COMMUNITY-BASED FLOOD MANAGEMENT

(A Case Study of Tharu Community in the riverbank area of ward 19,

Dhangadhi Sub-Metropolitan City)

A Thesis

Submitted to

Central Department of Sociology

Tribhuvan University, Kathmandu, Nepal

In the Partial Fulfilment of the Requirement of M.Phil. in Sociology

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Letter of Recommendation

This is to certify that Ms. Anjali Limbu Lawati has completed her thesis entitled **"Community-Based Flood Management (A Case Study of Tharu Community in the riverbank area of ward 19, Dhangadhi Sub-Metropolitan City)"** under my guidance and supervision in partial fulfilment of the requirement for the degree of M.Phil. in Sociology. I hereby recommend this thesis for final approval and acceptance.

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Letter of Approval

This thesis, entitled **"Community-Based Flood Management (A Case Study of Tharu Community in the riverbank area of ward 19, Dhangadhi Sub-Metropolitan City),"** submitted by Ms. Anjali Limbu Lawati, has been evaluated and accepted by the following evaluation committee as a precondition for partial fulfilment of the requirement for the degree of M.Phil. in Sociology.

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DECLARATION

I hereby declare that the thesis entitled **"Community-Based Flood Management (A Case Study of Tharu Community in the riverbank area of ward 19, Dhangadhi Sub-Metropolitan City),"** submitted by me to Central Department of Sociology, Tribhuvan University, is entirely an original piece of work. This research has been conducted under the guidance and supervision of Mr. Tika Ram Gautam. Proper acknowledgements have been made for all ideas and information sourced from various references during the composition of this thesis. The results presented in this study have not been submitted and presented anywhere else for the award of any degree or other reason.

Anjali Limbu Lawati

2025

ACKNOWLEDGEMENTS

I express my deepest gratitude to my supervisor, Dr Tika Ram Gautam, for providing consistent support and guidance during my research. I also extend my sincerest thanks to Prof. Chaitanya Mishra, Dr Guman Singh Khatri, and Dr Bishnu Basyal, who were among the first to engage in my research ideas.

I also thank Dr Pramod Bhatta and Dr Youba Raj Luintel (former Head of Department) for their early evaluation of my research proposal and their feedback. I also thank my externals Dr Pasang Shrepa (Head of Department) and Dr Guman Singh Khatri for their later constructive criticism without which this thesis would not have been complete.

I thank my respondents and volunteers during my field visit and data collection process. And finally, I thank everyone who cheered for me.

Anjali Limbu Lawati

2025

ABSTRACT

This study investigates community flood disaster management within the Tharu riverbank community of Kheda Tole, Ward 19, Dhangadhi Sub-Metropolitan City, Nepal. As one of the most flood-prone areas along the Mohana River, this community practices indigenous knowledge systems deeply rooted in its social, ecological, and agricultural practices for flood preparedness. The research draws on a qualitative case study approach, using in-depth interviews with residents to explore how the Tharu people understand and respond to recurring flood disasters. Framed through the social constructionist lens, the study examines how lived experiences and collective memory inform community-based strategies of resilience. The research site is also part of an external disaster risk reduction (DRR) intervention program. This intersection makes it an ideal location to observe how traditional knowledge is adapted, preserved, or challenged by modern institutional practices. The findings show that the community has enhanced its flood preparedness by integrating traditional and externally introduced knowledge. Similarly, *Bhalmansa* (Tharu indigenous social leader) and changemakers for DRR have adapted an advocacy role for the benefit of their community. The *Samudayik Kosh* (Community Savings) plays a key role in post-disaster recovery. While the community has effectively protected residential areas, efforts to safeguard agricultural land remain inconsistent and divided. This research contributes to broader understandings of community-based flood management and highlights the importance of recognizing indigenous knowledge systems in shaping equitable and effective DRR strategies.

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ABBREVIATIONS

CBFM	Community-based Flood Management
BRC	British Red Cross
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management
GBP	Great Britian Pound
GESI	Gender Equality and Social Inclusion
IDNDR	International Decade for Natural Disaster Reduction
IFRC	International Federation of Red Cross and Red Crescent Societies
INGOs	International Non-governmental Organizations
NAP	National Action Plan
NDC	Nationally Determined Contribution
NDRRMA	National Disaster Risk Reduction and Management Authority
NGOs	Non-government Organizations
NRCS	Nepal Red Cross Society
SURE	Strengthening Urban Resilience & Engagement

CHAPTER ONE

INTRODUCTION

This chapter introduces the research study outlining the background of the study, statement of the problem and research objectives. It also records the significance of the study. Finally, the organization of the study is outlined, providing a roadmap for the subsequent chapters.

1.1 Background of the Study

Disasters impact human society and its developmental efforts. They disrupt the social order and cause physical destruction and death, necessitating people to adjust by deviating "from the pattern of norm expectations" (Killian, 1954, p. 67). After the disaster, the scale of disruption shows a society's lack of preparedness and vulnerability which further hinders recovery.

Nepal is among the countries most vulnerable to natural disasters worldwide. Nepal is ranked 30th for flood hazards and 20th for disaster susceptibility globally (Khanal, 2020). Flood ranks as one of Nepal's top-highest disasters annually. IFRC, in terms of floods, states as a condition where water spills from a stream, river, or other body of water's natural borders or collects in a typically dry location (IFRC, n.d.-a).

In Nepal, floods are the most frequent natural disasters. One of the main reasons for floods in Nepal is the monsoon season and its steep topography (Acharya, 2023; Pokharel, 2007; Pandey, 2019). Communities in the Terai region are especially affected. It affects riverbank communities who depend on agriculture for their livelihood as they rely heavily on agriculture and natural resources to support themselves.

Nepal has a history of big floods resulting in immense human and economic losses. Acharya (2023) says 80% of Nepalese are vulnerable to natural disasters including floods. Nepal has over 6,000 rivers and streams flowing from north to south. Historical data shows significant floods in *Tinau* Basin (1978), *Tadi* River Basin (1985), *Sunkoshi* basin (1987) and a cloud burst in *Kulekhani* (1993) which killed 1,336 people.

From 1971 to 2021 A.D., the flood caused 5,225 deaths and 712 injured and affected 4,517,369 families. It has also incurred an economic loss of NPR 16,254,152,588 with total damages to 1,06,878 private houses and partial damage to 144,500 private houses (Acharya, 2023). In Nepal from 2006 to 2021 various policies were made to address disasters. But the number of people affected, and total deaths have increased compared to 1990-2005. The total affected people have increased by 365% and total deaths by 187%. Similarly, the damage caused by these disasters from 1990 to 2021 is 21.16% of the country's GDP (Khatiwada, 2022).

From 2000 to 2009 A.D., in Kailali, a flood affected a total of 5528 families, caused 24 deaths and 202 animal losses (K.C., 2013). Furthermore, the research study by Kumal (2021) in Kailari Rural Municipality provides ample data on the consequences of floods, including physical infrastructure damage, loss of livestock, food storage, crop spoilage, and resident relocation. A significant finding is that 75% of respondents were farmers before and after the flood, but only 65% continued farming. Additionally, 10% of the respondents became completely landless and pursued other occupations due to the loss of cultivated land (Kumal, 2021).

The United Nations' creation of the International Decade for Natural Disaster Reduction (IDNDR) is the beginning of the history of disaster preparedness worldwide. This decade and program were significant in encouraging world nations to protect their communities from natural catastrophes. Through the introduction of the Disaster Risk Reduction and Management Act 2017, the Nepal government has also put the Disaster Risk Management idea into practice. The significance of incorporating local knowledge into disaster risk reduction (DRR) has become more widely acknowledged on a national and international level because of rising flood frequency and climate variability.

In Nepal, Tharu community, an indigenous group native to the southern plains mostly settled in the flood prone plains of Terai region, has developed intricate knowledge systems and communal practices for flood management. Tharu people's flood management strategies are deeply rooted in their socio-cultural and ecological understanding of their environment and have lived along riverbanks and developed local knowledge systems to cope with seasonal flooding (Chaudhary Tharu, 2021).

However, in favor of top-down, technocratic methods, mainstream disaster management frameworks in Nepal have frequently undervalued the importance of indigenous knowledge. Academic and policy-level knowledge of how indigenous people, such as the Tharu, use their own ways to manage disasters is still severely lacking. Ward 14 of Dhangadhi Sub-metropolitan City, a flood-prone riverbank area, presents a unique case where indigenous/community knowledge and external interventions co-exist, making it a relevant site for studying community-based flood management. This study seeks to situate Tharu's community-based flood management practices within broader discourses on

resilience, sustainability, and knowledge hybridity, contributing to more inclusive and effective DRR strategies.

1.2 Statement of the Problem

One major and frequent disaster risk in Nepal, especially in the Terai region, is flooding. Understanding how local communities use their traditional and local knowledge to cope with flood disasters is the main goal of this study. Formal disaster risk management (DRM) strategies frequently ignore the indigenous flood management techniques used for generations by the Tharu community, an indigenous group native to the southern plains of Nepal. Top-down approaches with technology solutions are given priority in external interventions, such as disaster relief programs run by governmental or non-governmental organizations.

The research currently accessible on flood disaster management puts small light on the importance of indigenous knowledge in flood management. These traditional flood management strategies, which have been shown to be successful in minimizing flood damage, deserve further attention. There is also limited research on how these local strategies work alongside modern solutions and whether these interventions complement or disrupt local practices. A thorough investigation into the community's capacity to successfully manage flood hazards and the combination of traditional flood management techniques with contemporary disaster solutions is required. This study aims to give a more comprehensive understanding of flood disaster management in the Tharu community by analyzing the relationship between traditional knowledge and outside interventions. It also

helps to develop more inclusive and culturally appropriate flood disaster risk management strategies.

This study broadly raises a research question: What are the local flood management practices of Tharu riverbank community and how have they adapted with the external interventions to strengthen their resilience to recurrent flooding?

This research question can be further developed as follows:

1. What traditional knowledge and practices are used by the Tharu riverbank community for managing flood disasters?

2. What types of external interventions have been introduced in the Tharu riverbank community?

3. How have these external interventions influenced the Tharu riverbank community's local flood management practices and their ability to cope with recurring floods?

1.3 Objectives of the Study

The main objective of the study is to explore the Tharu riverbank community's traditional knowledge on flood disaster management and to analyze the impact of external interventions on their local practices of flood management and resilience.

1. To explore the traditional knowledge and local practices used by the Tharu riverbank community for managing flood disasters.

2. To identify and describe the types of external interventions introduced in the Tharu riverbank community for flood management.

3. To evaluate how these external interventions have influenced the Tharu riverbank community's traditional practices and their capacity to cope with recurring floods.

1.4 Significance of Study

As Nepal faces frequent flooding, it is critical to understand and appreciate local knowledge on community-based flood management that has helped minimize flood vulnerability in seasonal flooding for so long. This study primarily explores the Tharu community's Indigenous practices for flood management whilst continued external interventions' influence. By investigating the Tharu community's social learning and adaptive flood management strategies with modern technologies, this research highlights the need for more inclusive disaster management policies that recognize and value local knowledge systems towards a sustainable route to flood disaster management and resilience.

1.5 Organization of the Study

The research study was organized into six chapters. The first chapter introduced the research background, statement of the problem and significance of the study. The second chapter reviewed the literature, which included a research gap and conceptual framework of the study. The third chapter discussed the research methodology, including the justification for site selection, and research design. The fourth and fifth chapters presented key findings and analysis based on the research questions. The sixth chapter summarized the findings and provided conclusions for the study.

CHAPTER II

LITERATURE REVIEW

This chapter begins with a theoretical review followed with policy and developmental practices on disaster and flooding. It delves on community-based flood management and indigenous practices in Nepal further specifying Tharu community's indigenous knowledge on flood management. Finally, the chapter ends with a research gap and conceptual framework for the study.

2.1 Sociological Understanding of Disaster and Flooding

Disasters can be broadly classified into natural and man-made (Holtermann et al., 2007) and furthermore into four theoretical approaches: 'acts of God,' 'acts of nature,' 'joint effects of nature and society,' and 'social constructions' (Costine, 2015; Praddhan, 2016). The social constructionist theory posits that disasters are not merely physical events but fundamentally shaped by social, economic, and political structures (Perry, 2018).

