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Integration of Banks and Financial Institutions in Disaster Risk Financing: A Pathway to Strengthen Nepal's Resilience

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Abstract

This paper reviews the theoretical basis of key Disaster Risk Financing and evaluates their use in Nepal, drawing on existing literature, national policies, practices, and secondary data. Findings show Nepal has implemented some Disaster Risk Financing components into its policy framework, but implementation remains limited. Institutional fragmentation, capacity gaps, and low stakeholders' awareness make these tools less effective. Banking and Financial Institutions contribute only marginally, with Disaster Risk Financing showing feeble performance on risk pooling, risk transfer, liquidity management, and timely fund disbursement. Regulatory bodies such as Nepal Rastra Bank and the Ministry of Finance have yet to introduce binding policies, guidelines, or incentives to integrate Banking and Financial Institutions in the national Disaster Risk Financing framework. The absence of innovative financial tools and institutional direction has created persistent gaps. The paper points out the necessity of a more integrated Disaster Risk Financing framework and stronger involvement of the banking and financial system through coordinated regulatory action, policy alignment, and capacity strengthening to increase fiscal resilience.

Keywords: Disaster risk reduction, Budgeting, National budget, Risk transfer, Disaster risk finance, Banking and insurance

JEL Classification: G18, G22, H54, H81, D81, Q55, Q56

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Introduction

The increasing frequency and severity of natural disasters, worsened by climate change, have heightened global awareness of Disaster Risk Financing (DRF). International agencies, such as the World Bank, ADB, and UNDRR, have shifted to proactive, prepared, and pre-arranged disaster financing rather than reactive financing, which comes after the disaster occurs (Adhikari, 2025). The global adaptation finance requirements are estimated to grow to $160- $340 billion by 2030 and $315- $565 billion by 2050. This indicates a persistent funding gap, despite dire international commitments (UNEP, 2022). Globally, in 2020, climate financing fell short of $17 billion of the $100 billion pledged under the UNFCCC (Carty & Kowalzig, 2022). COP26 called for double adaptation finance by 2025, and COP27 has created the Loss and Damage Fund to assist poor and vulnerable nations that are victims of climate disasters. The significant funding deficit remains a barrier to effective adaptation by vulnerable countries to climate impacts (UNEP, 2022).

The DRF framework is an emerging and evolving problem in an international scenario. It includes both pre- and post-disaster financing techniques. Ex-ante techniques serve as a buffer against shocks by planning for disasters in advance, and ex-post techniques respond to disasters and bounce back afterward (Linnerooth-Bayer & Hochrainer-Stigler, 2015). It seeks to reduce the financial and fiscal costs of disasters by ensuring early preparation, proactive planning, and effective allocation of financial resources to enhance the country's economic resilience in the event of disasters (World Bank, 2014).

The World Bank has a program on DRF and Insurance that helps developing countries estimate the financial needs and risks associated with disasters and plan risk-sensitive financing to reduce the impact of crippling disasters (World Bank & GFDRR, 2014). The Sendai Framework 2015-2030 suggests integrating DRF into the government's state strategy, identifying gaps in disaster funding, and providing long-term, sustainable financial instruments across their preparedness, response, and recovery systems (UNDRR, 2015). According to the ADB-World Bank Guidance Note (2017), a standard diagnostic framework and recommendations for a holistic DRF strategy are provided to evaluate the current situation of DRF and insurance capacity to mitigate processes in a country.

International collaborative DRF systems have also gained momentum to reduce the consequences of disasters. Indicatively, the Caribbean Catastrophe Risk Insurance Facility and the African Risk Capacity are regional insurance pools in which risk is shared, and liquidity management is carried out in the event of a disaster. They combine the funds and ensure they are disbursed in times of emergency (World Bank, 2020).

The Resilient Development in the Pacific 2017-2030 framework proposes developing regional facilities to support government efforts to finance disaster and climate change risks. This strategy incorporates disaster financing systems, such as insurance or a pooled risk instrument, into comprehensive financial planning to build resilience and enhance disaster preparedness across all tiers of society. It also helps the Pacific island government and other relevant stakeholders incorporate DRM and climate adaptation into sustainable development planning for their area. Similarly, the ADB action plan 2024-2030 supports the mainstreaming of DRF within the resilient development and recovery framework in the Asia-Pacific region (ADB, 2024). Moreover, international systems, such as the Hyogo Framework for Action and the Sendai Framework for Disaster Risk Reduction (DRR), help realize that it is crucial to consider the DRF as part of disaster resilience systems (UNISDR, 2015). International policies, such as the Paris Agreement and the Sustainable Development Goals, highlight the need to use climate financing to build economic and social resilience (United Nations, 2015).

Despite significant global development, the gap in DRF remains large in many low-income countries. The trend of economic loss from disasters is rapidly growing relative to GDP in these countries, and insurance markets are underdeveloped, which means they cannot absorb financial shocks and create more robust fiscal safety nets. Such unrelenting financing and insurance coverage issues have raised international concern and necessitated building financial resilience, offered more inclusive insurance products, and aligned DRF strategies to work better (OECD & ADB, 2020).

Institutional Background

Nepal has made significant progress in disaster risk management (DRM) by establishing essential policies and institutions. The Disaster Risk Reduction and Management Act (2017) introduced a multi-level governance structure and resulted in the formation of the National Disaster Risk Reduction and Management Authority (NDRRMA). The framework of the National DRR Policy (2018) and the Strategic Action Plan for DRR (2018–2030) are complementary in offering long-term resource mobilization at both the public and private levels. Additionally, Nepal has developed a Disaster Risk Financing Strategy (2020) with the World Bank, which defines a variety of financial instruments to strengthen fiscal resilience. (Adhikari, 2025; MoF, 2023).

