Government of Nepal
Ministry of Home Affairs
National Disaster Risk Reduction and Management Authority

Rapid Damage and Needs Assessment (RDNA)

Rasuwa-Bhotekoshi Flood 2026

September 2026

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FOREWORD

The ice and rock avalanche and subsequent debris-laden flood of 26 August 2026 caused extensive loss of life, displacement and damage along the Bhotekoshi–Trishuli–Narayani river corridor. The Rasuwa Bhotekoshi Flood 2026 affected homes, agricultural land, roads, bridges, hydropower facilities and other essential public services. Damage to transport and communication networks isolated several communities and constrained rescue, relief and assessment activities. The disaster exposed the serious and interconnected risks facing settlements, infrastructure and livelihoods in Nepal's mountain river corridors.

This Rapid Damage and Needs Assessment (RDNA) was undertaken under the leadership of the National Disaster Risk Reduction and Management Authority (NDRRMA), in collaboration with the National Planning Commission (NPC), federal ministries, provincial and local governments, security agencies and technical institutions. It consolidates the information available on physical damage, economic losses, effects on people and services, and priority recovery needs. As access to some upstream areas remained restricted and sectoral verification was continuing, several findings and estimates will require further review. The report should therefore be treated as an evolving evidence base and updated as additional sectoral and local-level information becomes available.

Recovery must respond to the immediate and longer-term needs of affected families while reducing the risks that contributed to the scale of the disaster. Reconstruction should apply safer siting, resilient design standards, environmental safeguards, and stronger monitoring and early-warning arrangements. Priority should be given to displaced and isolated households, and to people facing greater barriers to assistance, services and recovery opportunities. Recovery support should be coordinated through government mechanisms and guided by verified needs, community priorities and principles of equity and accountability.

I extend my appreciation to the affected communities, local representatives, government officials, security personnel, technical experts, humanitarian and development partners, civil society organisations and volunteers who contributed to rescue, relief, information collection and assessment under exceptionally difficult conditions. This RDNA provides a common basis for recovery planning, resource mobilisation and reconstruction. I call upon all partners to support a government-led, locally informed, inclusive and risk-based recovery process.

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Dr. Dharam Raj Uprety
Chief Executive
National Disaster Risk Reduction and Management Authority
Government of Nepal

ACKNOWLEDGEMENT

This Rapid Damage and Needs Assessment was prepared under the leadership, coordination and technical support from the National Disaster Risk Reduction and Management Authority. The Multisectoral RDNA Committee reviewed sectoral submissions, clarified assessment definitions and consolidated findings received from responsible government institutions. Participating ministries, departments, provincial and local governments, and field offices collected and validated information relating to their respective sectors. NDRRMA coordinated the assessment process and maintained the consolidated report.

MOBILIZATION TEAM

The Government of Nepal (GoN) acknowledges the contribution of the Data and Technology for Rescue, Assessment and Response Team, mobilized to support information collection, geospatial analysis, technical assessment and response coordination. Its work helped generate and consolidate evidence used in the disaster response and the RDNA process. The Government of Nepal also acknowledges the Asian Disaster Preparedness Center (ADPC) for the technical support for preparing this report.

The Government of Nepal acknowledges the affected communities, local representatives, government officials, emergency operation centres, security agencies, health workers, technical experts, international search and rescue teams, private-sector infrastructure operators and volunteers who supported the response to the 2026 Rasuwa Bhotekoshi Flood. Reports, operational updates, maps, datasets and technical analyses published or officially shared by government agencies, response partners, United Nations agencies, international and intergovernmental organizations, development partners, the Red Cross and Red Crescent, humanitarian and development organizations, civil society and community-based organizations, academic and research institutions, professional associations, private-sector entities and media organizations were reviewed as secondary sources and provided valuable contextual and supporting evidence for the Government-led RDNA. Responsibility for the assessment's analysis, interpretation and conclusions rests with the Government-led RDNA process.

