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Post-Disaster Reconstruction Contracts: Unpacking Competency Gaps and External Constraints

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Abstract

This study investigates contract implementation challenges in developing countries, focusing on competency gaps and external factors. Fifteen in-person semi-structured interviews were conducted with professionals involved in reconstruction efforts following the Gorkha Earthquake in Nepal and analyzed using thematic analysis. The analysis revealed two key themes: competency & compliance, and external environment. Competency and compliance gaps included contractors' limited understanding of contract terms, reliance on low bids in the hope of mischievous variations later, government agencies' resource shortages and inexperience, and the added complexity of donor-imposed systems. External challenges included unrealistic community expectations, temporary agency roles, corruption, and limited insurance coverage and mechanisms. These issues can lead to a spectrum of contractual difficulties, from minor misunderstandings and weak oversight to serious breaches, often resulting in delays, cost overruns, and disputes. The study emphasizes the need for better alignment between contract requirements and local capabilities and the importance of pre-disaster planning, clearer stakeholder engagement guidelines, and comprehensive contract management training. These findings provide valuable lessons for future reconstruction and underscore the need for context-sensitive contract frameworks that address post-disaster challenges. Building on this, the study proposes a practical roadmap to guide the development and implementation of tailored construction contracts for reconstruction projects.

1 Introduction

Reconstruction following disasters in developing countries takes place in a complex environment influenced by local and international stakeholders. The involvement of numerous actors, diverse funding sources, different perspectives on project success, and close community engagement adds significant complexity in decision making and increases the likelihood of disputes compared to typical construction projects (Puri et al., 2024b). However, comprehensive research that incorporates practitioners' perspectives to identify the most influential elements shaping reconstruction decisions remains limited (Mushtaha et al., 2025).

There is currently no standardized procurement and contracting model tailored for large-scale post-disaster reconstruction, nor is there one endorsed by global reconstruction agencies. Instead, these projects often rely on improvised ad-hoc approaches (Aliakbarlou et al., 2018; Hidayat & Egbu, 2011). However, as Puri et al. (2024a) point out, reconstruction differs significantly from regular construction in environment, funding, resources, coordination, health and safety, procurement, and policies. These differences emphasize the importance of adopting a tailored contractual approach for reconstruction (Puri et al., 2025).

Traditional risk-transfer contracting models, as noted by Masurier et al. (2006), are unsuitable for reconstruction due to skill shortages caused by loss of life, injuries, and intense competition for limited resources. These challenges are even greater in developing countries, where policies and resources are

often lacking for effective implementation. The urgency of rebuilding on a large scale within a constrained timeframe calls for the development of quicker, more efficient procurement and contracting mechanisms, as well as the recruitment of skilled professionals. However, construction markets in developing countries are often underdeveloped. As a result, they fail to meet the standards expected by international funding agencies, which are the primary financiers of reconstruction projects (Puri et al., 2025).

Consequently, multiple reconstruction studies have consistently identified the selection of qualified and competent project partners as crucial to project success (Charles et al., 2022; Hidayat & Egbu, 2011; Sospeter et al., 2020). Each stakeholder brings distinct knowledge and skills essential to their roles, highlighting the importance of understanding the competencies of key stakeholders. A single stakeholder's skill gap can compromise the project outcomes, leading to delays and cost escalations.

Furthermore, while external factors such as community dynamics and market conditions are difficult to control, identifying these influences in advance enables the development of proactive mitigation strategies, helping to reduce potential impacts. Numerous studies have highlighted issues such as community engagement (Bilau & Witt, 2016), resource cost inflation (Chang et al., 2011b, 2012b), corruption (Sospeter et al., 2021), political instability (Acharya et al., 2022), and supply chain disruptions (Bilau et al., 2018) as obstacles to successful reconstruction. However, these challenges have seldom been analyzed from a contractual perspective, and their specific impact on contract implementation remains underexplored.

This study investigates the challenges of contract implementation in post-disaster reconstruction, with a particular focus on low-income country contexts. It examines both stakeholder competencies and the influence of external environmental factors. Drawing on Nepal’s large-scale reconstruction following the 2015 Gorkha Earthquake, the study explores the challenges faced by key stakeholders through a qualitative research approach. Nepal’s extensive reconstruction experience and its developing country context provide a strong foundation for this analysis.

2 Literature review

2.1 Professional competency in reconstruction

Competency in reconstruction is crucial due to the operating environment consisting of severe resource constraints. Challenges from less competent resources were evident in Aceh's post-tsunami reconstruction, where many agencies involved were inexperienced in housing reconstruction and post-disaster work, leading to implementation challenges (Daly & Brassard, 2011). A similar situation occurred during Nepal's reconstruction after the 2015 earthquake, where competency gaps also created obstacles during implementation (Sharma et al., 2018a). Competency becomes even more critical as post-disaster humanitarian and reconstruction efforts often face accountability issues (Dhungana & Cornish, 2021; Puri et al., 2024b).

Successful reconstruction demands a project team with a combination of technical expertise, contextual awareness, and interpersonal skills (Charles et al., 2022). Effective collaboration becomes essential with reconstruction involving multiple stakeholders, making strong interpersonal skills crucial for fostering coordination. Accelerating the reconstruction process also requires professionals capable of designing and building swiftly, necessitating a deep understanding of the local context. However, in post-disaster situations, where the demand for reconstruction often outpaces available resources, finding individuals with these specialized skills is especially challenging in developing countries.

As identified by Puri et al. (2024b), numerous studies have highlighted competency challenges among three key actors in reconstruction:

- Contractors: lack of competence in managing reconstruction projects (Chang et al., 2011a, 2012a; Farni et al., 2020; Ophiyandri et al., 2010)
- Client: limited capacity to oversee and manage reconstruction effectively (Bilau et al., 2018; Fayazi et al., 2017; Hidayat & Egbu, 2010; Sospeter et al., 2021)
- Consultant: insufficient skills and resourcing in delivering professional support (Ahmed & McDonnell, 2020; Kim & Choi, 2013; Saleh et al., 2020)

While most reconstruction studies on management and resourcing focus on technical competence or general project management skills, few address the challenges arising from insufficient competency in contract management. This gap exists partly because construction contracts for reconstruction are often underexplored, with conventional contracts often used inappropriately for post-disaster projects (Puri et al., 2024a, 2025; Puri et al., 2024b).

Contracts form the cornerstone of relationships between clients and contractors by defining a project's scope, quality, and performance expectations while assigning clear responsibilities to each party. They also delineate the roles and authority of engineers or consultants, ensuring efficient project execution. Additionally, contracts are essential tools for dispute resolution and accountability throughout the project lifecycle. Therefore, effective management of reconstruction contracts requires all stakeholders to possess adequate competency.

