Post-Disaster Reconstruction Management: Challenges and Strategic Solutions

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Abstract –

Natural hazards frequently affect regions across the world, causing extensive damage to human life, infrastructure, and economic assets. In recent decades, the frequency and intensity of extreme climatic events have increased significantly, amplifying their destructive impacts on the built environment. As a result, disaster-affected areas are increasingly required to strengthen their reconstruction capacity, which demands skilled and knowledgeable professionals capable of managing complex recovery projects. Post-disaster reconstruction (PDR) represents a multifaceted and highly challenging process that involves a wide range of interdependent and coordinated activities.This study aims to assess the impacts of disasters, critically examine the challenges encountered in post-disaster housing reconstruction projects in India, and propose strategic measures to improve reconstruction outcomes. A quantitative research approach was adopted, employing a structured questionnaire to collect data from a purposively selected group of respondents with relevant experience. The findings indicate that factors such as institutional frameworks, reconstruction methodologies, project implementation practices, and stakeholder coordination play a decisive role in the successful delivery of post-disaster housing reconstruction initiatives.

Keywords - Post-Disaster Reconstruction; Housing Reconstruction; Disaster Management; Construction Project Management; Stakeholder Coordination; Sustainable Recovery.

I. INTRODUCTION

Over the past two decades, a total of 7,348 disaster events have been documented globally by EM-DAT, one of the most authoritative international disaster databases. During this period, disasters resulted in approximately 1.23 million fatalities—averaging nearly 60,000 deaths per year—and affected more than four billion people, many of whom experienced multiple disaster events. In addition to human losses, global economic damages caused by disasters are estimated at nearly US$2.97 trillion (Human Cost of Disasters, 2020). Challenges related to post-disaster housing reconstruction in developing countries have been extensively discussed in existing literature. However, limited attention has been given to long-term rehabilitation strategies that are initiated immediately following a disaster and address the needs of all vulnerable households. To strengthen reconstruction policy frameworks in developing regions, it is essential to focus on at-risk rural communities and to understand patterns of residential transition after disasters, including changes in housing types and occupancy conditions, as well as the socio-economic and institutional factors influencing these transitions (Kotani, Honda, Imoto, Shakya, & Shrestha, 2020). The construction sector, which consumes more raw materials than any other industry, is under increasing pressure to adopt

sustainable practices—a concern that is equally critical in post-disaster reconstruction. The extraction of natural resources, the manufacturing of commonly used construction materials, and the environmental footprint of reconstructed buildings collectively exert significant ecological stress. Consequently, the adoption of innovative, cost-effective, and environmentally sustainable composite materials has become essential for reconstruction activities (Sanchaniya et al., 2022a; 2022b; 2022c). Post-disaster reconstruction (PDR) represents one of the four recognized stages of disaster recovery, encompassing emergency response, restoration, reconstruction, and improvement-oriented development. Reconstruction initiatives are often characterized by high levels of uncertainty (Hayles, 2010; Sun & Xu, 2011) and operational complexity. Several studies identify reconstruction as one of the most demanding phases of post-disaster recovery due to the involvement of multiple stakeholders, limited resources, and challenging coordination requirements (Bello, 2006; Boano & García, 2011). Despite support from governmental bodies, non-governmental organizations, and international agencies, the proportion of post-disaster rehabilitation projects that achieve successful and timely completion remains relatively low. Against this background, the present study aims to assess the impacts of disasters, identify key challenges associated with post-disaster housing reconstruction projects, and propose strategic solutions to improve reconstruction outcomes. Data were collected through interviews with 100 professionals—primarily engineers—who have direct experience working on post-disaster housing reconstruction projects. The survey focused on identifying critical issues encountered during housing reconstruction following natural disasters and gathering expert-driven recommendations to address these challenges effectively.

II. LITERATURE REVIEW

Post-disaster reconstruction (PDR) has been widely recognized as a critical phase in the disaster management cycle, directly influencing the long-term resilience and socio-economic recovery of affected communities. According to Davidson et al. (2007), reconstruction extends beyond physical rebuilding and encompasses social, economic, institutional, and environmental dimensions. In developing countries, post-disaster housing reconstruction is particularly complex due to limited resources, weak institutional capacity, and high levels of social vulnerability.

