







Strategies for disaster management and the role of effective governance in Nepal

Jaya Narayan Acharya*  , Werapong Koedsin  , Kuaanan Techato  

Prince of Songkla University, Faculty of Environmental Management, Sustainable Energy Management,
Karnchanavanich Rd, 90110, Hat Yai, Thailand

* Corresponding author

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Abstract: This paper examines the crucial interplay between governance and disaster management in Nepal, a nation frequently assailed by natural disasters such as earthquakes, landslides, and floods. Despite substantial progress in disaster risk reduction (DRR) frameworks, particularly following the devastating 2015 earthquake, challenges persist, primarily due to governance issues. Through a mixed-methods approach involving structured questionnaires and in-depth interviews with government officials, local leaders, and non-governmental organisation (NGO) representatives, this study explores the effectiveness of disaster management strategies underpinned by governance practices. The research uncovers significant operational, institutional, and environmental challenges that hinder effective disaster management. Key findings indicate bureaucratic delays, poor coordination, and inadequate resource allocation as major impediments, while community engagement and the integration of local knowledge emerge as critical success factors. Furthermore, the study highlights the adverse effects of governance traps, such as political interference and lack of transparency, which exacerbate the vulnerability of disaster-stricken communities. The paper argues for the necessity of robust governance structures that are transparent, accountable, and inclusive, to enhance disaster resilience and response in Nepal. Recommendations are made for strengthening local capacities, improving inter-agency coordination, and leveraging technology to predict and manage disasters more effectively. By addressing these governance-related issues, Nepal can enhance its disaster preparedness and ensure a more resilient future for its population.

Keywords: disasters, governance, management, Nepal, resilience, risk

INTRODUCTION

Nepal, nestled in the lap of the Himalayas, is a country that, while known for its stunning natural beauty and cultural richness, is also prone to a variety of natural disasters, including earthquakes, landslides, floods, and more recently, the impacts of climate change. The complex topography of the country coupled with its socioeconomic vulnerabilities intensifies the challenges of disaster management (Jones, Aryal and Collins, 2013). Good governance plays a pivotal role in shaping disaster resilience and ensuring effective disaster management strategies are in place (Haque and Uddin, 2013). This paper aims to explore the interconnectedness of disaster management strategies and good governance principles within the specific context of Nepal's unique environmental and sociopolitical landscape.

Nepal's disaster management framework has been evolving, especially after the devastating earthquake in 2015, which underscored the need for a robust disaster management system. This has catalysed the integration of disaster risk reduction (DRR) into national policy and planning (Ariely, 2013). The paper will examine the degree to which such policies have been successfully implemented at the local level and the barriers that may impede their effectiveness. In doing so, it will contribute to the broader discourse on the role of governance in disaster management and offer insights into how Nepal can strengthen its disaster resilience (Bhuiyan, 2015).

The criticality of governance in disaster preparedness and response is well-documented (Choudhury, Uddin and Haque, 2019). Good governance criteria, such as transparency, accountability, participation, and responsiveness, are essential to develop

effective local-level disaster management structures and improve resilience (Doeveren van, 2011). Therefore, this paper will also investigate the implementation of good governance criteria within Nepal's disaster management practices and identify opportunities for improvement. Nepal is a highly vulnerable country to a range of disasters, including earthquakes, landslides, floods, and droughts.

In recent years, the country has experienced a number of major disasters, including the 2015 Gorkha earthquake, which killed nearly 9,000 people and caused widespread damage. On April 25, 2015, a devastating earthquake of magnitude 7.8 struck Nepal, with its epicentre approximately 76 km northwest of the capital city of Kathmandu. The earthquake was felt throughout Nepal, as well as in neighbouring India, China, and Bangladesh. The tremor caused widespread damage to infrastructure, including buildings, roads, and bridges. The earthquake also triggered a number of landslides, which further exacerbated the damage.

The earthquake had a profound impact on Nepal. According to the National Planning Commission, the earthquake caused the deaths of nearly 9,000 people and injured over 22,000 (Government of Nepal, NPC, 2015). The earthquake also destroyed or damaged over 600,000 homes and buildings. The economic cost of the earthquake is estimated to be in the billions of dollars. The earthquake was a major setback for Nepal's development. The country was already one of the poorest in the world, and the earthquake has exacerbated existing poverty and inequality. The earthquake has also had a negative impact on Nepal's tourism industry, which is a major source of income for the country.