However, in many developing countries, where international donors or governments often fund reconstruction projects, there is a disconnect between the expectation of external funding agencies and local capacities. For example, following the Bam earthquake, it was found that international donors' rigid standards exceeded the local capacities (Fayazi et al., 2017).

Reconstruction becomes even more complicated when multiple agencies are involved, each with their own standards and contracts. This was evident in Nepal’s reconstruction, where primary users struggled to manage different forms of construction contracts introduced by funding agencies (Puri et al., 2025). Across many low-income countries, the construction industry is underdeveloped, and donor approaches to contracts often differ significantly from local practices and capacities. Local consultants, contractors, and government officials are often unfamiliar with donor processes, making it hard for them to adapt,

especially with little prior experience. This lack of exposure also limits opportunities to build essential skills. Despite these challenges, the impact of such issues on contract implementation remains largely underexplored in existing research.

2.2 External influences in reconstruction

Large-scale reconstruction projects involving multiple stakeholders are highly vulnerable to external influences. Factors like the political environment, international relations, and market trends and conditions lie beyond the parties' control. However, they can significantly influence the project's execution. Additionally, unexpected changes in laws and policies can present unique challenges that are difficult to anticipate within the contract's scope.

Several studies have highlighted the impact of external influences in post-disaster reconstruction. Key challenges related to external influences included in the meta-study by Puri et al. (2024b) are shown below:

- Difficulties in collaborating with communities (Ade Bilau & Witt, 2016; Bilau et al., 2018; Chang et al., 2010a; Lin, 2014; Tall et al., 2021; Xu et al., 2016)
- Inability to capture community expectations (Acharya et al., 2022; Edgington, 2017; Fayazi & Lizarralde, 2018)
- Political instability (Acharya et al., 2022; Osland, 2010; Sospeter et al., 2021)
- Corruption (Brandon, 2011; Shuvo et al., 2022; Sospeter et al., 2021)
- Disruptions in local and international supply chains (Bilau et al., 2018; Chang et al., 2010a; Ophiyandri et al., 2010)
- Price inflation and market volatility (Afkhamiaghda & Elwakil, 2022; Bilau & Witt, 2016; Brandon, 2011; Chang et al., 2012a)
- Changes or inadequacies in legal and policy frameworks (Le Masurier et al., 2006; Platt & So, 2017; Tagliacozzo, 2018)

Studies like Farni et al. (2020) highlight that communities often act as indirect project management teams in reconstruction projects, making their involvement crucial to success. However, Waheeb and Andersen (2022) caution that community participation can sometimes result in unrealistic demands and numerous late-stage project changes, which delay reconstruction efforts. While such challenges are often discussed in terms of community engagement, there is limited analysis of their broader contractual implications, particularly regarding project timelines, budgets, and potential disputes.

Post-disaster situations are marked by resource constraints coupled with price inflation and volatility. After the 2008 Wenchuan earthquake, the Chinese government faced overwhelming demand: reinforcing 1.6 million houses and building 2.1 million new ones in rural areas, alongside strengthening 600,000 houses and constructing 720.3 million new units in urban areas (Li et al., 2019). This surge in short-term demand, constrained by limited resources, led to significant inflation and price fluctuations (Chang et al.,

2010a). While price volatility influenced by local and international factors often lies beyond the parties' control, measures like price adjustment clauses in contracts can help mitigate its impact. However, research on construction contracts in disaster contexts remains limited, making it difficult to incorporate such measures effectively into contracts (Puri et al., 2024a, 2025; Puri et al., 2024b).

Political issues and bureaucracy can similarly impede reconstruction efforts. When new reconstruction authorities are established after a disaster, political agendas and bureaucratic processes often limit their effectiveness. Manandhar et al. (2022) found that Nepal's national government's bureaucracy, control over disaster funds, and influence over staff recruitment, transfer, and dismissal at the National Reconstruction Authority (NRA) undermined its capacity, stability, and flexibility. Similarly, Safapour et al. (2021) noted that reconstruction projects, already constrained by tight budgets, are often subject to losses and cost overruns due to corruption and fraud. Reconstruction following the 2017 wildfires was slow in Portugal, and in August 2018, Portuguese media uncovered the misuse of funds. It was found that some funding intended for disaster-affected areas was misallocated for refurbishing homes that had not been affected due to political ties and influence (Freitas & Mendes, 2019).

While political issues and bureaucratic delays have been recognized as significant challenges in reconstruction, there has been limited exploration of their impact on the implementation of construction contracts. When reconstruction funds are misused, and political interference delays procurement and contract awards, the implementation of projects is further hindered. Bureaucracy also contributes to these delays.

Formal contracts are fundamental to the success of major reconstruction projects, and understanding the contractual challenges arising from external factors is crucial. Without a clear understanding of these issues, effective mechanisms to mitigate their impact cannot be developed, leading to disputes, cost overruns, and project delays.

2.3 Reconstruction in a developing context: Nepal's post-2015 recovery

The 7.6 magnitude Gorkha Earthquake in April 2015 was the most powerful earthquake to hit Nepal in nearly a century, causing extensive damage throughout the country. Nearly 9,000 lives were lost, approximately eight million people were affected, and the country incurred over just United States Dollars (USD) 7 billion in damages, which was 36% of the gross domestic product (GDP) in 2014 (National Planning Commission, 2015). The timing of the earthquake, occurring on a Saturday afternoon, likely mitigated its impact, as many people were outside their homes and children were not in school (Rushton et al., 2022).

In the aftermath, a large-scale reconstruction effort was launched to rebuild homes, schools, medical facilities, heritage sites, and vital infrastructure. However, the scale of destruction far exceeded Nepal's available resources and capacity, especially with a GDP per capita of just USD 750 and a heavy dependence on foreign remittances (Stein et al., 2018). As a result, Nepal turned to the international

community for support. Following a donor conference in June 2015, Nepal secured a pledge of USD 4.1 billion in grants and loans, which enabled the country to initiate the reconstruction process (National Reconstruction Authority, 2016).

Nepal's struggles with the reconstruction process are not unique among developing countries. Developing countries like Nepal face significant challenges, including low wealth, underdeveloped and poorly performing industries, and socio-economic vulnerabilities (Jerome et al., 2018). These challenges are compounded by political instability, weak governance, and corruption, all hindering effective disaster management. As a result, disaster response systems in such countries are generally inadequate compared to those in developed nations.

Additionally, in countries with weak governance and widespread corruption, construction work often fails to comply with building acts and earthquake codes. As per Shrestha (2022b), the destruction of over 800,000 homes in Nepal during the earthquake was primarily due to non-earthquake resilient design and construction. This reality highlights a critical issue of non-compliance with essential building regulations, which played a major role in the scale of damage from the disaster.