Several scholars have examined the management challenges associated with post-disaster reconstruction projects. Hayles (2010) emphasized that uncertainty, time pressure, and coordination difficulties significantly affect decision-making during reconstruction. Similarly, Sun and Xu (2011) highlighted that unclear responsibilities, poor communication among stakeholders, and inadequate planning frameworks often result in project delays and cost overruns. Bello (2006) and Boano and García (2011) further identified post-disaster reconstruction as one of the most demanding stages of disaster recovery, given the involvement of multiple actors, including government agencies, non-governmental organizations, donors, contractors, and local communities.

In the context of housing reconstruction, institutional and governance-related issues have received considerable attention. Chang et al. (2010) noted that ineffective policy frameworks and fragmented institutional arrangements frequently undermine reconstruction efficiency. In India, studies by Sanchaniya et al. (2022a; 2022b; 2022c) revealed that bureaucratic procedures, land ownership disputes, and lack of technical guidance significantly hinder post-disaster housing delivery. These findings are consistent with observations by Kotani et al. (2020), who stressed the importance of understanding residential transition processes in rural communities to ensure equitable and inclusive reconstruction outcomes.

Stakeholder participation has been identified as a key determinant of reconstruction success. According to Lizarralde et al. (2010), community involvement improves transparency, enhances social acceptance, and ensures that reconstructed housing meets local needs. However, poor stakeholder coordination and limited community engagement often result in inappropriate housing solutions and reduced occupancy rates (Anilkumar & Banerji, 2021). Effective collaboration among stakeholders is therefore essential for achieving sustainable reconstruction outcomes.

Sustainability considerations in post-disaster reconstruction have gained increasing attention in recent years. The construction sector is one of the largest consumers of natural resources and a major contributor to environmental degradation (UNEP, 2018). Researchers such as Opdyke et al. (2018) argued that reconstruction offers an opportunity to integrate sustainable materials, energy-efficient designs, and resilient construction techniques. In the Indian context, Sanchaniya et al. (2022a) advocated the use of innovative

composite and eco-friendly materials to reduce environmental impacts while maintaining affordability and structural performance.

Despite extensive research on post-disaster reconstruction challenges, gaps remain in translating theoretical frameworks into practical, long-term reconstruction strategies. Many studies focus on immediate reconstruction outcomes, while limited attention is given to long-term housing performance, livelihood restoration, and policy continuity (Chang, 2010; Kotani et al., 2020). Furthermore, empirical studies that systematically integrate construction management principles with sustainability and resilience considerations remain limited, particularly in the Indian and Maharashtra contexts.

In summary, the literature highlights that successful post-disaster housing reconstruction depends on effective institutional frameworks, efficient project management practices, stakeholder coordination, and the integration of sustainability principles. However, persistent challenges related to governance, resource constraints, and long-term planning underscore the need for context-specific strategies. This study builds upon existing literature by examining post-disaster housing reconstruction challenges and proposing strategic solutions tailored to developing regions, with a particular focus on improving reconstruction management and sustainable recovery.

III. IMPACT OF DISASTERS

The impacts of natural disasters (NDs) are commonly classified into two broad dimensions: (a) direct and indirect effects, and (b) short-term and long-term consequences (Cavallo & Noy, 2011). Direct impacts primarily include immediate losses such as fatalities, injuries, and physical damage to housing, infrastructure, and productive assets. In contrast, indirect impacts are often long-lasting and manifest through reduced productivity, disrupted consumption patterns, and weakened economic growth over time (Cavallo & Noy, 2011).

Existing literature further distinguishes between market and non-market losses arising from disasters. Market losses refer to damages affecting goods and services that can be monetarily valued, such as residential buildings, infrastructure, and agricultural production (Sangha et al., 2020). Non-market losses, on the other hand, include impacts that are difficult to quantify economically, such as loss of human life, cultural heritage, ecosystems, and protected natural sites (Rogers et al., 2019). Several studies indicate that natural disasters can suppress economic development for many years, particularly in regions with limited recovery capacity (Botzen et al., 2019; Sanchaniya & Geipele, 2021). The overall severity of disaster-related losses is strongly influenced by household vulnerability levels and the effectiveness of local and national institutions in disaster preparedness and response (Eriksen et al., 2021).