Regardless of these frameworks, disaster funding in Nepal is largely reactive, and there are multiple implementation gaps at multiple levels. Most of the public funds are used in emergency response, compensation, and post-

disaster reconstruction. The government has spent an average of NPR 50 billion on response and recovery between 2012 and 2020, reflecting a narrow focus on proactive risk reduction (UNDP, 2024). The budgets for DRR at the local level are insufficient and often fail to address the needs of the most vulnerable populations or to include pro-poor and gender-sensitive policies. The capacity constraints at the institution level further reduce the efficiency of the planned actions. (Shrestha, 2023).

Although legal frameworks provide a basis for resilience financing, weak enforcement, inadequate investment, and institutional capacity hinder the implementation of such commitments as practical measures (Prevention Web, 2025). The current presence of reactive funding and the lack of resources indicate the necessity of stronger legislation and dedicated funding to shift towards proactive and sustainable resilience financing.

Bank and Financial Institutions (BFIs) in Nepal have great potential to mainstream DRF through the risk retention, risk transfer, and post-disaster recovery methods. Nevertheless, their roles are still minimal and somewhat disjointed. Most institutions focus on post-disaster crisis relief rather than risk-informed pre-arranged financing (Adhikari, 2025). There are also significant structural issues in the insurance industry, which is the core of risk transfer. There are 40 insurance companies in Nepal (19 life and 20 non-life and one Reinsurance Company). Nevertheless, the Insurance Board does not have sufficient technical expertise and human resources needed to manage the diversified climate and disaster risks effectively and innovate products and cover more risks. Standardized government policies often fail to represent local risks. Agricultural insurance, which is backed by a 75 percent subsidy, also has low uptake due to delays in procedures, limited awareness, and poor claims management (Nepal Insurance Board, 2023). Insurance of property and other public assets, such as hydropower, hospitals, and roads, is also not well developed.

In Nepal, the use of DRF tools has been very low, particularly during major disasters. After the 2015 earthquake, the absence of a clear contingent credit policy delayed financial response efforts and exposed the structural vulnerabilities (World Bank, 2019). Widely used financial instruments, such as catastrophe bonds and alternative reinsurance mechanisms, are largely unexplored. There is no prioritization of public asset insurance. Subsidized agriculture micro-insurance has very low enrollment. Consequently, the country is very dependent on the ex-post financing instruments, including budget reallocations, international aid, and loans, with few ex-ante measures. Even though the annual contingent liabilities from natural disasters amount to 2-3 percent of the national budget, pre-

arranged instruments are largely underutilized (World Bank and GFDRR, 2014). Institutional capacity gaps also exist. Most of the BFIs operating in high-risk areas lack sufficient capital buffers and technical capabilities to manage large-scale disaster exposure. Awareness of DRF instruments among the population remains low, and individuals and businesses are still exposed to the risk of financial losses (Adhikari, 2025).

Overall, the DRF system of Nepal is characterized by a high potential that has not yet been developed. Strengthening the system involves implementing specific financial tools effectively, making them more accessible, developing products that reflect local risk conditions, raising stakeholder awareness, and boosting institutional capacity. These measures play a significant role in strengthening financial security and allowing quicker recovery from disaster-related economic shocks.

Considering such issues, the proposed research topic investigates the following research question: How can the banking and financial system of Nepal be effectively used to promote DRF to reduce economic losses and increase resilience to natural disasters? Resolving this question will be important in determining the roles, strategies, and tools that the financial systems can adopt to enhance the resilience of disaster and economic stability of Nepal.

Literature Review

Disaster Risk Financing: Concept and Theories

DRF is an emerging area that aims to invest in financial strategies and tools to manage the economic consequences of climate-related hazards and natural disasters. It is a system of financial practices aimed at distributing, absorbing, or transferring risk, with the primary objective of enhancing the financial readiness of individuals, communities, the private sector, and governments. The main mechanisms of DRF are risk transfer, risk retention, and risk pooling, which serve different purposes and are combined to strengthen resilience against unforeseen shocks.

Risk transfer will spread the cost of disaster between parties. The United Nations Office for DRR (UNDRR, 2017a.) states that this may occur either formally or informally, in which households, businesses, or governments are compensated after a disaster in exchange for regular contributions or premiums. The CAT bonds, reinsurance, and sovereign risk pools are risk-transfer tools that can spread significant losses across larger groups, reducing the fiscal burden on any single entity.

Risk retention occurs when governments or organizations finance disaster-related losses from their own resources. The method is usually applicable to low-cost, high-frequency events that occur regularly (World Bank, 2014). The important risk retention tools are budget allocations, reserve funds, and contingency budgets. UNDRR (2017) notes that risk retention must be implemented with other measures to minimize vulnerability and provide resilience in the longer term.

Risk pooling involves pooling resources and sharing risks among multiple parties to reduce each party's exposure. The pooling arrangements diversify risk, reduce premiums, and enhance financial stability among participants. A notable example is the Caribbean Catastrophe Risk Insurance Facility (CCRIF), which provides participating countries with rapid access to liquidity following severe disasters (World Bank, 2014).

