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Valuing Land, Saving Lives: A Fresh Look at Disaster Management

SUBMITTED BY:

Puskar Paudel [029025-21]

Rupa Bajagain [028994-21]

SUBMITTED TO:

Assoc. Prof. Dr. Subash Ghimire

Department of Geomatics Engineering

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Valuing Land, Saving Lives: A Fresh Look at Disaster Management

Puskar Paudel, Rupa Bajagain

Department of Geomatics Engineering, Kathmandu University, Dhulikhel, Nepal

paudelpuskar522@gmail.com, rupabajgain33@gmail.com

Abstract

This paper provides a thorough examination of the essential role land valuation plays in disaster management. This paper addresses how accurate assessments of land values are crucial in mitigating the impact of disasters like floods, earthquakes, and landslides, which have grown more frequent and severe due to factors like climate change. By effectively valuing land before disasters occur, authorities can identify high-risk areas and enforce zoning regulations that prevent unsafe construction. This proactive approach helps reduce property damage, minimize economic losses, and safeguard lives by encouraging safer locations for human settlements. Land valuation emerges as a key tool in disaster management by informing planning and zoning decisions, enabling authorities to restrict development in vulnerable regions. Recognizing that high-risk zones can be avoided by effective zoning laws informed by land valuation, the paper underscores the potential of such preventive measures to save lives and protect property. The focus on proactive land valuation and preemptive zoning policies reflects the growing emphasis in disaster management literature on the critical need for preparedness in the face of climate-induced natural hazards.

During the response phase, the paper highlights the importance of rapid land valuation, which supports decision-making in resource allocation and provides a basis for fair compensation for those impacted by disasters. Accurate valuations allow for equitable compensation, helping affected individuals rebuild their lives more swiftly. However, this review acknowledges the challenges in implementing standardized valuation methods, especially in areas with informal land ownership or incomplete land records. These situations can make it difficult to apply traditional valuation methods, which often do not account for informal land uses. This reality underlines the need for adaptable valuation practices that can cater to local contexts and support inclusive recovery efforts. The paper also addresses land valuation in the post-disaster phase, where it plays a critical role in guiding reconstruction, resettlement, and compensation. Fair compensation is emphasized as fundamental to the recovery process, helping communities restore livelihoods and rebuild homes. By focusing on equitable compensation, land valuation supports communities in maintaining a pre-disaster standard of living, even in areas with informal land ownership. Furthermore, flexible valuation approaches that consider informal land use allow for a more

inclusive recovery process, which is essential in preventing long-term displacement and ensuring that all affected groups receive adequate support.

Throughout the review, the paper identifies a range of technical and policy challenges that impede effective land valuation in disaster contexts. These include limited access to data, insufficient cadastral systems, and the lack of digital tools needed for quick and accurate assessments. The authors argue that embracing digital tools, such as Geographic Information Systems (GIS) and improved land records, can greatly enhance the speed and precision of land valuations. Digital tools, combined with enhanced land records, are seen as crucial for supporting quick and precise valuations, which are essential for effective disaster response and recovery. By streamlining the valuation process through technology, governments and agencies can more efficiently allocate resources and support recovery. In response to these challenges, the paper advocates for policy improvements aimed at strengthening land tenure security, promoting interagency collaboration, and adopting digital technologies to support accurate land valuations in disaster-prone regions. For example, interagency cooperation can facilitate information sharing and improve resource allocation, enabling a more comprehensive disaster response. Secure land tenure is also highlighted as a means of encouraging individuals to invest in disaster mitigation efforts, as secure ownership incentivizes people to take proactive steps in protecting their property and communities from disaster risks.