Developing countries with low per capita incomes are especially vulnerable to the impacts of natural disasters, as they often host a large proportion of the world's poor while lacking robust infrastructure and social protection systems (Yoon, 2012). Within these contexts, disadvantaged and low-income populations face the greatest risks (Eriksen et al., 2021). Although the absolute financial losses experienced by poorer households may be lower than those incurred by wealthier groups, the relative impact on well-being is frequently far more severe (Hallegatte & Rozenberg, 2017). Natural disasters can push households that are marginally above the poverty line into poverty, with recovery delays potentially affecting multiple generations (Skoufias, 2003). Repeated exposure to disasters may trap families in persistent poverty or force displacement, resulting in environmental migration or refugee situations (Bates, 2002).

This research focuses on India, a country characterized by extensive geographic, social, and economic diversity. Environmental conditions play a crucial role in shaping infrastructure development, particularly in relation to building design, construction practices, and housing resilience (Kalinka et al., 2020). According to the National Institute of Disaster Management, 27 out of 32 Indian states are vulnerable to one or more forms of natural disasters (NIDM, 2019). Approximately 12% of India's total land area is prone to flooding, while nearly 68% of the cultivable land is exposed to drought risk. In rural regions, extreme climatic events significantly threaten food security, livelihoods, and agricultural assets (Lipper et al., 2014). Furthermore, India has been identified as one of the countries most at risk from sea-level rise and intensified river flooding due to climate change (Eckstein & Kreft, 2020).

Floods represent the most frequent natural disaster in India. In 2021 alone, 223 flood events were recorded, exceeding the annual average of 163 flood occurrences observed between 2001 and 2020. During the monsoon season (June to September), a sequence of severe flood events resulted in the loss of 1,282 lives across the country (Centre for Research on the Epidemiology of Disasters, 2021). These statistics highlight the urgent need for effective disaster preparedness, resilient infrastructure planning, and sustainable post-disaster reconstruction strategies.

IV .Post-Disaster Housing Reconstruction

Post-disaster housing reconstruction in developing countries has been extensively examined in the literature due to its critical role in long-term recovery. Several studies have focused on the provision of temporary shelters immediately following natural disasters (Anhorn & Khazai, 2015; Ansary et al., 2010), as well as the planning and management of temporary housing solutions during early recovery phases (Johnson, 2007; Félix et al., 2013). In contrast, other researchers have emphasized the identification of key success factors during the pre-construction stage of housing reconstruction projects, highlighting the importance of early decision-making and planning processes (Sospeter et al., 2020).

A substantial body of research has also examined challenges related to effective resource allocation and management during reconstruction (Chang et al., 2010). In addition, scholars have highlighted the significance of regulatory frameworks and technical guidelines (Ahmed, 2011), participatory planning approaches (Davidson et al., 2007; Ganapati & Ganapati, 2009; Kitzbichler, 2011; Tauber, 2015), stakeholder collaboration (Rahmayati, 2016), governance structures (Guarnacci, 2012), and construction training programs (Opdyke et al., 2018) in ensuring successful permanent housing reconstruction. These studies collectively propose practical strategies for improving the management and delivery of post-disaster housing projects.

Community involvement has been identified as a central component of sustainable reconstruction, particularly when recovery initiatives are implemented through community-based or participatory development models rather than purely philanthropic or top-down approaches (Geipele & Auziņš, 2015; Geipele et al., 2021; Puķīte & Geipele, 2017). Active community engagement in planning and implementation processes has been shown to enhance social acceptance, long-term sustainability, and resilience of reconstructed housing. According to the Centre for Research on the Epidemiology of Disasters (CRED), India is among the most disaster-affected countries in South Asia. Estimates indicate that between 1987 and 1996, disaster events in India resulted in an average of 5,063 fatalities and affected approximately 56.6 million people annually (Jones et al., 2014).