The instruments of DRF are typically categorized as ex-ante (pre-disaster) and ex-post (post-disaster) instruments. Ex-ante tools, such as reserve funds, contingency budgets, contingent credit lines, and parametric insurance, are designed to provide immediate liquidity in the event of a disaster. The ex-post instruments include donor aid, emergency loans, and budgetary reallocations and are triggered after the occurrence (World Bank, 2014). An effective DRF model balances both approaches to minimize fiscal fluctuations, accelerate quick recovery, and help to create long-term risk reduction. Different financial instruments operate in this system. Weather derivatives are paid based on a specific weather condition. Insurance products offer compensation to households and businesses against disasters. Catastrophe bonds distribute risk to investors seeking higher returns, and contingent funds provided by the government offer immediate post-disaster funding. These instruments help spread risk more effectively and enhance the government's and institutions' capacity to respond to shocks.

Application of DRF Tools and Instruments in a Global Environment

Countries worldwide are moving towards the use of DRF tools in order to enhance financial preparedness and strengthen disaster response systems. The practice of BFIs internationally also indicates that BFIs are vital in the implementation of such tools- management funds flow, payouts, disbursements, financial product structuring, as well as linking national systems with the resources of the private sector. The subsections below describe the application of these tools in various countries and show how institutional arrangements and operational practices facilitate effective disaster risk financing.

Table 1 provides an overview of the key financial instruments utilized in DRM, outlining their objectives, the way to use them (ex-ante or ex-post), and examples of their application in various countries.

Table 1: Disaster risk management, financial instruments, and their implementation in different countries

Financial Instrument	Purpose / Concept	Implementation Across Countries
Risk retention (Ex-ante)		
Self-Insurance	Organizations or individuals isolate sections of the risk and indemnify the probable losses with their own funds (World Bank, 2014).	In the United States, self-insuring against disaster risks is a common practice among large companies and is provided by banks with technical and administrative assistance. (Heffernan, 2019).
Contingency Funds	Pre-determined funds are maintained to meet emergency demands and provide a rapid response in the event of disasters (OECD, 2015a).	Nepal's Prime Minister's Relief Fund and Japan's disaster contingency reserves are coordinated with banks to ensure rapid mobilization (World Bank, 2019).
Deductibles / Co-payments	The shared risk between the insured and the insurer reduces premiums and encourages risk management (OECD,2015a).	In the UK, disaster-related costs are commonly borne through insurance deductibles, and banks assist in developing balanced insurance products (Davidson, 2018).
Captive Insurance	A captive insurance company is an insurance company established by the parent company to deal with particular risks (OECD, 2015a)	Cayman Island-based Multinational firms use captive insurers, and banks aid them in creating and managing these arrangements (Bragg, 2020).
Risk Financing / Loans	Availability of credit or loans to finance disaster prevention, preparedness, or recovery (World Bank, 2014).	German banks provide dedicated credit lines for post-disaster reconstruction, helping businesses resume operations while easing immediate fiscal pressure (Müller, 2022).

Financial Instrument	Purpose / Concept	Implementation Across Countries
Risk pooling (Ex-ante)		
Mutual Insurance	Several actors combine resources to spread disaster risks collectively (IAIS & A2ii, 2017).	The banking sector supports and administers agricultural mutual insurance schemes in France (Dupont, 2019).
Risk Pools and Syndicates	Financial intermediaries assist in the formation of disaster risk-sharing groups, including agricultural or regional risk pools (World Bank, 2017).	Brazil has an agricultural insurance pool in which farmers and insurers share risks, with banks offering operational and financial services (Silva, 2021).
Reinsurance Pools	Insurance Companies distribute risk among other insurance companies to lessen the financial burden in the event of an impending disaster (World Bank, 2017).	Swiss Reinsurance distributes large-scale risks among insurers; banks support the structuring, assessment, and transfer of funds (Müller, 2020).
Catastrophe Risk Pools	Banks establish risk pools for large disasters and shift the risk to a few countries or industries (World Bank, 2017).	The Catastrophe Fund of Mexico centralizes disaster-response funds across multiple sectors; banks manage the flow of funds (Martinez, 2022).
Cooperative Risk-Sharing Agreements	Financial institutions help industries like agriculture to set up agreements to share disaster risk among members (World Bank, 2020a)	Farmers in Australia participate in cooperative programs to manage climate risks, with banks coordinating financial transactions and record-keeping (Harris, 2021).
Public-Private Participation	The bank aligns with the government and business to finance the projects that enhance disaster preparedness and recovery (OECD, 2015a)	India's NDMA partners with private firms for DRR; banks align financing mechanisms to support both preparedness and recovery (Coalition for Disaster Resilient Infrastructure, 2022; Kaur & Singh, 2024).
Compulsory Private Insurance	Mandatory insurance for exposed assets helps governments build financial readiness and reduce uncompensated losses (World Bank, 2022).	Romania mandates that every homeowner enroll in a national insurance pool, and reinsurers help diversify risk across the portfolio (Law no. 191/2015).

