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Urbanisation and Landslide: A Sociological Overview of Anthropogenic Impact in Sechü-Zubza, Nagaland

Asuno Tase¹, Toshimenla Jamir²

¹ Department of Sociology, Nagaland University, Lumami, Nagaland, India

² Professor, Department of Sociology, Nagaland University, Lumami, Nagaland, India

Correspondence: Asuno Tase, Department of Sociology, Nagaland University, Lumami, Nagaland, India

E-mail: asunotase97@gmail.com

ORCID ID: <https://orcid.org/0009-0007-3186-0686>

Abstract

The people of Nagaland living in the hilly terrain have been facing Landslides every monsoon with incessant rainfall. A prominent disaster affecting Sechü-Zubza, a mountainous area with active developmental activities on National Highway 29 under the central scheme. The road extension projects have been frequently hampered due to mud sinking, a widespread disaster threatening the commuters and the inhabitants. However, the calamity can be associated with anthropogenic activity due to broader developmental aims in the study area. The central theme of the study is the adverse effects of landslides triggered by anthropogenic activities, evident from the losses incurred by the affected victims in terms of their physical, social, and economic aspects. The paper seeks to give a paradigm shift in understanding natural calamities like landslides as not solely the result of natural disasters but also ill-managed and ill-planned human activities. Data were collected through primary and secondary sources, and personal interviews were conducted directly with the affected victims. The study will enable an understanding of human nature's destructive capabilities and actions.

Keywords: Landslide, Anthropogenic Activities, Development, Social Impact, Displacement

1. Introduction

The draft report by the scientists of ISRO states that Nagaland is in the third position with 47% of the land at risk of degradation, after Uttar Pradesh with 53% and Rajasthan with 52%. Kohima and Wokha districts are two vulnerable, with 62.42% and 36.59% of their land getting degraded (M, A.M., et al., 2022). Socio-economic losses due to slope failures are great and are growing as the built environment expands into unstable hillside areas under the pressure of expanding populations. Human activities disturb large volumes of earth materials in the construction of buildings, transportation routes, dams and reservoirs, canals, and communication systems and thus have been a major factor in increasing damages due to slope failures (Schuster & Highland, 2001).

Landslides continue to be one of the major geo-hazards, with 9% of global natural disasters. These events continue to persist worldwide despite the advancement in science and technology, leading to losses in the economy, humans and environment (Chalkias, 2014).

Disasters do not occur solely from a natural hazard; instead, they arise from a combination of a natural hazard event and exposure to highly vulnerable assets to that hazard. Disasters should be viewed as reflections of underlying development issues rather than as external, unforeseen events impacting a society (UNDRR, 2013). Over time, Nagaland has experienced swift urban growth and expanded land utilisation. Urbanisation, an intrinsic element of human progress, significantly impacts human societies and the natural surroundings. This ongoing advancement, shaped by various factors, underscores the pivotal importance of road connectivity. Improved connectivity leads to enhanced amenities and initiates the creation of new urban centers and the expansion of existing ones (Saikia & Kar, 2023). Rapid urbanisation and population density growth in cities can pose risks, especially when inadequate planning and poverty are widespread. The road system serves as the cornerstone for the economic advancement of a region, holding profound importance for both social and economic progress (Ye, 2019). High concentrations of people and economic activities often coincide with areas prone to high-risk exposures (UNDRR, 2013). Risks are the probability of physical harm due to technological or other processes (Beck, 1992).

As the population grows, land scarcity rises, leading to settlements in hazardous zones. Poorly regulated construction in landslide-prone areas, particularly seismic regions, poses a significant threat to human lives (Yadav et al., 2023). According to the IndiaSpend report, the leading factor behind landslides in the country is human intervention, revealing that India accounts for 18% of global casualties resulting from human-induced landslides (Murti, 2020). Landslides jeopardise lives and infrastructure, influenced by human-induced changes in land development (Rohan et al., 2023). Over time, significant infrastructure growth has occurred in the pursuit of urban amenities, with particular emphasis on constructing four-lane roads in the elevated areas of Nagaland. The primary aim is to enhance the linkage between the capital city and vital commercial hubs within the state and expedite the transportation of people and goods, fostering growth and prosperity (CW Team, 2023).

Following the establishment of the four-lane road, landslide incidents in the state have notably increased. Similarly, the examination utilising interview data obtained from impacted families indicates that the land's stability has been compromised after the implementation of the four-lane construction. This destabilization has initiated landslides, which directly or indirectly affecting numerous households. It continues to imperil many residences, with the potential for further landslide occurrences. This research attempts to understand how anthropogenic developmental activities, such as the four-lane construction, have caused landslides and evicted force-displacement, short-term unemployment, abandonment of land and properties, destroyed properties, and have taken a toll on the mental health of the affected families and their daily day-to-day activities. The landowners are being compensated for their land and properties, but some families expressed dissatisfaction with the amount. The land, which is not part of the compensation, is also impacted by the developmental work, with cracks and debris flow visible.