From sociological lens, disasters are embedded within social systems, and their impact depends heavily on the vulnerability of those systems. "Disaster occurs only when these manmade structures collapse" (Silwal, 2017, 53). They are 'extreme occurrences' (Wallace, 1956) that disrupt the social order, often causing death and destruction, and require individuals to deviate from regular norms and adopt new behaviors (Killian, 1954; Moore, 1958). A disaster is a severe interruption of the functioning of the community following widespread human, material, economic, or environmental losses (McEntire, 2015; Bates & Peacock, 1993; Ait-Chellouche, 2015). Quarantelli (2000, 2005) highlights key features of disaster: sudden onset, disruption of collective routines, irrational coping

mechanisms, unexpected social impacts, and threats to socially valued resources-emphasizing that disasters reveal 'weakness in societal systems.'

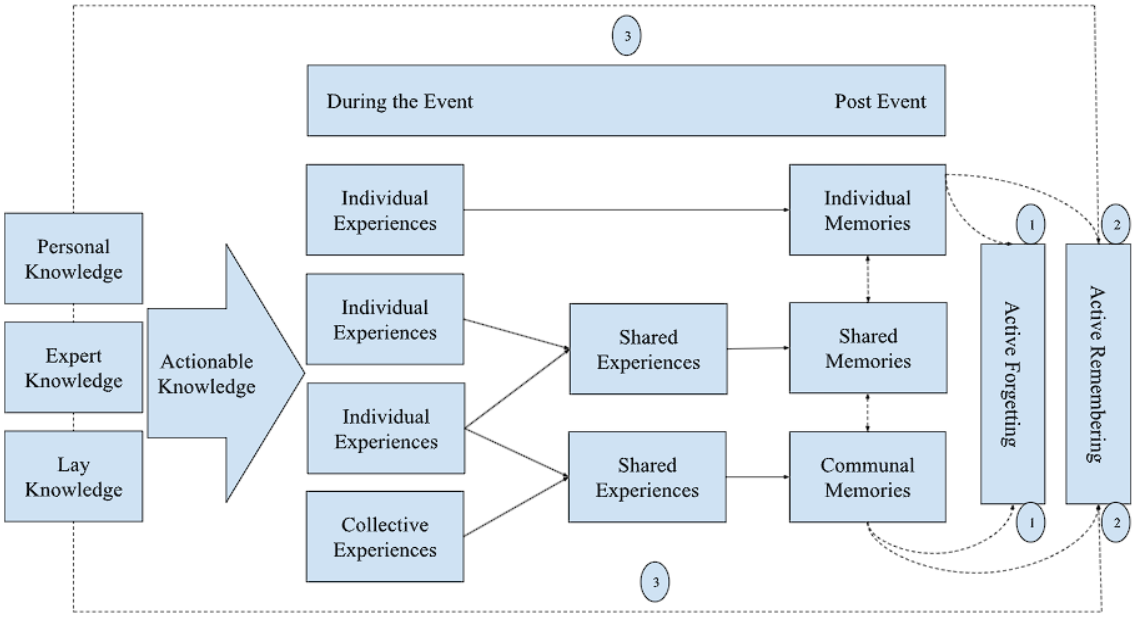
Stallings (2002) looks at disaster studies through a Weberian sociological lens by not just looking at advocacy but also how social actions, power and institutions impact disaster response. These social factors include class dynamics, authority, political structures and recovery patterns. Zakour and Gillespie (2013) say that resilience, a community's ability to recover (Aguirre, 2006) must be understood with vulnerability, both of which are shaped by the sociocultural and political environment. Assemblage Theory (AT) offers another perspective by seeing disasters not just as social constructions or natural occurrences but as outcomes of complex interrelated human and non-human factors (McGrowran & Donovan, 2021).

For flood disasters, the intersection of these theories becomes even more relevant. Flooding is a physical phenomenon, but its social impact depends on many factors. Who is exposed to floods and their access to resources can affect them differently. That is why sociological theories help us understand why riverbank settlements are disproportionately affected by flood disasters. Flood disasters are the convergence of environmental risk and social vulnerability.

The social constructionist theory says disasters are not just natural occurrences. The theory says human perceptions, institutions and social structures shape disasters. This theory highlights risk, vulnerability and response as socially produced (Bankoff, 2001; Wisner et al., 2004). Tierney (2007) says disasters become meaningful through how they are interpreted, managed and acted upon. Rooted in interpretive sociology, this theory

emphasizes the role of knowledge systems, cultural beliefs, historical experience and power dynamics in how communities understand and respond to hazards (Oliver-Smith, 1996).

Figure 1: Towards 'sustainable flood memory': pathways of active remembering and forgetting in relation to knowledge



Source: McEwen et al. (2017)

Similarly, the concept of social learning theory could be applied to social resilience against flood disaster. Social learning brings people together to contribute with mutual trust and respect, and results in a behavior change brought on by a developed grasp of pertinent concerns. The notion is that social learning permits the vertical flow of knowledge from individuals who initiate talks about learning to the community actors below is shared by organizations that promote learning to foster resilience (Barquet et al., 2016). The concept of "sustainable flood memory" has been utilized to explore on flood memories to enhance community resilience and adaptive capacities for dealing with future flood risks. McEwen

et al. (2017) emphasize the significance of developing and sharing lay knowledge to create social learning opportunities within communities. There is a need for appropriate interventions by informal educators with proper communication channels to reinforce accessible education on disaster and community resilience (Feng et al, 2018).

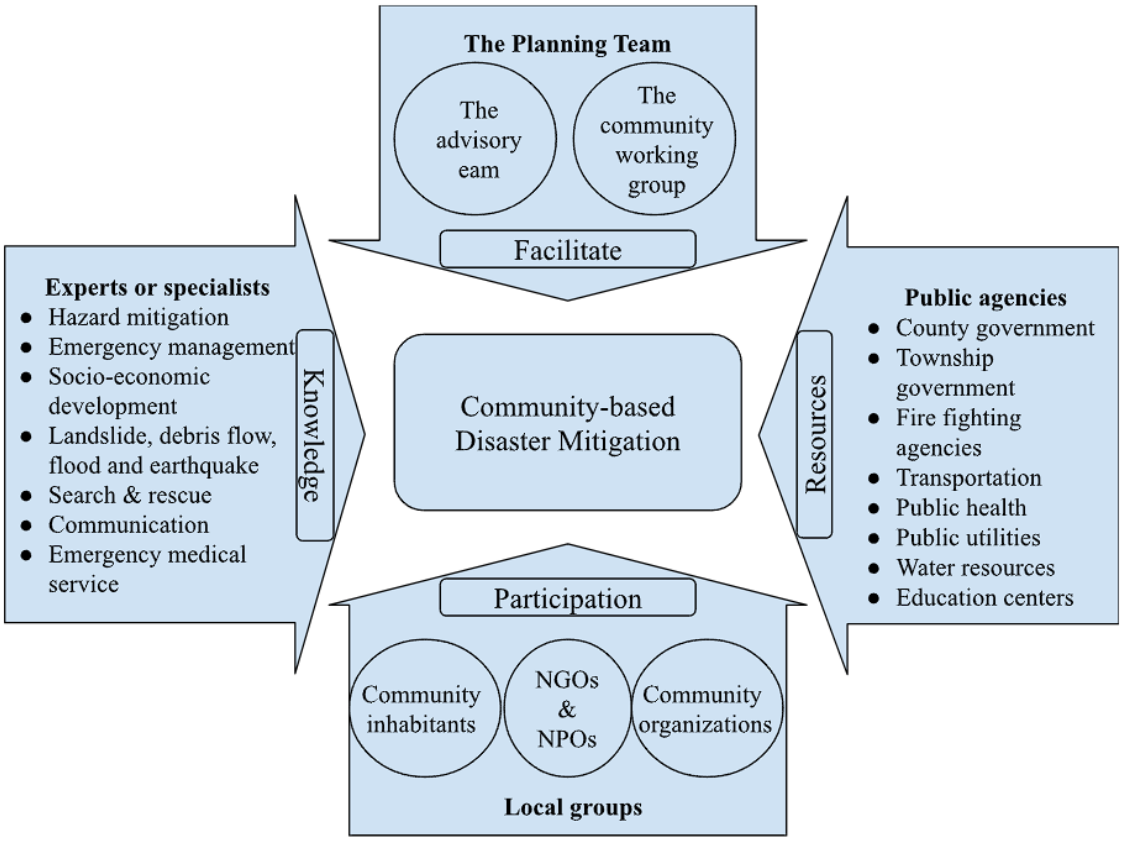
2.2 Global Disaster Management: Policy and Frameworks

Globally, the understanding of disaster and its management evolved significantly. With the United Nations playing a pivotal role in framing global strategies there have been many major world conferences on disaster risk reduction (DDR). The three major world conferences in Japan-Yokohama (1994), Hyogo (2005), and Sendai (2015) have set DDR on a broader context of sustainable development. The Hyogo Framework for Action introduced comprehensive disaster risk strategies. Sendai Framework (2015) further addresses underlying risk drivers and serves as a guiding tool for integrating disaster preparedness with climate risk management and development planning (UNDRR, n.d.).

Similarly, the Chen's model helps integrate communities into all aspects of disasters. The ICBDM project is a model for how a community-based disaster management program will function prior to, during and after a disaster (Patterson et al., 2010). The IOSP paradigm aims to capture the many social network dimensions for investigation, analysis, and comprehension levels (Varda et al., 2009). Cutter (2014) writes that communities need a resilience tool to assess needs and goals, monitor progress, evaluate costs and benefits, and analyze different policies. The risk presented by natural hazards can be decreased by disaster risk reduction and adaptation. Both are focused on lowering vulnerability, keeping an eye on dangers, and raising the capacity of society to minimize and manage hazards.

Recent discussions on resilience also stress financial risk management. Chen et al. (2018) argue that transferring financial risks to the private sector, especially through insurance and reinsurance can reduce the fiscal burden on governments and communities' post-disaster. In regions like Southeast Asia, where insurance markets are underdeveloped, enhancing financial preparedness becomes critical.

Figure 2: ICBDM Framework (Chen's Model)



Source: Patterson et al., 2010

Resilience in DRM involves a system's ability to adapt, self-organize, and absorb shocks while maintaining core functions (Barquet et al., 2016). It encompasses more than physical recovery, it includes social learning, innovation, and institutional memory. Community

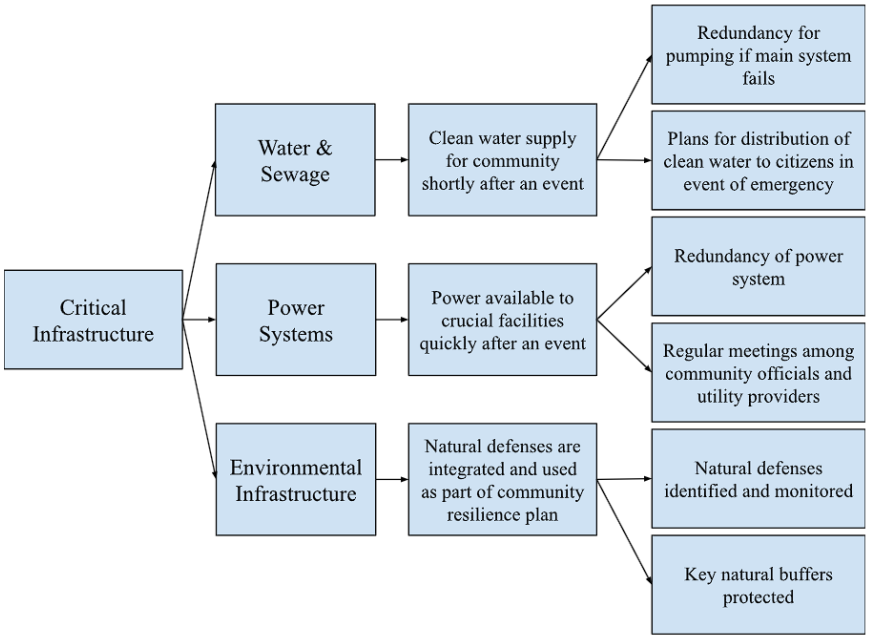
resilience, therefore, thrives in environments where there is inclusion, access to resources, collaborative decision-making, and strong governance structures.

DRR is a collection of methods that can be implemented rather than a specific course of action, adaptation is viewed as a perspective shift that directs action. DRR can, therefore, be a part of adaptation to the extent that adaptation necessitates tackling the hazards of climate-related disasters (Davis & Vulturius, 2014). Any attempt to enhance DRR should be based on a thorough comprehension and respect of this interplay, as well as, more importantly, culture's significance in how people prepare for, experience, respond to, and recover from catastrophes (Barquet et al.,2016).