MULTISECTORAL RDNA COMMITTEE

The Multisectoral RDNA Committee brought together NDRRMA, central planning and statistics institutions, and government agencies responsible for key affected sectors. The Committee reviewed sectoral submissions, clarified definitions and supported the consolidation of findings. Individual ministries and departments remained responsible for validating information relating to their respective sectors. NDRRMA coordinated the overall process and maintained the consolidated assessment.

Multisectoral RDNA Committee

Member	Designation and Institution
Arjun Bhandari	**Joint Secretary,** National Planning Commission (NPC) — RDNA Lead
Mahesh Chandra Neupane	**Joint Secretary,** National Disaster Risk Reduction and Management Authority (NDRRMA)
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Shankar Adhikari	**Director,** Ministry of Education and Sports (MoES)
Dol Narayan Shrestha	**Computer Officer,** National Statistics Office (NSO)

DISCLAIMER AND STATUS OF ESTIMATES

This **Rapid Damage and Needs Assessment (RDNA)** was prepared under the leadership of the National Disaster Risk Reduction and Management Authority, with support from the National Planning Commission and contributions from relevant government institutions. The assessment reflects information received and consolidated up to **3 September 2026**. Subsequent revisions and editorial review continued until **10 September 2026.**

The assessment is based on submissions from the responsible government ministries, departments, public agencies and affected local governments; administrative records; initial field information; technical observations; and geospatial analysis. Where direct information was unavailable, estimates were derived from census data, government norms, previous records, unit costs and stated assumptions. Coverage and verification vary across sectors. Estimated affected buildings, households and population should be interpreted according to the stated methods and should not be equated with verified counts of destroyed buildings, displaced people or households requiring relocation.

The distinction between damage, economic losses and recovery needs is informed by the joint European Union–United Nations–World Bank Post-Disaster Needs Assessment Guidelines.[1]

For this assessment:

- ➔ **Damage** represents the estimated monetary value of physical asset damage, calculated using the methods specified in the respective sector assessments.

- ➔ **Losses** represent estimated changes in production, income and service flows attributable to the disaster over the periods specified in the respective sector assessments.

- ➔ **Recovery needs** represent the estimated requirements for restoring services, livelihoods and infrastructure and reducing future risk. These estimates do not constitute approved budgets or financing commitments.

The findings are intended to inform disaster response, early recovery planning, government decision-making, prioritisation and resource mobilisation. They provide a basis for subsequent verification and detailed sector assessments, including a Post-Disaster Needs Assessment (PDNA) where undertaken. Missing or zero monetary entries do not necessarily indicate an absence of effects or recovery requirements. Their interpretation depends on the coverage and notes stated in the relevant sector assessment.

ABBREVIATIONS AND ACRONYMS

[1] *European Union, United Nations Development Group and World Bank. 2013. Post-Disaster Needs Assessments Guidelines, Volume A. Available at: GFDRR - PDNA Guidelines, Volume A.*

Abbreviation	Meaning
AAP	Accountability to Affected People
ADBL	Agricultural Development Bank Limited
ADPC	Asian Disaster Preparedness Center
AEPC	Alternative Energy Promotion Centre
APF	Armed Police Force
ATM	Automated Teller Machine
ASYCUDA	Automated System for Customs Data
BBB	Build Back Better
BPT	Break-Pressure Tank
BS	Bikram Sambat
BTS	Base Transceiver Station
CC	Collection Chamber
DDA	Detailed Damage Assessment
DDMC	District Disaster Management Committee
DoED	Department of Electricity Development
DHM	Department of Hydrology and Meteorology
DMG	Department of Mines and Geology
DRR	Disaster Risk Reduction
DUDBC	Department of Urban Development and Building Construction
DWRI	Department of Water Resources and Irrigation
DWSSM	Department of Water Supply and Sewerage Management
DoH	Department of Health
DoHS	Department of Health Services
DoLID	Department of Local Infrastructure Development
DoR	Department of Roads
DoT	Department of Tourism
EMIS	Education Management Information System
FAO	Food and Agriculture Organization
FTTH	Fibre to the Home
FNCCI	Federation of Nepalese Chambers of Commerce & Industry
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GEDSI	Gender Equality, Disability and Social Inclusion
GIS	Geographic Information System
GoN	Government of Nepal