The paper ultimately suggests that integrating land valuation across all phases of disaster management—pre-disaster planning, emergency response, and post-disaster recovery—can significantly bolster resilience within communities. By providing a framework for proactive land valuation, authorities can better anticipate risks, plan for safer land use, and recover more effectively from disasters. This comprehensive approach not only aids immediate recovery efforts but also lays the groundwork for long-term community resilience against future disasters. In conclusion, the review underscores the importance of land valuation as a fundamental element in disaster risk management. It illustrates how land valuation can support a more effective disaster management strategy by informing land use, zoning policies, and resource allocation in ways that prioritize community safety. The integration of valuation practices throughout disaster management frameworks could enable authorities to allocate resources more effectively, mitigate economic losses, and foster community resilience. Furthermore, addressing the existing challenges in valuation practices, especially in regions with informal land tenure, will be critical for maximizing the impact of land valuation in protecting vulnerable populations and enhancing their capacity to withstand future disasters.

Through strengthened policies, improved digital systems, and community-focused valuation practices, the paper advocates for a disaster management approach that leverages land valuation as a powerful tool for protecting lives, property, and the livelihoods of at-risk populations. Ultimately, by incorporating land valuation into disaster management, this paper proposes that communities can achieve greater resilience and preparedness for future disasters. Emphasizing a holistic approach to land valuation within disaster risk management frameworks not only enhances immediate response and recovery efforts but also contributes to sustainable development and long-term resilience in disaster-prone areas worldwide.

Keywords: Community Resilience, Disaster Risk Management, Emergency Response, Land Valuation

Introduction

Disasters, ranging from earthquakes and floods to hurricanes, are increasing in frequency and severity, partly due to climate change (Intergovernmental Panel on Climate Change [IPCC], 2012). These events often lead to devastating loss of life, displacement, and significant damage to land, properties, and infrastructure. In recent years, a growing body of literature has highlighted the essential role of land valuation in disaster management, emphasizing its importance in safeguarding vulnerable populations' land rights, providing a basis for fair compensation, and aiding effective resource allocation during recovery phases(Mitchell et al., 2014). Land valuation plays a critical role in all phases of the Disaster Risk Management (DRM) framework, including preparedness, emergency response, and reconstruction, as it underpins decisions about land use, zoning, and resettlement.

The Hyogo Framework for Action (HFA) and the Sendai Framework have both underscored the need for proactive DRM approaches that include considerations of land use and ownership. Secure land tenure can encourage individuals to invest in disaster mitigation and adaptive strategies. Conversely, in areas where land rights are insecure or informal, vulnerable populations may face displacement or even land-grabbing post-disaster (United Nations Office for Disaster Risk Reduction [UNISDR], 2015) (Syahid, 2011). Thus, effective land valuation is foundational to addressing these complex land issues, reducing economic losses, and enhancing community resilience in disaster-prone areas. This review explores the multi-faceted role of land valuation in DRM, with insights primarily drawn from (Mitchell et al., 2014) and supporting literature.

Land valuation influences DRM by helping authorities identify high-risk zones and design effective zoning policies, thus mitigating potential economic losses in future events. Addressing

land valuation within disaster contexts requires understanding the interactions between land policies, tenure security, and socio-economic factors, particularly in areas with informal settlements. Land valuation has emerged as a critical aspect of Disaster Risk Management (DRM), informing decisions related to land use, property valuation, and compensation. Studies highlight the importance of accurate valuation in DRM, particularly in high-risk zones, where valuation helps manage resources and guide policy. For instance, (Mitchell, Myers, & Grant, 2014) emphasizes the role of land valuation in DRM by ensuring fair compensation and facilitating disaster recovery.

Objectives

The **primary objective** of the study is to understand the relationship between land valuation and its impact on disaster management.

The **secondary objectives** are:

- To explore the impact of land valuation laws and policies.
- To suggest possible solutions for land valuation for disaster management.

Methodology

This review paper is the result of an extensive and systematic literature review conducted to gather, analyze, and synthesize information related to land valuation in disaster management. A comprehensive search was performed across multiple sources, including well-known research papers, books, journals, websites, and other relevant publications in the field.

