The Research Dialogue

An Online Quarterly Multi-Disciplinary
Peer-Reviewed / Refereed Research Journal
ISSN: 2583-438X
Volume-1, Issue-3, October 2022
www.theresearchdialogue.com

"Review Paper on Impacts of Natural Hazards on Livelihood Security in Himachal Pradesh, India"

Lakhan Kumar
Doctoral Scholar, Department of Geography,
Delhi School of Economics, University of Delhi

Prof. Vishwa Raj Sharma
Associate Professor, Department of Geography,
Shaheed Bhagat Singh College, University of Delhi

Nishit
Doctoral Scholar, Department of Geography,
Delhi School of Economics, University of Delhi

Shubham Kumar Sanu
Doctoral Scholar, Department of Geography,
Delhi School of Economics, University of Delhi

ABSTRACT:

Natural disasters or hazards are closely tied to humans; historically, natural disasters as a result of environmental disruption have been linked to the downfall of human civilisation. Natural catastrophes, according to numerous reports, are becoming increasingly regular in terms of their impact and frequency of occurrence. It is important to determine the role of researchers in disaster research. Hazards and catastrophes research has evolved from simply determining the causes of natural hazards and implementing structural solutions to conceptualising and defining human vulnerability in a broader context that visualizes disaster management as a continuous process of defining hazardousness of locations, human dimensions of disaster risk, and vulnerability. This research work provides a comprehensive overview of the available literature on natural hazards and livelihood security in the Himachal Pradesh Region of India.

Introduction

Natural hazards are extreme natural phenomena that can result in death, severe property damage, and disruption of human operations. They differ in intensity, impact, size, and the level of response they need (Sanu and Sharma, 2022). There are two types of natural hazards: tectonic hazards and climatic hazards. Landslides, floods, volcanic eruptions, earthquakes, and droughts have all occurred in the history of human civilisation. Humans have been interacting with and intruding on nature since the dawn of civilisation (Da Silva & Cernat, 2012). These put forward plenty of challenges and threats to the welfare & survival of human beings. The rise and fall of great civilizations in the past already have direct or indirect linkages with the breakdown of the delicate balance between nature and humans. Natural hazards and their devastation are based in the disruption of human-environment connections, which is a major topic in geography. The link between geography and natural disasters/hazards is based on the dynamics of man-environment relationships, which are an inherent component of geographic studies. Various scholars have interpreted livelihood security in various ways. While livelihood has been defined as an adequate flow of resources (both cash & kind) to meet people's basic needs, access to social institutions such as kinship, family, and neighbourhood, village, and gender bias free property rights required to support and sustain a given standard of living, livelihood security has been defined as ownership of or access to resources and assets to mitigate risks, ease shocks, and meet contingencies (Shyamalie and Saini, 2010). The changing natural environment also has an impact on livelihoods. Because of the geographical location, Himachal Pradesh is vulnerable to a variety of natural disasters due to its distinct geo-climatic conditions that ultimately affects the livelihood of the population. Therefore, it is very important to find out the existing knowledge and research gaps associated with natural hazards on livelihood security in Himachal Pradesh which could lead us to design a framework for further research for the impact of natural hazards on livelihood security of local communities. This will pave a sustainable pathway for development.

Objective

- To find out the existing knowledge and research gaps associated with natural hazards on livelihood security of local communities of Himachal Pradesh.
- To design a framework for further research for the impact of natural hazards on livelihood security.

Methodology:

This study used the secondary data archives available on various platforms like The Tribune, The Hindu, District Management Plans, Google Scholars, Research Gate, BBC News etc. It aims to promote sensitivity towards and an understanding of past and recent works on disaster study. The literature review also draws from reports based on the Internet and from peer-reviewed research journals.

History of Research on Natural Hazards

Indian geographers have been studying disasters since the mid-twentieth century. Floods, droughts, earthquakes, and landslides were all studied from a geographical standpoint by many geographers.

Rawat and Rawat (1994) conducted a two-year study of human impacts on the monthly, seasonal, and annual stream runoff characteristics of the 55-square-kilometre Nana Kosi watershed in the Indian Kumaun Himalaya, highlighting the necessity for precise, site-specific process studies. Furthermore, Rawat and Rawat (1994) report that on an annual scale, forested regions provided twice as much runoff than agricultural areas, owing to increased evapotranspiration rates in degraded areas, which equates to a 50% reduction in yearly runoff attributable to deforestation in the region. Panikkar and Subramanyan (1996), studied the impact of various geomorphic, geologic, and anthropogenic characteristics on the incidence of 75 landslides observed by remote sensing in the Doon Valley of the Mussoorie Hills in northern India. Their findings supported that rock and debris slides are most common in areas of quartzite and limestone lithology, along active faults, on south-facing slopes with gradients between 18"- 45", where the removal of

supporting material by stream undercutting is compounded by a deforested land cover and most frequently induced by rainfall and earthquake activity.