Asthana (2014) states that the conventional disaster management approach is more effective in mitigating and managing disaster risks than further developing complex methods. Nonetheless, the author argues for the integration of disaster risk reduction into development planning seems essential. A holistic approach with proper hazard mitigation, vulnerability, and preparedness is required to build resilience at the community level. This intervention approach also addresses underlying structural issues such as poverty and inequality in regards of risk reduction. There is a need for political will and institutional support to ensure effective disaster risk management. By guaranteeing that emergency services, coordination, and communication continue in the event of a crisis, organizational interventions promote community resilience. This calls for high situational awareness of other stakeholders and resources, vulnerability management, and adaptive capability maintenance (Barquet et al., 2016). Furthermore, there are many other aspects of resilience, including institutional, social, economic, environmental, habitat, and infrastructure variables. Essential components that impact a community's capacity to respond to and

recover from disasters are captured by each dimension, including social capital, economic resources, environmental sustainability, housing and planning, public services, and governance trust (Rodriguez et al., 2022).

Figure 3: An example of components, objectives, and measures identified using the critical infrastructure target category

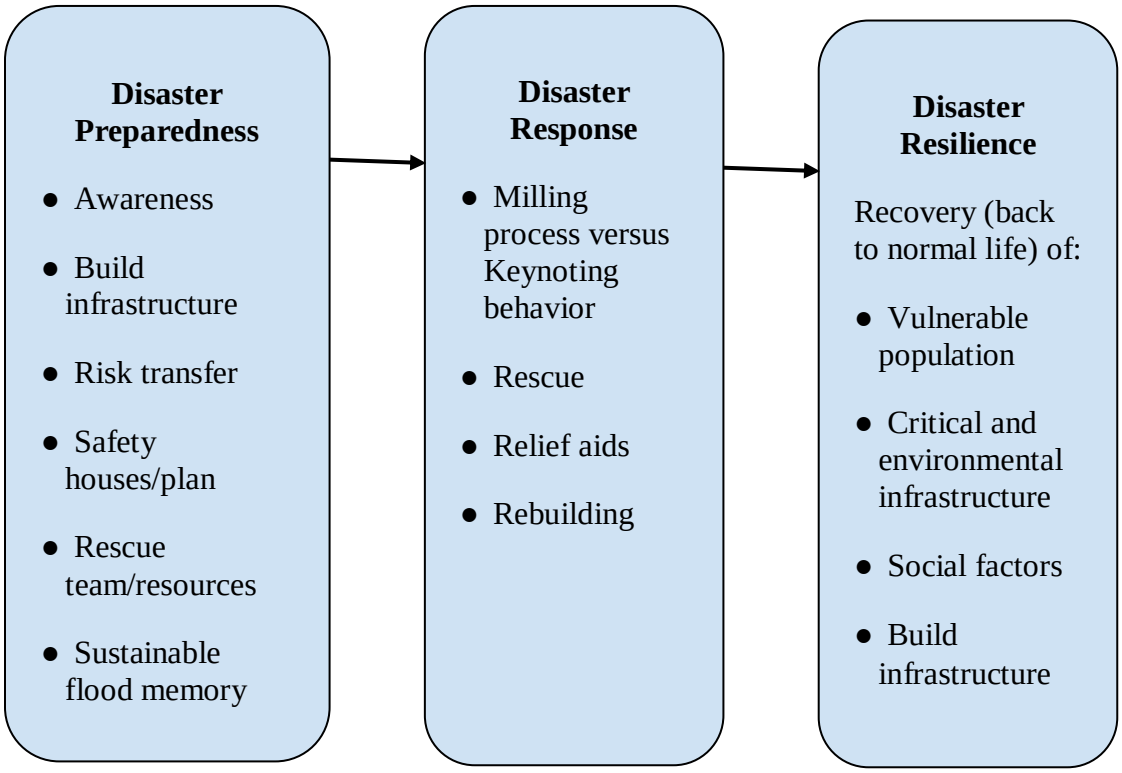


Source: Cutter, 2014; National Research Council (2015)

Sutton (2006) writes that dimensions of disaster preparedness consist of several aims and readiness to accomplish it. The three main components of disaster preparedness are reaction capability, vulnerability reduction, and mitigation. Despite disasters are natural occurrences, human activities including urbanization, land use, and environmental degradation are to blame for their hazards (Wahlstrom, 2009). Therefore, lowering the risk of disasters must be the duty of all parties, including governments, international organizations, non-governmental organizations, the corporate sector, and people. The

indigenous knowledge for disaster management has been advocated to be included in the policy level (Lambert and Scott ,2019; Maly et al., 2024) that potentially provide a conflict between knowledge systems (Ruheza and Khamis, 2012) but beneficial to the conservation of biodiversity. However, global disaster management proposes that stakeholders must overcome their propensity to learn about one tragedy at a time and concentrate more on the origins of all disasters and environmental issues. Additionally, they need to situate catastrophe research within broader theoretical models, particularly those that deal with risk, organizations, institutions, and connections between society and the environment (Tierney, 2007).

Figure 4: Disaster Risk Reduction Framework



Source: Prepared by the researcher herself 2023

The concept of disaster risk reduction showcases preparedness, response and resilience as a three-tier system. From the theoretical knowledge gained through the literatures of Chen et al. (2018), Patterson et al. (2010), McEwen et al. (2017), Schneider (1992), National Research Council (2015), and Rodriquez et al. (2022), the researcher has prepared a framework of disaster risk reduction.

Nepal's DRM trajectory follows these global frameworks. The Disaster Risk Reduction and Management Act of 2017 has made disaster preparedness a government wide agenda. It emphasizes bottom-up approaches, using local communities, civil society and advocacy groups to build resilience. The Act has created formal structures like National Disaster Risk Reduction and Management Authority (NDRRMA) and mandated disaster risk committees at municipal, provincial and district levels (Khanal, 2020). The Local Government Operation Act (2017) has empowered municipalities to formulate and implement DRR policies, especially on building code compliance and inclusive planning. Recent national strategies including DRR Policy (2018), Second NDC-2020, NAP (2021-2050), and GESI in Climate Change (2077-2087 BS) have shown Nepal's commitment to mainstreaming resilience in development (Khatiwada, 2022).

2.3 Global Flood Management: Developmental Practices

Global flood management frameworks, which aim to lessen the human and economic impacts of floods, place an emphasis on preparedness, response and recovery at the international and regional levels. Flood control infrastructure, early warning systems, and flood forecasts are some of the tactics included in these frameworks (IPCC, 2012). To control risks, policies in wealthy nations frequently concentrate on technological solutions

such as floodplain zoning and dam development (UNISDR, 2015). Organizations are placed for interaction where learning may be limited and improved (Sutton, 2006).

Flood risk prevention, flood defense, flood risk mitigation, flood preparation and response, and flood recovery are the five categories of flood risk management strategies (Hegger et al., 2014; Hegger et al., 2016). Flood warning systems, disaster management and evacuation plans, and flood management when it happens are all examples of flood preparation and reaction that is measured during a flood occurrence. Similarly, after a flood, recovery includes reconstruction and rebuilding plans. The recovery process also highlights public compensation or private insurance systems (Driessen et al., 2016).

Even the design of "landscapes are shaped by human actions and the structural inequalities of race, identity, gender, and class" (Spears, 2021, p. 360). Structural mitigation can also bring a false sense of safety and understanding, resulting in people's dense and proximal livelihood in hazard/risk zones to natural disasters. Even with an effective early warning system and successful evacuation, disasters leave huge structural, economic, and psychological damage that will take years to rebuild (Tubbesing et al., 1990).

Similarly, Liao (2012) writes that river cities should be based on resilience rather than a resistance approach. Engineering resilience comprises both resistance to floods and faster recovery, focusing on stability, and ecological resilience comprises the ability to survive, regardless of the state. The three capacities of resilience in application to floods are (1) capacity to resist (an increased threshold that flood can cause harm), (2) capacity to absorb and recover (ability to respond, recover, and remain functioning during the flood), and (3)

capacity to transform and adapt (adjust to external drivers and to moderate potential damages) (Driessen et al., 2016).

Research also shows a reciprocal relationship between disaster and corruption. Meanwhile corruption causes disaster with greed and faults in law, policies and its implementation. Similarly, in disaster, it leads to a fertile ground for corruption where victims' identification, fund allocation and proper distribution are hampered (Ghimire, 2017). Furthermore, powerful agencies such as political actors and fraternal organizations are important for a timely distribution of rescue and aids. Furthermore, internal conflicts within political parties, local government or communities hamper positive impression from international and donor community reducing bargaining power making the vulnerable population wait on relief and response works (Pandey, 2017). Urban areas are closer to institutions, political power and donor agencies and means to mobilize quickly in terms of disaster response making rural areas more vulnerable on disaster aftermath (Sharma, 2017).

In the context of Nepal, with a rise of urbanization, Lamichhane (2021) examines the social causes of urban flooding in Bhaktapur in 2018. The primary reported social causes of urban flooding are the increase in population, haphazard settlements affecting the riverbank, rural-to-urban migration, transformation of agricultural land, shift in choice of farming, and lack of waste management which goes against the flood risk management strategies. The study warns of upcoming urban floods if these social factors are ignored due to rapid and unstructured urbanization in Nepal.

2.4 Community-based Flood Management

Indigenous knowledge, traditional knowledge and community-based knowledge are used interchangeably. However, they have distinct approaches in terms of use and understanding. Indigenous knowledge originates with indigenous societies interaction with their social and natural environments. It is cumulative, dynamic, and transmitted through generations. The larger corpus of information, skills, and customs that are created, maintained, and transmitted throughout time within communities is known as traditional knowledge. It encompasses ecological knowledge, agricultural methods, customs, and beliefs that may or may not be indigenous (Chaudhary, 2021; Starosta, 2024).

Furthermore, Community-Based Flood Management (CBFM) is a participatory flood risk management approach where local communities are most proactive to save their community from flood risk. CBFM integrates both local knowledge and external institutional support, and sustainable practices to enhance resilience, reduce vulnerabilities, and improve adaptive capacity (Chaudhary, 2021). CBFM means a localized, participatory approach to managing flood risks that focuses on the knowledge, priorities and capacities of the communities who are most affected by flooding. Even in times of disaster, people prioritize their own communities and local networks before they ask formal agencies for help. In rural areas, the mutual trust and cooperation is entrenched in their social structure making them prioritize help from within before going to formal agencies as their last resort (Sharma, 2017).

The notion that social learning permits the vertical flow of knowledge from individuals who initiate talks about learning to the community actors below is shared by organizations

that promote learning to foster resilience (Barquet et al., 2016). Emphasizing the same point of 'learning,' Barquet et al. states that effective communication of personalized information is essential when disseminating knowledge and information for catastrophe risk reduction and resilience-building. It takes enough motivation and rewards to start the desired behavioral change in a group or civilization. Learning that capitalizes on people's innate drive for self-reflection, learning, and flexibility may foster more self-efficacy, which can aid in disaster recovery, as opposed to being driven by the desire to close a knowledge gap.

Wahlstrom (2009) suggests cooperation among all actors to achieve an effective DRR. This includes incorporation in development planning and policies and relaying vital information to vulnerable communities. Ultimately, reducing disaster risk is a shared responsibility that requires a collaborative and multi-sectoral approach. However, community practices of their indigenous knowledge, traditions and customs builds up for a lot of negotiations for any localized and hybrid approach of traditional and scientific knowledge on the grassroot level (Starosta, 2024).

Thomas et al. (2015) show that individuals with stronger disaster knowledge are significantly more likely to engage in preparedness activities like assembling emergency kits or writing household plans. Communities of practice also serve as informal but vital platforms for knowledge sharing and collaborative disaster planning (Barquet et al., 2016). However, Holtermann et al. (2007) note that both political leaders and communities often display apathy toward preparedness, especially in areas repeatedly affected by disasters, leading to fatalistic attitudes. Human perception of flood hazard/risk is overly complex,

resulting in people putting up with the inconvenience of flooding rather than any actions or reactions (Goulter & Myska, 1987).

Studying disasters is “an important way to understand the process of evolution of responses” (Upreti, 2008, p. 27). Empirical studies underscore the role of knowledge and perception in preparedness within the community. Effective disaster response goes beyond planning; it demands regular training and public trust. Heide (1989) warns against the "paper plan syndrome," where disaster plans exist without corresponding practice or community engagement. Misconceptions about community panic—termed "disaster syndrome"—can also lead to flawed assumptions in response strategies.

Lastly, community engagement remains central. According to Mercer et al. (2008) and Raška and Brázdil (2015), participatory techniques highlight trust, historical memory, and knowledge co-production as the cornerstones of successful flood risk management. In addition to encouraging ownership, communities in planning and decision-making guarantees that interventions are based on local reality.