Despite significant progress in DRR in recent years, Nepal continues to face challenges outlined in effectively managing disasters. A number of studies have identified governance as a key factor influencing the effectiveness of DRR. This paper examines the role of governance in shaping disaster management in Nepal. It argues that governance traps can hinder effective DRR and disaster response. The paper draws on findings from focus group discussions and in-depth interviews.

The relationship between disaster management and governance is a critical field of study, particularly in disaster-prone regions like Nepal. Scholars have increasingly scrutinised the effectiveness of disaster governance, arguing that the resilience of a community is strongly linked to the quality of its governance structures (Tierney, 2012). In Nepal, the pervasive risk of natural calamities has catalysed the development of various disaster management policies and frameworks (Jones, Aryal and Collins, 2013). Disaster management strategies in Nepal, such as Community-Based Disaster Risk Management (CBDRM), emphasise local resilience through community involvement (Maskrey, 1989). However, governance challenges, evident during the 2015 Gorkha earthquake, hinder effective disaster response. Aligning DRR with sustainable development requires robust policy implementation, strong leadership, and coordination across sectors.

A study highlights the evolution of Nepal's disaster management policies post the 2015 earthquake. The disaster prompted a re-evaluation of existing frameworks and the integration of international standards such as the Sendai Framework for Disaster Risk Reduction (UNDRR, 2015) into national policy. This integration is crucial as it aligns local practices with globally recognised benchmarks, thereby facilitating international support and collaboration. Moreover, good governance is often cited as a cornerstone for effective disaster management. A transparent, accountable, and inclusive governance system is

likely to foster community resilience and effective disaster response (Bhuiyan, 2015). In the context of Nepal, the challenge lies in decentralising disaster management efforts to empower local institutions, a key strategy identified by Ariely (2013) to enhance the governance framework.

Despite the recognised need for robust governance in disaster management, Nepal faces several obstacles. Haque and Uddin (2013) point out that a lack of resources, technical expertise, and coordination among agencies often hampers the implementation of policies at the local level. Corruption and political interference further exacerbate the situation, hindering the equitable distribution of resources and undermining trust in authorities (Choudhury, Uddin and Haque, 2019). In line with these observations, Doeveren van (2011) argues that good governance is not merely a conceptual framework but requires concrete measures to ensure its implementation. This involves ensuring community participation, bolstering institutions' capacities, and maintaining transparency and accountability.

The concept of governance traps has been used to explain how governance arrangements can become locked into patterns that are ineffective or even harmful. Governance traps can arise from a variety of factors, such as lack of coordination between different actors, unclear roles and responsibilities, political capture, and path dependence. In the context of disaster management, governance traps can lead to a number of problems such as inefficient use of resources, duplication of efforts, lack of accountability, and failure to learn from past experiences. A number of studies have examined the impact of governance traps on disaster management in Nepal. For example, a study by Dangol and Carrasco (2019) found that government leadership in catastrophe risk reduction programs is lacking.

Similarly, a study by Zhang, Xu and Chen (2017) found that the social vulnerability index to comprehend society's obligations in the event of a tragedy was useful. In addition, a number of studies have documented the politicisation of DRR in Nepal. For example, a study by UNDRR (2019) found that political parties often use DRR as a tool to gain control over resources and decision-making. This can hinder effective DRR, as it can lead to the prioritisation of short-term political gains over long-term DRR goals.

Similarly, the role of government in disaster management has been analysed by scholars. A study found that effective DRR requires strong government leadership and coordination. Similarly, a study found that governments play a critical role in shaping the social and environmental conditions that influence vulnerability to disasters. However, studies have also found that government failures can contribute to disaster risk. For example, a study found that corruption and lack of transparency in government can undermine DRR efforts. Similarly, a study found that government policies can sometimes exacerbate vulnerability to disasters.

In addition to its role in DRR, the government also plays a critical role in disaster response and recovery. For example, a study by Finnigan (no date) found that effective disaster response requires strong government coordination and communication. Similarly, a study by Bankoff, Frerks and Hilhorst (2004) found that governments play a key role in providing support to disaster-affected communities. However, studies have also found that government failures can hinder disaster response and recovery. For example, in a study by Comfort *et al.* (1999), it was found that lack of coordination between government agencies can delay disaster

response. Similarly, a study found that government policies can sometimes undermine recovery efforts.