The selection process prioritized materials that explore both theoretical and practical aspects of land valuation within disaster management. Studies covering valuation methods, policy frameworks, and relevant case studies were analyzed to understand challenges and recent developments. By reviewing widely referenced, peer-reviewed sources, this paper aims to provide a clear perspective on the evolution and current trends in land valuation for disaster management.

Literature Review

The literature indicates a growing recognition of the significance of land valuation in disaster management contexts. (Mitchell, Myers, & Grant, 2014), examines land valuation as a key tool in DRM and discusses how it facilitates post-disaster recovery, informs resettlement policies, and addresses tenure security issues. Additional studies on land administration's role in mitigating disaster impacts and various case studies from developing countries, where informal settlements and limited valuation resources challenge DRM efficacy. This includes thematic analysis to categorize findings by pre-disaster planning, emergency response, and post-disaster recovery phases, as outlined in DRM frameworks, with a focus on how valuation practices impact each stage (Correa, 2011; Syahid, 2011).

Various studies have employed different methodologies to assess the economic land value of cultural heritage sites. For instance, the CVM has been widely used to estimate both use and non-use values associated with these sites. Research highlights that communities that understand the economic benefits tied to cultural heritage are more likely to engage actively in preservation efforts. In addition to economic valuation techniques, community-based approaches have emerged as essential components of effective disaster management strategies. Engaging local populations not only fosters awareness but also enhances the effectiveness of preservation efforts. Case studies underscore how integrating economic assessments into disaster preparedness plans can guide policy recommendations aimed at safeguarding cultural heritage from disasters (Denpaiboon, Kanegae, & Pakdeeburee, 2011).

The thesis by *Chinnapan Charoenkalunyuta (2011)* investigates the role of land tenure and valuation in disaster risk management (DRM), focusing on resilience in flood-prone areas, particularly in Nepal's Chitwan district. The study underscores how secure land tenure, efficient land registration systems, and stakeholder collaboration are crucial for community resilience against disasters. By examining case studies from various countries, including Nepal, it identifies key resilience elements: secure tenure, comprehensive DRM plans, and robust stakeholder interactions. Primary data collected through household surveys and stakeholder interviews reveal that although land tenure in Chitwan is largely private, tenure security is inadequate, contributing to high community vulnerability in flood-prone areas. The study concludes with recommendations for policy improvements to enhance tenure security and inter-agency collaboration to bolster resilience against future floods (Charoenkalunyuta, 2011).

Results & Findings

Roles in Pre-Disaster Valuation and Planning

The effectiveness of DRM heavily depends on pre-disaster planning, wherein land valuation plays a crucial role in identifying high-risk zones and assessing potential losses. According to (Mitchell, Myers, & Grant, 2014), integrating land valuation in zoning and infrastructure development helps governments guide urban planning, avoiding construction in vulnerable areas. This is particularly relevant for developing regions, where unregulated settlements in high-risk zones elevate disaster risks (Correa, 2011). For instance, land use master plans in Indonesia have been instrumental in zoning forested areas as buffer zones, although such plans can sometimes lead to land tenure conflicts (Syahid, 2011).

(Mitchell, Myers, & Grant, 2014) suggest that proactive land valuation is essential in DRM, as it guides land use policies and zoning practices. (Charoenkalunyuta, 2011) demonstrates this through the Chitwan district case study, where flood-prone areas were identified through a combination of land use data and cadastral maps. This preemptive identification aids in mitigating risks by discouraging development in hazard-prone zones, thereby reducing potential property damage. Effective DRM requires proactive land valuation and planning to assess property risks and guide zoning decisions. An argue that valuation allows governments to plan land use, thereby reducing exposure to natural hazards. (Zulkarnain, Yuzir, & Razali, 2018) support this, showing how economic valuation models help prepare for flood risks by identifying high-risk zones and setting property values accordingly, which is critical in urbanizing areas prone to frequent floods.