Natural disasters cause extensive damage to the built environment, leading to widespread destruction of housing and infrastructure, loss of life and livelihoods, and prolonged economic disruption at the local level. Housing represents one of the most significant social and economic assets and constitutes a major component of disaster-related losses, particularly in developing countries where affected populations face heightened risks of homelessness and humanitarian crises (Jones et al., 2014).

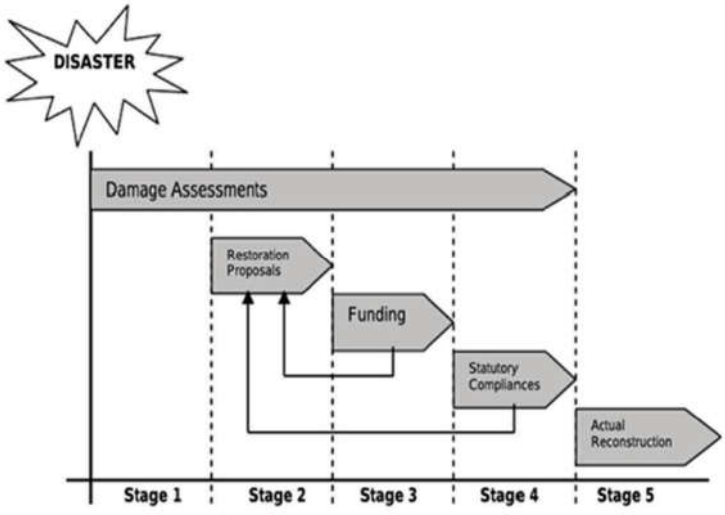

Figure 1. Post-disaster housing reconstruction process (Masurier & Wilkinson, 2014).

Given the humanitarian and developmental importance of post-disaster reconstruction, substantial financial resources from governments, international agencies, and non-governmental organizations are allocated to recovery efforts, with a significant proportion directed toward permanent housing reconstruction (PHR). PHR plays a vital role in restoring safety, dignity, and stable living conditions for affected and displaced populations, thereby supporting livelihood recovery and reducing long-term vulnerability (Yumarni & Amaratungga, 2017). Typically, permanent housing reconstruction follows sequential recovery stages, including emergency shelter, temporary shelter, and transitional housing.

Post-disaster housing reconstruction involves not only the repair or replacement of damaged housing stock but also the construction of new dwellings to meet evolving safety and resilience requirements (Jones et al., 2014). As illustrated in Fig. 1, the reconstruction process comprises multiple interconnected phases. To enable the rapid delivery of safe, habitable, and disaster-resilient housing, an integrated and coordinated approach involving diverse stakeholders is essential within the inherently complex, dynamic, and uncertain post-disaster environment (Sanchaniya et al., 2022; Yumarni & Amaratungga, 2017). Reconstruction activities following catastrophic events generally evolve through a structured sequence of five developmental phases, beginning with damage and impact assessment and culminating in the execution of rebuilding works, as illustrated in Fig. 1 (Masurier & Wilkinson, 2014). This phased framework provides a conceptual basis for understanding the progression of post-disaster recovery processes over time.

The initial phase commences after the completion of search, rescue, and evacuation operations during the emergency response stage. Damage and impact assessment constitutes the primary activity at this point, involving systematic collection of data related to the effects of the disaster on individuals, communities, infrastructure, and the natural environment. The outcomes of this assessment guide the planning of recovery and reconstruction initiatives. Importantly, this phase is not static; assessments may be revisited and refined as new information emerges during subsequent stages, which explains the extended time horizon represented in Fig. 1. Active participation of all relevant stakeholders during this phase facilitates the preparation of a comprehensive needs assessment report through surveys and damage evaluations. Effective data transmission, consolidation, and coordinated planning among stakeholders significantly enhance the quality and usefulness of the assessment outcomes.