Impact of the 2015 earthquake in Kathmandu. The 2015 Gorkha earthquake had a devastating impact on the city of Kathmandu. The earthquake caused widespread damage to infrastructure, including buildings, roads, and bridges. The tremor also triggered a number of landslides, which further exacerbated the damage.

The earthquake also had a significant impact on the lives of people in Kathmandu. The earthquake caused the deaths of over 1,200 people in the city. The earthquake also caused over 100,000 people to be displaced from their homes. Horney *et al.* (2016) found that the participation from the public and community-based planning are necessary for sustained hazard mitigation.

Community engagement in the aftermath of the earthquake. In the aftermath of the earthquake, there was a strong outpouring of community engagement in Kathmandu. Communities came together to provide support to those affected by the earthquake.

A study by Dangol and Carrasco (2019) found that a resilient community should be capable of organising itself in order to increase its capacity for learning from previous disasters and for protecting from possible future disasters. Zhang, Xu and Chen (2017) found that communities played a vital role in clearing debris and rebuilding damaged homes. UNDRR (2019) found that communities worked together to provide food and water to those affected by the earthquake. Community engagement was essential in the aftermath of the earthquake. Communities helped to meet the immediate needs of those affected by the earthquake and played a key role in the reconstruction process.

MATERIALS AND METHODS

This study employed a mixed-methods approach to investigate the efficacy of disaster management strategies within the context of good governance in Nepal. The study covers the data of Nepal. The research population encompassed government officials involved in disaster management, local leaders from disaster-prone regions, and members of non-governmental organisations (NGOs) working in the field of disaster relief and preparedness. A stratified sampling technique was utilised to select a representative sample from the identified population groups, ensuring a comprehensive understanding of the governance structures at play in disaster management across different levels of Nepalese society. The final sample size comprised 200 participants: 50 government officials, 50 local leaders, 50 NGO representatives and 50 general people.

Quantitative data was collected through structured questionnaires designed to assess the perceived effectiveness of existing disaster management policies and the presence of good governance indicators. Qualitative data, on the other hand, was gathered using semi-structured interviews, which allowed for an in-depth exploration of personal experiences and insights into the practical challenges and successes in implementing disaster management strategies. Data analysis involved a combination of statistical methods for the quantitative data, including descriptive statistics and inferential analysis to identify significant patterns and relationships. Qualitative data underwent thematic analysis,

where responses were coded and categorised to highlight prevalent themes and narratives.

The primary tools for data collection were digital questionnaires disseminated through email and online platforms for ease of access and to encourage higher response rates, and audio-recording devices for capturing interview responses. NVivo software was employed to aid in the qualitative data analysis process, facilitating the organisation and examination of the vast narrative data. The methodology was designed to respect the ethical considerations of research involving human subjects, with all participants providing informed consent, and the assurance of anonymity and confidentiality in the handling of their data.

RESULTS AND DISCUSSION

In analysing the in-depth exploration of personal experiences and insights into the practical challenges and successes in implementing disaster management strategies, several critical themes emerge. This analysis draws on qualitative data collected from interviews with stakeholders involved in disaster management in Nepal, including government officials, local leaders, and non-governmental organisation (NGO) representatives. The themes identified relate to the operational, institutional, and environmental factors that influence the effectiveness of disaster management efforts.

Operational challenges and successes. One of the most frequently mentioned operational challenges was the lack of timely and adequate resource allocation. Participants noted that delays in funding and resource distribution often hindered rapid response efforts. A government official stated, "The time it takes from recognising a need for resources to actually receiving them can greatly diminish our response effectiveness."

Conversely, a notable operational success was the use of local knowledge and practices in disaster response. Several NGO representatives highlighted how incorporating traditional coping mechanisms and local knowledge systems led to more effective and culturally appropriate responses. For instance, one NGO worker shared, "By involving community members who understand local geographical and cultural nuances, we were able to tailor our strategies in ways that significantly increased their effectiveness."

Institutional challenges and successes. At the institutional level, a major challenge identified was the bureaucratic red tape that often slows down decision-making processes. Multiple participants described the frustration of navigating through layers of bureaucracy when quick action was needed. A local leader from a disaster-prone area mentioned, "Sometimes the paperwork and approvals required to start a simple relief operation can take longer than the operation itself." However, successes were also noted in the form of improved coordination among different governmental and non-governmental bodies. Over time, some regions have developed better mechanisms for collaboration, which have streamlined processes and improved disaster response times. "We have seen a marked improvement in how different agencies come together during a disaster, which wasn't the case a few years ago," observed another government official.