2.3.1 Disaster management systems in Nepal

Although Nepal has long been prone to natural hazards, its disaster management systems were insufficient in 2015. The first significant disaster-related legislation, the Natural Calamity Relief Act of 1982, focused primarily on emergency relief and rescue operations (Natural Calamity (Relief) Act, 1982). It took almost 40 years and the lessons from the Gorkha Earthquake for the framework to be replaced by the more comprehensive Disaster Risk Reduction and Management Act of 2017 (Disaster Risk Reduction and Management Act, 2017).

The 2015 earthquake highlighted Nepal's urgent need for stronger disaster preparedness and post-disaster management. Initially, the NRA, established in December 2015, led the country's recovery efforts from 2016 to 2021. However, it became clear that a long-term solution was needed to manage ongoing disaster risks. In response, the Government of Nepal (GoN) established the National Disaster Risk Reduction and Management Authority in 2020, as mandated by the 2017 Act. This new authority was given a wider remit: overseeing disaster management strategies, conducting research, gathering and analyzing data, and coordinating disaster response efforts for greater effectiveness (Disaster Risk Reduction and Management Act, 2017).

The challenge in Nepal, however, is not just about formulating sound policies but ensuring there is capacity to implement them and enforce compliance. Schneider and Witting (2018) point out that while earthquake-related policies and international best practices have been available since the 1990s, significant obstacles remain in Nepal. Despite federalization, power and administrative resources are still heavily centralized in Kathmandu, and rampant corruption makes effective policy implementation difficult. This disconnect between policy and practice is evident in the findings of Shrestha (2022b), who noted that despite the NRA's technical support in 32 districts, many rebuilt homes did not meet

earthquake-resilient standards. Key contributing factors included the inadequacy of the housing grants, economic struggles, and lax enforcement by NRA staff and local authorities.

2.3.2 Nepalese construction industry during post-earthquake reconstruction

In developing countries, many industries face significant setbacks due to low Human Development Index (HDI) scores, weak regulatory compliance, and less competitive markets, often leading to complacency (Jerome et al., 2018). Nepal is no exception, ranking 146th out of 193 countries in HDI (Human Development Report Office UNDP, 2024) and 57th on the Fragile State Index (FSI), which measures stability in security, economic, political, and social sectors (The Fund for Peace, 2024). Over the past decade, Nepal's FSI scores have steadily worsened, reflecting these systemic vulnerabilities.

The construction industry is a vital indicator of a country's development and serves as a catalyst for investment in related sectors (Sultan & Alaghbari, 2023). It also plays a crucial role in post-disaster recovery following natural hazards (Ingirige, 2016). In Nepal, it stands as a key pillar of the economy, contributing 12–15% to the national GDP. During the intensive reconstruction period from 2015 to 2020, driven by post-earthquake recovery efforts, the country's GDP grew at an average rate of 5% (Nepal Reconstruction Authority, 2021). However, this influx of reconstruction funding also led to significant challenges. Sharma et al. (2018a) reported that no major reconstruction projects were completed within budget, as weak oversight allowed for political interference and extended timelines, often driven by corrupt motives.

Corruption and unethical practices have long been obstacles to compliance within Nepal's construction sector, even before the post-earthquake reconstruction efforts. Despite the GoN's enforcement of building codes in Kathmandu since 2002, adherence has been dismally low. According to Sharma et al. (2018a), 90% of homes have not sought a ‘building conclusion certificate,’ indicating widespread non-compliance with the building code.

The sector also suffers from a deep-seated lack of trust between project owners and contractors. Many owners are concerned that contractors may cut corners to increase profits, using subpar materials or resources (Shrestha, 2022a). This distrust is intensified by allegations of collusion between politicians and contractors, raising fears that cartels control the construction industry, leading to dubious contract awards and corruption-ridden project implementation (Shrestha, 2022b).

Another major challenge for Nepal's reconstruction was the shortage of skilled workers. Around 2.2 million skilled Nepali workers were employed abroad, primarily in the Middle East, contributing to a severe domestic skills gap (Platt et al., 2020; Sharma et al., 2018b). The National Planning Commission (2015) estimated that only 20% of the skilled workers needed for reconstruction were available locally, creating significant obstacles in sourcing adequate resources. The damage from the earthquake was immense, with over 800,000 homes needing reconstruction, 78,000 homes requiring retrofitting, and substantial damage to critical infrastructure such as schools and hospitals. In response, the NRA set a

target to train 10,000 skilled workers and 40,000 semi-skilled and unskilled workers for the reconstruction effort (Sharma et al., 2018a). However, governance and implementation challenges persisted throughout reconstruction due to insufficient resourcing and administrative limitations (Lam & Kuipers, 2019; Manandhar et al., 2022).

2.3.2.1 Public procurement and post-disaster construction contract implementation

Public procurement is vital in Nepal, as 60% of the country's annual budget is allocated through public procurement processes (Adhikari, 2015). Public procurement was equally important during reconstruction. To streamline the reconstruction process, the NRA introduced the Post Disaster Recovery Framework (PDRF), a comprehensive reconstruction planning and implementation framework. The PDRF required all reconstruction projects funded directly by the GoN, or implemented by the GoN through loans, to follow the Nepalese Public Procurement Act and Regulations. However, donor-funded projects were granted flexibility, allowing them to use the government's procurement systems or adopt alternative methods (National Reconstruction Authority, 2016). Since a significant portion of reconstruction was managed by the GoN, these projects were vulnerable to issues inherent in local procurement practices, including lax enforcement, procedural inefficiencies, and problematic practices.

Nepal's Public Procurement Management Office (PPMO) has standardized public procurement using Standard Bidding Documents (SBD) for national and international competitive bidding. SBD is mandatory for public works exceeding USD 170,000 but remains optional for privately financed projects. The SBD, comprising seven sections and 91 clauses, is a simplified version of a construction contract partially based on FIDIC standards. For international competitive bidding, FIDIC standard forms of contracts are typically used. Since multilateral development banks finance most internationally tendered projects, the FIDIC Pink Book is commonly adopted (Dulal & Shrestha, 2021; Puri et al., 2024a). Following the 2015 earthquake, most reconstruction projects were executed by the GoN or multilateral development banks and donor organizations that adopted FIDIC contracts. This reliance on complex international standards placed significant demands on the professional competence of stakeholders involved in contract management.

However, GoN departments often lack sufficient resources to maintain an implementing agency capable of monitoring projects at the level required by FIDIC standards. Additionally, delays in hiring skilled personnel due to lengthy government recruitment processes exacerbate these challenges (Paudel & Henry, 2023). Moreover, studies such as Dulal and Shrestha (2021) have highlighted a pervasive lack of expertise in the procurement, management, and administration of construction contracts in Nepal.