According to Howard (2022) and Barquet et al. (2016), community resilience is a society's capacity to adjust, withstand, and continue to perform key functions in the face of adversity. This entails drawing lessons from the past, diversifying sources of income, and cultivating robust institutions that encourage cooperation and readiness. A community's ability to avoid long-term social disturbance during crises is increased by institutions that are knowledgeable, proactive, and responsive.

CBFM places more emphasis on local ownership, involvement, and integration of traditional knowledge with institutional and scientific assistance than it does on top-down

initiatives (such massive infrastructure). With a focus on enabling communities to control and lessen the effects of floods, it is based on local knowledge and customs. Indigenous knowledge systems have developed over ages and provide sustainable solutions to environmental problems, especially in places that are prone to flooding.

In case studies from communities in South Africa, Pakistan, and Indonesia, Mercer et al. (2008) examined the application of participatory research in disaster risk reduction (DRR) and how it was utilized to create local disaster preparedness and response plans. The authors contend that fostering sustainable change and enhancing local capacity are two benefits of participatory research. Nonetheless, it necessitates thorough preparation, sustained dedication, and regard for regional expertise and customs. They also emphasize the importance of reflexivity in participatory research, which considers the positionality and impact of the researcher on the study. The authors draw the conclusion that participatory research can promote fairer and more successful DRR policies and practices by bridging the gap between local populations and policymakers.

To help communities recover more successfully, community-level research (Patterson et al., 2010) stresses the value of social cohesiveness, trust, and leadership. Coordination among stakeholders is critical. Davis and Vulturius (2014) highlight that poor coordination, differing priorities, and unclear responsibilities often hamper effective DRR. Schneider (1992) distinguishes between bureaucratic and emergent norms in post-disaster scenarios, noting that rigid institutional responses often fail when unexpected conditions arise. Moreover, social networks that emerge post-disasters are often temporary and ad hoc, requiring flexible and adaptive responses (Varda et al., 2009).

CBFM is essential as, Raška and Brázdil (2015) discuss, the relevance of participatory approaches to risk reduction in the context of historical flash floods. The case study of Czech Republic's transition to a market economy and a democratic political system has facilitated greater community involvement in flood management with a strong tradition of communal cooperation and high trust among residents. In these cases, community members could work together effectively to reduce flood risk by sharing knowledge and resources and developing local flood management plans. The writers also stress how crucial historical understanding is in influencing how communities react to floods. They contend that recollections of previous floods can impact how communities anticipate and react to upcoming occurrences and thus contribute to the gradual development of resilience.

2.5 Indigenous Knowledge and Nepal on Flood Management

Yet, disaster vulnerability in Nepal is not merely ecological—it is social and historical (Pokhrel, 2020). Hilhorst et al. (2015) write that indigenous people are adaptable and context dependent to the environmental changes. Furthermore, they view disasters not as an abnormal event but as a part of their lived experience thus building generational knowledge of coping strategies and even practicing hybrid solutions that are both culturally relevant and effective in reducing disaster vulnerability. There are also many saying within the local community such as the "snake and river don't run straight," (Dekens, 2007, vi) and "living near enemies and building houses near rivers are never wise" (Dekens, 2007, 62) which shows indigenous and traditional knowledge passed down generation for risk management (Baumgartner, 2016).

However, a case study in various disaster-prone areas of Nepal have shown that over 30% had basic knowledge of disaster-related facts, however many lacked comprehensive understanding of risks and appropriate response measures. Despite them residing in disaster-prone areas, over 75% of respondents were unaware of major past disasters within their communities (Tuladhar et al, 2015). Addition to that, the disaster database (DDR Portal) records show that floods between 1971 and 2021 have caused over 5,000 deaths and displaced millions (Acharya, 2023). The disproportionate impacts on specific caste and ethnic groups, as documented by Dekens (2008), highlight how the caste system and gender roles exacerbate vulnerability. Land ownership, migration, and patriarchal structures all shape how risk is experienced and managed. Similarly, Kumal (2021) and K.C. (2013) provide empirical evidence from Kailali, where recurring floods have pushed many farmers out of agriculture, reshaping the local economy and demography.

With growing institutional DRR mechanisms in Nepal, Indigenous knowledge remains vital for disaster mitigation and preparedness. It highlights that the traditional wisdom possessed by different communities has a significant functional utility and is frequently passed down through oral tradition (Pokhrel, 2020; MoSTE, 2015). There are four pillars of local knowledge: observation, anticipation, adjustment and communication (Baumgartner, 2016; Dekens, 2007). Nepalese scholars have noted that some indigenous communities have substantial knowledge base regarding disaster mitigation. Communities like Tamang, Lepcha, Gurung and Tharu have utilized local environment and weather patterns, irrigation and drought-resistant crops to mitigate disasters effects (Tuladhar et al., 2015; Thapa et al., 2008; Rai & Khawas, 2019). Sherpas have utilized natural resource from their own vicinity: boulders from the rivers and woods from their forest to make solid

embankment and reinforced with wooden poles to protect the bedding plain (Baumgartner, 2016). The construction of river embankment and boulder dams is a use of human force to put river back into its original bed as an artificial force to not hamper the human dwelling and utilize the natural resources to the maximum.

Local community have utilized traditional landside mitigation strategies such as fencing, improved terrace risers, mixed and intercropping, and agroforestry techniques. To guard against landslides and soil erosion, communities have used agroforestry that entails grass, shrubs and bushes cultivation. Improving terrace risers through terracing and growing grasses helps control topsoil loss and reduce landslide vulnerability. Fencing, including drywall and bio-fencing, protects standing crops from animal damage and prevents soil erosion. Additionally, mixed and inter-cropping increase crop intensity and diversifies harvests, reducing topsoil loss and surface run-off (Thapa et al., 2008; Pokhrel, 2020).

However, the indigenous community also hold superstitious beliefs. Sometimes these beliefs and practices may affect them negatively in front of other people. There were many news articles in 2004 about Tharu community women ploughing naked in their fields in hopes to appease God for timely rainfall (Bhattachan, 2016). So, their indigenous knowledge may be disregarded when in conflict with modern society's norms and values.

The entitle approach used by Acharya (2017) focuses on the social realm of vulnerability. It shows that ownership of resources, opportunities to employment and exchange entitlements are important variables of disaster vulnerability. The poor and socially disadvantaged live in a state of permanent emergency (Maskrey, 1989; Rai, 2017). Ethnic

people face a subordinate and excluded position due to structural inequalities in law and policies, language barrier, religion, norms and values (Rai, 2017).

Another research study in the eastern part of Nepal focusing on the vulnerability of rural communities to natural hazards and their responses to these risks have found that social vulnerabilities were influenced by the Hindu caste system. With high-caste individuals holding landownership and money-lending roles, lower-caste individuals depended on them for survival (Dekens, 2008). The studies emphasized the influence of the Hindu caste system on socioeconomic relationships and the impact of male migration on women's roles in the *Maithili* culture, where floods are a recurring issue in the studied areas, causing considerable damage to agricultural land and domestic property and impacting people's livelihoods. Gender vulnerability was also pronounced, as women worked at home, but with increasing male migration, more women had to work outside their homes. People had to find the least vulnerable spots within alluvial fans for settlement, and rain-fed irrigated lands were crucial for agriculture (Dekens, 2008).

There is a need to preserve and systematize this indigenous knowledge before it disappears, as it could significantly contribute to better and safer living conditions for the people (Thapa et al., 2008). To which, Pandey and Basnet (2022) further discuss the integration of traditional and scientific knowledge systems in managing disasters in the Narayani Basin of Nepal. Their study shows that combining local knowledge, such how indigenous people forecast the weather and manage disaster risks, with scientific approaches could make disaster preparedness better. By combining these many types of knowledge, disaster management plans may be more tailored to the needs of each community, making them better able to deal with the effects of natural catastrophes. Pandey and Basnet (2022) say

that this kind of integration should not only look at the technical side of things, but also the social and cultural components of local knowledge, which are frequently important to the community's everyday existence and activities.

2.5.1 Tharu Community and Indigenous Knowledge on Flood Management

The Tharu indigenous community is unique in their social system as they practice democratic and social hierarchy with leadership roles. *Bhalmansa* or *Barghar* is a social leadership role where one individual is unanimously chosen to be their community leader and plays a key role in social cohesion, learning and change in various aspects of their community life (Chaudhary, 2018; Chaudhary, 2021).

The Tharu community are particularly susceptible to the adverse impacts of flooding due to heightened vulnerability because of their location in flood-prone areas combined with limited access to formal disaster risk management systems (Pangali Sharma et al.,2022). Their deep connection with land and rivers has helped them develop specific flood management strategies. They have developed techniques for flood prediction, early warning, and the use of flood-resistant crops that offer them significant resilience in the face of natural disasters. These practices are passed down through generations and play an essential role in protecting the community from flood impacts (Pangali Sharma et al., 2022).

Further exploration of Tharu's perceptions of climate change have shown that the increasing unpredictability of rainfall patterns and flood frequency is a significant threat to their agricultural livelihoods (Maharjan et al., 2011). In response to these adverse environmental changes, they have adapted through diversifying their farming systems

which include drought-tolerant and flood-resistant crop varieties and utilization of traditional water management techniques (Maharjan et al., 2011). It has shown that Tharu Indigenous group has been proactive with their traditional and newfound scientific knowledge to tackle climate change impacts.

The Tharu community living in the flood-prone Mahakali River area relies on their understanding of river dynamics, seasonal changes and flood forecasts to guide their preparedness and response efforts (Deshar et al., 2021). Altering crop planting schedules, crop varieties, water management or regularly reinforcing embankments in riverbank areas are part of their traditional knowledge adapting to changing climate (Deshar et al., 2021; Chaudhary Tharu, 2021).

The hybrid knowledge systems are emphasized to enhance their resilience to climate change risks. This development in knowledge systems enables them to withstand diverse challenges including floods or droughts while maintaining sustainable agricultural practices (Chaudhary et al., 2022). Some of the hybrid technologies practiced include a mix of relay sowing, zero-tillage, and mixed cropping with hybrid seeds, irrigation and use of chemical fertilizer. While traditional methods are still employed for minor crops like lentils, peas, and mustard, modern practices are increasingly used for staple grains such as rice, maize, and wheat.

2.5.2 SURE Program and Tharu Community of Dhangadhi ward 19 riverbank area

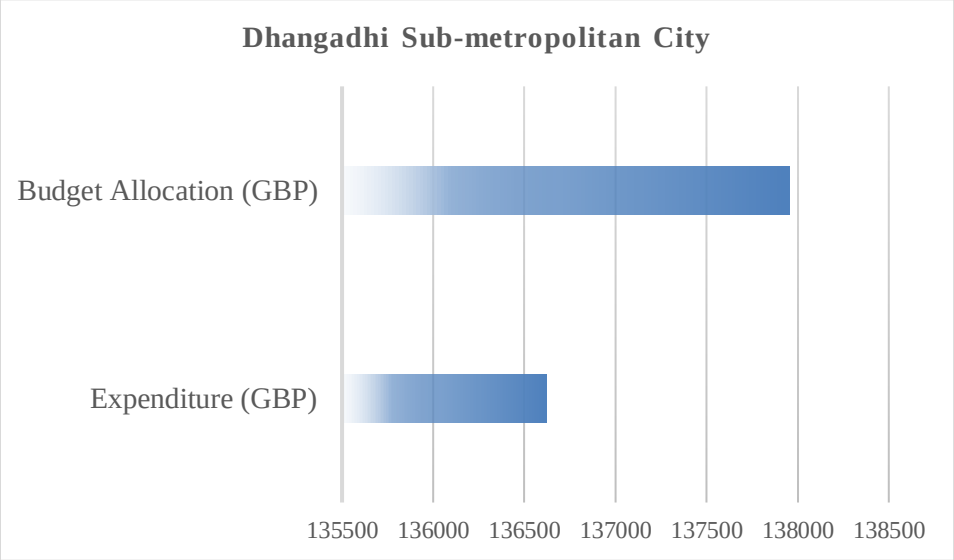
Although indigenous knowledge is appreciated for their traditional and community-based flood management (Khawand, 2025), with the rise in the frequency and intensity of catastrophic flood with climate change and social variability (Hilhorst et al ,2015), external

interventions have become an inevitable part of their social learning and adaptations towards disaster risk reduction. The 5-year project on collaborative Strengthening Urban Resilience & Engagement Program (SURE) program by the British Red Cross and Nepal Red Cross Society in Nepal aimed to strengthen the disaster resilience of local people, including vulnerable groups, by enhancing their awareness, preparedness, and capacity to advocate for disaster risk reduction. This project was also introduced in the Dhangadhi ward 19 where both the ward's general and riverbank community people were exposed to in a collaboration with the local municipal government. The program utilized a champion model, where local people were trained in advocacy and disaster response skills (British Red Cross [BRC] & Nepal Red Cross Society [NRCS], n.d.-a). The champions were empowered to identify and bring up DRR issues with decision-makers and influence local officials to invest in preventative measures. Through the program, marginalized communities, including women and members of excluded castes and minority ethnic groups, were given the tools and resources to become engaged citizens who could advocate for themselves and take advantage of local government services.

