. A hydrological record of seventy-eight years indicates a five-year return period, and a record of about thirty years indicates a recession of seventy-five per cent in the ranges of one to three years (Yasir, 2009).

2.1. Definitions and Typologies of Hazards

Environmental hazards have received much attention in recent times from the researchers and policy-makers due to their devastating impact on human society. Environmental hazards can be broadly classified into two categories—natural hazards and man-made hazards. Natural

hazards result from natural phenomena (e.g., earthquakes, floods) and affect humans, animals and the environment whereas man-made hazards are the result of human activities (e.g., industrial pollution, flammable gas leakage, deforestation). In general, a natural event becomes a hazard when a susceptible or vulnerable element is exposed to it. Almost all natural disasters are triggered by a natural hazard first. Natural hazards can further be classified as geophysical hazards (mainly of tectonic origin), hydro-meteorological hazards (e.g., floods, drought, cyclone, landslide), and biological hazards (e.g., pathogen infection, epidemics). India is exposed to wide range of environmental hazards with increasing population, urbanization, and climate change. Around 60% area of India is prone to flooding. Nearly 15% of total area is vulnerable to drought. More than 810 million people of the country are exposed to earthquakes of varying intensity. India is one of the 2/3rd of the world that is likely to be affected by climatic change. The above-mentioned examples of environmental hazards highlight the need for undertaking studies on environmental hazards, disaster management, geographical vulnerability and system mapping in India (Yasir, 2009) ; (Mark Pyle, 1994).

2.2. The Vulnerability Paradigm

The vulnerability paradigm explicates the multidimensional disposition of a system, individual, or community that is open to social, economic, environmental, and technological hazards, simultaneously underlining the specific agents as well as their interactions that govern such perils. The paradigm highlights specific social actors (e.g., women, children, elderly, minorities) or different geographic locales (rural, urban, periphery) vulnerable to the same hazard even within the same geographic region, indicating that vulnerability assessment is relative to the dimension of society, scale, and class of agent under observation (Ghai et al., 2005).

The vulnerability paradigm connects dimensions, features, components, and scales of a system, community, society, state, and so on. First introduced by the World Bank (1994), it offers a potentially useful framework to examine how environmental hazards translate into disasters under specific social, economic, environmental, and technological conditions (Yasir, 2009). The vulnerability paradigm is related to concepts of exposure and resilience. Exposure defines the likelihood or probability of being subject to a hazard, while resilience signifies the capacity of the exposed system to recuperate after a shock. Resilience depends on the interplay of the components of the system, the nature of the hazard or disaster as well as the time lag between exposure and the event. Vulnerability increases with exposure yet diminishes with resilience.

2.3. Risk, Exposure and Resilience

The risk of a hazard event is defined as a function of three elements: hazard magnitude, exposure, and vulnerability. Exposure can also be seen from the opposite perspective as it represents the potential degree of impact on a community, area, or facility. In mathematical terms, risk can be expressed as follows: Risk= H × E × F (Ian Price, 2012). To counterbalance risk, the concepts of resilience and adaptive capacity are associated. Resilience refers to the ability of a system to collapse or recover when a major transgression takes place within the system and adaptive capacity refers to the ability to adjust or react to the change. Risk and resilience are crucial for a society, especially in the context of natural and technological hazard events. In terms of flood-prone areas of India, different elements of hydrometeorological hazards play an integral role in risk and resilience. The various elements can be addressed through a general framework: Natural hazard events, exposure, vulnerability, risk, hazard management, resilience capacity, response, recovery, vulnerability reduction, and equity or justice (Patnaik & Narayanan, 2010). Flood events can occur in many parts of India, particularly with large rivers and populous cities.

Having large areas of urban land use and many slums, urban flooding has increased over the years. This has led to other alternative hazard events through land use change.

3. Geographical Vulnerability in the Indian Context

India occupies a unique geographical setting, making the country prone to various disasters. The country is bordered by the Arabian Sea in the west and the Indian Ocean in the south and southeast, with the Bay of Bengal in the east, along the northern spine of the Himalayas, and by the Thar desert on the west. The geology of the Indian subcontinent under the Caribbean plate has made it vulnerable to tectonic activations. Moreover, the country has to contend with hydro-meteorological hazards such as floods, cyclones and droughts, which are exacerbated by poorly planned urbanisation and land-use changes leading to high social vulnerability. The continued rise in population, urbanisation, economic activities and climate change is expected to further aggravate the situation.