These issues, compounded by a general lack of compliance with legal requirements, are further complicated reconstruction efforts. Addressing these gaps in competency, compliance, and the influence of external factors is crucial to improving contract implementation in Nepal and ensuring more effective post-disaster reconstruction outcomes in the future.

3 Research methodology

3.1 Study design and data collection

This exploratory study uses semi-structured interviews as the primary data collection method and employs an interpretivist approach to analyze the findings. The flexibility of semi-structured interviews allows participants to share their insights and emotions, providing answers to the challenges faced and an understanding of why they perceive these as challenges (Sadiqi et al., 2017). This flexibility is particularly valuable for a study exploring the impact of competency and external influence on construction contracts in post-disaster reconstruction, an area that has not been extensively examined.

Approval from the educational institution's ethics committee was sought before data collection to ensure ethical standards were upheld in research involving human participants. However, as this research was assessed as 'low risk', it received a 'Low Risk Notification', which did not require full ethics approval. Between December 2023 and January 2024, fifteen interviews were held with stakeholders who had significant experience in Nepal's reconstruction efforts. All participants were selected based on a minimum of five years of experience, practical knowledge of construction contracts in reconstruction, and familiarity with the complexities of working in a volatile post-disaster environment. One challenge in the study was identifying suitable participants, as nearly a decade had passed since the earthquake and many individuals involved in the reconstruction efforts were no longer available. Snowball and purposive sampling were used to address this challenge. Additionally, some participants were initially hesitant to participate in interviews. However, after the researchers clarified the purpose of the study, explained the ethical research standards used for this study, and assured confidentiality, they agreed to in-person interviews.

Each interview was conducted with the participant's consent, audio-recorded, and subsequently transcribed and anonymized to ensure confidentiality. Table 1 provides demographic information about the participants, including their professional experience, educational background, organizational affiliations, and roles in reconstruction projects.

Table 1
Participant profiles

Participant	*Experience (Years)*	*Education*	*Sector Type*	*Role*
P1	21–25	Masters	Construction Firm	Director
P2	21–25	Doctorate	Government Agency	Project Director
P3	11–15	Masters	Aid Agency	Associate Programme Manager
P4	30+	Masters	Government Agency	Deputy Project Director
P5	21–25	Masters	Aid Agency	Monitoring Engineer
P6	5–10	Masters	Construction Firm	Team Leader
P7	16–20	Masters	International Consultancy	Project Controls Specialist
P8	16–20	Masters	National Consultancy	Director
P9	16–20	Masters	Government Agency	Project Engineer
P10	30+	Doctorate	Government Agency	Project Management Specialist
P11	26–30	Masters	Aid Agency	Team Leader
P12	16–20	Masters	Government Agency	Deputy Project Director
P13	21–25	Doctorate	International Consultancy	Team Leader
P14	30+	Masters	National Consultancy	Procurement and Contract Management Specialist
P15	21–25	Masters	Aid Agency	Project Management Specialist

3.2 Data analysis

Thematic analysis is used to identify common ideas within the data, which are then organized into themes (Dhungana & Cornish, 2021). Data coding and thematic analysis were conducted using Nvivo 14 software, following a six-step process adapted from Ahmed and McDonnell (2020) and Puri et al. (2025). The steps included: a) becoming familiar with the data, b) coding the data, c) developing themes, d) reviewing the themes, e) defining and naming the themes, and f) writing the report.

Initially, the first author transcribed all interviews in MS Word and conducted a thorough review of the transcripts, taking initial notes to gain a general understanding of the data. The transcripts were subsequently uploaded into NVivo 14 for analysis, and the first author did the initial coding using inductive coding method. The initial codes were examined in the following stages with co-authors, and closely related codes were merged to refine the analysis. This process led to the development of

preliminary themes, which were assigned working names. These themes were subsequently refined and organized into a hierarchy consisting of a main theme and several sub-themes.

All transcript excerpts related to each theme have been presented in italics, followed by a pseudonymized identifier for the participant quoted. The result of the thematic analysis has been discussed in the Section 4 below.

This paper focuses on selected themes from the data, specifically the impacts of competency gaps and external influences on reconstruction efforts. These themes were chosen to provide a focused scope for the current study. Other themes from the same dataset, such as procurement challenges including legislative barriers and contract issues such as unclear language and clauses, are explored in greater detail in Puri et al. (2025).

4 Results

The thematic analysis identified in two main themes, each comprising several inter-related sub-themes. These are presented in Table 2 below.

Table 2
Summary of themes and sub-themes

Item	Themes	Sub-themes
Theme 1	Competency and compliance	Contractor competency and management
		Client and consultant expertise
		Unfamiliarity with systems
		Compliance
Theme 2	External environment	Insurance-related issues
		External influences and community dynamics

4.1 Theme 1 – Competency and compliance

Competency, as discussed in earlier sections, refers to the ability of parties to effectively fulfil their contractual responsibilities, while compliance pertains to their adherence to the contract's requirements and procedures.

A prominent theme emerged around widespread issues of competency and compliance, with all 15 participants identifying different challenges related to this. This main theme was divided into four sub-themes, which along with the interviewees referencing them, are presented in Table 3.

Table 3
Competency and compliance sub-themes

Sub-theme	Interviewees
Contractor competency and management	P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14, P15
Client and consultant expertise	P2, P3, P5, P6, P14
Unfamiliarity with systems	P1, P2
Compliance	P2, P3, P5, P8, P9, P11, P12

4.1.1 Contractor competency and management

The study revealed that most participants had experienced a lack of competency and professionalism among Nepalese construction contractors working on reconstruction projects. According to participants, many Nepalese contractors, especially smaller ones, struggle with handling contracts and managing projects effectively. They tend to focus solely on cost, neglecting to hire sufficient resources or specialized expertise required for implementation. They often avoid investing their funds, delaying project initiation, and misusing advance payments. Poor record-keeping further complicates the variation and extension processes, creating serious obstacles to effective contract implementation. Please see some excerpts below, illustrating the lack of competency and management issues discussed above.