Financial Instrument	Purpose / Concept	Implementation Across Countries
Risk transfer (Ex-ante)		
Insurance / Risk Transfer	Transfers disaster risks to insurers who provide payouts after an event (OECD, 2015a)	The United States has the National Flood Insurance Program, in which banks help administer policies and claims (Brown, 2019).
Catastrophe Bonds / Insurance-linked Securities (ILS)	Market-based instruments transfer large-scale disaster risks to investors (World Bank Treasury, 2020)	The issuance of catastrophe bonds in Spain to finance extreme events, where issuance, investor relations, and payout systems are managed by banks (Garcia, 2022). Bermuda is also an international ILS center, with banks that help to arrange, meet regulatory requirements, and distribute (Thompson, 2021).
Parametric Insurance /	This type of insurance compensates quickly in response to a pre-determined physical event, e.g., rain, wind speed, earthquake magnitude, etc. (World Bank, 2018)	The Philippines uses parametric insurance to respond to typhoons; banks coordinate with reinsurers and monitor triggers (Reyes, 2021).
Weather Derivatives	Contracts that pay out when weather conditions impact economic activities (GARP, 2025).	South African farmers hedge climate risk with weather derivatives, and banks handle contract design and settlement (Jones, 2022).
Disaster Bond	Bank disaster bonds are financial instruments to cater to disaster-related expenses that provide a prompt inflow of funds (OECD, 2024)	Colombia issues disaster bonds to facilitate the issuance and disbursement of funds for disasters, which are provided through financial instruments (World Bank, 2025).
Contingent Credit Lines	Financial institutions offer pre-approved credit, such as the World Bank's CAT-DDO, for rapid post-disaster access (World Bank, 2014).	In the Philippines, the World Bank's CAT-DDO has been successfully applied to obtain fast funding following significant disasters (Martinez, 2021).

Financial Instrument	Purpose / Concept	Implementation Across Countries
Catastrophe Future	It allows investors to speculate on disaster events, transferring risk to global financial markets (OECD, 2015a)	In the United States, banks enable catastrophe futures to facilitate market deals and payments (Wilson, 2020).
Public Insurance	Government-supported insurance that cushions communities and households against the losses of a disaster (OECD, 2015a).	The CatNat system in France is a government-sponsored insurance that offsets part of the financial risks of natural disasters (OECD, 2015a).
Public Compensation Fund	Public compensation funds are government-funded compensation payments to households and businesses following calamities to assist in quick recovery and minimize uncompensated losses (OECD, 2015a).	The Netherlands has a public compensation fund that pays the residual, uninsurable disaster losses (OECD, 2015a).
Ex-Post disaster tools		
Emergency Loans / Grants / Tax Relief / Donor Assistance	Financial support is provided after disasters to enable recovery and reconstruction (OECD, 2015b)	Nepal offered subsidized housing loans at 2% interest to earthquake-affected households through commercial banks, refinanced by Nepal Rastra Bank (MoF,2015)
Post-Disaster Budget Allocation	Reallocation of government funds to address emergency disaster response (World Bank, 2020b)	NPR74 billion was allocated in the 2015/16 budget in the National Reconstruction Fund in Nepal to aid the reconstruction of housing, public buildings, and infrastructure post-disaster (myRepublica, 2015)

Regional Adaptions of DRF

The following table presents a comparative analysis of how various regional integration projects have used these DRF instruments and the functions they have performed in providing quick financial assistance and ensuring economic stability even after the disaster.

Table 2: Comparative analysis of main disaster risk financing instruments in the region

Region/ Issuing Entities	Instrument Type	Role of BFIs	Implementation/ Example
Caribbean (CCRIF), Latin America (Mexico, Philippines)	Catastrophe Bonds	Facilitate bond issuance, management, and rapid payouts	$30 million bond after the 2017 hurricanes (CCRIF, 2024); Mexico's $175 million Pacific hurricanes bond in 2024, and the Philippines' $225 million catastrophe bond in 2019 (World Bank, 2024; World Bank, 2019)
Sub-Saharan Africa (ADRF), Nigeria (Lagos State)	Catastrophe Credit Line / Parametric Insurance	Manage credit lines, insurance policies, and trigger-based payouts	Kenya used a $200 million CAT-DDO (World Bank, 2018); Lagos State activated a parametric scheme in 2022 to cover flood damages (Lagos State Ministry of Environment and Water Resources, 2024)
Europe (European Governments, Insurance Industry)	Catastrophe Insurance	Provide coverage and support for post-disaster recovery	Less than half of the EU population is currently insured against such events (European Central Bank & European Insurance and Occupational Pensions Authority, 2024)
Global (World Bank)	Integrated DRF Program (Risk Finance Umbrella)	Consolidate funding, reduce costs, and support analytical activities	Integrates previous DRF programs; supports analytical activities (World Bank, 2022)
European Union (EU Solidarity Fund, SEAR)	Public Disaster Fund	Manage fund allocation, disbursements, and post-disaster financial support	€500M annual budget (2014–2020); SEAR max €1.2B (2021–2027); extended to public health emergencies (COVID-19, 2020)

Region/ Issuing Entities	Instrument Type	Role of BFIs	Implementation/ Example
European Union (Cohesion Policy Programmes – ERDF, Cohesion Fund)	Co-financing / Risk Prevention	Co-finance the disaster prevention, resilience, and climate adaptation project	€8B spent over 2014–2020, with added flexibility introduced in the 2017 regulation for major disasters
EU Member States – Bulgaria, Czechia, Poland, Estonia, Lithuania, Malta, Ireland, Spain, Latvia, Hungary, Cyprus	Budgetary / Contingency Reserves	Manage immediate funding for emergencies; flexible allocation or supplementary budgets.	Annual contingency reserves 0.1–0.5% of GDP; used for unforeseen, urgent circumstances (OECD & European Commission, 2022)

The international practices outlined above show that an effective DRF involves a strong collaboration and good working relationship between financial institutions and regional cooperatives.