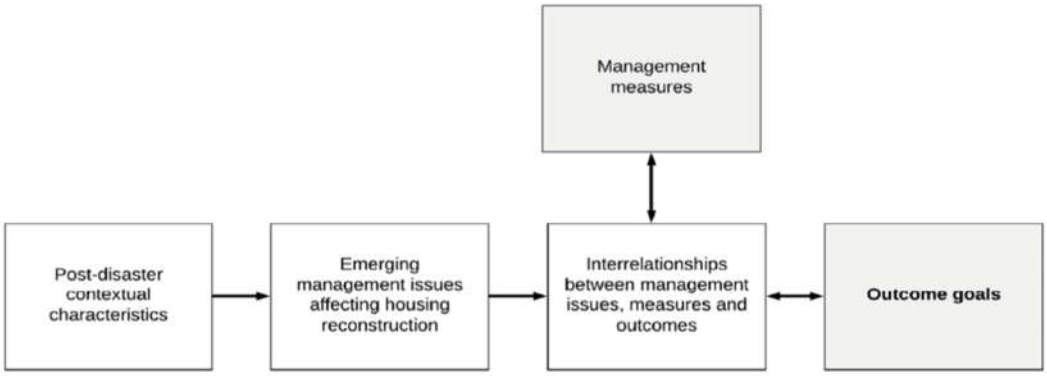

Figure 2. Conceptual framework for the management of post-disaster housing reconstruction (Bilau et al., 2018).

Following the needs assessment, critical decisions are made regarding whether damaged housing should be repaired, reconstructed, or demolished. A restoration plan is then formulated, outlining the projected reconstruction requirements and serving as a prerequisite for securing approvals from funding agencies and regulatory authorities. The level of technical detail incorporated in the restoration proposals directly influences the feasibility of obtaining financial support and statutory clearances. At the local government level, restoration proposals may incorporate hazard and risk assessments, along with mitigation strategies

aimed at reducing the likelihood of future disaster impacts. Financial resources for reconstruction may be mobilized through a combination of private funding, insurance mechanisms, governmental allocations, external donor agencies, and charitable organizations.

Once financial arrangements are either underway or finalized, the process advances to securing resource approvals and construction permits. This stage is frequently time-consuming, as regulatory authorities are required to ensure compliance with safety standards and verify that proposed developments incorporate adequate resilience measures. Despite its administrative nature, this phase plays a decisive role in shaping both the commencement and the overall timeline of reconstruction activities. Previous studies indicate that statutory approval procedures and documentation requirements have historically contributed to delays in rehabilitation projects (Bilau et al., 2018), a situation often exacerbated by shortages of skilled professionals and experienced regulatory personnel. Prolonged delays during this phase may lead to frustration and disillusionment among affected communities, driven by unmet expectations, implementation failures, and perceived inadequacies in disaster assistance mechanisms (Scurfield, 2006).

The final phase of the post-disaster reconstruction process involves the on-ground execution of rebuilding activities. This stage represents the regeneration phase of recovery, during which the affected community and its surrounding contexts—including the natural environment, built infrastructure, social systems, and local economy—are progressively restored to functional normalcy. Successful implementation at this stage depends on the effective coordination of resources, stakeholders, and technical processes established during earlier phases.

As illustrated in Fig. 2, the conceptual framework highlights the strategic significance of disaster preparedness initiatives that must be instituted prior to the occurrence of future hazards. In addition, it underscores the cross-cutting role of capacity development and active engagement of beneficiary communities, both of which remain critical throughout all stages of the post-disaster reconstruction cycle (Jones et al., 2014). These elements ensure continuity, adaptability, and resilience in recovery efforts rather than treating reconstruction as an isolated technical exercise.

It is important to note that the applicability of the findings is largely confined to developing-country contexts, as the empirical evidence and practical insights informing this framework are primarily derived from post-disaster housing reconstruction experiences in such regions (Bilau et al., 2018).

V. RESEARCH METHODOLOGY

The research methodology followed a structured sequence comprising an extensive review of existing literature, development of a structured questionnaire, survey administration, data collection, and subsequent hypothesis testing. A quantitative research approach was adopted, wherein the proposed research hypotheses were empirically examined through a questionnaire-based survey. A structured questionnaire was designed to address the core research objectives and hypotheses. The survey was administered electronically using Google Forms, and the questionnaire links were distributed to respondents via their official corporate email addresses. These email addresses were obtained from publicly available company information listed in the FMM Directory. Participants accessed the questionnaire through an embedded link in the email, and responses were automatically recorded within the Google Forms platform. This digital data collection approach enhanced efficiency while reducing time and operational costs. The survey was conducted across India. Of the 120 questionnaires distributed, 100 complete and valid responses were received and deemed suitable for statistical analysis. To measure respondents' perceptions, a five-point Likert scale was employed, where 1 represented the least significant impact and 5 indicated the highest level of impact. Respondents were asked to assess the influence of each identified factor on investment strategy selection within real estate management organizations.

