

Assessing the Flood Resilience Frameworks in Nepal

N. GYAWALI, PhD Scholar, D. DEVKOTA, PhD, A. CHHETRI, PhD,
P. CHAUDHARY, PhD AND N.R. DEVKOTA, PhD

Abstract

Flood is one of the most common natural disasters affecting Nepal. The principal and most destructive type of flooding is from rivers including monsoon and flash flooding from heavy rainfall in mountainous areas. On an average, floods cause over 125 deaths each year and average annual economic losses exceeding USD 140 million. The government of Nepal and other stakeholders (NGO, INGO, UN and private sectors) have put their efforts to reduce the losses of life and livelihoods and strengthen disaster resilience. There are several disaster risk reduction and management acts, policies, plans, directives, approaches and frameworks with remarkable progresses made for reducing disasters risks in Nepal. This paper is mainly focused on assessing common flood resilience frameworks used in Nepal. The general objective of the paper is to review and reflect on the flood resilience frameworks in Nepal and its implications in the development practices. Accordingly, it is based on the study that entailed an in-depth review of the published documents and disaster risk reduction framework, approaches and water induced policies of the government of Nepal and subsequent field data collection. The primary data were collected from six key informant interviews and eight focus group discussions in three communities of Saptari district and three communities in Nawalparasi-west district in Nepal. Four cases as the framework and approach were reviewed and primary data generated were verified. Sendai Framework and nine minimum characteristics for disaster risk management are found useful frameworks, however these are general frameworks and do not cover all the aspects of the floods. Six pillars of flood resilient community framework are found dedicated to the flooding, but this framework also needs to be further validated through government and multi-stakeholders' consultation. The paper highlights that below discussed and reviewed frameworks and approaches are beneficial and useful for flood risk management, however, there is need of assigned government authority to monitor, review-reflect, coordination, communication and reporting for further improvements in the flood risk management in Nepal. A flood risk reduction and management framework are necessary to address the needs of flood prone municipalities and communities in Nepal.

Keywords: Flood, Resilience, Frameworks, Disaster Risk Reduction

1. Introduction

Flood is one of the most frequently occurring devastating disasters in Nepal. On an average, river flooding affects the lives of 21 million people, causes the reduction of US\$ 521 billion GDP (T. Luo, Robert S. Young, P. Reig, 2015), and inflicts internal displacement of several thousand people annually (Wilner, S.N., Otto, C. & Levermann, A, 2018). Flood-led disasters are increasing in frequencies and magnitudes together with more extreme events in recent decades as an impact of the rising global temperature all over the world, which needs an integrated approach that addresses social protection, Disaster Risk Reduction (DRR), and climate change adaptation. When compared to the other natural hazards, floods affect more people globally; they can literally 'wash away' overnight what communities have gained over years in terms of growth and development (De Bruijn, 2004; Gersonius et al., 2010).

In Nepal, floods are expected to affect 156,600 people every year (WR, 2017). The annual flooding affects the communities and households with more poverty and marginalization (Myron B Fiering, 1982). The losses from the annual flooding in Nepal are considered a serious problem to the government as well as to the ordinary people. Every year, it becomes a hotcake of discussion to the government, security agencies, and victims. Agricultural lands in the Terai regions have been degraded in Nepal through regular floods and inundations (MoHA- 2022). Koshi and Narayani rivers are big rivers in Nepal which causes floods almost every year and damages the lives and livelihoods of the rural communities along the flood plains. The Koshi and Narayani river basins flow from the northern Himalayas down to the Ganges River in the Bihar of India. People living on the banks of these river basins are among the people who have very low socio-economic characteristics

(Nepal, P, Khanal, N.R., Sharma, B.P.P., 2018). Their impoverished condition of living is attributed due to floods especially during the monsoon season that starts in June and ends in September in Nepal. Other disasters such as drought also prevails after the end of monsoon rains compounding the environmental shocks and stresses to the vulnerable.