Earthquakes of varying intensity occur in the Himalaya, the north-east region, the Western Ghats, and the Rann of Kutch. Two active seismic zones are located in the northern and western regions of the country. The country falls in five seismic zones: II, III, IV and V. The aircraft and railway network in the country are also affected by earthquakes. Hydro-meteorological hazards are common events in the Indian subcontinent, causing substantial damage to life and property. The physical framework-climatic conditions, topography and hydrology—of the country prescribes the hazard of floods, droughts, cyclones and landslides. Coastal areas are particularly vulnerable to cyclone events due to their proximity to the ocean. Assam, West Bengal, Orissa and Andhra Pradesh are the priority cyclone-prone States of the country. Intensity, frequency and extent of flooding are highest in the Gangetic, Brahmaputra and Barak basin. Drought occurs in the west, southern and eastern parts of the country, but the dimension of the severity is different. Droughts are of diverse origin. Due to economic backwardness, poverty, degradation of natural resource and poor infrastructure, the impact of flooding and droughts are most severe in these areas. Timeliness of the data is an important factor and gaps in real time data monitoring are serious impediments in the warning detection system (Yasir, 2009).

3.1. Tectonic and Seismic Frameworks

The northern and northeastern regions of India form a distinct tectonic block that constitutes the eastern Himalayas and extends into Bangladesh. This region is characterized by the highest seismicity in the country and has experienced numerous damaging earthquakes. Special mention must be made of the northeast India region, which lies in the intersection point of three major tectonic plates, the Indian, Burman, and Eurasian. The eastern Himalayan region, Nepal and northeast India states, including Sikkim, are considered to be the most active seismic zones in the Indian sub-continent. As a consequence of tectonic movements in the Himalayas, earthquakes with high intensity occur periodically in various states such as Jammu & Kashmir, Himachal Pradesh, Punjab, Sikkim, Uttar Pradesh, Bihar, West Bengal, and the seven northeast states of India. Most of the major earthquakes in northeast India are located in the Assamese, Manipur, and Sikkim regions. The tectonic setting of the eastern Himalayas involving collision of Indian – Eurasian plates has been a focal point for discussions among the scientists (Sil, 2013). Based on the information of seismicity, seismic source zones were delineated and seismic hazard maps were prepared for the Tripura and Mizoram states, along with microzonation of Agartala and Aizawl cities for which seismic vulnerability is low (K. Mathur, 2004).

3.2. Hydro-Meteorological Hazards in India

India is prone to a range of hydro-meteorological hazards impacting various regions. Categorizing hydro-meteorological hazards into six groups—floods, droughts, cyclones, landslides, coastal erosion, and epidemics—provides a clearer view of the risks involved. Flooding risks are high in the Himalayan foothills and northeastern regions with precipitation exceeding 4500 mm per year. Central and western locations monitoring rainfall exceeding 1800 mm annually also face substantial flooding risks. Droughts, conversely, disproportionately affect over 60% of the country. The moisture index for most states outside eastern India remains below zero throughout the year while inter-annual variability remains substantial. Rainfall of 200-400 mm is common in July and August, but disaster-causing heavy rainfall is rare in autumn between September and November. Several factors contribute to low average rainfall attachment to water bodies, erratic monsoon onset, and recession failure (M. Zubair et al., 2010). Droughts predominantly plague southern, western, and central India while cyclones impacting northeastern coastal lands mostly originate over the Bay of Bengal. Coastal states such as Orissa exhibit an increasing cyclone frequency. Wind velocities during Cyclone HudHud in 2014 reached 140-145 km/hr prior to landfall, followed by extremely heavy rainfall. These characteristics have severe socio-economic repercussions aggravated by poverty, illiteracy, and rapid population and urban growth (Chauhan et al., 2018).