According to the municipalities' financial reports, all SURE municipalities have invested in infrastructure-related operations and relevant risk-sensitive components. Spending by municipalities increasingly reflects the value of readiness in DRR and uses the allocated funds. Three out of seven municipalities fully utilize the DRR allocation, with all municipalities spending at least 70% of the allocation. The community champions model has challenged social norms and empowered marginalized groups to become more assertive in identifying and addressing issues with stakeholders. As a result, 55% of beneficiaries felt more confident in raising issues with local authorities, and 57% of

advocacy was addressed through mitigation actions or increased investment in preventative measures (BRC & NRCS, n.d.-b). The program's focus on building human capacity has enhanced the understanding, knowledge, and skillsets of the most vulnerable people and groups for disaster preparedness and response. In addition, the program has supported schools to mainstream DRR, provided economic security initiatives, and facilitated network opportunities for champions and community members with service providers and technical departments of government, wards, and municipalities (BRC & NRCS, n.d.-c).

Figure 5: Budgetary allocation and expenditure of Year 2020/21 in SURE targeted Dhangadhi Sub-metropolitan Municipality



Source: British Red Cross and Nepal Red Cross, n.d.-b.

Barquet et al. (20161) also focuses on the community's social resilience, which is the society's ability to adapt by resisting or modifying to achieve and maintain an acceptable functioning and structure. The extent to which the community can learn from past disasters to protect itself in the future and enhance risk reduction measures is an essential aspect. To

build this capacity, communities must have diverse livelihood options, robust governance systems, and institutions that can encourage group action. Therefore, in the event of a severe natural disaster, communities with institutions that are informed, ready, and responsive are more likely to be able to prevent long-term social calamity (Barquet et al., 2016). An organization must be able to perform critical emergency functions to maintain normalcy in the community during a crisis, prevent excessive damage, promote recovery, and allow the movement of resources and information; managing keystone vulnerabilities, adaptive capability, and situational awareness are the three characteristics of organizational resilience. Situationally aware organizations know the more extensive network of players, the resources available, and their responsibilities, expectations, and constraints concerning other stakeholders (Barquet et al., 2016).

2.6 Research Gap

The mainstream disaster risk reduction strategies for flood management have overemphasized on top-down and technological approaches (UNDRR, n.d.). These policies and frameworks focus on formal and institutional structural management often dismissing local approaches (Patterson et al., 2010; Varda et al., 2009). However, there is limited focus on indigenous communities' contribution on flood management. The specialized research on these groups and community-based flood management have detailed their traditional practices. Indigenous group like Tharu and their generational practices for flood management have been mentioned regarding traditional techniques but not about their ongoing social learning and change in coping strategies in a modernized world (Lambert & Scott, 2019; Maly et al., 2024).

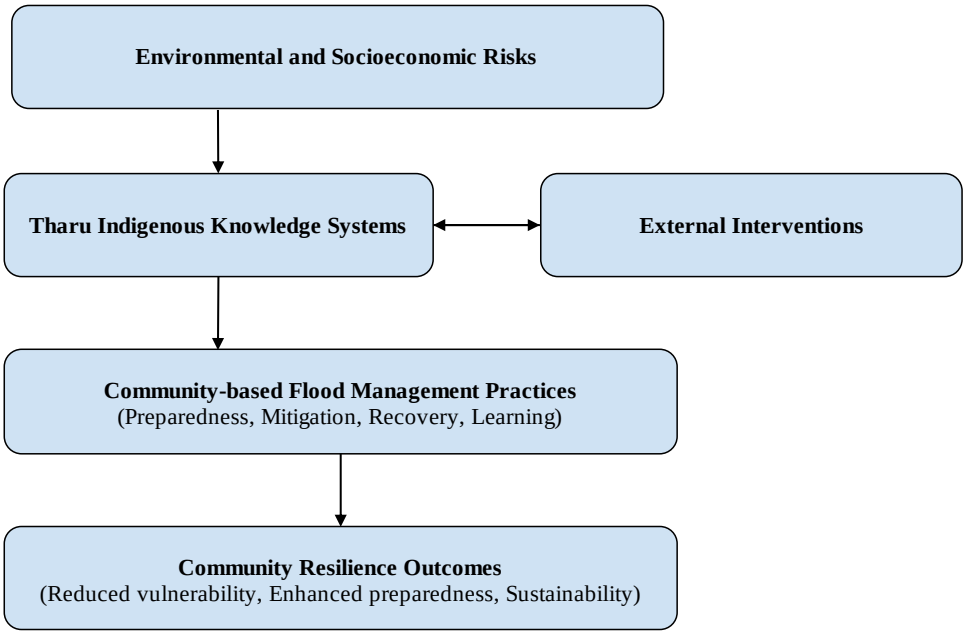
However, their social learning, adaptation to modern change and continued resilience are not deeply studied (Barquet et al., 2016). In terms of climate change and bottom up/ participatory approaches, the research is pushed by the donor agencies giving a glorified image to technological solutions. However, with local communities interacting with external interventions and emphasis on participatory approaches bring forth new social dimensions for growth and resilience that need to be properly studied (Khawand, 2025; Hilhorst, 2015).

With the focus on only the traditional practices (use of resources and technology parts) of traditional knowledge systems (Thapa et al., 2008; Chaudhary et al., 2022) hinders importance of the social learning process and greater adaptability of Indigenous groups (Chaudhary, 2021). Putting focus on these intersections of forced interactions between local knowledge systems and external interventions, and adaptations for resilience towards a hybrid knowledge system will provide a context-specific and sustainable approach to flood disaster risk reduction.

This study focusses on how communities depict their own vulnerability and resilience through their own experience and new learned knowledge. Their change in flood disaster and risk management are to be studied through their own perspective on how they perceive this recurring disaster. The study will explore their social learning style and stand for a safer, sustainable life amidst these external interventions and a long-term perspective on cultural relevance, social cohesion and local leadership.

2.7 Conceptual Framework

Figure 6: Conceptual Framework of the Study



Source: Prepared by the researcher herself, 2025

In any community, floods as a catastrophe come with environmental and socioeconomic risks proving to be disastrous to the most vulnerable population. When a community religiously become victim to a disaster then this community, here Tharu riverbank community, come to practice their generational led down indigenous knowledge of traditions and local practices to mitigate and prevent flood damages. With their indigenous knowledge systems, the external interventions also provide modern technological solutions in a top-down approach. These innovative approaches are either supported or resisted by the Tharu indigenous community. This hybrid approach of new community-based flood management practices showcases the community resilience outcomes through their reduced vulnerability and preparedness in flood risk.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter details the research methodology employed in the study. This chapter explains qualitative research design with study area selection and data collection tools and techniques. Finally, it addresses the study's limitations, focusing on the specific context and constraints of the research.

3.1 The Research Site

The research site is located at *Kheda Tole*, a riverbank community in Dhangadhi Sub-Metropolitan City ward-19, in the Kailali District of the far western region of Nepal. The city is geographically flat and covers an area of 261.75 square kilometers. It is home to diverse indigenous communities, with the *Tharu* ethnic group being the largest (42.7%), followed by the *RanaTharu* (16%) and *Thakuri* (12.5%) communities (Dhangadhi Sub-metropolitan City, n.d.). *Kheda Tole*'s riverbank community is situated on the southern border of the ward 19. The riverbank community consists of 29 Tharu households who have lived in the area from 2040 BS, adapting to the challenges posed by Mohana river. These riverbank areas comprise of fertile agricultural land essential for the livelihoods of the Tharu riverbank community. The Tharu community have used Indigenous knowledge and traditional farming methods to mitigate the hazards associated with flooding. Furthermore, the Tharu riverbank community in *Kheda Tole* is a crucial location to research the role of indigenous knowledge in community-based flood management because of its susceptibility to flooding and a cross-point between traditional knowledge and external interventions for DRR.

Table 1

Socio-demographic Profile of Selected Study Site and overall Nepal

Indicators	Nepal	DSC	DSC ward 19	*Kheda Tole*	*Kheda* Riverbank
Female	14,911,027	100,608	4,328	870	75
Male	14,253,551	98,184	3,838	705	85
Total	29,164,578	198,792	8,166	1,575	190
HH	6,666,937	44,779	1,710	175	29
Area (sq. km)	147,516	262	16.99	-	-

Source: National Statistics Office, 2021; Dhangadhi Sub-metropolitan City, n.d.; Field Visit, 2025

3.2 Justification of the Site Selection

Dhangadhi is surrounded by several rivers. *Mohana, Shivganga, Ghuraha,* and *Gaunkandri* are some of the major rivers surrounding Dhangadhi making it prone to monsoon flooding. In 2021, floods had affected 6,563 houses in Kailali and caused the deaths of 18 people. Furthermore, 22,000 people from 4,861 households in Dhangadhi had been identified as highly vulnerable to flooding (District Disaster Management Committee Kailali, 2078 & District Disaster Management Committee Kailali, 2079).

Ward 19, with its proximity to three major rivers: Mohana, Ghuraha, and Gaunkandri and had experienced frequent flooding making it one of the most flood-prone areas in Dhangadhi. The selection of *Kheda Tole's* riverbank community can be justified by its cultural and environmental significance. There are 29 Tharu Indigenous homes in the riverfront community of *Kheda Tole*. Because they had lived in this flood-prone location

for a long time, the community had established customs for flood resistance that had been handed down through the generations.

The SURE program, which provided disaster risk reduction training to locals, also helped to reinforce the study's objective. The research's relevance was increased by the participation of local champions, who also made sure that traditional knowledge was incorporated with contemporary disaster management techniques.

The viability of conducting in-depth qualitative research was guaranteed by the researcher's previous field experience in Dhangadhi and the relationship they had built with local organizations and community people. The riverbank village in Kheda Tole has provided an excellent environment for investigating the relationship between formal disaster management techniques and indigenous knowledge because of its cultural value, susceptibility to floods, and existence of community-based disaster risk reduction programs.

3.3 Research Design

The plan and approach for examining research topics, with an emphasis on data collecting and analytic techniques that complement the objectives of the study, is referred to as research design (Akhtar, 2016; Kumar, 2011; Ahuja, 2010; Kerlinger, 1986). A qualitative research design has been used for this study, with an emphasis on comprehending community members' subjective experiences with flood disaster preparedness and resilience.

According to the social constructionism theory, social interactions and collective meanings within communities shape knowledge (Berger & Luckmann, 1966). Community members' perceptions of risk and resilience regarding flood risk are shaped by their cultural background and life experiences rather than being intrinsic.

With a focus on adaptation, organization, and mobilization based on social roles and experiences, the interpretive approach will investigate how the riverbank community in Kheda Tole understands and reacts to flood hazards.

An in-depth examination of these experiences is made possible by the qualitative method, which also produces non-numerical data and contextual insights into the ways that community-based practices, Indigenous knowledge, and outside interventions (such training in disaster preparedness) affect flood resilience. Understanding how the community views and reacts to flood threats in a socially created context is the goal of the design, which is in line with the study aims.

3.4 Nature and Sources of Data

This study employs a qualitative methodological approach and draws from both primary and secondary data sources. Primary data, including focus groups, key informant interviews, and in-depth interviews, were gathered through fieldwork. These methods allowed for a deeper understanding of the participants' Indigenous perspectives on flood risk and their degree of preparedness knowledge. The aim is to gain insights into how this traditional knowledge builds their flood resilience and how these practices are either maintained or adapted in response to modern disaster management strategies.

Secondary data will be drawn from journal articles, research studies, published books, and organizational reports related to traditional knowledge systems on flood preparedness and disaster risk management. These sources will provide additional context and theoretical insights, enhancing the understanding of how traditional flood resilience strategies are integrated with contemporary disaster risk reduction efforts.