Community is resilient to flood when it can sustain the critical functions as well as function the critical systems under flood stress caused by adaptation to change in the economic, social as well as physical environment and also, be self-reliant if external resources are cut off or limited. (Frankenberger, T., Mueller M., Spangler T., and Alexander S., 2013). Resilience is the extent to which communities can successfully combine collective actions and social capital in response to flood shocks and stresses. Social capital is observed as one of the key capacities at the household level that has a direct bearing on flood resilience. A community is a group of the households who live together and share and celebrate the similar culture, language, and economic livelihoods (N. Gyawali, D. Devkota, P. Chaudhary, A. Chhetri, and N. R. Devkota, 2020). The households discuss, interact, and work together to respond to any kind disasters including floods with bonding, linking, and networking actions that help to mitigate, response and recover from the adverse impacts of floods.

Flood resilience implies either withstanding the flood wave (resistance) or quick recovery with limited impact after being exposed to flood water (De Bruijn, 2004; Gersonius et al., 2010). Flood resilience frameworks are necessary to systematize the analysis of complex topics such as resilience. Many frameworks have been proposed to conduct resilience analysis and still many more will be introduced. While there is no harm in bringing new frameworks, the high

learning cost of these frameworks often reduces them to a theoretical exercise with limited applicability. Frameworks should be useful and support the achievement of intended goals of the development practices. The framework employs a holistic and dynamic systems-based approach that conducts a retrospective analysis of resilience by strengthening the existing elements, stakeholder, and conditions of the frameworks. Under this context comprehensive research was done with the objective to review and reflect on the flood resilience frameworks in Nepal and its implications in the development practices. The paper has explored and discussed on primary data and information from the fields in Saptari and Nawalparasi-west districts of Nepal and verified with community perspectives. The other objectives of this research were to identify the flood resilience frameworks practiced by the community people and followed by local government in Nepal, and to highlight the discourse in the paper about the trade-off of each flood resilience framework, and how National and Municipal governments interests are all served, especially with respect to flood preparedness, response and recover.

2. Methodology

The study entailed an in-depth review of the published documents and DRR and water induced policies of government of Nepal and subsequent field data collection. In the primary review of data, qualitative sources were collected and analyzed following seven steps:

Step 1: Exploring facts and evidence

Step 2: Initiating the search and exploration

Step 3: Storing and organizing information

Step 4: Selecting/deselecting information

Step 5: Expanding the search and exploration to include O=one or more MODES (Media, Observation(s), Documents, Expert(s), Secondary Data)

Step 6: Analyzing, synthesizing and comparing information, and

Step 7: Presenting and summarizing the conclusion.

These seven steps are multidimensional, interactive, emergent, iterative, dynamic, holistic, and synergistic; being fundamental tenets of social science research (Orwuegbuzie et al. 2010).

Figure 1: Maps showing study area (map source: <https://thehimalayantimes.com/nepal/nepale-new-political-map>). The study was done in three communities of Saptari district and 3 communities in Nawalparasi district in Nepal (Table 1).



Table 1: Description of Study Areas and Communities

Districts	Municipality	Community	Coordinates
Saptari	Saptakoshi	Sakhubari	86.95693°E; 26.7292°N
	Harunamagar Kankalini	Bisanpur	86.80099°E; 26.4550°N
		Gobargaraha	86.87519°E; 26.46067°N
Nawalparasi	Susta	Narsahi	83.834728°E; 27.417191°N
		Susta	83.869586°E; 27.358502°N
		Ratangunj	83.850313°E; 27.379677°N

2.1 Primary Data Collection

Visits to Nawalparashi and Saptari districts of Nepal were made to collect primary data and information regarding disaster risk reduction and management at local levels. During the visits, six Focus Group Discussions (FGDs) in participation of 8 to 12 community people in each FGD were carried out. The age group of the participants ranged between 20-70 years with an average 70% male and 30% female participation. FGD covered discussion on vulnerabilities of the communities, their mitigation, preparedness, response and recovery efforts, support from local government with regards to disaster risk reduction and management, change in the disaster governance in the federal structure of the country and establishment of municipalities, appropriateness, and efficiency of the government efforts in disaster risk reduction and management and the impact of disaster governance. Each FGD took approximately two hours to complete.

Similarly, 8 Key Informant Interviews (KIs) were carried out with 5 community leaders representing 1 female and 4 male, 1 Disaster Risk Reduction (DRR) expert male and 2 male government officials that continued for about 1.5 hours. The FGDs and KIs were based on check-list prepared in semi-structured format to facilitate discussion/interview, and the response

were transcribed with support of a note taker.