Abbreviation	Meaning
HBL	Himalayan Bank Limited
HH	Household
HMIS	Health Management Information System
IC	Interception Chamber
IDO	Infrastructure Development Office
IEMIS	Integrated Educational Management Information System
ISP	Internet Service Provider
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Produces
MBL	Machhapuchchhre Bank Limited
MSME	Micro, Small and Medium Enterprise
MoAFE	Ministry of Agriculture, Forest and Environment
MoCIT	Ministry of Communication and Information Technology
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MoHA	Ministry of Home Affairs
MoID	Ministry of Infrastructure Development
NA	Nepal Army
NAP	National Adaptation Plan
NbS	Nature-based Solution
NDC	Nationally Determined Contribution
NDRRMA	National Disaster Risk Reduction and Management Authority
NEA	Nepal Electricity Authority
NICA	NIC ASIA Bank Limited
NIMB	Nepal Investment Mega Bank Limited
NP	Nepal Police
NPC	National Planning Commission
NPR	Nepalese Rupee
NRB	Nepal Rastra Bank
NSO	National Statistics Office
NTC	Nepal Telecom
NWASH-MIS	National Water, Sanitation and Hygiene Management Information System
PDNA	Post-Disaster Needs Assessment
PHCC	Primary Health Care Centres
PSEAH	Protection from Sexual Exploitation, Abuse and Harassment
RCC	Reinforced Cement Concrete

Abbreviation	Meaning
RCP	Representative Concentration Pathway
RDA	Rapid Damage Assessment
RDNA	Rapid Damage and Needs Assessment
RET	Renewable Energy Technology
RVT	Reservoir tank
SAR	Search and Rescue
SDG	Sustainable Development Goals
SMS	Short Message Service
UN	United Nations
UNEP	United Nations Environment Programme
VC	Valve Chamber
VRA	Vulnerability and Risk Assessment
WASH	Water, Sanitation and Hygiene
WB	World Bank
WDV	Written-Down Value
WECS	Water and Energy Commission Secretariat
WHO	World Health Organization

UNITS AND SYMBOLS

Symbol or expression	Meaning
NPR crore	Ten million Nepalese rupees
NPR million	One million Nepalese rupees
NPR billion	One thousand million Nepalese rupees; 100 crore
%	Percent
ha	Hectare
km / km²	Kilometre / square kilometre
m / m² / m³	Metre / square metre / cubic metre
m³/s	Cubic metres per second
mm	Millimetre
sq ft	Square foot
MT / tonne	Metric tonne
kW / MW	Kilowatt / megawatt; power capacity

Symbol or expression	Meaning
GWh	Gigawatt-hour; energy
Mw	Moment magnitude
-	No estimate or not applicable, as explained in the relevant table
USD	United States Dollars