3.5 Study Area, Population and Sampling

The universe for this study consists of Kheda Tole in Ward 19, Dhangadhi Sub-metropolitan City. The study population includes 29 households located near the Mohana River. From this population, 16 residents (6 females and 10 males), including 8 changemakers, were purposively selected as the study sample. This strategy was used to guarantee that the sample included a wide variety of viewpoints, including representation from both genders and age groups, as well as from individuals who uphold and practice traditional Tharu knowledge systems. The inclusion of the eight changemakers also provided external interventions influence within the Tharu indigenous community and a hybrid knowledge systems acknowledgement. While the study is localized to Kheda Tole, Ward 19, the experiences shared by the participants offer a broader understanding of the Indigenous knowledge base of Tharu riverbank communities, highlighting how traditional knowledge integrates with external interventions in the region's flood management efforts.

3.6 Data Collection Method and Tools/Techniques

3.6.1 Focused Group Discussion

For focus group discussion 8 participants (6 women and 2 men) were selected from the Kheda Tole riverbank community in Ward 19. The formal discussion aimed to understand

the community's collective knowledge related to indigenous flood management practices. It also explored the participants' perspectives on external interventions and their effects on traditional Tharu flood management practices.

3.6.2 Key Informant Interviews

For key informant interviews 4 individuals were selected who have played significant roles in the community. The list included formal local representative of Ward 19, a Female Community Health Volunteer, Indigenous community leader, and a Nepal Red Cross Society (NRCS) social mobiliser. These interviews provided insights into the broader role of the Tharu riverbank community in disaster risk preparedness and response. The interviews also assessed how external interventions have either aligned with or disrupted these traditional practices.

3.6.3 In-depth Interviews

For in-depth interviews 16 respondents (7 women and 9 men) from the Kheda tole riverbank community in Ward 19 were selected. This sample selection also included 8 changemakers who were trained as part of an external intervention program designed to improve disaster preparedness and resilience in the community. The semi-structured interviews allowed for open-ended responses, providing deeper insights into the experienced participants and their thoughts on the integration of traditional Tharu knowledge with modern disaster management strategies.

3.7 Limitations of the Study

This study focuses exclusively on the riverbank community residents in Kheda Tole, Ward 19 of Dhangadhi Sub-metropolitan City, all of whom belong to the Tharu Indigenous community. The research aims to explore Tharu knowledge and practices, as well as participants' understanding of flood disaster preparedness, using an interpretive and constructivist approach. Due to time and logistical constraints, the scope of the study is limited to Kheda Tole, Ward 19, and the sample of riverbank community residents. The study relies on qualitative data and does not aim to generalize the findings to other communities or larger populations.

The findings are based on a small, purposively selected sample and are specific to the experiences of Kheda Tole riverbank residents who are also exposed to external interventions on disaster risk reduction. Therefore, these results may not reflect the broader experiences of other residents in Dhangadhi Sub-metropolitan City or beyond. The study seeks to understand the intersection of traditional knowledge and external interventions in shaping the community’s flood preparedness and resilience strategies, without aiming to generalize broader frameworks for disaster risk reduction.

CHAPTER IV

THARU INDIGENIOUS KNOWLEDGE AND COMMUNITY-BASED FLOOD MANAGEMENT

This chapter records the Tharu riverbank community's narrative history of two major flood events, their flood disaster preparedness and response to comprehend their understanding of flood and risk management.

4.1 History of Flood

The community recollect two major flood events (1) flood of 2064 BS and (2) flood of 2078 BS in Dhangadhi, Kailali where the ward 14 and 19 had been heavily impacted. The two majors occurred in an interval of fourteen years and had different aftermaths in the study area. The first one inflicted great loss of property and few human casualties while the latter caused minimal damage. The contrast in the consequences and the way residents dealt with each event will be known as we discuss how the floods entered and the level of damage they inflicted on the community. The narrative record below shows their sustainable flood-memory.

4.1.1 Flood of 2064 BS

In the past couple of decades, it has been recorded that wards 14 and 19 have seen the most significant flood in the year 2064 BS. In 2064, the flood water was high and almost touching the roofs of ground-level houses. The community recalls that they were not prepared for the flood at all. They were oblivious that there would be floods during that period and on such a large scale. They recall that they did not have any awareness about

floods and used to go fishing and fetch swept away trees and logs as firewood. The water that had risen took two days to level down and during that period of 48 hours.

As the flood came at night/early morning, people experienced floods at their own homes with their family members. They were trapped in their own homes as their belongings were being swept away from them. It had managed to sweep away people's small belongings along with their houses, walls, and small animals (that included goats, chickens, and pigs). The objects that were swept away included their house furniture, cooking utensils, clothes, food, and the loss of essential documents and papers (citizenships, birth certificates, etc.). The field study showed that many people retorted to unhook/loosen their larger farm animals and send them off towards the main road, which is comparatively higher than their residential areas, and managed to keep their big animals alive. Those unable to release their animals on time reported losing both their bigger and smaller farm animals, which included cows, oxen, pigs, chickens, and goats.

The riverbank residents whose houses were built with mud and hay were affected by the flood and only had a carcass structure remaining after the flood. It remained only with the roof and their house pillar, where most of the walls had been swept by the flood. It took them a week-long period to collect and bring in new hay to build a weaker structure of walls. They also took over a month to clean their houses, filled with knee-deep mud. People gave an extra-long time, almost 3-6 months, to build a reliable, more robust wall structure, and they attached stronger house pillars and a higher-levelled house even with a mud and clay house. They also lost huge rations of food grains from current and past year's agricultural harvesting, which took them a year or more to recover. Their animal stables were strengthened in structure with more robust pillars and now included a first floor,

which would be utilized to store food and grain untouched by flood water. People died during floods because the water swept them away; as the village recalls, when river water rose, they used to go to the river to collect swept-away wood and go fishing.

Looking at the flood destruction and disruption to their lives, it took them 1 to 1.5 years to recover, especially reconstruction of their house and recovering their agriculture losses. When a past flood occurred, the community was not prepared nor anticipated any major flooding event. During the 2064 BS flood, it took 2 days for the high water to settle down, during which people were trapped in their houses, but they did not receive any rescue. After the two-day period, nearby police and army came to look over the damage and villagers. The villagers also took shelter at the local community schools/buildings where their initial data were collected for damages (people, animals, house structures, and food grains). It has been recalled that their past flood experiences were not shared with any external agencies during the flood. They said they were not rescued from trapped areas, and after the water had settled down, they temporarily shifted to the local community school for shelter. But they instead recall the presence of government agencies (police and army) coming after the water level had been settled down and taking in data of people missing and material damages. They were also helped with distributing food and shelter equipment from the government and the Nepal Red Cross Society. Additionally, they also received help from local financial cooperatives and the community.

4.2.2 Flood of 2078 BS

The recent floods in the past five years have not had such a significant effect that raised eyebrows of the government and the community. Nowadays, they are prepared for the flood

with their alleviated house structure, go-bag, resource management, and even with safety evacuation plans. However, they recall that the 2078 BS flood was also significant in that it drowned houses and lost resources, but the rest were not so significant to their community. Floods, so far, mostly do not reach the residential areas, and when they do, the water is only logged knee-deep, which leaves mud to clean up afterwards. People in response to the flood, have been practicing temporary evacuation to nearby shelters in public school buildings and grounds. Due to the recent floods, the community had been temporarily displaced for safety measures. However, it did not affect their residences but only affected their agricultural land areas. The most damage current floods have been doing is to the agricultural land, which either sweeps away the food crops and harvest (*Kataan*) or puts a thicker inch of sand (*Pataan*) as a reminder that the flood occurred that year. So, to minimize the damage of their crops yields, they have been growing semi-aquatic plants and bamboo fences around the border of their agriculture lands that are near the river bay area.

The houses have been alleviated, and with more robust pillars, the flood water has not been able to damage the houses. The flood water, which is not raised too high, has not been able to damage the walls of the houses as well. One of the respondents recalls losing her brother-in-law in the flood of 2079 BS, who went to the river area to fetch floating wood and do some fishing in a raised water level. People either release or put their animals in heightened areas further from the river. For instance, their community roads are all high above the ground, and this practice has given them the chance to preserve their animals. After the water has settled down, the previously waterlogged houses must take in the manual labor days up to a week to clean the remnants, i.e., mud. People who report that they have

agricultural land where water was logged state that depending on the flood and time of the year, they either lose the harvest from their field or need to clean off the sands to pull out the crops and simply work again next year with sand mix fertile land. They do not recall response and relief aid with floods that do not rise high and do not do any structural damage to the residential areas.

4.2 Tharu Community's Flood Disaster Preparedness

The community has been growing their knowledge of flood and flood preparedness. The researcher looked at the past flood events (1) the flood of 2064 BS, (2) the flood of 2078 BS and the current scenario to understand their flood preparedness. They have deployed various safety measures to prepare them for any future uncertain disaster and crisis. The locals have taken lessons from their first crisis and used the experience to help them take as much minimum damage as possible.

Sustainable flood memory and flood awareness:

The community has recalled its most extensive flood experience in a couple of decades and learned immensely from its historical flood for flood preparedness. The respondents recall that they were naïve and were not prepared for the flood at all. On their preparedness for the flood of 2064 B.S., one of the respondents stated, 'Although it had been raining, we were not prepared for incoming flood, nor did we receive any flood warning from any institutions.'

The flood of 2064 B.S. came early in the morning, around 4 am, and it continued to rain for eight days. Their experience of the 2064 B.S. flood is almost administered as a 'trauma'

where people have now admitted that they lose sleep whenever there is non-stop heavy rainfall for a couple of days, which showcases that they have now learned to anticipate floods and try to be prepared for it. They also note their losses during their flood and how they rebuilt after the disaster, which has helped them revisit their memory and better prepare themselves for the flood disaster.

Flood warning system and community network:

The Tharu indigenous community remembers that they did not used to have a proper community network for flood warning. However, they used to rely on their weather awareness on seasonal patterns to anticipate rainfall during rainy seasons. Villagers are also used to marking their land with the help of makeshift flagpoles (using sticks and clothes) to see the rise in water level and if the river is getting closer to their residential area. However, they have shown preparedness through shared activity of a community network using word of mouth where messages of rising flood levels are passed down to everyone, either from an official ward representative or their Tharu community leader (*Bhalmansa*) or messenger (*Chaukidar*). Despite these, one of respondents stated that her brother-in-law was swept away in 2079 B.S. even with community warnings, she stated that he may have gone to collect swept aways logs which showcases that flood warnings were not of higher priority to the villagers.

Mitigation or prevention of flood damage:

Farmers have also used hand-made bamboo fences to prevent sand from entering their agricultural land. Adding trees and semi-aquatic plants prevents water from seeping into the residential areas. They remember these techniques as a common knowledge for farmers

or community members and usually do this kind of preparation when anticipating high rainfall or flood or mending broken fences for just-in-case scenarios. The community has also employed big-budget projects including the *tarjali* dam (gabion wall), using home pipes for community drainage, and redirecting the water back to the river.

Crop security:

The Tharu indigenous community have relied on their traditional knowledge about seasonal patterns and types of crops suitable for each weather. They have described that this local knowledge on agriculture has been a routine to them and practiced in a similar fashion throughout the village. They have described their agricultural routine into two themes: summer/monsoon and winter crops. For monsoon season they sow paddies and peanuts which are best according to the weather and water irrigation. For winter season the varieties of crops are wheat, mustard, lentils, potatoes and peas which require less water and according to weather. Winter crops are usually sown in the month of November and are harvested throughout the following months. However, they state that due to climate change and its uncertainty, the fullest crop harvest and crop security has become an almost impossible task.

Build infrastructure:

The community remembers their house walls made of bamboos and straw being floated away with the big flood and water inundation of 2064 B.S. Now, their house-built structures have been prepared to resist flood water where the house pillars withstand the water current. And because they structurally raise their house from half a foot to a couple of feet above ground level, the water would not quickly enter their houses or damage the

walls. They have also changed their culturally structural food storage of crop harvest, which used to be inside their main home. Now, they store their food crops on the upper level/story of their cattle stable. It is secure from when the water rises to 5-6 feet.

4.3 Tharu Community's Flood Disaster Response

The community's flood disaster response has been derived from the narrative inquiry about their flood disaster response experience on the two past flood events: (1) the flood of 2064 BS and (2) the flood of 2078 BS. It includes testimony from various residents regarding their response to safely bear through the situation, the protocols to reach a safe place, and the availability of relief aids. The rebuilding process after the 2064 BS disaster appears to be one of the most challenging times for the community compared to the switching back to normal daily life after the 2078 BS flood.

Milling process versus keynoting behavior:

Looking at the historical flood events in 2064 BS, although they found themselves shocked by an unanticipated flood, there was not much of the milling process because every individual was trying their best to survive the flood and keep their material possessions as safe as possible.