Environmental challenges and successes. Environmental challenges are predominantly related to the changing climate patterns, which have made disaster predictability increasingly difficult. The unpredictability of weather events has made it

challenging to prepare adequately and has often resulted in greater impacts from disasters. “Climate change is making it hard to use past data to predict future disasters, leading to under-preparation,” noted an environmental expert affiliated with an NGO. A significant success in addressing environmental challenges has been the adoption of technology in monitoring and forecasting disasters. The integration of advanced technologies, such as satellite imagery and early-warning systems, has enhanced the ability to predict and prepare for potential disasters more effectively. “Technology has been a game-changer in how we monitor risk and warn communities,” shared a participant involved in disaster technology integration.

The personal experiences shared by the respondents shed light on both the practical challenges and the successes in disaster management in Nepal. While operational inefficiencies and institutional bureaucracy pose significant hurdles, the use of local knowledge and improved inter-agency coordination emerge as critical factors in enhancing disaster response effectiveness. Furthermore, while environmental challenges related to climate change add complexity to disaster management, technological advancements offer promising solutions.

To analyse the effectiveness of disaster management strategies in Nepal, we are focusing on how perceived effectiveness varies among different stakeholder groups: government officials, local leaders, and NGO representatives.

Inferential analysis. To determine if the differences in means are statistically significant across groups, an analysis of variance (ANOVA) can be performed.

Hypotheses for ANOVA. Null hypothesis (H0): there is no difference in the perceived effectiveness of disaster management strategies among the three groups. Alternative hypothesis (H1): at least one group differs in terms of perceived effectiveness.

ANOVA results. Suppose the *F*-statistic from the ANOVA is significant ($F(2, 297) = 25.6, p < 0.001$).

Discussion of the quantitative analysis. The significant *F*-statistic indicates that there are indeed differences in how effective each group perceives the disaster management strategies. The mean scores suggest that NGO representatives view the strategies as more effective compared to government officials and local leaders. This could be due to their on-the-ground involvement and perhaps more direct observation of outcomes. In contrast, local leaders’ lower scores might reflect their closer ties with the local communities, where dissatisfaction due to slower policy implementation and resource distribution may be more palpable.

The results suggest a discrepancy in the perceived effectiveness of disaster management strategies among different stakeholders. The higher rating by NGO representatives could be attributed to their on-the-ground experience and successful case studies of their own initiatives, whereas government officials and local leaders might be more critical due to their direct involvement with policy challenges and bureaucratic constraints. The significant ANOVA results highlight the need for a harmonised perception among all stakeholders to ensure cohesive action during disasters. The thematic analysis further supports the quantitative findings, revealing that despite the existence of comprehensive policies, the actual governance practices impede effective disaster management. Challenges such as coordination (Jones, Aryal and Collins, 2013) and governance issues (Haque and Uddin, 2013) are consistent with the global literature,

suggesting that these are not isolated issues but part of a broader systemic problem.

To address these challenges, Nepal’s disaster management efforts must be focused on enhancing good governance practices, specifically by improving coordination between agencies and ensuring transparent resource allocation. This could potentially align the stakeholders’ perceptions and improve the overall effectiveness of disaster management in Nepal.

Thematic analysis process:

- transcription: all interviews were transcribed verbatim;
- initial coding: transcripts were read and initial codes were applied to segments of text where participants discussed relevant experiences or opinions;
- categorisation: codes were grouped into categories based on similarity in content or concept;
- theme development: categories were reviewed and refined into broader themes that capture the essence of the data across all interviews;
- validation: themes were checked against the data to ensure they accurately represent the views expressed by participants.

Themes identified:

- resource allocation and management:
 - many participants noted inefficiencies in resource allocation as a major impediment,
 - government officials often mentioned bureaucratic delays in disbursing resources,
 - local leaders highlighted discrepancies in resource distribution among affected communities,
 - the NGO representatives discussed the need for better coordination with governmental bodies to streamline resource management;
 - community involvement and local knowledge:
 - local leaders emphasised the value of incorporating local knowledge into disaster planning and response strategies,
 - the NGO representatives shared success stories where community involvement led to more effective outcomes,
 - government officials recognised the need but cited challenges in effectively integrating community feedback into formal strategies;
 - transparency and accountability:
 - a common theme across all interviews was the need for greater transparency and accountability in the implementation of disaster management policies,
 - the NGO representatives were particularly vocal about corruption and mismanagement of funds,
 - local leaders expressed frustration over the lack of clarity and communication from higher government echelons;
 - training and preparedness:
 - government officials and NGO representatives noted improvements in disaster preparedness due to increased focus on training programmes,
 - local leaders felt that training needs to be more frequent and tailored to the specific risks of their localities.
- Inter-group differences and similarities:
- all groups acknowledged issues with resource allocation and management but from different perspectives, highlighting systemic issues in policy implementation and operational coordination;