This paper addresses how anthropogenic activities have contributed to landslide occurrences through the narratives of the lived experiences of the landslide-affected victims in a sociological approach.

2. Theoretical Framework

Ulrich Beck (1992) has extensively contributed towards a sociological understanding of risk. Ulrich Beck's work has been foremost among the studies on risk. In his book, *Risk Society: Towards a New Modernity* (1992), he opines that modern society has become a wealth and risk production society. He argues that modernization claims to pave the way for hidden sources of social wealth with the keys of techno-scientific development. However, modernisation is becoming reflexive with the potential risk of advanced technologies bringing forth a potentially irreversible threat to the lives of plants, animals, and humans. The growth of risks is unequally distributed, and some people are affected by the consequences of modernised development compared to other strata of society. The history of risk distribution shows that poverty attracts an unfortunate abundance of risks. Unlike economically disadvantaged individuals, wealthy individuals can purchase safety and freedom from risk.

Risk does not differentiate between the rich and the poor. The ones producing or gaining the profits are not safe from the risk either; sooner or later, the boomerang effect of risk impacts them. The risks and consequences

of modernisation are irreversible; it threatens the lives of plants, animals, and humans. It is not just the health problems for nature and humanity, but the significant impact on social, economic, and political consequences.

Beck further delves deeper into how risks are unequally distributed in society. Some people are more affected than others by the distribution and growth of risks. The risk of modernisation sooner or later also strikes those who produce or profit from them; risk does not discriminate. It contains a boomerang effect where the rich and powerful are neither safe from them.

Landslides are caused partially by ill planning, changing developmental activities, and the actions and results of modernised activities. The latent risk, once invisible, is active in modern society, affecting all sections of society irrespective of wealth and power.

3. Method

The study employs a qualitative approach, utilizing semi-structured interviews and direct observation to gather data from the affected victims of Sechü-Zubza, under the Kohima district of Nagaland. Using snowball sampling, landslide-affected victims were identified, and face-to-face interviews were executed to capture personal narratives of displacement, property loss, and the social dynamics of living in disaster-prone areas. Field notes were also taken to record the environmental changes triggered by landslides and road construction. Furthermore, governmental records, official documents, books, articles, and other relevant materials were referred to for secondary data. Before each interview, the respondents were made aware of the objectives of the interview, and consent was obtained for conducting the interview. The interviews were carried out in *Tenyidie*, the local language of the study area, and later translated into English. The protection and anonymity of all sources were given utmost priority.

4. Results and Discussion

The study's findings are presented under various subheadings below for a more systematic presentation and analysis.

4.1 Anthropogenic factor: The widespread expansion of roads in the hilly region is causing slope instability, irreversible harm to the ecosystem, and an elevated risk of landslides (Sangeeta & Singh, 2023). A similar situation is evident in the current study area, where anthropogenic activity such as the four-lane construction has triggered disasters like landslides. An affected male respondent emphasized:

Despite willingly surrendering part of my land for future development, the company failed to construct the retaining walls securely, regardless of our requests. I have been given only a pitiful two lakhs, which is not even close to the value of my land. The project is part of our shared future and not merely to fulfil their benefits alone.

It is evident that surrendering his land was not an issue for him, regardless of not receiving adequate compensation for his expectations, but the contestation arose when the construction company failed to comply with proper safety measures, although numerous complaints were made to make up for their irresponsible acts.

Another female eluded by highlighting the environmental impact of development:

I have lived in Sechü-Zubza for over 20 years; our area was not prone to landslides until the four-lane construction project. The extensive slope cutting and the lack of appropriate measures have resulted in an anthropogenically induced landslide.

Here she underlines the absence of landslides around her residence, having lived for 20 years in the neighborhood, and blames the road construction and cutting of the sloping mountains as the main cause that triggered the landslide.

4.2 Displacement: Sociologists and anthropologists have done extensive research on forced displacement. The disasters intensified by climate change are increasing with unsustainable and irresponsible development practices,

leading to the initiation of displacement (Mosneaga, 2022). Globally, the outcome of displacement is acutely felt among economically and socially vulnerable groups and politically marginalised and indigenous communities (Kaushal, n.d.). The displacement observed in the current study can be classified into two categories: a) *Displacement induced by development activities* and b) *Displacement triggered by a landslide resulting from developmental endeavours*. The former is evident in instances such as the acquisition and clearance of land for expanding four-lane roads, resulting in the forced displacement of families residing adjacent to the road.