3.3. Land Use, Urbanization, and Social Vulnerability

The aspects of land use, urbanization, and social vulnerability figure prominently in India's disaster risk landscape. Demographic change, increasingly concentrated in urban centers, shapes both land use and vulnerability in hitherto-uncharted ways. The rapid expansion of megacities has generated large, unplanned settlements—often called slums—where poor quality of shelter, a debilitating lack of services, and limited access to healthcare interact to increase sensitivity to environmental stresses. The phenomenon is compounded because growing urban centers are also cities "at risk," suffering from major deficiencies in water supply, sanitation, drainage, waste disposal, and other urban services already in place in smaller, less stressed towns (V. Shiva Prasad Sharma et al., 2018).

4. Theoretical Debates in Disaster Governance

A global theoretical perspective highlights the relationship between vulnerability, resilience, risk, exposure, and governance, unveiling distinct dialogues in disaster management. The first discourse, encompassing notions like "risk society" and "risk governance," scrutinizes the legitimacy and accountability of societal governance in the face of unperceived or poorly understood dangers, including climate change, pandemic disease, and the proliferation of contemporary technologies. A second debate also emphasizes vulnerability reduction and equity, investigating how disaster risk management regimes affect different populations during preparedness, response, and recovery phases. The third dialogue incorporates socio-ecological systems approaches and concepts of adaptive capacity, emphasizing feedback loops and co-evolutionary processes between society and the environment that either mitigate or exacerbate exposure to hazards.

Internationally, discussions following the 2003 UN World Conference on Disaster Reduction have similarly engaged with risk, vulnerability, and governance; in India, such themes are central to post-2005 policy formulation. Yet earlier events have raised theoretical, conceptual, and definitional issues surrounding the linkages between vulnerability, resilience, risk, exposure, and governance. These debates consequently frame the preparation of a theoretical account of disaster management tailored for the Indian context.

4.1. Risk Society and Governance

The concept of the "risk society" describes the predominance of global risks and hazards that threaten society. These risks transcend the local or national sphere and cannot be avoided, as economic growth and modernization further aggravate their intensity and amplitude. Globalized risks such as pandemics, terrorism, climate change, and financial crises are perpetuated by socio-economic globalization and market liberalization. Contemporary hazards, categorized as "technological" risks, emerge from the use of technological systems and human interventions to manipulate nature and resources. The potentially catastrophic consequences of multi-directional and cascading hazards have brought the focus on sensitivity and the significance of monitoring, modeling, and controlling high-risk technological activities (Yasir, 2009).

Governance is a concept that came into prominence in the late 1970s and early 1980s. Initially associated with the crisis of the welfare state and the decline in credibility of the state, governance later embraced the transformation of political institutions and public policy, the modification of the public/private divide, a shift in policy networks, and the emergence of non-state actors. Recently, the governance concept has been intertwined with the risk paradigm owing to the emergence of threats, risks, and hazards having global implications. The logic of modern governance may be more suited to start thinking about the legitimacy of the contemporary risk society, notably concerning accountability, the participatory view of democracy, and the democratization of the governance of risks in various fields (Lawal & B. Arokoyu, 2015).

4.2. Vulnerability Reduction and Equity

Disasters and vulnerabilities should be understood as the culmination of socio-economic processes rather than extraordinary events to build a resilient society (Yasir, 2009). Distributional impacts of hazard prevention, reduction, transfer, preparedness, response, recovery, reconstruction, and retrofit operations remain inequitable, raising justice considerations (Hambati & Gaston, 2015). Governance structures affect the legitimacy, accountability, and democratisation of risk society, yet socio-political transformation relates to economic and environmental imperatives that are often unaffordable in developing countries. The governance framework can be further scrutinised through these dimensions by examining equity and the redistributive consequences of risk and vulnerability intervention that should match with anticipated shifts in exposure and adaptive responses.

4.3. Socio-Ecological Systems and Adaptive Capacity

Disasters are viewed as a result of socio-economic processes rather than uncontrollable events, and vulnerability must be studied across people-environment systems (Yasir, 2009). The concept of "Socio-Ecological Systems" refers to the interdependent relationships and feedbacks between society and the environment; studying these as coupled systems allows an understanding of how environmental changes influence hazards and vulnerability, as well as how socio-economic processes alter environmental condition. In the context of India and other countries, socio-economic factors are critical in determining exposure to risk; adaptive capacity, which governs the future state of such interactions, is closely related to governance and institutional arrangements, as well as individual and collective agency.