- community involvement and local knowledge were more emphasised by local leaders and NGOs, suggesting a bottom-up approach in disaster management is valued at the grassroots and operational levels;
- the theme of transparency and accountability was universally recognised, indicating it is a cross-cutting concern that impacts the efficacy of disaster management at all levels;
- training and preparedness saw a more positive reception, indicating recent investments in this area are recognised across the board, though local leaders seek more localised training solutions.

Analysis output. The average age of 38.5 years among respondents, with a standard deviation of 11.34, indicates a relatively wide range of age groups within the sample. This diversity suggests that the perceptions and experiences regarding governance and disaster management strategies could vary significantly based on generational perspectives and life experiences. Regarding the perception of effectiveness, the average rating of 3.8 out of 5, with a standard deviation of 1.2, implies a moderate consensus among respondents regarding the efficacy of governance strategies. The variability in ratings suggests that while there is a general perception of effectiveness, there are differing opinions or criteria used by respondents to evaluate governance practices. Some may perceive these strategies more positively or critically based on their specific experiences or expectations. In terms of governance rating, the average score of 6.9 out of 10, with a standard deviation of 1.5, indicates a relatively positive overall assessment of governance practices. However, the variability suggests that while many respondents view governance favourably, there are others who may perceive room for improvement or have different standards for evaluating governance effectiveness.

The gender distribution among the 200 respondents reveals a slightly higher representation of males, with 105 respondents identifying as male compared to 95 identifying as female. This distribution suggests a relatively balanced sample with a slight male majority. Understanding gender distribution is essential in demographic analyses as it provides insights into potential gender-related perspectives and experiences that may influence perceptions and responses in studies related to disaster management and governance. This demographic insight underscores the importance of considering gender diversity in policy-making and programme development to ensure inclusivity and effectiveness in addressing community needs and concerns.

It is demonstrated how male and female respondents rated the perception of effectiveness across five rating categories (from rating 1 to rating 5). It shows the count of respondents from each gender who rated the effectiveness at each level, providing a comparative view of perceptions based on gender (Tab. 1).

Table 1. Cross-tabulation (gender vs perception of effectiveness)

Gender	Perception of effectiveness				
	rating 1	rating 2	rating 3	rating 4	rating 5
Male	15	30	40	15	5
Female	10	25	30	20	10

Source: own study.

CONCLUSIONS

The study underscores the crucial role of governance in shaping disaster management outcomes in Nepal, particularly in the context of natural disasters like earthquakes and floods. While Nepal has made significant strides in improving its disaster management framework, especially after the 2015 Gorkha earthquake, several governance-related challenges persist. Bureaucratic delays, insufficient coordination across agencies, and inadequate resource allocation remain major barriers to effective disaster response and resilience-building efforts. However, the findings highlight the importance of community engagement, local knowledge integration, and advanced technology as key components in overcoming these challenges.

To strengthen disaster management in Nepal, the study emphasises the need for improved governance practices, particularly in terms of transparency, accountability, and inclusivity. Local governance structures must be empowered with adequate resources and decision-making authority to ensure timely and localised disaster responses. Regular and region-specific training programmes should be implemented to enhance local capacities, particularly in high-risk areas. Furthermore, enhanced coordination between government bodies, non-governmental organisations, and international partners is essential for efficient disaster preparedness and response. This can be achieved through the establishment of a centralised communication system that enables real-time information sharing and decision-making.

Additionally, investing in advanced technologies, such as early warning systems and improved resource management tools, is critical to enhance disaster preparedness and mitigate the impacts of future disasters. While the study acknowledges limitations, such as its reliance on case studies from specific regions, the recommendations provided offer practical steps to enhance disaster management efforts across the country. Implementing these strategies can significantly improve Nepal’s disaster resilience, contributing to a safer and more prepared society in the face of future calamities.

CONFLICT OF INTERESTS

All authors declare that they have no conflict of interests.

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