'*It is a four-year project and has already been extended by one year. Still, we are not in the completion phase because the project is almost 95% in progress. Actually, it still takes six months to complete after the completion of this one-year extension period...It is due to the performance of the contractor. In the last phase, the performance of the contractor is not good*.' (P10)

'*…the contractor just focuses on the unit rate, amount, and all those things. They are not going through much on the contract clauses, nor are they aware of how to respond to whom they need to respond*.' (P2)

'*…at the very beginning of signing the contract, they signed without reading or reviewing any of the contractual clauses. Then, while the contract is administered, the contracting parties, especially the contractors, pretend we don't have any full information on the contract or what was written. The clauses are very clumsy and not understandable. This type of problem exists in our context*.' (P5)

'*…that is kind of how to tie them for performance, which is very, very challenging. We provide a certain amount of money, and they utilize it for different purposes outside project. That was a bigger challenge*.' (P2) '*Sometimes, contractor take the mobilization money from the client, and they invest in other things. Even for the land purchase or the share market, they did not have the cash flow for the construction…*' (P13)

'*…that's why sometimes they don't get time extension because of poor documentation. They don't get variations because of their poor communication and poor documentation.*' (P8) '*But in most cases, the*

contractor cannot compile all the documents and the proof. If the documentary proof is not there, then the claim is invalid.' (P9)

'*They do not look anything, even we have to remind the contractor that your time is going to end after two months. So, prepare all and collect all the evidence, whatever you think that the time should be extended and submit those things on time. Otherwise, the contractor will just continue their work, submit their claim and do not request a time extension, and the contract will be void, and there will be a huge problem.*' (P11)

'*…the professionalism they have not developed. So larger contractors will maintain the quality, control and other aspects of such things.*' (P14) '*Generally, low-level or small contractors always have a shortage of funds. They are not financially sound.*' (P4)

4.1.2 Client and consultant expertise

Some clients and consultants also demonstrated a lack of experience and expertise in managing contracts and large-scale reconstruction projects. There were instances when clients and consultants failed to efficiently prepare, review, and provide the necessary documents, leading contractors to claim delays due to these deficiencies. Participants also reported a general lack of expertise within GoN departments and the construction industry for effectively managing disaster-related projects and contracts. An example cited by P6 was the appointment of a non-technical individual with an educational background as the project manager for a school reconstruction project, which negatively impacted the project's progress. Below are excerpts illustrating the issues related to client and consultant expertise.

'*Parallelly, the effort of the consultant and their capacity are important. That is also the big challenge we have. Consultant capacity and contractor capacity are bigger issues in terms of checking, preparing, and furnishing the documents.*' (P2)

'*If you talk about the clients, there are many departments in Nepal. They are dealing with the civil works. Some departments have very good, competent contract administrator managers. In some departments, however, they lack.*' (P14) '*In some cases, in our school's reconstruction project, the project manager is a non-technical person. In the education sector, the teachers are from B.Ed., M.Ed., background, right? That is a non-technical person.*' (P6)

'*We always follow up with the executing agency to ensure proper contract administration. There are many cases when the contractor claims mistakes on the other side or the client's side.*' (P3)

4.1.3 Unfamiliarity with systems

Two participants, P1 and P2, highlighted the challenges arising from unfamiliarity with donor systems among Nepalese contractors and GoN staff. P1 discussed that contractors who have not previously worked with international agencies struggle to navigate their procurement systems, processes, and contracts. Similarly, P2, a GoN staff member involved with multiple international agencies during reconstruction, described difficulties managing contracts due to each development partner's diverse systems and contract forms. P2 observed that the variation in systems and contract forms created

significant challenges for the government in handling these contracts effectively during reconstruction. Below are excerpts illustrating the issues.

'*Definitely. For those who have not worked or experienced working with international agencies, that will definitely be difficult for them.*' (P1) '*Because of the capacity of the contractor, they aren't used to that kind of system. So, the expertise challenge is also very real. But not much in our case.*' (P2)

'*We have different development partners that support the reconstruction. For example, the JICA has its own rules and regulations. They have their own document. The World Bank has its own documents that we need to follow. The ADB has its own documents, rules, and regulations. So, as an implementer, we need to follow different kinds of documents… We needed to follow different kinds of donor modalities. That was the main problem that we felt while working in this field.*' (P2)

4.1.4 Compliance

Participants noted that although good standard contracts like FIDIC and PPMO contracts (based on FIDIC) have been used in Nepal reconstruction, the enforcement and compliance of the contract in the Nepalese construction industry is lacking. Parties are not mostly held accountable, and contract compliance is mostly taken softly, with contracts not strictly enforced. The entire industry has not matured in terms of construction management, including the use of contracts, so no one wants to go into the details of the clauses and implement them. Although provided in the contract, some repercussions for breach of contract are also not implemented. For example, P9, a GoN staff, highlights that although the contractors are supposed to receive interest in the payment if payment is delayed, employers often do not pay these interests. Below are excerpts illustrating the issues.

'*…although the government has already adopted this FIDIC, but still our enforcement part is weak. Following the contractual provisions strictly from the implementing agencies is still weak.*' (P11) '*I reviewed the contract document, the document itself is good, but the compliance of responsibilities of contracting parties, like client, consultant and contractors, there were some deficiencies in complying with the contracting clauses.*' (P5)

'*Nobody wants to look at the clauses to clauses. Interpret the clauses as well.*' (P2)

'*…the case of Nepal, you know, the construction management, contract management, and the management issue, the contract, you know, is very, very challenging. And also, nobody wants to go into much detail.*' (P2)

'*Mostly not practiced, but in the document, it is mentioned that if the payment is delayed after the 35 days of submission of the contract to the office if the office doesn't pay in that time, the contractor can claim. The employer should pay interest to the contractor, but this is not practiced.*' (P9)

4.2 Theme 2 – External environment

A clear theme emerged around external influences and environmental factors, with 12 participants identifying different challenges in this area. This central theme is divided into two sub-themes, which are

detailed in Table 4 along with the interviewees who referred to them.

Table 4
External environment sub-themes

Sub-theme	Interviewees
Insurance-related issues	P1, P3, P6, P7, P8, P9, P12, P13, P14
External influences and community dynamics	P1, P2, P4, P6, P8, P9, P10, P13

4.2.1 Insurance-related issues

When donors attempted to use their standard overseas contracts directly in Nepal, they failed to consider whether the requirements were applicable locally. This oversight led to challenges, particularly with insurance in some donor-funded projects. For instance, one donor's standard contract mandated the procurement of Defense Base Act (DBA) insurance, which was unavailable in Nepal and could only be obtained from a U.S.-based insurance company. These companies were reluctant to issue policies to third-world construction firms, and they were procured with difficulty. Additionally, this insurance duplicated coverage is already required by another contract provision, resulting in redundant insurance solely because it was stipulated in the standard template.