One of the respondents stated in their response to the flood, "We put our children in the *Khatiya* (bed) and hung the *khatiya* in strong house pillars so the children would be safe from the waters." In the flood of 2078 BS, after two days, when the water died down, they went to the nearby communal buildings (local community school) for safety and shelter.

Some people were proactive and had already sent their aged parents and young children to safety before the flood.

One of the respondents stated that nobody outside the community was present during the flood. From the community, we listened to the *Bhalmansa*. At that time, there was no leadership from the state government. When the flood water was lowered, they notified the police and government authorities. The respondents said that nobody in an authoritative (state) figure was in the immediate vicinity to help in the first two days. But help (as in police and army) showed up after the water level went down for monitoring and rescue. External agents (Red Cross) state that they look at Nepal state and local government as critical leaders who come to the top as the leaders for rescue and relief operations. Local agents come in second, especially when we are hollered for help. However, they constantly observed their local Tharu community head, *Bhalmansa*. They responded positively that they look towards their community head for safety directions in case of any imminent danger.

Shelter, rescue, and relief aids:

In the flood of 2078 BS, one of the respondents recalled that their tight knit nine households sent off their minor children and old people to the nearby jungle for safety. As the children and old people left, she said only she and her small baby were left alone at her home, whom she had wrapped around her body. She remembers her *Chimeki dai* (neighbor) brought the tube and rescued her afterwards to bring her to safety and into the jungle to reunite with others. People also recall that they stayed at their local community schools for one whole week, where they were provided with some governmental aid regarding food and shelter.

The data had been collected regarding who died and their material and agricultural losses. Families were compensated for the death of their loved ones. Still, respondents showed dissatisfaction with the distribution of compensation and aid for agricultural losses as they could not prove it fairly.

Rebuilding:

In the flood of 2064 BS, people took breaks from work for at least 3 to 6 months to rebuild their houses, and farmers hoped for a proper next year's harvest to overcome their losses to the flood. However, during the recent flood, the was no severe damage to the houses and people due to relocation or sustainable houses in the riverbank areas. In recent times, people only face residual flood sediments and thus have resorted to clean floodwater and mud-logged houses and roads, which are easily pulled off with shared community labor.

Flood and agricultural risk minimization:

People are now less affected in their residential areas. The agricultural land is the most affected by the flood and river overflow. Nowadays, people have opted not to cut their crops too soon when there is an ongoing flood warning, or if they have done so, then quickly transport them to their household areas for safekeeping. Whenever the river overflows into the agricultural land and brings too much sand, the villagers either throw away the sand or sow new seeds in the same area.

CHAPTER V

EXTERNAL INTERVENTIONS, CHANGES AND THE DYNAMICS OF COMMUNITY RESILIENCE

This chapter notes the changes brought to the Tharu riverbank community on flood management by external interventions, the community's adaptations with hybrid knowledge systems and growing resilience.

5.1 External Interventions

The two most prominent external institutions in the community that have been a major influential factor in bringing flood disaster awareness and preparedness for the preparation of response and resilience have been the local state government in collaboration with the Nepal Red Cross Society (NRCS).

5.1.1 Nepal Red Cross Society and SURE Program:

In 2016 AD, NRCS, along with the British Red Cross, brought the SURE program in Dhangadhi Ward 14 and 19 to their riverbank residents as a social network approach to support the preparation of disaster resilience. The five-year project (2016-2021 AD) concentrated on providing disaster risk management awareness and advocacy programs to the selected candidates to be groomed as advocacy champions to lobby ground-level concerns for actionable disaster preparedness programs. The champion model empowered the marginalized community (riverbank residents) in enhancing their advocacy capacity to depend on their rights and influence their local officials on disaster risk reduction concerns. Furthermore, the champion model provided champions with advocacy and response

training: basic first aid, Community Action for Disaster Response (CADRE), and water rescue. The initiative also created a pool of trained leaders, first responders, and volunteers to help with disaster risk reduction and management activities. The resilience of people has been brought through building human capacity. The program has efficiently enhanced the understanding, knowledge, and skillsets of the most vulnerable people and groups for disaster preparedness and response. This has been brought by volunteer and champions training in DRR and advocacy skills.

5.1.2 Local Government and DRR:

The local government was also lobbied by the NRCS in their capacity and willingness to allocate their budget for disaster preparedness further. The resilience of services has also been increased by bringing the direct involvement of local government and officials into the program and building infrastructure, which has helped formal and informal institutions build their resilience. This initiative further helped to bring gender inclusion and sensitivity to DRR initiatives and economic security initiatives, supporting schools to mainstream DRR and providing network opportunities for champions and community members with service providers, technical departments of government, wards, and municipalities. It has collaborated with authorities to improve its capacity to effectively respond to community disaster risk reduction and management needs, including ward offices and urban municipalities. The local government has invested in infrastructure-related operations and relevant risk-sensitive components. These include constructing water pipelines, drainage control, gabion walls, bioengineering, and road improvements. The municipality has also invested in skills essential for DRR activities, like first aid, fire safety, and search and rescue training. All of these contribute to a more successful catastrophe response and

recovery. The SURE program has supported strengthening early warning systems to prevent loss of life and property. Four distinct locations have weatherboards built to track the weather prediction, rainfall, and water levels to notify the appropriate authorities and warn locals if the levels rise to unsafe levels. Various platforms, such as social media, FM stations, and emergency task groups, were used to disseminate information on rainfall and water levels. This auxiliary readiness has become a prompt response to safeguard lives and livelihoods.

5.2 New Changes and Adaptations to Flood Disaster Preparedness

Nowadays, the community members have received disaster awareness, including flood disasters, water rescue training, and rescue equipment for the community from the Nepal Red Cross Society.

Flood warning system and community network:

They also have an imminent presence of governmental and non-governmental agencies for flood preparedness. With the help of a communication network (NTC and NCELL), the villagers receive flood warning text messages when the river water is rising continuously. They also have people stationed at various parts of the river area who watch the water level and communicate with the spokesperson for representative villages to give them ample time for shelter and safety. Whenever they receive flood warnings, they go outside their homes to watch the rising river level, even at midnight, and keep themselves awake to quickly respond to impending flood disasters.

Crop security:

When there is a weather forecast for heavy rain and flood, villagers are notified, and the police and army are seen on the fields with a warning not to cut their crops for a couple of days so that the flood does not sweep them away and do not lose their harvest of the year. When there is heavy rainfall and flood warnings during crop harvesting, they are advised not to cut their crops altogether and wait for the flood to pass. This will help retain their crops after the water is settled, and they can harvest it later. And, if they had already cut down their crops, they immediately transferred them to their secure storage above their cattle shelter.

Build infrastructure:

Because of their past flood experiences, some people have been able to relocate their houses further away from the riverside, which helps them avoid annual river overflow in their houses. Those unable to relocate have built their house infrastructure stronger and heightened their house level so there would be minimum water damage to their houses and resources when there is river water overflow.

Risk transfer:

The community recalls their disaster preparedness knowledge, derived from their past sustainable flood memory and through governmental and non-governmental flood awareness and preparedness programs. In terms of risk transfer, they have also been highly advised to take farm animal insurance for their animals' sudden and disastrous demise, but not every villager can do this. Farm animals who need to be pulled out of the house and

grazing land are sent away to the heightened road, and although this is ill-advised and restricted by the local ward and government, the villagers recall that they do not have any other option but to free their animals towards the local road. Similarly, their personal (health and life) insurance is not targeted for any flood-related disaster. Moreover, they do not have house insurance against disaster as many houses are not up to the code, and many said that these houses built on the land are without proper documentation, limiting their choices of insurance and disaster safety.

Safety houses and evacuation plan:

The community has also proactively used its community halls for flood preparedness training and immediate rescue centers. Their community water and disaster rescue materials are in safekeeping inside the premises of their nearest community building, which is made accessible to the needy immediately. The community hall and open grounds were utilized in the past flood and are now being popularized in the community as an immediate disaster shelter to run towards whenever a big flood occurs. These community buildings are small and cannot hold all the village population; thus, they also endorse the community buildings' open ground to hold more people for shelter when needed.

Rescue team/resources:

The local community has a team of changemakers well-versed in disaster and disaster safety preparedness. They have been given basic first aid and water rescue training. These community changemakers also know how to build water rescue materials from local household items that are easily accessible. Their community also holds a set of disaster

rescue equipment in their community hall, a pair of water boats in the river, and smaller items in their individual households.

Go-bag with emergency articles:

One of the most utilized items/steps in their disaster preparedness plan is to make a go-bag that holds their legal documents, priced items, dried foods, and clothing. This go-bag is always tucked away in the upper shelf of the house and is taken away with the people when they run for safety. They also make a few waters rescue equipment for their personal use, made from household items such as rubber tubes, empty plastic bottles tied together as makeshift life jackets, and ropes. One of the respondents stated that she has a torchlight whose battery lasts for 24 hours, and another stated that his torchlight can light up to 1 km in distance. Recently, people have been notified of flood warnings, which give them ample time to safely keep their valuable items in go-bag and run for heightened community buildings for shelter.

Emergency community savings:

One of the most evolved concepts in disaster preparedness in the Tharu riverbank community was shared community savings for disaster. A village community holds many community-saving programs, but they have additional separate community-saving programs dedicated to disastrous events. These savings are then utilized for the individual benefit by loaning them at a minimum interest when people need money, primarily targeted for personal perils and disaster-related needs.

5.3 Tharu Community's Flood Disaster Resilience

Respondents are now more aware of the flood disaster and its impact. Due to their sustainable flood memory, they have prepared themselves to prevent (by relocation) or mitigate flood disaster impacts by resistant housing structures. Here, their resilience or recovery to their normal life is measured through their past disaster aftermath. In the past couple of decades, these wards' most significant floods were in the year 2064 BS, where villages have been flooded and people have been displaced for a week. The highest flood water was up to the first story, and flood water swept people's house walls, resources including their grain ration in storage, agricultural land, and animals. Their house objects include furniture, clothes, cooking utensils, and essential documents.

Vulnerable People and Compensation:

The local government noted the vulnerable people affected by the flood who lost their houses, beloved family members, pasture animals, and food crops and compensated them likewise. However, the riverbank residents complained that they were not compensated relatively; poor households or socially influential households received aid and compensation instead or more than those who were affected by the flood.

One of the respondents stated, "I recall that the flood impacted 50-60 houses, but many others had agricultural loss in flood areas. Our community had a serious conflict about who should be compensated fairly, either those who lost their houses or their harvest. In comparison, I feel that people whose houses were destroyed were not compensated fairly."

Farmers also complained that they were not compensated for what they lost in food crops because they could not provide proof of the produce they had on the land and in-house storage. The rebuilding of social infrastructure, especially the heightened tube well for safe drinking water, was also built to satisfy the needs of the village's middle area, which disregarded the few households located much closer to the river area. Although there has not been a big flood that has reached the residential areas and fewer people oblivious to flood warnings, the community still faces human loss from time to time. In the flood of 2079 B.S., a respondent's family member was swept away. Initially, they could not find his body, but his body was later retrieved after six days, and the grieving family received two lakh rupees as compensation from the state.

Critical and Environmental Infrastructure:

People returned to their normal lives within 3 to 6 months after rebuilding their houses and returning to their routine day jobs. Children's education was halted for a week when all the villagers took shelter in the school (public building), but it was also quickly resumed. For farmers, it took them a year and a half to harvest and restock what had been lost due to the flood. As the unaffected governmental institutions and public buildings, these critical environmental infrastructures were safe and readily available for public services.

One of the respondents stated about their critical infrastructure, "In 2064 BS, there were no electricity service in our area. Nowadays, the electricity is immediately cut off in case of severe weather, and it is restored after it passes."

Social Factors:

During and after the 2064 BS flood, people concentrated on their private recovery. They were tending their wounds (loss) and thus had no time to look after one another (neighbors and community). It was more critical for them that they were compensated rather than being fair to everyone. Because this flood swept away many houses, people were more attuned to their recovery than they felt the burden or the requirement to check one another's (neighbors) social and economic needs. However, in the case of the 2078 BS flood, the flood did not affect the residential areas much, and people could participate more socially and communally in the recovery process, especially in road reconstruction and providing physical labor. They were also more supportive of the social, emotional, and capital aspects of the reconstruction of the built infrastructure of those affected people and their houses. They are vocal to advocate towards external agencies if it helps their woeful neighbors tremendously. The community has leapt through their understanding and awareness of flood disasters.

One of the respondents stated that this flood disaster awareness can be seen through their raising their welfare towards each other during the perilous times. He stated that he has seen a more helpful nature in the community in the last two years. People are more proactive in giving help to those in need. In earlier times, people were more consumed with taking care of themselves. However, the community has not resorted to uniting firmly to mitigate flood damage in their agricultural lands.