One female respondent expressed:

Our Thevo ki (Pigsty) was damaged first, and we had to relocate our domesticated pigs. Later, we felt the need to shift our properties to a safer location. The days passed by, and soon, with the incessant rainfall, part of our land sank and collapsed.

The narrator highlights the significance of early hazard identification and proactively prioritizing the well-being of both humans and animals. The eviction of the domesticated pigs symbolizes the disruption of livelihood and traditional practices, which are deeply intertwined with the land.

4.3 Physical impact: Landslides have a devastating impact on the infrastructure by destroying buildings and arable land, changing the land pattern (Skrzypczak et al., 2017). Landslides shape and reshape the topography of the land. The high rainfall events transport the soil down-slope through landslides (Walker et al., 2013). Though the record of lives lost is rare, the damage is done heavily to settlements, infrastructure, and road development activities (Belho et al., 2023). According to a newspaper statement, the National Highway 29 road was covered with mud and debris, and a truck was partially buried while crossing the road (Eastern Mirror, 2019). None of the respondents narrated any human casualties or injuries caused by landslides. However, the study reveals a substantial effect on the infrastructural properties of individuals and public properties such as Highway 29. In most instances, landslide signs and symptoms were indicated, enabling the victims to move the movable properties to safer locations before the condition deteriorated.

River bed dynamics and morphological alterations due to a landslide were observed during the field study. One of the mid-aged males emphasized:

This area was a footpath, but after the landslide, it has turned into a small river bed/drainage. The breath of the affected area has been increasing with every incessant rainfall. Another landslide is expected since the road construction is ongoing and if the retaining walls below are not constructed well.

His response emphasizes how the footpath of his colony has turned into a river/drainage and with the incessant rainfall, there is persistent instilled fear of recurrent landslides with the ongoing developmental activities and is expected for more changes in the topography of the already affected area, if measures are not taken up. The narration further delivers insights into the complex interplay between the environment and human activities. It projects how human interventions of altering the natural environment impact the courses and dynamics, placing both the residents and the environment at risk of hazard.

An old aged male expressed:

All the savings that I invested in my house went in vain. It was not long after the construction that the landslide occurred and destroyed our building, and as I was retired, I had to rely on my Children to construct the present house.

This narrative propounds the environmental risk, of disrupting the stability and security of an individual. It also highlights the intergenerational exchange of support between the ageing parents and the children, displaying poignant family bonds and solidarity among the generations.

4.4 Economic impact: Landslides impact everyone, regardless of an individual's wealth; all are subject to financial losses. According to the United Nations Office for Disaster Risk Reduction (UNISDR): "*Direct losses refer to human lives, buildings, infrastructure and natural resources. Indirect disaster losses are declines in output or revenue, as a consequence of direct losses or owing to impacts on a supply chain.*" (GAR, 2015). In the study area, both direct and indirect economic losses could be observed. The study unveils that the economically weaker section

with fewer assets was significantly impacted post-landslide. It also reveals that property values decreased abruptly after the landslide as the aesthetic value of the environment and the land was damaged, making it a challenge to find prospective buyers for resale. The past researchers show how a vacant property has a great deal by citing an example of a house where the next door is an abandoned house, which consequently has an impact on the entire property value of the neighbourhood (Klein, 2017).

The economically weaker sections were more vulnerable since their savings were exhausted while recovering and shifting to a safer location. Production loss for the farmers was seen since the agricultural fields were damaged. The direct economic loss was observed in the damage to fields, land, and houses. The indirect impacts are the disruption of economic and social activities. The respondents comprised government employees, entrepreneurs, farmers, and daily wagers. Amid renovation and resettlement, the affected victims could not attain their work, especially daily wage earners and entrepreneurs; there was a reduction in economic production after the landslide. In the case of some families, there was a permanent extinction of activities such as agriculture, farming, and gardening since the land could not be recovered. The local news reports stated the damages to farmhouses and nurseries (The Morung Express, 2019), which serve as a source of income for the owners, and the damages greatly impact the revenue generation of the affected victims.