Government Structure, Institutional Arrangements, and Policy in Nepal

The DRM of climate-related disasters in Nepal needs to be governed with stronger policy, financial and institutional governance. In the recent past, the nation has made significant progress in DRR. The main agencies involved in the preparedness, response and risk reduction include Ministry of Home Affairs, the Ministry of Federal Affairs and General Administration and the Ministry of Urban Development which coordinate development partners for active implementation of DRM in Nepal.

The Disaster Risk Reduction and Management Act 2017 recognized a multi-layer governance system between federal and local governments. Thus, the National Disaster Risk Reduction and Management Authority (NDRRMA) was formed, with roles and responsibilities clearly defined across different levels of government. The long-term goals such as mobilizing public/private investment and resources at all levels of governance are stipulated by complementary policies such as the National Disaster Risk Reduction Policy 2018 and the Strategic Action Plan for DRR 2018–2030. The Disaster Risk Financing Strategy 2020, created in cooperation with the World Bank, suggests various financial instruments but notes the lack of effective implementation and of investment volumes (Adhikari, 2025; MoF, 2023).

DRF tools are becoming a greater in significance. On the federal level, the budgets on DRRM are documented in the Line Ministries Budget Information System (LMBIS); planning and reporting are carried out in the Sub-National Treasury Regulation Application (SuTRA) Government of Nepal, 2018). The National Framework on Climate-Induced Loss and Damage (2021) insists on the evaluation of loss and damage. It promotes the cooperation of the Ministry of Forests and Environment, NDRRMA, and other relevant stakeholders (Government of Nepal, 2021).

The national development plans include clear objectives: the 15th National Development Plan aims to reduce disaster-related GDP losses by up to 1.5%, disaster-related deaths, and the number of families affected (Government of Nepal, 2019). The 16th National Development Plan (2023/24–2025/26) continues to focus on resilience, the integration of DRR & CCA, government-level coordination, and civil society interaction (DPNet Nepal, 2023). In the meantime, the Second Nationally Determined Contribution (NDC) proposes a climate financing framework that distinguishes the fund among adaptation, mitigation, and loss and damage (Government of Nepal, 2020).

Despite these frameworks, funding remains primarily reactive and responsive to disasters, rather than a measure to prepare for them. Finance for public disasters is distributed across different levels, and DRRM funding covers only about 5% of total capital expenditure. As an example, post-disaster recovery expenses following the 2017 floods and earthquake amounted to NPR 912 billion, while the state's capital expenditure was only NPR 209 billion (ADB, 2019). The recent incidence of the October 2021 floods where the NPR 8.26 billion in paddy losses were recorded and the August 2024 Thame flooding in Khumbu, indicates the gaps that still exists (Ministry of Agriculture & Livestock Development, 2021; ICIMOD, 2024). Risk assessment, retention measures (reserves, contingent budgets/credit), and transfer mechanisms (sovereign risk transfer, asset insurance) are poorly developed. The issues are more challenging at the local level where DRR implementation is critical. The local government often does not have the means and abilities to incorporate DRR into its development programs. There is a lack of coordination between federal, provincial and local levels resulting in duplication of responsibilities and fragmented actions. Such fragmentation makes it challenging to monitor DRRM integration in the wider sectoral plans. Moreover, the lack of technical capacity and frequent transfer of government officials between various places also contribute to the problem of effective implementation (GoN, 2017c).

Methodology

This paper uses a comparative analysis and qualitative policy to identify the role of BFIs in DRF, Nepal. It integrates global best practices with Nepal's policies to identify gaps and opportunities in implementing the DRF. The study uses only secondary data, such as government policies and strategies (DRRM Act 2017, National DRR Policy 2018, Strategic Action Plan 2018–2030, Disaster Risk Financing Strategy 2020, Loss and Damage Framework 2021), fiscal data (RED Book, White Book, LMBIS, SuTRA), and reports of the international organizations (World Bank, ADB, GFDRR, UNFCCC, UNSIDR, OECD, UNDP and UNDRR). Reviews of relevant scholarly and empirical research on the DRF instruments were also conducted.

The study has three areas of analysis in terms of: (i) review of the international DRF instruments, experience, (ii) analysis of how Nepal adopts and operationalizes mechanisms of risk retention, risk pooling and risk transfer, and (iii) how the BFIs can play a contribution towards mobilizing resources, facilitating rapid flow of liquidity, and transferring risk. This paper applies the framework of fiscal resilience, examines ex-ante and ex-post financing plans, indicates institutional coordination, technical capacity, and policy integration gaps.

Triangulation of multiple data sources ensures reliability and strengthens findings. Limitations are the reliance on secondary sources, which can reduce the possibility of confirming real time flow of funds and full effectiveness of DRF implementation. This approach offers a systematic way of funding actionable insights into how banking and financial system can enhance disaster resiliency and financial preparedness against climate-induced disasters.

Results and Discussions

Nepal is highly susceptible to climate-related disasters, and it is often struck by floods, landslides, droughts, heatwaves, and wildfires, which are exacerbated by its mountainous topography and climate change-driven climatic conditions. The impacts of these events are high casualties, destruction of property and livelihoods, and the affected communities are mostly marginalized communities (DPNet-Nepal, 2025). In the year 2018-2024 alone, Nepal reported 32,375 incidents of disasters, which have led to 3,672 fatalities, 446 people missing, 11,752 injuries, 57,271 destroyed homes, 43,168 destroyed public infrastructure, 18,336 deaths of livestock, and losses to the economy in the form of NPR 23.60 billion (MoHA, 2024). Floods and landslides are the most common and devastating, occurring between June and September. The total damages related

to floods are over NPR 87,204 million in between 2008 to 2017 (GoN, 2024), and the 2017 floods in the Terai resulted in NPR 17.9 billion in agricultural losses (NPC, 2017). In the recent past, disaster damages reached NPR 8.28 billion of which there were NPR 422.85 million due to floods and landslides (GoN, 2024). The monsoon season resulted in losses of NPR 46.68 billion to the economy, 249 lives lost, and more than 10,000 displaced families in 2024 (NDRRMA, 2024). These recurring disasters underscore the vulnerability of the situation in Nepal and the dire need for proper disaster risk mitigation and management.