Data Analysis

Descriptive statistical techniques were employed to analyse the demographic characteristics of the respondents. Frequency distribution and percentage analysis were used to summarise respondent profiles and to establish a clear understanding of the sample composition. This preliminary analysis also facilitated the transformation of raw survey data into a structured format suitable for inferential statistical evaluation.

To test the proposed research hypotheses, both Analysis of Variance (ANOVA) and regression analysis were applied. These statistical tools enabled the examination of differences among reconstruction-related challenges and the assessment of their influence on project performance.

Table 1. ANOVA Results for Challenges in Post-Disaster Housing Reconstruction Projects

Parameters	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	3.432	1	1.564	6.754	0.000
Within Groups	112.256	118	0.432	—	—
Total	115.688	119	—	—	—

Hypothesis H1 proposed that post-disaster housing reconstruction projects in India face significantly varying challenges during the reconstruction phase. To test this hypothesis, a one-way ANOVA was conducted. The results, presented in Table 1, indicate an F-statistic value of 6.754 with a corresponding significance level (p-value) of 0.000. As the p-value is below the threshold of 0.05 at a 95% confidence level, the null hypothesis is rejected. This confirms that post-disaster housing reconstruction projects in India experience statistically significant differences in reconstruction-related challenges.

Table 2. Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.867[a]	0.743	0.712	0.67871

Note:
[a] Predictors: (Constant), problems faced in reconstruction

Table 3. ANOVA Analysis of the Impact of Problems Faced in Reconstruction on the Performance of Post-Disaster Housing Reconstruction Projects in India

Model	**Source**	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	521.343	1	511.212	131.331	0.000[b]
	Residual	187.625	118	0.432	—	—
	Total	708.968	119	—	—	—

Notes:
a. Dependent Variable: Performance
b. Predictors: (Constant), problems faced in reconstruction

The model summary indicates a strong relationship between reconstruction challenges and project performance ($R = 0.867$). The R^2 value of 0.743 suggests that approximately 74.3% of the variation in post-disaster housing reconstruction performance is explained by the problems faced during reconstruction. The ANOVA results confirm that the regression model is statistically significant ($F = 131.331$, $p < 0.001$), demonstrating that reconstruction challenges have a significant impact on project performance in India.

Hypothesis H2 examined whether the challenges encountered during reconstruction significantly influence the success of post-disaster housing rebuilding projects in India. Regression analysis was used to evaluate this relationship. The findings reveal that reconstruction-related difficulties have a statistically significant impact on project performance, as evidenced by a p-value of 0.000, which is below the 0.05 significance level

at a 95% confidence interval. Therefore, the alternative hypothesis is accepted, indicating a strong association between reconstruction challenges and the overall success of post-disaster housing projects.

Table 4. Regression Analysis of the Impact of Problems Faced in Reconstruction on the Performance of Post-Disaster Housing Reconstruction Projects in India

Model	**Predictor**	**Standardized Coefficients (Beta)**	**t**	**Sig.**
1	Problems faced in reconstruction	0.342	15.32	0.000

The regression analysis indicates that problems faced during reconstruction have a statistically significant and positive influence on the performance of post-disaster housing reconstruction projects in India ($\beta = 0.342$, $t = 15.32$, $p < 0.001$). This result confirms that reconstruction-related challenges are a critical determinant of project performance, thereby supporting the proposed hypothesis.

VI.CONCLUSION

The findings demonstrate that institutional frameworks, reconstruction methodologies, execution practices, and stakeholder coordination play a critical role in ensuring the successful delivery of post-disaster housing projects. Despite their importance, the study reveals that these critical success factors are often insufficiently addressed or systematically integrated during the reconstruction phase, which adversely affects project outcomes.