4.5 Environmental risks: One common denominator of triggering landslides is removing vegetation by cutting large forest areas without planning (Nikolic, 2015). As mentioned earlier, the study area has been undergoing the extension of road construction, for which a vast majority of land and trees have been cut down, which impacts the environment. A study carried out in Coimbatore on the destruction of trees on highway roads and its impact on the environment displays the air temperature being significantly increased and the rainfall being decreased due to the cutting of trees in the pursuit of building roads and flyovers. During the field observation, the destruction of aesthetic values by altering the natural landscape was prominently observed. Past studies have shown several instances of soil erosion due to heavy rainfall in Sechu-Zubza (Piden et al., 2023). The victims affected by the landslide and the Project Affected People (PAP) were seen moving to the isolated area, which further puts pressure on the local ecosystems as the land is being cleared for shelter, agriculture, or other needs, leading to deforestation in the area. The study unveils that properties away from the road construction area are gradually becoming more susceptible to landslides. Constructing roads is a construction risk. The interviewees mentioned several self-detected warning signs which immediately precede landslide events, such as the formation of cracks, difficulty in opening the windows or doors, and debris fall. All these signs promptly enabled the affected residents to move out early to safer locations. and reduced the possibility of injury, death, damage, and property loss of moveable items. The construction process has various uncertainties and potential dangers, which further escalate with the magnitude of the projects (Singh & Chugh, 2016). One of the physical risks triggered by road construction has been stated by one of the male residents, who conveyed:

The road construction beneath our building has placed our house in a precarious situation due to land excavation and landfills.

The narration highlights the environmental degradation and the unintended consequences of developmental activities in the area. While conducting field observations, visible cracks and signs of vulnerability were apparent, causing alarming tension among the residents and erupting contestations among the residents, the road construction company, and the government.

4.6 Unemployment: Past studies show empirical evidence about the increase in unemployment post-disasters. A study on the impact of hurricanes in the Caribbean indicates a significant increase in the number of unemployment (Barattieri et.al., 2023). Another study on the impact of the East Japan Earthquake on employment status indicates that 19.1% of the community became unemployed post-earthquake (Katayanagi et.al., 2020). Likewise, the narrations of the victims point out evident unemployment faced by the landslide-affected victims. Unemployed victims comprised daily wage earners and farmers. Both short-term and long-term unemployment were seen among the affected victims. The victims of daily wage earners experienced a temporary cessation of employment in the aftermath of the landslide as they were preoccupied with shifting their movable properties to secured locations and rebuilding their homes. Consequently, unable to attain any work and lacked any means of income. Farmers are dependent on natural resources and the ones who are solely dependent on agriculture become more

vulnerable to disasters (Chapagain & Raizada, 2017). Agriculture is crucial for ensuring a nourishing food supply and is one of the primary determinants of creating employment and the direct impact of disasters affects livelihoods. Thus, leading to unemployment for the farmers and a decline in income (FAO, 2023). Congruently, the present research disseminates landslides taking a toll on the farmers, creating unemployment as the agricultural fields are destroyed by the landslide. The news reports highlighted that a Village named Nerhema, under Kohima District faced multiple landslides, affecting the road, the houses, businesses, fields and disrupting the livelihood for the families, notably the ones dependent on terrace cultivation (The Morung Express, 2018).

One female participant recounted:

Neither we could go to the field nor we could go for earning our daily wage for some period as our foremost priority was to relocate and rebuild.

The above statement eludes the juxtaposition of two realities, on one hand, the victims attaining the urgency of rebuilding the wrecked damages and on the other, grappling to obtain work, facing the harsh reality of stagnating means of income. Some interviewees assert idleness as the fields were destroyed and no agricultural activities could be performed. It is significant to point that few farmers faced permanent cessation as farmlands were destroyed. Consequently, this indicates the long-term effect of landslides on the victims.

4.7 Abandonment of land and buildings: The UNEP 1992 Conference on Environment and Development (UNCED0 in Rio de Janeiro defined desertification as the “Land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities” (Shroder & Sivanpillai, 2016). The studies show that the development activities and landslides have resulted in land degradation and have made certain areas deserted, leading to the abandonment of properties and land. A female respondent articulated:

We have temporarily abandoned our land after dismantling the house since the land became vulnerable and uninhabitable for now but we hope to make use of it when the land becomes firmer for utilization.

Here the interviewee elucidated the reason for abandoning the land as a precautionary measure as the condition of the land becoming inhabitant, leading to the abandonment of their properties. Few respondents have shed light on how the self-detection of early evacuation has helped the respondents from facing deteriorating hazards and risking their lives. Although some properties are presently deemed unsuitable for use which were once dedicated to agriculture, farming, and gardening, the interview with the affected people revealed that they are hopeful for the land to stabilize, permitting eventual reuse in the future. During the site assessment, it was noted that certain colonies were deserted due to developmental projects and landslides triggered by anthropogenic activities. The natural vegetations are disturbed due to the presence of buildings, roads, human endeavours and so on. Simultaneously, once the abandoned land is left untouched the natural vegetation recovers (Gizzi, et al., 2019). The on-site observations display a similar scenario where the abandoned land and properties had more coverage of natural vegetation as the area was deserted after the landslide.