3. Results and Discussion

The paper discusses on flood resilience frameworks and reflect the current situation and future scenario of the flood risk management in Nepal. The authors of the paper understand that there are no specific government suggested framework designed for flood risk management. In Nepal, the flood hazards and risks are taken as one of the many hazards and risks of Nepal and viewed it broadly as other general disasters. The cases discussed under results and discussion sections are some common frameworks used in Nepal by different stakeholders. There are other frameworks too, not limited as discussed in this paper only. The paper does not undermine to other remaining frameworks which are not discussed in this paper.

3.1 Disaster Risk Reduction and Management Policy Trend in Nepal

There are several policies for disaster management but there is lack of coordination and awareness among the government agencies and officials that who is responsible for what during a disaster. Originally formulated in 1982, the Natural Disaster Relief Act (NDRA) also known as the Natural Calamity Relief Act (NCRA) was the first DRR policy in Nepal, and paved the way forward for DRR policy (Jones et al.

2014; Nepal et al. 2018). With changes in governance system, increased knowledge in DRR and needs for addressing different aspects of disaster other than relief were realized. The Government of Nepal has formulated number of acts, regulations, plans, policies and frameworks that have been directly or indirectly supportive in DRRM. Thus, evolution of DRRM was seen as follows:

- Natural Calamity (Relief) Act, 1982
- National Action Plan for Disaster Risk Management, 1995
- Local Self Governance Act, 1999
- National Strategy for Disaster Risk Management in Nepal, 2009
- National Strategy for DRM, 2009
- Three Year Interim Plan 2007-2010
- National Disaster Response Framework, 2013
- Disaster Risk Reduction and Management Act, 2017 (replaces Natural Calamity (Relief) Act, 1982).
- Local Government Operation Act, 2017
- National Policy for Disaster Risk Reduction, 2018
- Disaster Risk Reduction National Strategic Plan of Action 2018-2030
- National Disaster Risk Reduction Policy, 2018

The Disaster Risk Reduction and Management Act (2017) replaced the 1982 Natural Calamity Relief Act, which did not cover the broader spectrum of hazard mitigation and disaster risk reduction and management. Formed a few days before the 2015 Gorkha Earthquake, the bill covered a range of disasters including health emergencies, famine, industrial accidents, and pollution, as well as weather-related disasters and

earthquakes. It also involves pathways for creation of more powerful institutional arrangements to deal with disasters. This stems in part from lessons learnt after the 2015 earthquake, which constituted a particular lack of coordination between different arms of government.

Legal policies, frameworks, guidelines and directives are very important, which bind all the stakeholders including government, civil society and private sectors for enforcing the given scopes, roles and responsibilities about flood risk management in Nepal. The policies also help to clarify the roles and responsibilities at the time of disaster for mitigation, preparedness, response and recover from the disaster. There are several policies and guidelines in disaster risk reduction and management, however there are no dedicated policies and guidelines for flood risk management. All disasters are seen in a basket view and the policies, acts, regulations, frameworks etc. are generalized. The most flood prone local governments too do not have designated specific roles and responsibilities for flood risk management. During the Key Informant Interview, chairperson of the Susta municipality said that "there is no any specific plan or policies for flood preparedness activities, we are just supposed to support communities for relief items distributions when we have any types of disaster". This municipality is very prone to flood, it would be great, if government of Nepal formulated specific policies for flood risk management. The DRRM Act (2017) directs for preparedness, but there are more financial and administrative challenges. The local leadership and communities also propose for a higher share of the budget for compensation to the affected rather than increasing the preparedness budget". The DRR expert and government officials also informed that they know there are different policies, regulations and framework for DRRM,

but they have a very basic knowledge regarding those policies which they heard during the trainings or orientations. All the three tiers of the government have DRRM responsibilities but there is also no clear-cut designated roles and responsibilities among them for responding to a disaster situation. There are some dilemmas and conflicts about the roles of provincial and local government at the time of responding to the disaster including flood, which affects the communities further vulnerable to the risks and hazards from the disaster and the magnitude of the impacts are compounded (JOM, 2019). Participants of the FGD of Nawalparashi districts also support discourse about the dichotomy role of the governments -federal, provincial and local.