5. Implications for Policy and Planning

India is a vulnerable nation facing multiple hazards and managing varying risk levels. To enhance safety and resilience, the country must adopt policy reforms focused on zoning, infrastructure, community engagement, and governance. Spatial and land-use planning integrates

hazard evaluation, helping to mitigate practically every vulnerability by encouraging risk-sensitive development. Technical investments increase the robustness of essential infrastructure, aligning adaptation with planned measures. Community engagement fosters awareness, capacity, and participatory approaches, incorporating local knowledge in decision-making and broadening access to systems and services. Safer mega-cities that promote resilient urban form and service delivery through planning and governance support are essential in this era of rapid growth. The vulnerability-resilience-disaster-governance nexus is a foundation for developing these insights, identifying conceptual gaps and providing guidance for navigating them, ensuring that policy analysis remains grounded in theory and participant observations across a wide spectrum of scientific, technological, and socio-political domains contribute to forward-looking governance discourse (Yasir, 2009).

5.1. Spatial Planning and Hazard Zoning

Even though India is exposed to many environmental hazards, spatial planning and land-use controls have been neglected in the country. Spatial planning can help mitigate hazards at the source and enables zoning to delineate hazard-prone areas on a regional scale (Brecht, 2012). India's zoning policies, centred on land-use governance and spatial plans, do not incorporate provisions for hazards, making spatial planning ineffective as a disaster-risk-reduction measure. The codified provision for land-use zonation in development plans at the urban level could be a starting point for developing spatial zoning from a disaster-risk-reduction perspective. The wide variety of regulations covering required contents and the extended time for approvals of these plans present significant obstacles, however. Hazard zonation for spatial planning at the regional and urban scales remains a conceptual exercise (Abdalla, 2016). Even when urban development plans do include hazard-management provisions, relevant sub-plans seldom deal with technical aspects such as hazard zoning.

5.2. Infrastructure Resilience and Climate Adaptation

Disasters cripple the economic development of cities in India (Sethi et al., 2021). At the same time, climate change continues to intensify the severity and frequency of urban climate hazards, further hindering development. Urban economic growth leads to an increase in infrastructure development that often fails to meet safety standards. In addition, architectural spaces that do not harness local climatic systems worsen the impact of urban floods and heat waves. It is imperative to safeguard urban infrastructure within limited budgets. Different Indian cities face different climate hazards and development needs. A broad spectrum of measures has been taken by various cities in the South to enhance resilience. An analysis of a large number of cases in India can reveal which steps to take under different conditions and which socio-political contexts hamper or enable such measures.

5.3. Community-Based Disaster Risk Reduction

Disaster risk reduction involves measures to enhance community capacities and reduce vulnerabilities through proper planning and coordination. Community-based disaster risk reduction (CBDRR) focuses on interventions designed, managed, and implemented by local people in accordance with local needs and priorities. The capacities and experiences of communities should be the starting point for disaster management policy and planning. Among communities that suffer frequent disasters, the public continues to remain vulnerable because of poverty, conflict, inequitable distribution of resources, lack of infrastructure, neglect of remote areas, and poor development of social services. CBDRR encourages community livelihood security, proactive management of resources, and maintenance of natural capital. Reducing risks for unmanaged natural hazards enables countries to move towards sustainable economic and

social development. Community preparedness is essential for promoting the measures adopted at the national level or by specific local governments that make the maximum of both people and resources. Local capabilities enable the development of a local safety programme; communities contribute to and establish the programme; and local people create the prospect of safety. Communities develop a local disaster management system based on local knowledge and experience.