KEY TERMS AND DEFINITIONS

Term	Definition used in this RDNA
Affected area	A geographic area reported or mapped as experiencing direct or indirect disaster effects, including flooding, erosion, debris deposition, access disruption or interruption of services. Inclusion within an affected area does not mean that every person, building or asset within it sustained damage.
Assessed building	A building included in the RDNA dataset through imagery, mapping, administrative reporting or sector submissions. Inclusion does not by itself confirm physical damage, occupancy or habitability.
Affected building	A general term for a building identified as having potentially experienced disaster effects. It may include a building that was swept away, buried by sediment or debris, inundated, structurally damaged or rendered inaccessible. Where identification is based only on location within the mapped impact area, the term **exposed building** should be used.
Exposed building	A building located within a mapped or assessed flood, debris-flow or erosion impact area. Exposure does not confirm physical damage, occupancy at the time of the event or loss of habitability.
Impacted building	A building for which imagery, field information or administrative reporting indicates some form of disaster effect. The term does not establish the degree of damage unless a damage classification is provided.
Estimated affected building	A building identified through the assessment methodology as potentially affected by the disaster. Depending on the information source, this may indicate mapped exposure or reported physical effects. It should not be interpreted as a verified damaged or destroyed building unless a damage classification is provided.
Affected household	A household experiencing direct or indirect disaster effects, such as damage to its dwelling or assets, displacement, livelihood disruption, loss of services or restricted access. Some household figures in this report are estimated from building counts and census relationships rather than verified household records.
Associated household	A household estimated to be linked to an assessed building by applying census-based households-per-building coefficients. It is not a verified count of households occupying that building at the time of the disaster.
Estimated affected population	The population is calculated by applying census-based household-size and occupancy relationships to assessed building counts. It is a planning estimate and not a verified count of people physically present, displaced or directly affected.
Associated population	The population is estimated to be linked to assessed buildings through census-based occupancy relationships. It does not represent a verified count of people present in those buildings or directly affected by the disaster.
Directly affected person or household	A person or household experiencing immediate disaster effects, such as death, injury, displacement, damage to housing or assets, livelihood loss, inundation or physical isolation.
Indirectly affected person or household	A person or household experiencing consequences through interrupted services, transport, markets, employment, supply chains or economic activity without necessarily sustaining direct physical damage.
Physical damage	The monetary value of the total or partial destruction of physical assets caused by the disaster, generally estimated using repair or replacement costs applicable at the time of assessment.
Economic loss	The estimated value of reduced production, interrupted services, forgone income or economic activity, and additional operating expenditure arising after the disaster over a specified period. Economic loss is distinct from physical damage.

Term	Definition used in this RDNA
Annual economic loss	An estimate of reduced production, turnover, income or service flows over the period specified by the relevant sector. Where annual assumptions are applied, the amount should not be interpreted as a confirmed loss unless the actual interruption period is established.
Total disaster effects	The combined monetary value of assessed physical damage and economic losses. Recovery needs are presented separately and are not included in total disaster effects.
Combined damage and losses	The sum of physical damage and economic losses recorded for a sector or subsector. This amount is not equivalent to recovery needs or to the disaster-induced reduction in gross domestic product.
Human effects	The consequences of the disaster for life, health, safety, displacement, living conditions, livelihoods and access to assistance and essential services.
Service effects	Changes in the availability, accessibility, quality or continuity of public or private services resulting from damaged assets, disrupted networks or operational constraints.
Asset inventory	A list of buildings, infrastructure, equipment, stocks or other assets covered by a sector assessment. An inventory may contain reported, estimated or modelled entries and does not necessarily constitute a field-verified record.
Household assets	Movable items used by a household, such as furniture, appliances, utensils, clothing and other essential possessions. These are valued separately from the residential structure where indicated.
Damage classification	The category assigned to an asset, commonly partial or complete damage, for assessment and valuation. Unless supported by an engineering inspection, the classification should not be interpreted as a formal determination of structural safety.
Completely damaged or destroyed	An assessment category applied where an asset has collapsed, been swept away, become buried or sustained damage so extensive that replacement or reconstruction is required. Unless supported by technical inspection, it does not constitute a final engineering determination.
Partially damaged	An assessment category applied where an asset has sustained physical damage but may be repairable. Partial damage does not mean that the asset is safe, habitable or functional.
Inundated building	A building entered or surrounded by floodwater. Inundation does not by itself establish the extent of structural damage or whether the building remains habitable.
Buried or sediment-affected building	A building wholly or partly covered, filled or obstructed by mud, sediment or debris. Its structural condition and habitability require verification following clearance and inspection.
Swept-away asset	A building, structure, vehicle, item of equipment or other asset physically removed from its original location by floodwater, debris flow or erosion.
Housing habitability	Whether a dwelling can be occupied safely and provides minimum essential living conditions. Assessment of habitability considers structural stability, safe access, weather protection, water and sanitation, adequate living space, essential services, contamination and exposure to continuing hazards. Habitability cannot be determined from exposure mapping alone.
Uninhabitable dwelling	A dwelling that cannot be safely occupied because of structural damage, inundation, debris, contamination, unsafe access, loss of essential services or continuing hazard. A dwelling may be uninhabitable even when it has not been completely destroyed.
Functionality	The extent to which a facility, infrastructure system or service can perform its intended function following the disaster. An asset may remain functional despite physical damage or become non-functional without being completely destroyed.