3.2 Nine Minimum Characteristics of Disaster Resilient Community

Nine minimum characteristics of disaster-resilient communities in Nepal are developed that should be included as a minimum component in community-based disaster risk reduction programing (MoFALD 2013). The framework was designed in consultation with Government of Nepal, INGOs, NGOs, UN, donors and Red Cross / Red Crescent movement. The characteristics do not suggest any specific modalities, activities, and processes for how each CBDRR programing should achieve these characteristics. Nine minimum characteristic includes- Organizational base at municipal, ward and community level; access to Disaster Risk Reduction (DRR) information; multi-hazard risk and capacity assessments; community preparedness / response teams; Disaster Risk Reduction / Management plan at municipality level; Disaster Risk Reduction (DRR) Funds; access to community-managed resources; local level risk / vulnerability reduction measures, and community based early warning systems (MoFALD, 2013).

The nine minimum characteristics were designed in participatory manner in consultation with multi-stakeholders. This is considered as holistic disaster management framework. The framework has all components and very relevant to tackle or respond to any disasters at the community level. The framework discusses about establishing local DRR institutions, access to DRR information, task forces for responding the disasters, vulnerability mapping, emergency funds, early warning systems and role of each stakeholder at the local level. During the focus group discussion, the participants of Sakhubani, Saptari shared that "they are not aware about the framework as such, but all these nine characteristics are relevant and useful for responding to any disasters. The participants also shared that they have not been informed about any livelihood components for early recovery from the disasters. They believed, the poor and marginalized group of people, livelihoods options are very important for being resilient after hit by the disasters and need to be included any framework". The framework was developed during the Flagship 4 and supported by the donor funded project. The framework is loose guidelines, but not mandatory, and there are no responsible stakeholders at government level. This is also general framework for disaster management and not focused to the floods. Most of the characteristic can be applied to flood risk management, however safety net and livelihoods options are missing in the frameworks considering the niche of the community needs at the time of disaster risk management. The evaluation of the framework too highlights that in order to move beyond disaster preparedness and towards resilience there is a need to begin to address underlying poverty through the strengthening of livelihoods (Owen K.J et. al., 2017). Community is not resilient to disaster unless their livelihoods are resilient.

Households with livelihood resilience will contribute to community and regional livelihood resilience. Transformational changes in certain communities may help the region as a whole to become more resilient through increasing the diversity of livelihoods (Fikret B & Helen R, 2013).

3.3 Sendai Framework for Disaster Resilient Community

The Sendai Framework on Disaster Risk Reduction (2015-2030) is an ambitious agreement that sets out the overall objective to substantially reduce disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. It pursues the following goal: *“Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience.”* The Framework recognizes that the strong commitment and involvement of political leadership in every country is crucial. State level governments share their responsibility to reduce disaster risk with other stakeholders such as local government, the private sector and other non-State actors. It puts in place 4 clear priorities for action and 7 global targets for the substantial reduction of disaster risk. The four priorities include (a) understanding disaster risk, (b) strengthening disaster risk governance to manage disaster risk, (c) investing in disaster risk reduction for resilience, and (d) enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction (UNISDR, 2015).

The Sendai Framework clearly states that in order to reduce the frequency and impact of disasters, what is required is to better understand disaster risk and to improve risk governance so that existing risks are reduced, and the creation of new risks is minimized (Mizutori M, 2020). This is broad framework in general and focused on disaster risk reduction, understanding risk of multiple disasters, mainstreaming DRR into development process and partnership of government, private sector, and civil society (Whole-of-Society Approach). This is owned by the national government through Ministry of Federal Affairs and General Administration (MoFAGA). There are priority areas and target for the government, and it is shown that there are good improvements in the target as well, however, there is dichotomy in the roles of the three tiers of the governments. The provincial and local government are not aware about the framework, neither there are any specific roles or scope for them. During the key informant interview with Mayor of Hanumannagar Kankalini municipality, he mentioned that “I have heard about it but not sure what to do with the framework and who is responsible for what and where are the resources. We need the concise policies with actions and resources. We have limited human resources and technical expertise for managing all kinds of the disaster. My municipality is very prone to flood, and it occurs every year, so that I was looking for focused plan and policies for flood risk management. I know, we are autonomy institution, and I am planning to have separate policies and guidelines to cope, withstand and recover with the impact of flooding”.