Another respondent stated that although people face monetary loss annually because of flooding in their agricultural land, they have yet to be able to produce a proper solution,

either lobbying the local government or collaborating. The villages are not in a unity to plant tall trees around the river area because it conflicts with individual interests where planting tall trees will minimize their property land. Thus, the farmers are only keen to build temporary bamboo fences or semi-aquatic plants that prevent heavy bulk of sand from entering their fertile land. However, this preparedness technique could be better.

Build Infrastructure:

In recent years, in the flood of 2078 BS, people have been more self-aware about the flood disaster impacts and how they can better prepare themselves. Their resilience is shown by their active flood preparedness plan and ability to return to everyday life as quickly as possible. People have resorted to building flood-resistant houses with strong, solid pillars and a heightened base. One of the respondents relocated after five years of the big flood in 2064. Their new house is more potent and includes *taad/paad* (storage unit), which helps keep their food safe. Their preparedness in the safekeeping of valuable items, food, and clothing, and at the same time sending their aged parents and young children away to the shelter as soon as the flood warning comes, they have been able to take a minimum hit. Although they are not yet active in the rebuilding (flood-resistant) process, they try to resist some flood effects.

One of the respondents recalls community collaboration in rebuilding, 'In one instance, the flood damaged the road, and we did manual labor from all our community.' Their social network has also strengthened, showing collaborative and proactive help towards people in need and each other, especially in making and clearing water or mud-clogged roads. The Tharu community also poses a unique social setting with their community leader with a

democratic system that any social issues are first proactively being sorted within the community. Thus, any conflict arising in cases of flood management and disputes to preparedness and mitigation techniques are required to go through their social system which maintains an ability to sort within themselves and transcend lesser ambiguity of social hierarchy and concrete goals for social cohesion and resilience against flood.

CHAPTER VI

SUMMARY AND CONCLUSION

The concluding chapter presents a comprehensive summary and conclusion of the study through the lens of social learning.

6.1 Summary

Community-based flood management composite of an Indigenous community's traditional knowledge of flood management that is integrated with growing local knowledge with time and technology plus external interventions. Flood management brings forth disaster preparedness and resilience as pivotal parts in gauging response effectiveness. Preparedness involves awareness, infrastructure, and sustainable flood memory, shaping societies to endure disasters. Effective disaster risk management remains elusive due to gaps between external interventions, community practices, and their understanding. The study aims to explore and document local flood preparedness practices, analyze their impact on resilience, and identify changes brought about by external interventions. This study contributes to understanding how communities evolve their disaster concepts for improved disaster management.

This study delves into the unique dynamics of disaster preparedness, response, and resilience within the Dhangadhi Wards 19 riverbank Tharu community. Ward 19 which is surrounded by river on three sides where the riverbank community is the most vulnerable population. The riverbank residents whose houses and primary livelihood, agriculture (land), are both near these riverbanks. The research idea is that this community's knowledge about a disaster and its resilience in preparing and responding to it will evolve.

The qualitative research involves the active participation of the respondents who are from Tharu community and changemakers through focused group discussions, key informant interviews, and respondent interviews. In a population of 29 households and 190 community members, the sample size is narrowed down to 16 respondents following convenience and purposive sampling. The findings reveal that the community regularly faces floods and has significantly enhanced its knowledge of flood preparedness. This knowledge is theoretical and actively applied in the community's daily life. The study underscores the importance of the dynamic relationship between the Tharu community and external interventions, such as those from local governments, NGOs, and INGOs, in building resilience.

Looking at their past flood experiences, they have significantly grown their knowledge of flood preparedness and applied local and attained knowledge of flood preparedness in their community life. The community leverages historical floods for preparedness, combining local knowledge with training from the Nepal Red Cross Society and other initiatives. Recent floods primarily affect agricultural land, with robustly built houses enduring floods.

Mitigation techniques include bamboo fences, tree planting, and infrastructure projects like gabion walls. Improved infrastructure, relocation strategies, and elevated structures contribute to increased resilience. Government agencies and the Nepal Red Cross Society have externally supported them. External awareness programs have also introduced the new notion of risk transfer. Proactive safety measures involve community buildings, training centers, and go-bags, while a community savings program aids financial support.

In disaster response, the community draws on past experiences, focusing on survival, protecting possessions, and utilizing communal buildings as shelters. Respondents exhibit heightened flood awareness, with a strengthened social network facilitating collaborative help during floods and rebuilding processes. Challenges persist in fair aid distribution, unity for large-scale solutions, and implementing dams or gabion walls. Monsoon floods annually impact agricultural land and financial losses. The community's proactive measures, training, and controlled damages enable a quicker return to normalcy.

6.2 Conclusion

Floods can be a just minor inconvenience if the people are socially, economically, and structurally sound. If not, then the community's vulnerability will always regard it as a potential disaster risk. Now, people can redefine a disaster into a hazard by shifting their position of vulnerability by strengthening their structural grounds: social, economic, and political factors. Here, the Tharu community of Dhangadhi wards 19 riverbank area employs social learning approach (Barquet et al., 2016) towards flood disaster preparedness, response and building resilience. This Tharu riverbank community provides an example of a proactive and resilient approach to disaster preparedness. This community is informed by both historical flood experiences and external awareness programs. It is evident how important social learning and information sharing between different stakeholders are to build community resilience. The community's notable increase in flood readiness demonstrates how well social learning works to promote self-efficacy and behavioral change.

The indigenous community have an adaptive instinct for their survival. As with modernization, the change is evident and necessary to fit in with the new world to minimize hazard risk and adaptation with climate change. The acceptance to technological hybrid is necessary for the Tharu indigenous community because it devises structural mitigation and financial aids which is hard to come by a spatially distant community from the core urban areas of the municipality. The integration of changemakers and *Bhalmansa* is an optimal example of community leaders (indigenous and community-wise) to come together as a unified front with a greater bargaining power against flood risk. The Tharu community thus can socially influence both the local state and donor agency for financial aid for structural mitigation which are the most important, and it could also be seen as a power of human (social) resource against a disaster.

There is a dynamic relationship between social action, power, and authority. The formal disaster risk management with their participatory and grass-root approaches has been great helping them to reach their disaster resilience. As the community is helped immensely through awareness programs, trainings, and fund allocation not only through the donor agency but including the local government in every activity.

The formal disaster risk management with their participatory and grass-root approaches has been great helping them to reach their disaster resilience. As the community is helped immensely through awareness programs, training, and fund allocation not only through the donor agency but including the local government in every activity. The research shows their lack in risk transfer programs and in sustainable livelihood as most of the residents heavily rely on agriculture, and thus the donor agency and their programs are welcomed by the Tharu community as they are helping them to diversify their livelihood. With the

struggle for fair aid distribution and compensation show that the community members still struggle with social marginalization and disaster vulnerability and have yet to receive an equal status and opportunity to rebuild after the disaster.

The community's evolving proactive nature and increased collaboration in recent years indicate a positive trend. The *Samudayik Kosh* (Community Savings) emerges as a crucial resource for the rebuilding process. The community's resilience has been highlighted after it has faced flood disasters and through its early preparedness and rebuilding process. The Nepal Government, with its change from disaster rescue and response to disaster risk preparedness, has given its disaster-prone communities ample support and opportunities to become flood resilient.

Furthermore, the social construction of disasters is shown through the delayed urgency and prioritization of DRR activities. Challenges in unity for large-scale solutions and disagreements to sacrifice personal land for greater goal reflect conflicting individual interests. For instance, building a gabion wall conflicts with the local state’s development scale and priority, budget allocation, time, local leaders’ interest and even individual’s greed of own land. The focus on agricultural flood preparation remains less robust, hampered by a lack of documented destruction and unity for large-scale projects.

This study has advanced our knowledge of the unique context of flood disaster resilience amidst interaction between local indigenous practices and outside initiatives in determining how communities react to disasters. For policymakers, practitioners, and researchers involved in disaster risk reduction and management, the riverside community's journey from disaster vulnerability to greater resilience provides insightful information. This study

concludes that more efforts are needed to address disparities, especially in agricultural flood preparedness. The community's skepticism about the timely construction of a gabion wall underscores the need for sustained commitment from local and external entities. While providing a rich understanding of the Tharu community's resilience, the study also points towards areas for further research, particularly in assessing the effectiveness of large-scale interventions, community savings programs and risk transfer strategies.

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Annex I

Focused Group Discussion Checklist

1. Does this Tharu riverbank community remember having floods? When was it?
2. How did the Tharu community respond to the flood during past flood events?
3. What is the recovery process of a flood disaster in your community?
4. What are the Tharu indigenous practices for flood management?
5. Does this community partner with others for shared knowledge/resources for disaster preparedness?
6. What help has this community received from external interventions in their growing understanding of flood preparedness and response?
7. Are there recent changes in the community made with external interventions for flood management?
8. Compared to the past, is this community more prepared for flood risk?

Annex II

Respondent's Interview Checklist

1. During past flood events, how severely were you and your family affected by the flood?
2. Does your Tharu community and past flood memories help you prepare for the flood?
3. Did you find your Tharu community networks and relationships satisfactory in responding and recovery process after flood?
4. Are there recent changes in your house with new knowledge passed by your community and external interventions for flood management?
5. Compared to the past, are you more prepared for flood risk?

Annex III

Key Informant Interview Checklist

1. Has this community been facing floods? And how has the community been managing its flood disaster rescue and relief operations?
2. Who are the key leaders in the rescue and response process during past flood events?
3. How have the external interventions helped in growing the community's understanding of flood preparedness and response?
4. Did you find the community networks and relationships satisfactory to help and assist in rescuing and recovery after the flood?
5. What is the community preparedness for (a) resources (food, water, shelter, and sanitation), (b) network/communication, and (c) essential (financial, health, and governmental) services backup?
6. Compared to the past, is this community more prepared for flood risk?

Annex IV

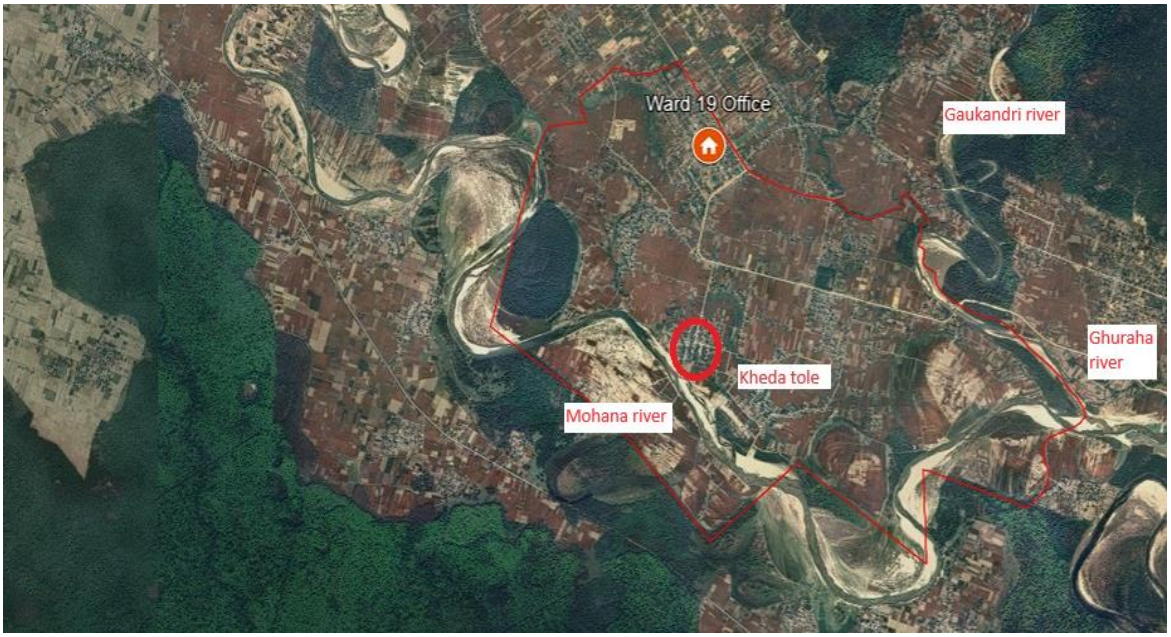
Mohana river and sandy but lush agricultural land

Uccha Nalka (heightened safe-drinking water)

FGD in progress

KII interview with *Bhalmansa* (local Tharu Community leader) of ward 19

Social Map of Ward 19's riverbank community



Google Earth Image of Site Location

FGD and Social Mapping