Role in Emergency Response and Valuation

During the emergency response phase, land valuation provides immediate economic assessments, aiding compensation and guiding resource allocation. Valuation informs preliminary estimates of damage to public and private property, essential for insurance and compensation claims (Jha, Miner, & Stanton-Geddes, 2010). The importance of land tenure data in estimating economic losses and informing response efforts (Griffiths-Charles, 2012; Mitchell, Myers, & Grant, 2014) argue that valuers are crucial for determining fair compensation, which becomes particularly challenging in informal settlements. Here, flexible valuation standards that consider informal land use can better address community needs.

During emergencies, land valuation serves as a basis for rapid damage assessments, supporting immediate relief and compensation processes. In the case of Chitwan, (Charoenkalunyuta, 2011) found that land tenure issues were particularly significant for those without documented ownership, underscoring the need for flexible valuation methods that address informal settlements.

Accurate and rapid valuations are crucial for directing resources and establishing temporary shelters in safe areas, as well as compensating those whose land becomes uninhabitable due to flooding. Flexible valuation standards that accommodate informal land ownership can improve equitable compensation distribution. (Mitchell, Myers, & Grant, 2014) emphasize that accurate valuation provides clarity in resource allocation, facilitating faster and fairer compensation.

Roles in Post Disaster: 3Rs

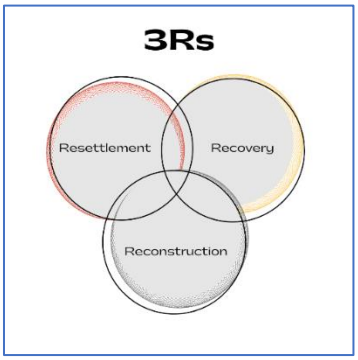

Fig: 3Rs

Land valuation remains indispensable during the post-disaster recovery phase, informing decisions on reconstruction, compensation, and equitable resettlement. (Mitchell, Myers, & Grant, 2014) highlight the importance of accurate valuation in determining compensation for affected populations, especially in cases where reconstruction involves resettlement. Fair compensation supports communities in maintaining pre-disaster standards of living, which is particularly challenging in informal settlements, where land tenure is often unrecorded. In such cases, flexible valuation methods can support compensation decisions while minimizing disputes over property values (UN-HABITAT, 2011). Moreover, transparent valuation practices help avoid conflicts with host communities, as resettled populations may affect local land values. (Charoenkalunyuta, 2011) highlights that in Nepal, the lack of cadastral data in some regions poses challenges for fair compensation, particularly for marginalized communities. Improved land tenure systems and valuation practices can significantly aid recovery by securing livelihoods, supporting equitable resettlement, and minimizing disputes over property rights.

In the recovery phase, land valuation guides reconstruction and resettlement strategies. There is an argument that fair and transparent valuation methods ensure that affected populations receive just compensation, helping them rebuild their lives. In Malaysia, (Zulkarnain, Yuzir, & Razali, 2018) found that integrating economic valuation models with Geographic Information System (GIS) tools helps monitor property values post-disaster, supporting informed decisions for future zoning and resettlement.

Challenges in Valuation Implementation

Effective valuation practices face significant challenges, particularly in developing regions with informal tenures and limited valuation resources. (Mitchell, Myers, & Grant, 2014) note that valuers often struggle with inadequate legal frameworks, lack of data, and informal land tenures. The absence of digital land records or secure cadastral data hampers rapid assessments post-disaster, making accurate valuations difficult. Furthermore, communal or customary lands complicate valuation, as ownership and rights are often undocumented, requiring non-standard valuation approaches (Aluko, Omisore, & Amidu, 2008). These challenges highlight the need for capacity building and policy reforms that prioritize valuation infrastructure and professional training within land administration agencies, as effective valuation in DRM is essential for equitable recovery.