The government officials during KI also shared that municipalities share the flood affected population, damages and losses data and updates on the relief and recovery activities. However, they are unaware about the SFDRR priorities

and targets. Hanumannagar Kankalini and Saptakoshi municipalities have localized the BIPAD portal however, they do not have authority and access the disaster related data in the system. Capacity building and engagement of local governments in localizing SFDRR is very necessary to achieve the goals and targets in a sustainable way. Nepal is currently focusing on the capacity building of province and local level governments on DRRM that include technical, formulation of relevant policy and legal documents and mainstreaming and integrating DRRM in development plans and programs from central to local level (MoHA, 2022).

Focus group discussion participants in Bisanpur, Sapatari expressed that they know there are several policies and plans for DRRM but how this helps the needy people, we don't know, they questioned policies for whom. Some of the preparedness activities are carried out by non-government organizations. Post flood relief are biased and accessible to those near to the governing officials. This discourse indicates that there is no accountability, ownership and clear roles and responsibilities of the concerned stakeholders. There should be dedicated authority for monitoring, review reflections, coordination and reporting for meaningful use of such frameworks.

3.4 Six pillars of Community Flood Resilience

Lutheran World Relief (LWR) as an international humanitarian organization has developed Six Pillars Approach to define what does a community need to be resilient to the flood (LWR 2018). The framework is developed with the learning and reflection of Transboundary Flood Resilience (TBR) in Nepal and India for more than 10 years. Floods destroy livelihoods, property and lives and exacerbate problems in already

struggling communities. Without the means to be prepared for and recover from such losses, reoccurring floods can keep people entrenched in poverty, forcing them to continuously start over from scratch. Ultimately, flood resilient communities have the means to absorb the impacts of floods because they are prepared beforehand and are equipped to recoup any losses afterwards. Should a flood take away their means of making a living or feeding their families, they are able to adapt their ways and resources to make ends meet. In some cases, these communities transform, adopting fundamental changes to their lives and institutions that significantly and sustainably reduce their vulnerabilities to floods. In order to build these attributes and enhance their absorptive, adaptive and transformative capacities, a flood resilient community depends on six things, a community needs- a) an Early Warning System (EWS) (b)community-based Disaster Risk Reduction (CB DRR) Institutions (c)Disaster Resilient (DR) Infrastructures, (d) Safety Nets, (e)Flood Resilient (FR) Livelihoods, and (f)public - Private Support (LWR, 2018).

LWR developed the framework from its learning in two river basins – Koshi and Narayani in Nepal and India. The framework has identified the pillars, which describe what needs to be a resilient community. These flood resilient communities have an EWS, CB DRR institutions, DR infrastructure and safety nets to help them absorb the impacts of a flood through well-planned, well-trained, and well-resourced preparation and recovery efforts. Their community members can adapt their livelihoods in ways that allow them to continue earning a living even after a flood as well as to increase their food security and incomes to be better prepared for the next flood. Their relationships with the public and

private sectors have transformed to afford them the long-term support they need to sustain their absorptive and adaptive capacities as well as the freedom to make progress towards improving their quality of life. During the Key informant interview with the Mayor of Saptakoshi, Saptari it was learned that six pillar approach is very useful because this is focused to the flooding, which is the major disaster in the municipality. The key informant also highlighted that they will be developing three communities as flood resilient model communities this year through applying six pillars approach. It is our hope that with proper contextualization, the six-pillar model will help local governments, development practitioners and flood-vulnerable communities plan and design new initiatives as well as reassess past or ongoing ones to build flood resilience in development contexts. The six pillars framework has also helped the municipality in Disaster Risk Reduction Management (DRRM) planning at local level focused to the flood vulnerable people". The participants of the focus group discussion from the Narsahi mentioned that this is good approach because it is integrated as per the need of the community to mitigate, preparedness, response and recover from the impact of flooding. This framework has also safety nets and livelihoods options which are primary factor to quickly recover from the impact of flooding. The communities of Saptari and Nawalparasi who have been living along the flood plains of Koshi and Narayani rivers from ages shared that the government and development agencies are more focused on disaster preparedness and response prioritizing CBDRR and early warning. However, to make communities resilient it is necessary to make their livelihoods and infrastructures resilient. The six pillars of resilient community framework is community focused because it covers