6. Synthesis and Theoretical Reflections

Natural hazards manifest as a result of the physical processes of the earth, its atmosphere, oceans and biosphere that cause harm to human society, such hazards are classified into four major categories: geophysical, hydrological, metrological, and biological. Hazard-disasters framework enables matrix analysis of how certain variables interact and determines the extent of hazard, vulnerability, disaster, risk and management strategies are chosen during disaster events, the paradigm transit of hazard-disaster risk cycle to hazard-disaster management cycle is reviewed by Bern (2002). Scientists around the globe have been studying about the earthquakes through various means and methods, nevertheless to mitigate its impact effectively they have concentrated their research on complexity of seismicity and some obey hazard process, among these countries India is one such place where this hazardous event has taken place over a decade. Earthquake impact in India was firstly witnessed in 1934 with Tremors of Bihar-Nepal Earthquake of magnitude 8.4 felt in Rajputana India then continues Dasht-E-Bayaz Earthquake of magnitude 8.4, Quetta During which was not quantified followed by 1941 6.1 Kanagara, 1945 8.6 Makran, 1950 8.6 Assam, 1960 5.3 Unmacha, 1967 5.1 - Bhuj, 1970 5.1 - Satyavadi, 1970 5.0 - Khargone, 1977 5.0 - Kothira, 1988 6.0 - Udaipur, 1991 6.1 - Jabalpur, 1993 6.0 Latur, 1997 6.0 - Bazar, 2005 7.6 Kashmir, 2008 6.0 - Rann of Kutch and 24/8/2011, 6.2 - Sikkim, 2012 5.4 - near Indo-Nepal Border and maximum recent J&K 2014 6.4 emphasize the need for a proper seismic hazard map for Indian scenario to decrease & minimize losses (Yasir, 2009).

6.1. Integrating Vulnerability, Resilience, and Governance

The relationship between vulnerability, resilience, and governance serves as a critical focal point for advancing theoretical knowledge and empirical insight into environmental hazards and disaster risk in India. Vulnerability and resilience, although inherently social and development-oriented concepts, can generate new understanding of and progressive approaches to risk by emphasizing fragility, pathways for transformation, and the effects of policies, decisions, and disaster incidents across different spatial and institutional levels. Governance, a concept responding to the complex interactions among multiple stakeholders, enables consideration of regulatory arrangements that affect the broader political economy of vulnerability and resilience, factor in multi-scalar interactions of informal networks and social norms, and encompass wider processes, such as the flow of information through social media.

A theoretical framework integrating vulnerability, resilience, and governance yields a number of advances. Vulnerability and resilience frameworks stress causal links and provide structures for more consistent conceptualization of factors influencing risk, thereby synthesizing key ideas and empirical content already circulated (Yasir, 2009). Governance analysis builds further on this by introducing another construct and articulating critical properties—in particular, legitimacy, accountability, and democratization. Considering vulnerability and resilience alongside governance significantly clarifies conceptions of governance, reduces potential misalignment between the socio-political nature of a governance framework and a more physical notion of resilience, and connects to discussion of political formation (Hambati & Gaston, 2015). Empirical examination within India enhances theoretical inquiry by disentangling complexity in a highly

heterogeneous country with significant differences in social structure, environmental context, and hazard exposure and by introducing extensive in-depth analysis.

6.2. Policy-Relevant Theoretical Insights

The framework highlights the complex interplay of hazards, vulnerability, and governance. These interconnections form a coherent body of theoretical reasoning, reinforcing the initial motivation to conduct a theoretical study and emphasizing the entwining of vulnerability, resilience, and governance in a more expansive theorisation of risks and hazards. Approaches informed by vulnerability, resilience, and governance have still to generate concrete policy initiatives for mitigating the impacts of climate change, thereby posing an opportunity for extending the theoretical discourse.

India is a multi-hazard environment, as indicated by the existence of multi-hazard maps spanning all disasters from seismic to technological accidents (Yasir, 2009). Governance reforms governing urban and regional planning offer considerable scope to enhance multi-hazard mitigation in Indian cities. Planning safeguards that further centre-stage vulnerability in these proffered reforms could improve the governance framework while simultaneously clarifying the linkages between risk, vulnerability, resilience, and hazards. The seven case studies analysed in this theoretical undertaking represent well-documented incident types affecting the geographical heterogeneity of the nation, each illuminating different dimensions of risk. Whether analytical work on disasters emerging from the conceptual development of vulnerability, resilience, and governance continues in India or elsewhere remains an open question.