Several challenges hinder effective land valuation in DRM, particularly in areas with informal tenures or inadequate data. (Charoenkalunyuta, 2011) emphasize that, in regions like Nepal, the lack of secure tenure and inconsistent cadastral data complicate accurate valuations. In the case of Chitwan, 52% of surveyed land was identified as hazardous, yet weak tenure security persisted, highlighting the need for policy reforms to strengthen land tenure and improve data sharing among agencies. Challenges persist in applying land valuation within DRM, particularly in regions with informal land tenure systems. (Charoenkalunyuta, 2011) highlights Nepal's struggle with informal ownership, which complicates valuation in post-disaster scenarios. (Mitchell, Myers, & Grant, 2014) suggest that robust valuation systems, enhanced cadastral data, and policy support are needed to improve valuation practices and enable more resilient DRM.

Approaches to addressing problems

Effective integration of land valuation in Disaster Risk Management (DRM) involves a multi-phase approach that covers pre-disaster planning, emergency response, and post-disaster recovery. Initially, embedding land valuation into the pre-disaster phase allows authorities to identify high-risk zones, establish effective zoning policies, and guide urban development away from vulnerable areas. This proactive approach helps reduce potential economic losses and promotes safer land-use practices. Furthermore, adopting flexible valuation standards that account for informal settlements and unconventional land tenure types is essential. These adaptable methods ensure that even those without formal land ownership receive fair compensation and aid during disaster response and recovery efforts.

Strengthening the legal and policy frameworks is another crucial step, particularly in regions prone to disasters. Enhancing land tenure security can protect vulnerable populations and prevent displacement, while policy adjustments can streamline the data-sharing processes between

agencies to facilitate rapid assessments. Increasing public awareness and fostering community engagement in valuation and land-use decisions not only align disaster strategies with local needs but also empower communities to participate actively in resilience planning.

Additionally, investments in valuation infrastructure, such as digital land records and accessible cadastral data, enhance the accuracy and speed of post-disaster assessments. Building capacity for professionals in land valuation and disaster management is equally important to ensure that agencies have the skills necessary to conduct precise valuations in complex scenarios. Utilizing economic valuation models in combination with Geographic Information System (GIS) tools further strengthens these efforts, providing a comprehensive approach to identifying property values and assessing high-risk zones. This approach helps authorities make informed decisions about zoning, resettlement, and post-disaster resource allocation, thereby improving DRM outcomes.

Conclusions

Land valuation serves as a foundational pillar in disaster management, impacting on the way resources are allocated, how recovery efforts are managed, and the level of fairness in compensation practices for affected communities. By incorporating valuation methods across DRM phases—before, during, and after disasters—authorities are better equipped to manage land use, predict potential economic losses, and implement zoning policies that reduce exposure to natural hazards. This comprehensive approach not only supports communities in rebuilding their lives after disasters but also promotes long-term resilience by guiding development away from vulnerable areas. However, realizing the full potential of land valuation in DRM necessitates addressing the existing challenges, such as the complexity of informal land tenure systems, lack of consistent data, and insufficient resources for rapid assessments.

Legal and policy reforms play an integral role in strengthening land tenure security, improving collaboration across agencies, and ensuring accurate and fair valuations, especially in regions where land ownership records are scarce. By enhancing digital land record systems and investing in GIS technology, governments can foster a more responsive and data-driven approach to disaster management. Building local capacity through training and community engagement further supports these efforts, empowering populations to be active participants in resilience-building processes. Ultimately, with a structured approach to land valuation and improved policy frameworks, disaster management can evolve to protect livelihoods, preserve community structures, and enhance sustainable recovery practices, laying the groundwork for communities to thrive in the face of future challenges.

In conclusion, integrating land valuation into disaster management offers a pathway to more equitable, resilient, and effective responses to natural disasters. Through strengthened policies, improved technical systems, and community-focused valuation practices, land valuation can serve as a powerful tool for protecting lives, property, and the livelihoods of vulnerable populations. Embracing a comprehensive approach to valuation within DRM frameworks will not only enhance preparedness and recovery efforts but also contribute to sustainable development and long-term resilience in disaster-prone communities worldwide.

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