Term	Definition used in this RDNA
Service interruption	A reduction, suspension or loss of access to electricity, water, sanitation, telecommunications, transport, education, health, banking or another service. Damage to an asset does not by itself establish the duration of interruption or the number of users affected.
Displaced person or household	A person or household that has left or been required to leave its usual residence because of damage, danger, loss of access or disruption of essential living conditions. This includes people staying in holding centres, temporary shelters, rented accommodation or with relatives or host families.
Temporary accommodation	Any short-term living arrangement used by displaced people, including holding centres, tents, rented accommodation, host-family arrangements or other transitional accommodation. It is broader than accommodation recorded through holding-centre reporting.
Temporary holding centre	A short-term communal location used to receive and accommodate people displaced or evacuated following the disaster. It may be established in a school, public building, community facility, tented site or other available space while safer or more suitable accommodation is arranged.
Characteristics of a temporary holding centre	A holding centre should have a safe location and access, adequate covered space, drinking water, sanitation, lighting, waste management, privacy, security and access to basic health and protection services. Arrangements should be accessible to women, children, older persons, persons with disabilities and others requiring additional support. Conditions may vary between centres.
Temporary shelter	Short-term household accommodation that generally provides greater privacy and continuity than a communal holding centre. It may include tents, transitional structures, rented accommodation or support for host families.
Isolated household or community	A household or community whose normal physical access to markets, services or administrative centres has been severed or severely restricted by damage to roads, bridges, trails or communications. Isolation does not necessarily mean displacement or damage to every dwelling.
Relocation	The temporary or permanent movement of a household, facility or settlement to another site where continued occupation or reconstruction at the original location is considered unsafe or impracticable.
Repair	Work undertaken to restore a partially damaged asset to a safe and functional condition without replacing it completely.
Reconstruction	Rebuilding an asset that has been destroyed or cannot reasonably be repaired, incorporating appropriate safety, resilience and accessibility measures.
Replacement cost	The estimated cost of replacing a damaged asset with an asset of comparable function and capacity at current prices. It does not automatically include resilience improvements, expansion or technological upgrading.
Recovery need	The estimated resources required to restore services, livelihoods and productive capacity, reconstruct damaged assets and reduce future risk. Recovery needs are distinct from damage and losses and may include temporary arrangements, resilience measures and implementation costs.
Indicative recovery estimate	A planning amount derived from available damage information, unit rates, sector assumptions or costing factors. It is not an approved budget, financing commitment or final intervention cost.
Early recovery period	The first six months following the disaster, during which interventions focus on restoring essential access, services, temporary accommodation and basic livelihood functions and preparing for longer-term reconstruction.