Cumulative Records on Climate-Induced Disasters (1971–October 2025)

Over the period from 1971 to 2025 October, Nepal reported 27,700 climate disaster events, which contributed 14,823 fatalities, 12,885 injuries, and NPR 113,575.6 million in damages, and impacted a population of over 5.5 million people. The most devastating hazards were floods and landslides, forest fires, hailstorms, strong winds, and cold waves, all of which caused significant damage.

Table 3: Summary of reported natural disasters in Nepal (1971–2025 october)

Natural Disaster	Number of Recorded Events	Number of deaths	Human Injuries	Livestock Loss	Reported Loss (Rs in million)	Affected
Avalanche	151	269	124	658	20.30	1568
Cold wave	696	870	132	780	834.65	2405
Drought	160	0	0	0	11.7	1625
Flood	6090	4300	800	541150	55221.49	4526813
FROST	6	7	0	0	457.2	0
Hailstorm	763	65	105	943	2231.50	218778
Heat wave	49	45	20	250	0	381
Landslide	7759	6358	3194	13775	50832.44	617226
Thunderbolt	4670	2299	5948	3685	154.34	15324
strong wind	2068	297	2089	4744	1346.45	64678
Heavy Rainfall	2918	212	373	5470	1043.94	78377
FOREST FIRE	2370	101	100	373	1421.59	17433
Total	27700	14823	12885	571828	113575.6	5544608

Source: Government of Nepal, 2025

Sectoral Losses and Economic Impact (1971–2019)

Between 1971 and 2019, Nepal suffered an estimated NPR 113,917.9 million in economic losses. The damage was caused by floods (NPR 105,950.8 million), then by landslides (NPR 1,972.9 million), and finally by forest fires (NPR 1,414.38 million).

Table 4: Sectoral losses and economic impact (1971–2019)

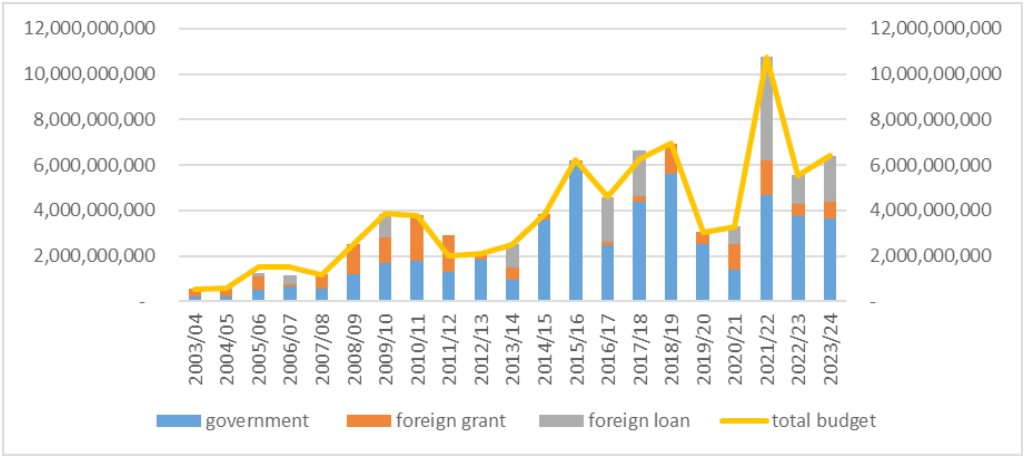
Type		Property					
	Livestock Loss	Private Housing (full)	Private Housing (Partially)	Agriculture (Ha)	Education center	Medical center	Reported Loss Rs millions
Avalanche	900	83	33	1.01	0	0	20.3
Cold wave	732	0	0	26906.5	12	0	834.65
Drought	0	0	0	465901. 7	0	0	531.7
Epidemic	7608	0	0	2000.94	0	0	2.631
Flood	543286	96274	103318	459327	133	5	105950.8
Forest fire	423	1877	2	46327.8 8	0	0	1414.38
Frost	0	0	0	5005	0	0	457.2
Hailstorm	951	208	1636	133481. 9	16	1	2733.31
Heat wave	250	0	0	0	0	0	0
Landslide	12519	20944	36432	22584.2 9	147	8	1972.9
Thunderbolt	0	405	643	0	0	0	0
Total	566669	119791	142064	493240.8	308	14	113917.9

Source: Government of Nepal, 2025

Funding Scenario in Flood Risk Management

The aggregate amount of the funds allocated to floods increased until 2010 and afterwards decreased until 2013. Between 2014 and 2021, it grows again, then falls in 2022 and 2023. The peak funding occurred in 2021.