According to hazards research by Singh and Pandey (1996) in the upper Beas River basin in Himachal Pradesh, identified the influx of visitors and the development of accompanying infrastructure, as well as a change in the local land tenure laws in the late 1960s, were identified as the key drivers of the increase in mass wasting and landslide activity in the late 1990s. The activity of roughly 50 ongoing landslides along a 52-kilometer stretch of National Highway 23, which connects Manali and Leh, is linked to proximity to fault lines and the road's construction over weak unconsolidated deposits and morainal materials throughout much of its length.

According to Suneja (1977) research in western Himachal Pradesh, landslides in the Kangra District are primarily found along road cuttings in highly fractured Tertiary beds made of alternating sequences of fine-grained clays inter-bedded with sandy, coarser sediments, and cause significant losses of life, property, natural flora, and fertile soils. The decline in vegetation cover on the upper slopes as a result of livestock overgrazing and frequent undercutting of toe material by streams and gullies exacerbates slope instability.

According to research in the Lesser Himalaya (Singh, 1989), mountain tourism is a major concern because it is frequently promoted as a method of network development that can provide alternative livelihood options, diversify surrounding economies, promote population growth, and address poverty and livelihood security issues.

The renowned geographer B.W. Pandey conducted various studies on mountainous regions. Since 1990, population expansion and economic development have raised risk sensitivity, and living with the threat of natural disasters has become a way of life (Pandey, 2002). Several anthropogenic factors such as poorly managed agriculture, forest fires, overgrazing, and poor road and building construction, may worsen the process in these mountain regions (Bhasin et al. 2002).

Research on Natural Hazards after 20th Century

Barnard et al. (2001) attribute approximately two-thirds of the 338 shallow, earthquake-induced landslides found in a 226 sq. km area of the Garhwal Himalaya to recent or in last couple of decade's increases in human activity. In global aspects, the authors ascertain the removal of toe material from slopes for the road construction purposes or filling are one of the key destabilizing factor, however, they also concede that "...the precise contribution of human activities to regional denudation cannot be quantified" (Barnard et al. 2001) and caution against extrapolating results from small research sites to broader regions due to the region's physical variability.

The river Beas, which rises in the Pir-Panjal range of Central Himachal Pradesh near Rohtang Pass, approximately 51 kilometres north of Manali town, serves as a water source for economic development and the sustenance of livelihoods in Himachal Pradesh, Punjab, and Rajasthan, as described in Hazard ecology techniques. The Beas River cuts a deep valley through the southern Himalayan mountains as one of the perennial Himalayan Rivers, according to a different study (Pandey & Prasad, 2014). It then rushes over mountains dotted with pine trees till it reaches Manali town. There are Hundreds of small and large snow-fed streams that join the Beas provide as a year-round source of water for the surrounding settlements.

GIS and Remote Sensing helped researchers to study about the geomorphology and hydero-meteorology conditions about the Himalayan far reached Mountains (Rawat, 2013; Nibanupudi and Shaw, 2015). In the recent times with respect to global climate change aspects, just because of its dynamic geosystem and seasonal hydro-meteorological conditions, the Himalayas are more susceptible to natural disasters, particularly water-related hazards and landslides.

Forest fires analysis, forest fire risk assessment and other aspects related to forest fire have also been studied using remote sensing (RS) and geographic information systems (GIS) (Chitale & Behera, 2019).

Land-Use Pattern and Hazards Risk Assessment in Kullu Valley, another study conducted by B.W. Pandey, indicated two-way effects. Changes in land-cover and slope

geometry destabilise slopes and demand extra infrastructures for transportation, energy, raw materials, etc. Climate change and land-use degradation hasten the occurrence of water-related hazards such as flash floods, riverine floods, erosion, and landslides during the monsoon season, and droughts during the non-monsoon season.

There are some doctoral theses submitted in the various India universities from geography department, which showed their interests in examine how the natural or manmade disasters causing effect on humans and environment. These include Disaster management in India- Analysis of Factors Impacting Capacity Building (Erramilli, 2008), geomorphological investigation of floods and socio-economic impact in northwestern Himalayas, Susceptibility to mountain hazards and livelihood security in the upper Beas watershed basin, Kullu Valley (Prasad et al. 2016).