Term	Definition used in this RDNA
Longer-term recovery and reconstruction	Measures expected to be implemented beyond six months, including permanent reconstruction, restoration of productive capacity and longer-term disaster risk reduction.
Build Back Better	The use of recovery and reconstruction to reduce existing vulnerability and disaster risk through safer location, design, construction, services and institutional arrangements.
Compound hazard	A situation in which two or more hazards or contributing processes occur together, in close succession or under connected conditions, producing effects greater or more complex than those associated with a single hazard. In this event, the interaction of rock and ice movement, floodwater, sediment, unstable slopes, river obstruction and rainfall created compound hazard conditions along the river corridor.
Cascading hazard	A sequence in which one hazardous process triggers or intensifies another. In this event, the rock–ice avalanche mobilised sediment and water, generating debris flow and downstream flooding, erosion, deposition, infrastructure damage and service disruption.
Residual risk	Disaster risk that remains after the initial event or following the introduction of risk-reduction measures. This includes risks from unstable slopes, blocked channels, temporary impoundments, continuing rainfall, renewed debris movement and secondary flooding.
Temporary impoundment	A body of water formed when sediment, debris or slope material temporarily obstructs a river or drainage channel. Sudden failure of the blockage may produce rapid downstream flooding or debris flow.
Debris flow	A rapidly moving mixture of water, sediment, rock, soil, ice and other material travelling downslope or through a river channel.
Debris clearance	The removal, transport and disposal or management of disaster-generated building debris, mud, sediment and other material necessary to restore safe access, land use or services. Estimated clearance quantities may represent only the portion assumed to require mechanical removal.
Assessment area	The locations, populations and assets included in the RDNA based on the information available. It is narrower than the full administrative area of the included districts and local levels.
River corridor	The assessed area along the Bhotekoshi–Trishuli–Narayani river system where disaster effects were reported or mapped. It is an analytical boundary and does not represent the full administrative area of every included district or local level.
Administrative area	The legally defined boundary of a district, municipality, rural municipality or ward. Inclusion of an administrative area does not mean that its entire territory, population or asset stock was affected.
Reported figure	Information submitted or published by a responsible institution or another identified source. A reported figure is not necessarily independently verified by the RDNA team.
Estimated figure	A value calculated from available records, unit rates, mapped information or stated assumptions. Its reliability depends on the quality and coverage of the underlying data.
Modelled estimate	A figure calculated from baseline data, statistical relationships, mapped exposure or stated assumptions where direct records were incomplete or unavailable.
Verified figure	Information checked against an authoritative record, field observation, imagery, technical review or another sufficiently reliable source. The method and extent of verification may vary by sector.
Data validation	The review of submitted information for internal consistency, geographic coverage, reporting period, valuation basis, calculation accuracy and possible duplication. Validation does not necessarily constitute field verification.
Field verification	The checking of reported or estimated information through direct observation, measurement, interviews or asset-level inspection at the affected location.