Figure 1: Funding scenario in flood risk management



Source: Ministry of Finance, *Red Book* and *White Book*, Fiscal Year 2024. Government of Nepal (GoN, 2024)

DRF practices in Nepal are minimal; however, they are gradually evolving. Some of the risk retention and ex-post mechanisms employed in the country include contingency budget allocations, post-disaster borrowing, and the redeployment of development funds for recovery and reconstruction (MoF, 2023). The advent of risk transfer is beginning to emerge, such as agricultural micro-insurance, which is 75% subsidized and provides incomplete cover to farmers. However, it is still not being used due to limited awareness and time-consuming administrative issues (Nepal Insurance Board, 2023). There is indirect contribution of financial institutions in providing liquidity and recovery loans during crises, and pre-determined risk finance instruments are generally lacking (Adhikari, 2025). Initial policy measures, such as the National Reconstruction Act (2015) and specific tax breaks and subsidy plans, represent the first step in implementing the DRF.

Uses of DRF Tools and Instruments in Nepal

Nepal's approach to DRF combines both ex-ante and ex-post tools to handle the financial effects of natural disasters. The federalized system of governance gives freedom in revenue policies and disaster funds distributions.

Ex-ante financing instruments: At the national level, there are contingent funds such as the Prime Minister Relief Fund, the Central National Disaster Relief Fund, and Provincial and Local Disaster Management Funds that address the contingencies of disasters and relief following a disaster. However, they are primarily focused on immediate response instead of risk management

(MoF, 2017). Local governments also face challenges in reactionary disaster budgets. For instance, Gauriganga Municipality had to redirect disaster funds to handle the COVID-19 pandemic due to budget misallocation (World Bank, 2021). Dhangadhi sub-metropolitan city had to assign responsibilities at both the municipal and community levels to enhance disaster response. In the same manner, Chure Municipality had included Local Disaster Climate Resilience Plan (LDCRP) activities in the annual budgets, but unforeseen expenses often interfered with proper implementation of the plan.

In Nepal, post-disaster liquidity resources are often offered through grants, soft loans, and contingent credit mechanisms, e.g., the Deferred Drawdown Option (CAT-DDO) of the World Bank. During the COVID-19 pandemic, $25 million was drawn, yet policy provisions remain unclear and are still underutilized (World Bank, 2021). Micro-insurance programs, initiated in 1988 and comprising the Integrated Property Insurance Program, provide partial coverage for property losses but still face low participation due to procedural and administrative delays (ADB, 2019). The recent introduction of the Insurance and Risk Financing Initiative by UNDP in Nepal also highlights a shift toward treating disaster shocks (e.g., floods, droughts, earthquakes) as financial risks. However, the Country Diagnostic Report cautions that low insurance awareness, data gaps, and regulatory obstacles are stalling efforts to develop inclusive disaster-risk insurance markets (UNDP, 2024).

Ex-post DRF tools: Nepal has relied heavily on post-disaster actions, i.e., budgetary reallocations, emergency loans, disaster relief, and donor relief. To illustrate, during the 2015 earthquake, the ADB provided loans to reconstruct, and the European Civil Protection and Humanitarian Aid Operations provided funds to recover through grants (World Bank, 2020). The latest foreign assistance has been a grant of $6.1 million and a concessional loan of $17.9 million for the forest-based businesses (World Bank, 2021). Recovery efforts are largely dependent on public-private partnerships and international assistance, yet overreliance on after-the-fact financing leads to underfunding of other sectors and insufficient disaster preparedness (COLARP & Practical Action Nepal, 2020; Dhungana, 2023). Cash transfer programs are now widely used to offset short-term losses, but explicit policies on tax relief remain minimal (Government of Nepal, 2023).

The Impact of Disasters on BFIs and NRB Interventions

Natural disasters cause concentrated credit shocks, weakening the asset quality of BFIs, increasing borrower defaults, decreasing collateral values,

and raising non-performing loan ratios and expected credit losses (ECL). Key indicators include sectoral NPL ratios, stage-wise ECL migration under IFRS 9/NFRS 9, provisioning coverage, restructured-loan volumes, concentration in vulnerable sectors, and liquidity ratios such as LCR and NSFR. Nepal's frequent climate-induced disasters often require post-disaster refinancing and budget reallocations, thereby increasing fiscal and banking-sector risks.

To strengthen resilience, NRB has formulated regulatory and operational measures. The Environmental and Social Risk Management Guidelines (2022) impose BFIs to consider environmental and climate-related risks in credit assessment and monitoring, to provide proactive exposure evaluation, and to disclose to the people. NRB also follows the Basel Committee's principles by incorporating aspects of business continuity, ICT/cyber resilience, and third-party dependency management (Basel Committee, 2021). Sustainable Banking and Finance Network (SBFN) makes green financing and sustainable banking accessible, including, but not limited to, green credit delivery and subsidized lending to renewable energy, irrigation, and climate-smart agriculture. ICT and cybersecurity policies, the flexibility of monetary policy, the possibility of loan rescheduling, refinance facilities, and prearranged instruments such as CAT-DDO contribute to the further resilience of BFIs to disasters (NRB, 2022; World Bank, 2020c).

Although such intervention makes the BFIs more resilient in dealing with disaster and climate risks, there remains a gap in the pre-established risk transfer arrangements and the dedicated Stressed Loan Resolution Framework, which are critical to assuring the quality of assets, a quick response, and the stability of the financial system in Nepal.

Problems, Facilitators, and Barriers of an Inclusive Climate and DRF

The institutions, practices, and policies of inclusive climate-related DRF are interconnected, as shown in Table 5. Both enablers and barriers to climate and DRF are discussed to highlight existing practices and gaps with reference to the DRF framework and instruments, as well as refinancing and risk insurance.