Impact of Natural Hazards

Disasters can lead to severe devastation of physical, human, financial, natural, and social capital, predictably resulting in economic standstill and the deterioration of livelihoods as well as overall development (Sanu, 2022). A detailed study Paul et al. (2000) of the seismicity, geology and climate of the Kali Valley in Kumaun Himalaya, India. The study explained that a combination of near vertical, overhanging slopes and the presence of structural wedges along the exposed face triggered a horrific earthquake-induced landslide that killed 221 people and dammed a tributary stream. Further, the proximity of major tectonic plates, as well as an increase in porewater pressure due to extended rain events in the days leading up to the event.

Disasters have actually hampered development progress as well as socioeconomic advancement, forcing millions of people into abject poverty or, in many circumstances, making worsen (Ehrlich et al. 2021). Topographical characteristics, drainage pattern, river discharge, land use-land cover change, and other important criteria are used in such hazard assessment studies (Marston et al. 1996). Because vegetation growth is a gradual process on such sites, they may remain vulnerable to erosion for decades or even centuries. As a result, slope failures, rock falls, and debris flows will become more

common posing increasing threats to people and infrastructure in such areas (Tiwari & Joshi, 2020). Hazards and disasters were studied from a variety of angles, and the notion of regional ecology of hazards and disaster studies evolved into the new concept of hazards of place.

Future Scope and Opportunities

Various disasters that humanity faces, the magnitude of environmental change, and the vast amount of human impact on the structure all highlight the importance of disaster studies and functioning of the biosphere in inter-linked relationship with these events. India has a strong scientific and traditional understanding of natural and community-based disaster risk processes, however this information is not consistently fed into the design and implementation of social and economic development strategies.

In addition, research must focus on adaptation and mitigation policies for livelihood security, which are designed based on evaluations of climate vulnerability and address local communities' coping methods in the face of increasingly frequent and harsh climatic events. The vulnerability and adaptation assessment reveal that tailored assistance can play an important role in assisting local communities in mountain regions like Kullu valley to adjust to climate change and disaster risk reduction and flexible governance structures should emerge instead of more bottom-up types of aid. The substantial effect of natural hazards on livelihood necessitates a more comprehensive approach to disaster risk reduction and resilience development for livelihood security. There is necessity to strike a balance between development and good environmental planning which gives paramount importance to human safety.

Conclusion

Based on the available literature and above discussion on natural disasters and hazards, the opinions and suggestions summarize some points like: Natural disasters or hazards and humanity are inextricably linked; historically, the collapse of human civilization has been linked to natural disasters as a result of environmental disruption. According to various reports, natural disasters are growing more common in terms of their impact and

frequency of occurrence. These are driving with composite interface between humans and environment; their mechanism of occurrence is multifarious. Hazards and catastrophes research has changed from merely establishing causative mechanisms of natural hazards and adopting structural remedies to conceptualizing and defining human vulnerability in a broader frame of reality that views disaster management as a continual process of defining hazardousness of locations, human dimensions of disaster risk, and vulnerability. It is also important to reduce disaster risk by preparing resilient environmental, sociopolitical, and economic infrastructure. Indian geographers have reacted to the increased focus on catastrophe studies by making piecemeal attempts to comprehend the issue. Floods and droughts have been researched in isolation, and no comprehensive picture has emerged; other forms of disasters have not been adequately addressed. Studies on hazard zonation, risk, and vulnerability related with catastrophes are lacking. Only a few doctorate theses in geography have focused on catastrophes, and there are few doctoral studies that use remote sensing and geographic information systems (GIS). All of the researches have focused on a single hazard or disaster, with studies on many disasters in a single location or region mostly absent. Studies on preparedness and mitigation is required, which corresponds to policy formation thinking government and institutional; national and international). This can be a departure from the old 'fire-fighting' strategy of being in a constant state of preparedness for an eventuality. In this regard, India's academic community, particularly geographers, has trailed behind.

References:

Barnard, P. L., Owen, L. 4., Sharma, M. C., & Finkel, R. C. (2001). Natural and human induced landsliding in the Garhwal Himalaya of northern India. Geomorphology, 40,21-35.

Bhasin, R., Grimstad, E., Larsen, J. O., Dhawan, A. K., Singh, R., Verma, S. K., & Venkatachalam, K. (2002). Landslide hazards and mitigation measures at Gangtok, Sikkim Himalaya. Engineering Geology, 64(4), 351-368.

Da Silva, J., & Cernat, L. (2012). Coping with loss: the impact of natural disasters on developing countries' trade flows. European Commission, 1-6.

Ehrlich, D., Melchiorri, M., & Capitani, C. (2021). Population trends and urbanisation in mountain ranges of the world. Land, 10(3), 255.