'*We had one…project. They had a clause for DBA insurance. That insurance can be issued only by the US-based insurance company, and we had to request that they issue the insurance for us for this project. But they are not, like, you know, willing to issue any third-world country company that kind of insurance. That was a challenge for us, but somehow, we managed it.*' (P1)

'*There were some challenges, like when I worked on a US government-funded project, as per the regulations, insurance for DBA insurance was required, which was typically absolutely for workers' compensation in case of injury, illness and death. But at the same time, the project demanded contractor's all-risk CAR insurance, which also covered the same item. So, there was duplication, and contractors were forced to have both insurance for the same purpose.*' (P7)

In some contracts, the deduction requirements significantly differed from what insurance companies were practicing in Nepal. These differences created challenges in obtaining the insurance to the client's satisfaction. Additionally, the insurance companies changed their policies later in the reconstruction, which conflicted with the contract requirements.

'*…our insurance clause in the contract is generally different to the Nepal insurance committee rules…the deduction mentioned on our BLOG is 0.5 percent of the claim amount or less than the 1 percent of the contract amount. However, in the BIMA committee's policy, it's 5 percent and 10 percent. 5 percent of the claim amount and 10 percent of the contract amount.*' (P6)

'*…later on, there were issues in insurance as well because the national insurance company had changed suddenly clauses, which overall hampered the project….Because ideally, or if we have to say, contractually speaking, those clauses should not have been altered. Because those clauses were agreed in the contract agreements, but there were issues practically.*' (P12)

Another insurance issue that came to light during reconstruction was when international agencies requested professional indemnity insurance from consulting firms in Nepal. There was limited practice of this insurance in Nepal at the time. Due to difficulties in procuring such insurance, the consultancies initially had to procure such insurance from India.

'*…the PLI, Professional Liability Insurance…we do not have that much practice in Nepal. Not common. Nowadays it's going up, but at the beginning when the reconstruction started in 2016, at the beginning it was not common in Nepal. So, in some of the projects, we did from India because we did not find any insurance company.*' (P13)

Insurance companies charged high excess fees for reconstruction projects, leading to the dismissal of small claims and further financial pressure on already strained contractors. As a result, despite paying high premiums, most contractors could not benefit from the insurance. During the early stages of the pandemic, many contractors purchased COVID-19 insurance. However, as infections rose, the insurance companies failed to honor claims, resulting in significant financial losses for the contractors.

'*But in this type of project, where the chances are there for a disaster, the insurer charges a high premium. And that's the problem the contractors are always complaining about.*' (P14)

'*So, some sort of CAR policy, other policy are used in contract, but still there are deductible provision in the CAR policy. The deductible, if the defect offers up to 5 lakhs or 10 lakhs or a small amount, that may be… cannot be claimed by the policy. But still, evaluating the total loss, that may be 10 or 5 or 10 lakhs, then the contractor does not claim that condition if a claim that is invalid.*' (P9)

'*Like the COVID insurance we did, and it's very difficult to claim in Nepal. Everyone faced that. Because we did continue the construction during the COVID, with the insurance, and there is a lot of COVID cases for the workers. And to claim the insurance, it's very difficult from the government side at that time because of number of infected cases.*' (P13)

4.2.2 External influences and community dynamics

Reconstruction projects in Nepal faced external challenges related to community expectations, government agreements, and special challenges from general perceptions.

Participants noted that reconstruction efforts often faced unrealistic demands from the community, who were perceived as not taking any risks themselves. Their perception of unlimited funds for unlimited changes made reconstruction work difficult to implement, as the community was heavily involved and influential due to community engagement requirements included in the contracts. For some historical

buildings, the community did not allow contractors to work properly in retrofitting as per the contract. The contractors had to take help from police and authorities to restart the sites.

'*Not only the core team of the construction stakeholder, but also there is a public, directly associated teacher, community. They make a lot of demand, because the necessity is unlimited, and the project has a very confined boundary on the BOQ, based on its objective…the contract is finished and still during the DLP period they demand the extra things, like we need the chair, computer table, a lot of things. But we do not have the funds that much in BOQ.*' (P13)

'*…There are some issues that occurred by the local people …in reconstruction, we have to demolish the old building or old structure and we have to reconstruct the same place. But at that time, the local people 's procedure is not to demolish the old building. At that time, we have to go to NEPCA, and we have to go with the police station to restart the project.*' (P6)

Challenges also arose when extending individual projects towards the end of reconstruction, particularly when overarching implementation agreements between development partners and the GoN were nearing their end. This challenge was not foreseen initially, and the contracts transferred from donors to GoN for implementation faced several challenges.

'*If there is no time for the project, if this project is already in the last phase, just now our project will be until March. And if we have to extend them after March also, it is not possible….because the project will be closed and the Nepal government is responsible. And the Nepal government cannot provide the money. If they cannot provide money, then there will be the problem.*' (P10)

One participant also noted that dispute resolution in the Nepalese context is challenging to be done amicably due to the overall perception of GoN officials being corrupt. This perception led to issues that could be settled amicably, going for adjudications and arbitrations, costing time and money.

'*But in our reconstruction project in Nepal, we have done many arbitrations, many adjudications, but we have not settled any dispute amicably. Because there are many barriers here. If we settle amicably, then another party, third party asks why we settle this amicably. This much amount is lost to the government….So in this environment, amicable settlement is more difficult. But if the construction environment is fair and all parties are educated, at that time amicable settlement is best, but it is less practiced.*' (P9)

5 Discussion

This study explored the impact of competency gaps and external environment on implementing construction contracts during post-disaster reconstruction in developing countries. Through interviews with 15 participants, the study identified two key themes:

- Competency and Compliance: There was a lack of compliance with contract terms and inadequate competency in contract management.

- External Environment: External factors beyond the control of the involved parties contributed to contractual difficulties that were challenging to manage.

Each theme discussed above reveal a specific pressure point in the contract lifecycle. Figure 1 below illustrates the issues, their potential contractual impacts, and how these issues combine to form overarching themes in this research.

The first theme highlights significant gaps in the competency and compliance of key stakeholders engaged in reconstruction. Contractors often entered contracts without fully understanding the terms, bidding low with the expectation of recovering costs through variations. This approach, coupled with poor resource management and misuse of advance payments, led to serious implementation challenges. Many contractors demonstrated limited professionalism, took uninformed risks, and lacked the technical background needed for sound decision-making. These shortcomings resulted in breaches of contract, forfeiture of legitimate claims, damaged reputations, and erosion of trust, undermining performance and jeopardizing future work opportunities.

Government agencies also lacked adequate resources and experience to manage large-scale reconstruction projects, as this was Nepal's first major reconstruction effort. The urgency of reconstruction fueled rushed contract preparations, while weak administration by clients and consultants triggered numerous claims of client default. Poor planning, oversight, and decision-making contributed to delays, cost overrun, and disputes. The limited expertise of contract professionals further weakened interpretation and enforcement, prolonging claims and inflating costs. Compounding these issues, development partners imposed varied systems and contract forms, leaving project teams struggling with inconsistent procedures. This lack of harmonization created procedural errors, misaligned expectations, and further delays.