Table 5: Problems, enablers, and obstacles of disster risk financing in Nepal

Problems	Enablers	Obstacles
Policies in the field of DRF	The National Strategic Plan of Action for DRR (2018–2030) and the DRF Strategy provide guidance on managing fiscal risk and multi-hazard financing (MoHA, 2018; NDRRMA, 2021).	The policies are not entirely localized. Very little is done to provide cost–benefit analyses and assessments of DRF tools, thereby reducing the evidence-based implementation of policies (World Bank, 2021; UNDP, 2021).
Institution/Agencies Formation	NDRRMA and disaster committees exist on federal, provincial, and local levels that offer organized coordination mechanisms (GoN, 2017a; NDRRMA, 2021)	Overlapping responsibilities between MoF, NDRRMA, and MoFE are problematic.
Guidelines for line agencies and local governments	Guidelines assist with the mainstreaming of DRRM in planning and budgeting (GoN, 2017b; UNDP, 2021).	The lack of human resources in provinces and localities poses a challenge to effective implementation.
DRR focal points in line agencies	Facilitate inter-agency coordination and DRF planning (GoN, 2017b).	The focal persons are usually burdened with other responsibilities, and this limits their concentration on DRF work
Reserve funds (PMR, CDMF, provincial/local funds)	Provide financial resources for immediate disaster response and risk financing (MoF, 2023).	Local staff are limited in capacity and poorly oriented, which minimizes their optimum utilization.
Private sector engagement (BFIs and insurance)	More banks and insurance companies are considering the prospect of involvement in risk transfer and financing (ADB, 2021; GoN, 2017b).	The functions of the insurance and financial sector in DRF are not clearly defined, nor are they fully defined.
Budget tracking systems (LMBIS, PLMBIS, SuTRA)	These systems allow tracking the DRR and climate-related spending at the federal and local levels (MoF, 2020; UNDP, 2021).	Information hardly figures in budget planning; local ability is constrained by effective utilization.
Expenditures on climate change	Tracking systems allow identification of adaptation and DRR spending (UNDP, 2011; MoF, 2020).	Uneven distribution constrains transparency and evidence-based planning.

Accounting systems integration	Potential for comprehensive national DRRM accounting (MoF, 2020; GFDRR, 2022).	Weak integration and poor coordination diminish efficiency.
Local practices (fund allocation, risk transfer)	Some local governments allocate DRRM funds at ward levels and support agricultural insurance (Practical Action, 2020; GoN, 2017b).	LDCRP is not compulsory; local authorities frequently cannot pursue the DRF strategy regularly.

Conclusion

Nepal is highly prone to climate-related disasters, including frequent landslides, floods, droughts, and extreme weather. Most disaster prevention and mitigation measures in Nepal are reactive and adopted only after a disaster occurs. The government is prepared mainly with its budget allocation and contingency funds. Risk pooling and risk transfer pre-disaster tools are not well developed. The DRR roles of regulatory bodies, such as MoF, NRB, and the Insurance Board, are minimal or negligible, and this has largely influenced the country's capacity to prepare for and respond to disasters on time. This scenario underscores the urgent need for an effective and proactive DRF framework.

Drawing on international experience, Nepal should integrate its policies, regulations, and institutions to enhance its DRF system. NRB, all banking and financial systems, and government programs must be integrated into a single DRF ecosystem to create a resilient, fiscally sustainable, and inclusive disaster management system. To cope with disaster losses, the government must consider and develop disaster financing tools, such as disaster bonds, disaster reserve funds, sovereign parametric insurance, cooperative risk-sharing, mandatory private and public insurance, and standby credit facilities in case of an emergency. BFIs must have their role expanded, and there should be rules and mandatory requirements for risk-related lending, credit guarantees, risk retention, and the transfer of risk.

Through the process of targeted policies and subsidy assistance by NRB, BFIs need to offer a variety of innovative and customized disaster-related financial products, such as catastrophe bonds, weather derivatives, catastrophe risk pools, risk financing, and credit lines, which can offer quick and more effective support to the communities and the governments affected by disasters. NRB has the potential to assist the BFIs by providing policy directives, refinancing, subsidizing, and integrating disaster financing in banking activities. It can assist in a layered risk financing system by incorporating government funds, insurance, and credit. Moreover, NRB might take on the role of researching disaster risk instruments and assessing their feasibility for implementation on BFIs.

The insurance sector, with its initial phase of disaster-related instruments such as government-subsidized crop insurance and property or infrastructure insurance, needs further development and maturity of its instruments to provide support in a timely and efficient manner. Increasing and expanding various types of insurance, such as parametric and index-based insurance, and encouraging micro-insurance, while capitalizing on risk-based capital market instruments for the Nepalese insurance industry, can further increase risk cover and financial sustainability and raise private and foreign capital. In collaboration with the government of Nepal, the governing institutions need to increase financial inclusion in the DRF. It can be done by introducing microfinance, disaster-specific savings, subsidies, and digital platforms.

The key stakeholders, such as banks, insurers, and government agencies, should have broad, visionary knowledge to introduce DRF into the financial system. It is also necessary to have a trusted, authentic database management system that will help identify, aggregate, and analyze risk information to enhance Nepal's disaster management. To improve disaster risk resilience and the timely delivery of disaster victims, it is necessary to transform the DRF system in Nepal from a reactive, post-disaster model to a pre-disaster one. Therefore, with a proactive, multifaceted, innovative, integrative, and participatory approach, Nepal can reduce unexpected economic and human losses from disasters, become financially robust, offer quick and reliable assistance to vulnerable groups and communities, and be prepared to handle the effects of disasters prior to their occurrence.

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