4.8 Relocation and adaptation: Studies show issues about resettling and adapting to a new environment, living in tents provided by various aid organizations and the government. Resettlement sites were described as bush and lacking proper basic amenities or opportunities for livelihood, away from the city (Jacobs & Almeida, 2021). Following the landslide, the impacted families primarily sought refuge with relatives and neighbours and rented accommodations. The study reveals victims relocated to desolate agricultural fields to rebuild new houses. A mid-middle-aged female respondent narrated:

To be honest, the previous neighbourhood was preferable. With our current neighbours, we exchange greetings when we encounter each other; otherwise, we do not visit each other's homes casually. In the old neighbourhood, regardless of age, we regularly visited each other's homes, building stronger bonds and enjoying each other's company.

This underscores the pain of the adaptation process in the new location, where the disintegration of social bonds and community networks was felt. It is observed that while some respondents were contented with settling in a safer place, some families felt isolated despite being surrounded by neighbours. In most disaster-affected cases, relocation and resettlement are taken care of by the government. In Taiwan, after Typhoon Morakot which caused

a landslide, the government pre-emptively relocated the villagers as a precautionary measure from future typhoons, although the landslide did not affect the villages which were designated as unsafe (Balkrishnan, 2022). On the contrary, the present study indicates the affected victims relocating to safer areas after self-detection of potential hazards and without relocation assistance from the government. However, few respondents received minimal monetary aid for the damaged properties.

4.9 Psychological distress: The aftermath of disasters and other traumatic events is often marked by emotional instability, stress reactions, anxiety, trauma, and assorted psychological symptoms. With the loss of social and economic, individuals and communities may experience mental instability, leading to Post Traumatic Stress Disorder (PTSD) (Makwana, 2019). The present study reveals that respondents experienced immediate stress and the pressure placed on them to decide what actions to take and where to relocate their movable assets. Commonly reported challenges encompassed shock and fear, enduring grief, disturbances in sleep patterns, and difficulties associated with maladjustment and dysfunctionality when they moved to a new location. A female respondent:

The damages caused to our properties have taken a toll on our family mentally. During the period of relocating and adapting, it has caused me a lot of stress and anxiousness. I still grieve for our old home and the properties being damaged.

The statement displays mourning about the attachments to the old house and properties, which signifies the disruption to the sense of security and stability, creating a burden to rebuild and restore the losses. When queried about their ongoing apprehensions regarding the possibility of another landslide, those who have relocated primarily expressed a sense of security, noting that they now feel secure in their new, safer environment. Conversely, individuals compelled to remain in high-risk areas cite the persistent existence of fear. Additionally, the delayed process of running after monetary help from the government has added additional stress and anxiety, which further underscores the coping challenges of post-landslide for the affected victims.

5. Conclusion

The study brings to light that disasters like landslides in Sechu-Zubza, Nagaland are not just natural disasters but are significantly influenced by human activities and developmental projects. The negative outcome of anthropogenic activities goes beyond the physical destruction, the socio-economic and psychological well-being are profoundly affected. Ulrich Beck's argument on modernization bringing about hidden risks in society is vividly unveiled in the study, where the hidden risks are the unforeseen and unintended consequences of road construction, triggering landslides. The findings underscore the inadequacies in the developmental policies and practices. The promise of better road connectivity has brought about setbacks in the absence of implementing proper measures. Further, it identifies the need to tailor the compensation packages to the affected families according to their needs. Additionally, there is a need for the government to take into account not only the short-term financial needs but rehabilitation and relocation of the affected victims. Additionally, it has been revealed that few families are actively seeking financial assistance to relocate to a safer area and for some to construct a new house in a secured location. Furthermore, the study underscores the importance of addressing the economic disparities exacerbated by landslides. The economically weaker sections, particularly farmers and daily wage laborers, face prolonged challenges in recovery, revealing the need for targeted assistance and rehabilitation programs. In light of these findings, recommendations for future urban development in Nagaland should include robust geological and geotechnical studies, adherence to construction standards, comprehensive risk assessments, and proactive community engagement. The goal should be to balance economic development and environmental sustainability, ensuring the well-being of both present and future generations. Mitigating landslide risks requires a collaborative effort involving government bodies, development agencies, local communities, and other stakeholders. It is imperative to integrate comprehensive risk assessments, community consultations, and adherence to established standards in future developmental initiatives.

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