Across all parties, contract enforcement was applied leniently, with terms often waived even under international standards such as FIDIC. Accountability was frequently overlooked, and contractual remedies for breaches were seldom pursued, resulting in major setbacks to reconstruction efforts. Together, these challenges underscore the urgent need to strengthen capacity and maturity within Nepal’s construction industry, particularly in the context of large-scale disaster recovery.

The second theme highlights challenges that were largely beyond the control of project parties. One of the most significant issues during reconstruction was managing community expectations. Local communities wielded substantial influence and often expected projects to meet all their needs, frequently overlooking budget constraints and project limitations. These unrealistic expectations contributed to scope creep, budget overruns, and, in some cases, work stoppages and project delays, ultimately straining relations between project teams and the communities they served.

Another challenge arose from the temporary presence of many agencies involved in reconstruction. Delays in project implementation were often not anticipated, and when these agencies’ umbrella agreements with the GoN expired, they departed. This left project teams in difficult positions, as

decisions made at higher bureaucratic levels resulted in unfinished projects being transferred to the GoN without secured funding. Consequently, project teams were forced to work under pressure, sometimes compromising on scope and quality of work.

Corruption presented an additional layer of complexity. While some individuals were indeed corrupt, the broader perception of corruption among government officials created hesitation in decision-making. Officials often refrained from resolving disputes amicably with contractors for fear of appearing corrupt, which led to unnecessary formal disputes. These disputes frequently escalated to adjudications and arbitrations, diverting resources and costs that could have been more effectively applied to project implementation.

Nepal's challenging terrain and disruptions caused by the global pandemic further complicated reconstruction efforts. Projects faced logistical difficulties during the monsoon, which were often not properly accounted for in project budgets, causing delays and cost overruns. Rural projects also struggled to attract competent experts, as many were unwilling to relocate outside Kathmandu. This lack of expert support delayed problem-solving and increased instances of non-compliance. Additionally, COVID-19 led to labor shortages, material delays, and health-related work stoppages, all of which hindered project progress.

Insurance posed another significant challenge. Nepal's insurance sector was underdeveloped and struggled to meet donor requirements. For example, professional indemnity insurance was virtually unavailable before reconstruction efforts began, and local companies did not offer it. Certain contract provisions required duplicate coverage, while others included deductibles misaligned with typical Nepali insurance practices, complicating procurement for contractors. These challenges not only increased project costs and administrative burdens but also caused delays in contract execution, as required insurances could not be secured on time.

5.1 Aligning reconstruction contracts with local contexts and capacity

Although many of these challenges are common in reconstruction contexts globally, as discussed in Section 2, they have rarely been examined specifically through the lens of contract implementation. The challenges faced in Nepal highlight the need to align contract requirements with local capabilities and realities. Reconstruction contracts often used imported requirements without considering the maturity of local markets. However, these led to many challenges. A common pattern in reconstruction is reactive planning, where disaster preparedness only begins after the next calamity strikes, as pre-existing policies and legislation are often ineffective (Chang et al., 2010b). However, in the disaster preparedness stage, robust pre-contract assessments must be taken to consider local conditions and stakeholder capacities carefully.

Additionally, when GoN staff reported that they did not resolve issues for fear of corruption accusations highlighted the pressing need for clear guidelines on stakeholder engagement to foster trust and transparency. Similarly, the temporary agencies involved in Nepal's reconstruction could have collaborated with the GoN to develop effective exit strategies. These strategies should include clear protocols for project transitions, ongoing funding, and long-term support to ensure sustainability.

The findings also highlight the need for more comprehensive contract management training and university-level courses to enhance awareness of construction contract compliance. Although project and contract management are included in engineering curricula, they often receive less emphasis compared to other core technical subjects. As a result, young professionals entering the industry lack a solid understanding of the importance of construction contracts and adherence to their terms. Professional organizations in Nepal, such as the Nepal Engineering Council, Nepal Engineering Association, Nepal Council of Arbitration, Federation of Contractors' Associations of Nepal, a Society of Consulting Architectural and Engineering Firms, and Nepal Law Council, also have a critical role in promoting contract compliance. These organizations can set stricter membership standards and offer specialized training in construction contract management. Offerings could include mandatory courses, certification programs, and workshops to build expertise within the industry. These developments will foster a more competent and accountable workforce that can serve the country in reconstruction when the next disaster hits.

5.2 Towards a practical implementation roadmap

The practical implications of this interdisciplinary research extend across several domains, bridging traditional construction, post-disaster reconstruction, and construction contracts. For academic researchers and educators, it provides foundational insights into the challenges inherent in post-disaster reconstruction and identifies directions for future research on designing construction contracts that are better aligned with post-disaster needs, local contexts, and capacities.

For construction professionals, the challenges identified, and their potential contractual implications offer a systematic framework to anticipate and assess risks. This enables practitioners to incorporate these considerations into procurement documents and contract preparation, improving project outcomes.

The research also provides valuable insights for policymakers and professional bodies, supporting the development of regulations, strategic policies, and trainings aimed at strengthening the construction sector in post-disaster contexts in developing countries.

Finally, the roadmap proposed in Fig. 2 below offers practical guidance for tailoring and implementing construction contracts in post-disaster reconstruction, ensuring that lessons from research are translated into actionable practice.

6 Conclusion

There is limited understanding of how competency and external environmental factors affect contract implementation in reconstruction. This study addresses this gap by highlighting key challenges related to these issues during the 2015 Gorkha Earthquake reconstruction. The findings revealed that reconstruction projects in Nepal suffered from inefficiencies linked to inadequate competency and compliance among stakeholders, as well as external factors beyond the control of the project. While some of these challenges have been documented in previous research, they have not been examined specifically through the lens of contract implementation. The insights from this study provide a valuable basis for developing strategies to address these issues effectively.

The study recommends conducting pre-disaster assessments and tailoring contracts to match local conditions, skills, and capabilities. Additionally, clearer and more robust guidelines are necessary to build trust and transparency among stakeholders. This requires significant involvement from the GoN, universities, and professional organizations to ensure that the construction industry is adequately trained in the importance and effective use of contracts.

Future research should explore how these recommendations can be practically implemented, including the specific policy changes and resources needed to strengthen contract management in post-disaster reconstruction. The practical implementation roadmap proposed in this research can serve as a guide for developing construction contracts that are responsive to post-disaster contexts.