livelihoods and safety nets aspects of the most marginalized and flood vulnerable people (LWR 2018). The participants of FGD and KI from the Saptari and Nawalparasi-west districts discussed that the application of this framework is very contextual in Koshi and Narayani river basin. The framework was designed with limited stakeholders and partners engagement. There is need of a big discourse on ownership and accountability and involvement of multi-stakeholders including national and local governments.

4. Conclusion

Nepal has developed some DRR frameworks or approaches, policies, strategies, and plan relating to disaster risk reduction and management, but very few frameworks or approaches focused to flood disasters are developed. The government is dedicated to implement some of the frameworks such as SFDRR and nine minimum characteristics, but it is still unclear how these frameworks and policies will transfer to the new federal system and engage the target communities and stakeholders at the local level.. Several issues remain uncertain given the introduction of a new federal system of government as well as the recent promulgation of the 2017 DRRM Act. Under the 2017 DRRM Act, the roles and responsibilities of three different government is still not clear enough to carry out the responsibilities independently. The policy formulation and institutional setup does not give expected output unless there is ability and competence to operationalize the intent of the relevant frameworks, acts and policies (Nepal et al. 2018). Different research and studies have also highlighted the need of technical capacity building of the local government, resource allocation and finances for formulation of relevant local frameworks, plan and policies for disaster risk management (Hayes et al. 2020; IOM 2019; The Asia Foundation 2019).

Defining clear roles and responsibilities, creating ownership and accountability are crucial for effective management of any frameworks, act, plans and directives. There should be dedicated institutions for technical backstopping, strong monitoring, coaching, mentoring, review reflections and reporting mechanism in all three tiers of the government for mainstreaming DRRM.

Six pillars approach is holistic and dedicated to the flood risk management. The rural communities have appreciated because the framework also includes safety nets and livelihoods which are very crucial to quickly recover from disasters. However, this framework needs further validation in the field and should build the ownership and accountability from the local government. The major point is such that these frameworks need to be promulgated to all three tiers of governments with clear roles and responsibilities. More technical and managerial supports are needed to local government as the implementer and responder to disaster situations. These frameworks should be flexible and revised based on the learning through a bottom-up process. Focused to particular disasters like flooding and its risk and vulnerability assessment, quantifying risk, database for vulnerable (or affected) households, mapping and tracking of available external support, coordinated approach in preparedness, mitigation, response and recovery and also planning and preparing for worst case scenario will certainly enable the local government and its localization. The general frameworks for DRRM at national level is very effective. The government should also categorize the districts and municipalities based on the vulnerabilities and disasters scenarios. Localized frameworks to address the hazards, risks, vulnerabilities and disasters of the local government and communities need to be prioritized.

The paper highlights that above discussed and reviewed frameworks and approaches are beneficial and useful for flood risk management, there are no specific recommended framework, neither it is necessary that there is need of government authority to monitor, review-reflect, coordination, communication and reporting for further improvements in the flood risk management in Nepal. A flood risk reduction and management framework is crucial to address the needs of flood prone municipalities and communities in Nepal, however this needs to flexible and dynamic based on the rural context of Nepal.

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(Narayan Gyawali is the PhD Student at Agriculture and Forestry University (AFU) Nepal and can be reached by email: gyawali@gmail.com. Other co-authors are Prof. Dr. Durga Devkota at Agriculture and Forestry University (AFU) Nepal. Dr. Anoj Chhetri, (Adjunct Professor), Chairperson for Nepal Participatory Action Network (NEPAN). Dr. Pasupati Chaudhary, Senior Resilient Agriculture Specialist in ADPC. Prof. Dr. Haba Raj Devkota, Vice-Chairperson, Gandaki University, Pokhara, Nepal)