This research enhances the existing body of knowledge on disaster project management by identifying and structuring the critical success factors (CSFs) associated with post-disaster reconstruction (PDR) initiatives. These CSFs are consolidated into key project management dimensions, a classification approach that has been widely adopted in post-disaster project studies. Such structured categorization provides a practical foundation for improving the efficiency and effectiveness of infrastructure recovery efforts following disasters. Once CSFs are identified, it becomes imperative for all stakeholders involved in post-disaster housing reconstruction to recognize these factors and ensure their continuous monitoring throughout the project lifecycle.

The study further highlights that external agencies frequently overestimate their understanding of local needs while underestimating the capacities and knowledge of disaster-affected communities. In reality, local communities possess the most accurate understanding of their priorities, constraints, and socio-cultural requirements. Consequently, reconstruction initiatives that fail to actively involve communities from the initial planning stages are unlikely to achieve long-term success or sustainability.

Community-driven post-disaster housing reconstruction programmes require strong collaboration and coordination between external authorities and local beneficiaries. The absence of mutual trust and transparent communication among stakeholders significantly undermines the effectiveness of such initiatives. Furthermore, the competence and engagement of facilitators emerge as decisive factors influencing the success or failure of housing reconstruction programmes. Facilitators act as intermediaries between communities and implementing agencies and play a vital role through their direct involvement in planning, coordination, and execution of reconstruction activities.

Periods of political transition often disrupt the functioning of institutional and administrative systems, particularly in developing countries such as India, which has spent over seven decades striving to establish and sustain stable governance mechanisms. The study identifies several systemic challenges that must be addressed through a robust and responsive National Reconstruction Authority (NRA) framework. These include financial constraints, weak inter-agency coordination, inconsistent stakeholder commitment, limited public awareness, inadequate capacity of international and non-governmental organizations, and insufficient local participation and ownership. Addressing these challenges with sensitivity and inclusiveness is essential for the successful implementation of NRA-led reconstruction policies.

In addition to institutional limitations, the research highlights several cross-cutting issues that complicate post-disaster reconstruction efforts. These include challenging geographical conditions, domestic resource shortages, limited technical capacity, misconceptions regarding international assistance, shifting political

priorities, ineffective housing schemes, labor shortages, lack of professional expertise, cultural insensitivity, inadequate knowledge of construction materials and techniques, loss of livelihoods, and the absence of structured strategies for retrofitting and long-term rehabilitation. Furthermore, bureaucratic inefficiencies, entrenched interests, and instances of corruption—coupled with an excessive focus on housing subsidy distribution rather than holistic rehabilitation—further undermine reconstruction outcomes.

Post-disaster reconstruction is inherently shaped by the prevailing social, cultural, and political environment following a catastrophe. Evidence from global reconstruction experiences suggests that challenges in this domain are complex, multidimensional, and deeply embedded within the broader societal context. While these issues manifest in various forms, they often converge around a limited number of core concerns, notably governance deficiencies, technological limitations, and unstable socio-political conditions. Although political instability in India may have contributed to frequent changes in NRA leadership and weakened local administrative capacity, such reconstruction inefficiencies are better understood as the result of interconnected structural and contextual factors. Future research should therefore explore how these variables interact and collectively influence the effectiveness and sustainability of post-disaster reconstruction programmes.

REFERENCES

Ahmed, I. (2011). An overview of post-disaster permanent housing reconstruction in developing countries. *International Journal of Disaster Resilience in the Built Environment*, *2*(2), 148–164. https://doi.org/10.1108/17595901111149141

Anhorn, J., & Khazai, B. (2015). Open space suitability analysis for emergency shelter after an earthquake. *Natural Hazards and Earth System Sciences*, *15*(4), 789–803. https://doi.org/10.5194/nhess-15-789-2015

Ansary, M. A., Reja, M. Y., & Jahan, I. (2010). Rethinking the public building as post disaster shelters – In the context of old Dhaka. *9th US National and 10th Canadian Conference on Earthquake Engineering 2010, Including Papers from the 4th International Tsunami Symposium*, *6*(118), 4215–4224.