Erramilli, B.P. (2008). "Disaster Management in India: Analysis of Factors Impacting Capacity Building." Dissertation, Georgia State University https://scholarworks.gsu.edu/political_science_diss/15

Marston, R., Kleinman, J.,& Miller, M. (1996) Geomorphic and forest cover controls on monsoon flooding, central Nepal Himalaya. Mountain Research and Development, I 6(3), 257 -264.

Nibanupudi, H.K., & Shaw, R. (2015). Mountain hazard and disaster risk reduction. Japan: Springer. ISBN 978-4-431-55241-3.

Pandey, B.W. & Prasad, A.B. (2014). Land-Use Pattern and Hazards Risk Assessment in Kullu Valley, along the Beas River in Western Himalaya. *Journal of Water & Land-Use Management* 14(1): 1–15.

Pandey, B.W. (2002). *Geo-environmental hazards in Himalaya: assessment and mapping*. New Delhi: Mittal publication.

Panikkar, S. V., & Subramanyan, V. (1996). A geomorphic evaluation of the landslides around Dehradun and Mussoorie, Uttar Pradesh, India. Geomorphology, 15, 169- 181.

Paul, S. K., Bartaraya, S. K., Rautela, P., & Mahajan, A. K. (2000). Catastrophic mass movement of the 1998 monsoons at Malpa in Kali valley, Kumaun Himalaya (India). Geomorphology, 3 5, 169-1 80.

Prasad, A. S., Pandey, B. W., Leimgruber, W., & Kunwar, R. M. (2016). Mountain hazard susceptibility and livelihood security in the upper catchment area of the river Beas, Kullu Valley, Himachal Pradesh, India. Geo-environmental Disasters, 3(1), 1-17.

Rawat, J. S., & Rawat, M. S. (1994). The Nana Kosi watershed, central Himalaya, India' Part II: human impacts on stream runoff' Mountain Researclt and Development' 14(3),255-260.

Rawat, P. (2013). GIS modelling on mountain geodiversity and its hydrological resources; in view of climate change. Saarbrücken: Lambert Academic Publishing.

Sanu, S. K., & Sharma, V. R. (2022). Fire Disaster Development Cycle: A Case Study of Anaj Mandi Fire, Delhi, India. *Research Journal (Arts)*, *XLVIII* (July-December 2021), 130–155.

Sanu, S. K. (2022). Fire Hazards in Anaj Mandi, Old Delhi: Vulnerability and Resilience. In: Sharma, V. R. and Chandrakanta (Eds.), Making India Disaster Resilient: Challenges and Future Perspectives, Springer.

Shyamalie, H.W. & Saini, A.S. (2010). Livelihood security of women in hills: a comparative study of India and Sri Lanka. Indian Journal of Agricultural Economics, 65(902-2016-66759).

Singh, R. B, & Pandey, B. W. (1996). Landslide hazard in Indian Himalaya and canadian Rockies: a comparative analysis. In J. chacón, c. Irigaray, &'T ' Frenidez (Eds.), Landslides (pp. 63 -69).

Singh, T.V. (1989). *The Kullu Valley: Impact of tourism development in the mountain areas*. New Delhi: Himalayan books, centre books for tourism research, Lucknow, India.

Suneja, I. J. (1977). Geological aspects of landslides in the Tertiary belt of western Himachal Pradesh, 33-36.

Tiwari, P.C. & Joshi, B. (2020). Challenges of urban growth in Himalaya with reference to climate change and disaster risk mitigation: a case of Nainital Town in Kumaon Middle Himalaya, India. In: Dimri, A.P., Bookhagen, B., Stoffel, M., Yasunari, T. (Eds.), Himalayan Weather and Climate and Their Impact on the Environment. *Springer International Publishing*, Cham, pp. 473–491 https://doi.org/10.1007/ 978-3-030-29684

THE RESEARCH DIALOGUE
An Online Quarterly Multi-Disciplinary
Peer-Reviewed / Refereed Research Journal
ISSN: 2583-438X
Volume-1, Issue-3, *October* 2022
www.theresearchdialogue.com
Certificate Number-Oct-2022/26

Certificate Of Publication

This Certificate is proudly presented to

Lakhan Kumar, Prof. Vishwa Raj Sharma, Nishit & Shubham Kumar Sanu

For publication of research paper title

"Review Paper on Impacts of Natural Hazards on Livelihood Security in Himachal Pradesh, India"

Published in 'The Research Dialogue' Peer-Reviewed / Refereed Research Journal and E-ISSN: 2583-438X, Volume-01, Issue-03, Month October, Year- 2022.

Dr.Neeraj Yadav
Executive Chief Editor

Dr.Lohans Kumar Kalyani
Editor-in-chief

Note: This E-Certificate is valid with published paper and the paper must be available online at www.theresearchdialogue.com