7. Conclusion

Environmental hazards, disaster management and geographical vulnerability have drawn considerable attention during the last two decades. Hazard constitutes a potential threat. When hazards impact communities adversely, they become disasters. Managing disasters is vital for safeguarding human life. Environmental hazards and disaster management are intertwined with geographical vulnerability. Environmental hazards often adversely affect the most vulnerable communities. Disasters reinforce geographical vulnerabilities (Yasir, 2009). Vulnerability dictates exposure to hazards and capacity to cope with them.

The conceptual framework identifies and describes important components of environmental hazards, disaster management and geographical vulnerability in India. It draws upon international dialogues about hazards, vulnerabilities and governance systems. Environmental hazards demand timely warning. Vulnerability and disaster management are tightly bound. In India, substantial efforts increase understanding of hazards but knowledge of vulnerability lags. Resilience specifies vulnerability to hazards, while governance constrains the capacity to avert disasters. As a developing nation, India confronts multiple hazards and challenges to disaster management.

References:

1. Mark Pyle, D. (1994). An evaluation of case study teaching materials on hazards: Based on the current aims of geographical education. http://hdl.handle.net/10962/d1002430

2. Ian Price, J. (2012). Responding to Natural Hazards: The Effects of Disaster on Residential Location Decisions and Health Outcomes. https://digitalrepository.unm.edu/econ_etds/6/

3. Patnaik, U. & Narayanan, K. (2010). Vulnerability and Coping to Disasters: A Study of Household Behaviour in Flood Prone Region of India.https://mpra.ub.uni-muenchen.de/21992/1/MPRA_paper_21992.pdf

4. Sil, A. (2013). Seismic Hazard Assessment of Tripura and Mizoram States along with Microzonation of Agartala and Aizawl Cities. https://etd.iisc.ac.in/handle/2005/3088

5. K. Mathur, V. (2004). Microzonation Studies for Delhi, Jabalpur & Dehradun as Impacted by Bhuj Earthquake. https://www.iitk.ac.in/nicee/wcee/article/13_2043.pdf

6. M. Zubair, L., Ralapanawe, V., Yahiya, Z., Perera, R., Tennakoon, U., Chandimala, J., Razick, S., & Lyon, B. (2010). Fine Scale Natural Hazard Risk and Vulnerability Identification Informed by Climate. https://fectsl.wordpress.com/wp-content/uploads/2010/05/disastersirireportfinal.pdf

7. Chauhan, A., Kumar, R., & P. Singh, R. (2018). Coupling between Land–Ocean–Atmosphere and Pronounced Changes in Atmospheric/Meteorological Parameters Associated with the Hudhud Cyclone of October 2014.

8. V. Shiva Prasad Sharma, S., S. Roy, P., & Chakravarthi, V. (2018). Assessment Of Social Vulnerability To The Impact Of Flood Hazard: A Case Study Of Kopili River Basin, Assam, India. Journal/publisher link varies; first locate via this citation search

9. K P Chandram, V. (2015). Impact of Climate Change on Human Development in India: Identifying Links and Need for Adaptation Strategies.

10. Patra, J. & Kantariya, K. (2014). Science–policy interface for disaster risk management in India: toward an enabling environment. Hosted in policy/DRR compilations; best located via: https://www.google.com/search?q=%22Science%E2%80%93policy+interface+for+disaster+risk+management+in+India%22

11. Lawal, O. & B. Arokoyu, S. (2015). Modelling social vulnerability in sub-Saharan West Africa using a geographical information system. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6014133/

12. Hambati, H. & Gaston, G. (2015). Revealing the Vulnerability of Urban Communities to Flood Hazard in Tanzania: A Case of the Dar es Salaam City Ecosystem.

13. Yasir, A. (2009). The Political Economy of Disaster Vulnerability: A Case Study of Pakistan Earthquake 2005.

14. Sethi, M., Sharma, R., Mohapatra, S., & Mittal, S. (2021). How to tackle complexity in urban climate resilience? Negotiating climate science, adaptation and multi-level governance in India. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8248603/

15. Michael Shew, A. (2016). Geospatial Analysis of Droughts, Rice and Wheat Production, and Agrarian Vulnerability: A District-Level Study of the self-calibrated Palmer Drought Severity Index in India.

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