Bates, D. C. (2002). Environmental refugees? Classifying human migrations caused by environmental change. *Population and Environment*, *23*, 465–477. https://doi.org/10.1023/A:1015186001919

Bello, W. (2006). The rise of the relief-and-reconstruction complex. *Journal of International Affairs, 59*(2), 281–296.

Bilau, A. A., Witt, E., & Lill, I. (2018). Practice framework for the management of post-disaster housing reconstruction programmes. *Sustainability (Switzerland)*, *10*(11), 18–20. https://doi.org/10.3390/su10113929

Boano, C., & García, M. (2011). Lost in translation? The challenges of an equitable post-disaster reconstruction process: Lessons from Chile. *Environmental Hazards*, *10*(3–4), 293–309. https://doi.org/10.1080/17477891.2011.594493

Botzen, W. J. W., Deschenes, O., & Sanders, M. (2019). The economic impacts of natural disasters: A review of models and empirical studies. *Review of Environmental Economics and Policy*, *13*(2), 167–188. https://doi.org/10.1093/reep/rez004

Cavallo, E., & Noy, I. (2011). Natural disasters and the economy – A survey. *International Review of Environmental and Resource Economics*, *5*(1), 63–102.

https://doi.org/10.1561/101.00000039

Centre for Research on the Epidemiology of Disasters. (2021). *Extreme events defining our lives: Executive summary*. OECDiLibrary.

Sanchaniya, J. V., Kanukuntla, S. P., Shereef, A., & Kaneps, J. (2022b). Modelling and analysis of composite polyacrylonitrile nanofiber mats utilized to strengthen motorbike side panel. *Engineering for Rural Development*, *21*, 727–736.

https://doi.org/10.22616/ERDev.2022.21.TF226

Sanchaniya, J. V., Kanukuntla, S. P., Simon, S., & Gerina-Ancane, A. (2022c). Analysis of mechanical properties of composite nanofibers constructed on rotating drum and collector plate. *Engineering for Rural Development*, *21*, 737–744.

https://doi.org/10.22616/ERDev.2022.21.TF227

Sanchaniya, R. J., & Geipele, I. (2021). The role of entrepreneurship activity in economic development. *22nd International Scientific Conference. "Economic Science for Rural Development"*, *55*, 388–395. https://doi.org/10.22616/esrd.2021.55.039

Sanchaniya, R., Praneeth, S., & Geipele, I. (2022). Investment attraction strategies for Indian real estate management firms. *27th RSEP International Conference on Economics, Finance & Business*, Madrid, Spain, 125–136. https://doi.org/10.19275/RSEPCONFERENCES205

Sangha, K. K., Russell-Smith, J., Evans, J., & Edwards, A. (2020). Methodological approaches and challenges to assess the environmental losses from natural disasters. *International Journal of Disaster Risk Reduction*, *49*, Article 101619. https://doi.org/10.1016/j.ijdrr.2020.101619

Scurfield, R. M. (2006). Post-Katrina aftermath and helpful interventions on the Mississippi Gulf Coast. *Traumatology*, *12*(2), 104–120. https://doi.org/10.1177/1534765606295924

Skoufias, E. (2003). Economic crises and natural disasters: Coping strategies and policy implications. *World Development*, *31*(7), 1087–1102. https://doi.org/10.1016/S0305-750X(03)00069-X

Sospeter, N. G., Rwelamila, P. D., & Gimbi, J. (2020). Critical success factors for managing post-disaster reconstruction projects: The case of Angola. *Construction Economics and Building*, *20*(3), 37–55. https://doi.org/10.5130/AJCEB.v20i3.7298

Sun, C., & Xu, J. (2011). Estimation of time for Wenchuan earthquake reconstruction in China. *Journal of Construction Engineering and Management*, *137*(3), 179–187.

https://doi.org/10.1061/(asce)co.1943-7862.0000277

Tauber, G. (2015). *Architects and rural post-disaster housing: Lessons from South India*. Transcript Verlag. https://doi.org/10.1515/transcript.9783839428627

Yoon, D. K. (2012). Assessment of social vulnerability to natural disasters: A comparative study. *Natural Hazards*, *63*(2), 823–843. https://doi.org/10.1007/s11069-012-0189-2