Declarations

Conflict of interest statement

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Declaration of use of Generative AI

During the preparation of this work the authors used Grammarly and ChatGPT to simplify complex and difficult-to-read sentences, with the goal of making the writing clearer, more concise, and grammatically correct. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Declarations regarding ethics and consent to participate are presented in Section 3.1. Prior to data collection, the authors sought approval from the educational institution's ethics committee to ensure that all research involving human participants adhered to established ethical standards. As the study was classified as 'low risk', it received a Low Risk Notification rather than requiring full ethics approval. All interviews were conducted and recorded with consent of the participants.

Author Contribution

A.P. was the main author and led the study, including the design, data collection, writing, figures, and thematic analysis coding.N.A.A. and M.E. supervised the work, helping with the study design, methods, and reviewing the coding and final manuscript.All authors reviewed and approved the final manuscript.

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Data Availability

All data supporting the findings of this study are available within the paper.

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Figures

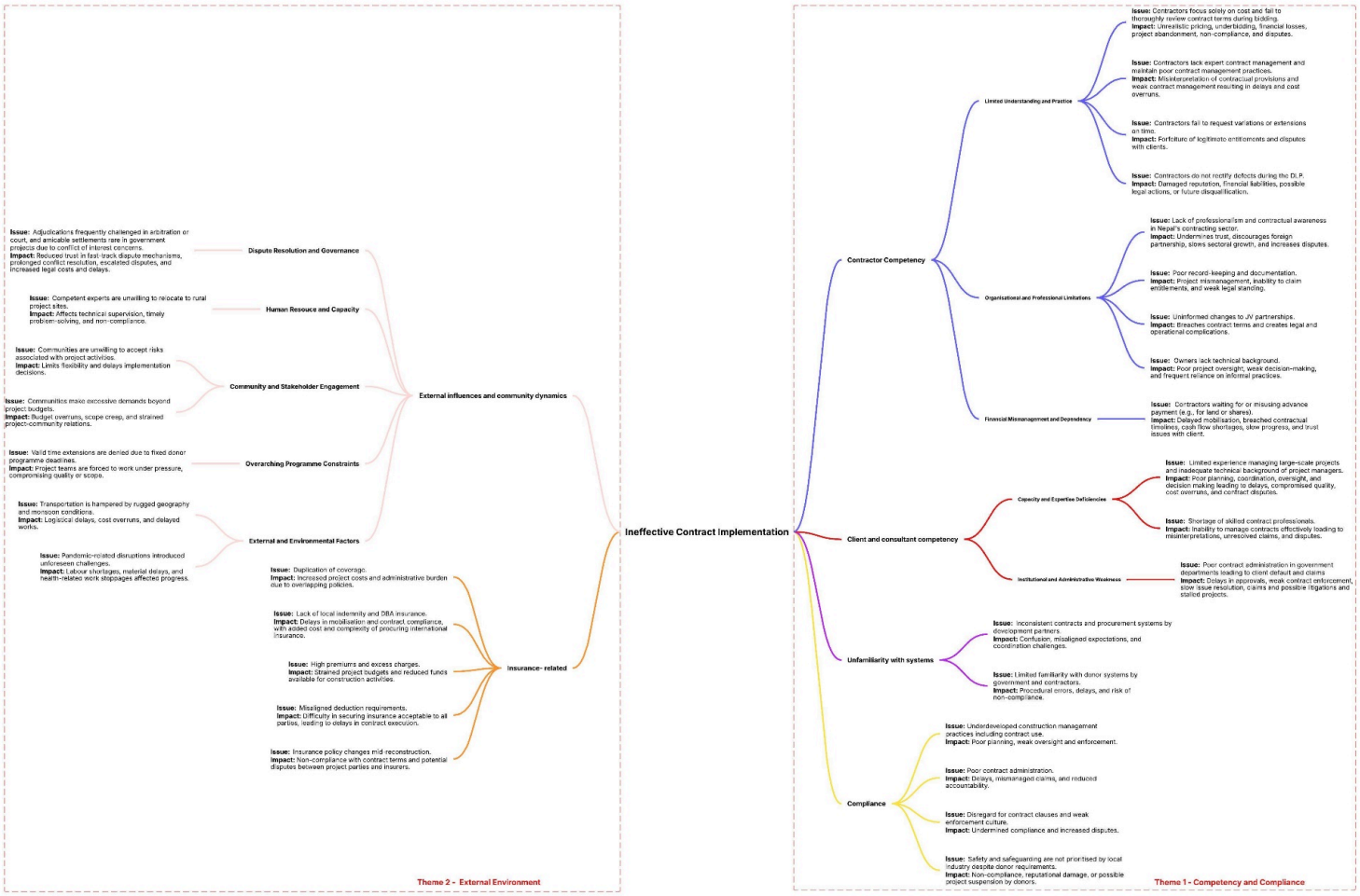


Figure 1

Issues and impacts contributing to ineffective contract implementation in post-disaster reconstruction

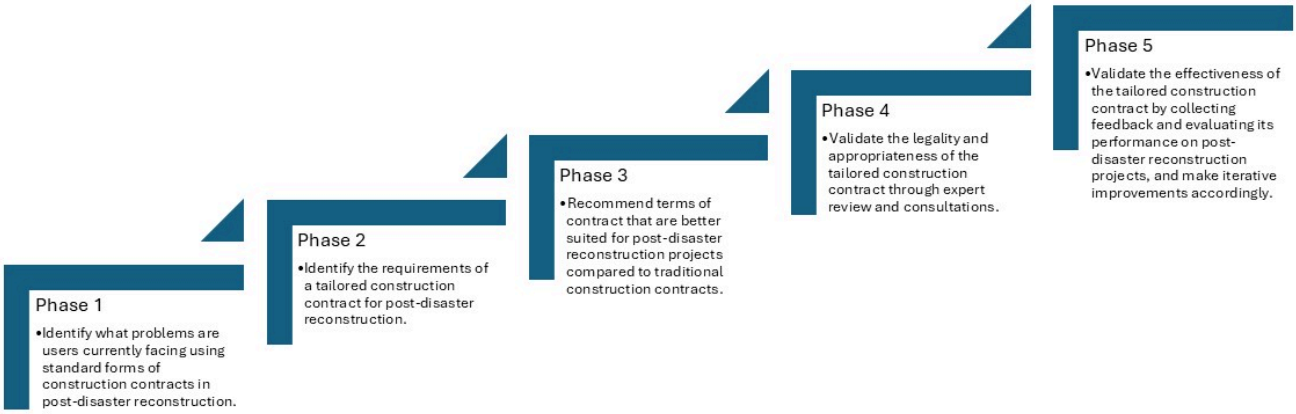


Figure 2

Roadmap for developing construction contracts for post-disaster reconstruction