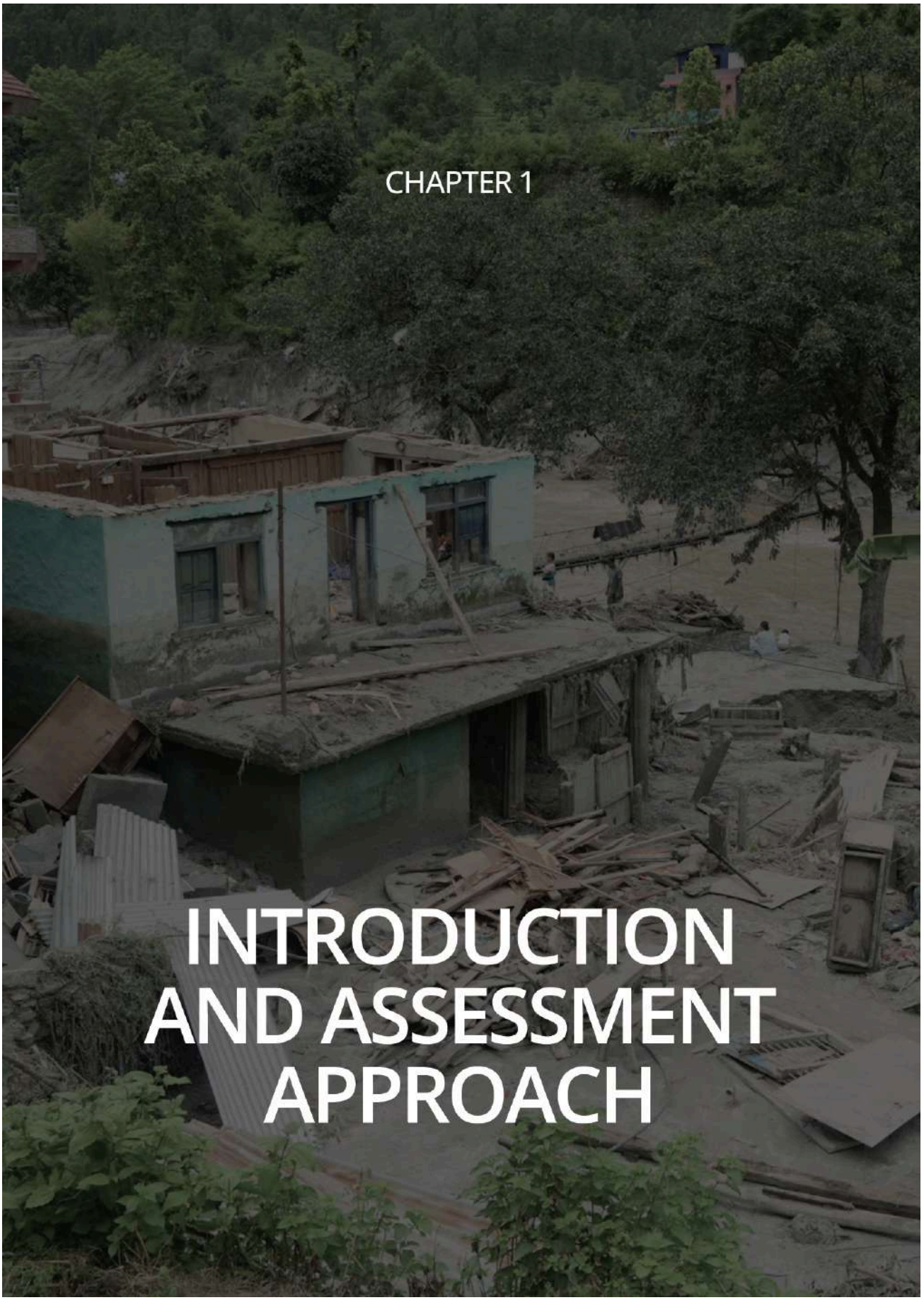
Term	Definition used in this RDNA
Detailed Damage Assessment	A subsequent asset-level assessment undertaken to establish the location, ownership, physical condition, repairability, safety and detailed repair or reconstruction cost of damaged assets.
Post-Disaster Needs Assessment	A comprehensive government-led assessment that examines disaster effects, recovery needs and recovery strategy through detailed sector analysis, consultation and validation. The RDNA may inform a subsequent PDNA but does not replace it.
Reporting cut-off	The date up to which information was considered for the assessment. Information received or conditions occurring after this date are not reflected unless the report is subsequently revised.
Blank, zero and not available	A blank entry indicates that information was unavailable or not reported. A zero indicates a reported or calculated value of zero. Neither should be interpreted as proof that no effects or recovery requirements existed unless explicitly stated.
Double counting	The inclusion of the same asset, economic loss, beneficiary or recovery activity in more than one sector or cost category. Overlapping sector inventories and interventions require reconciliation before final costing.
Inclusive recovery	Recovery planning and implementation that identify and address differences in exposure, vulnerability, capacity and access to assistance, particularly for people facing social, economic, physical or institutional barriers.

EXECUTIVE SUMMARY

On 26 August 2026, an ice-and-rock avalanche in the upper Lhende Khola watershed, approximately 20 km upstream of the Rasuwagadhi border point, generated a debris flow and major downstream flooding along the Bhotekoshi–Trishuli–Narayani river system. Reported effects extended through Rasuwa, Nuwakot, Dhading, Gorkha, Chitwan, Tanahun and Nawalparasi. According to technical analysis by the Flood Forecasting Division of the Department of Hydrology and Meteorology, peak discharge at the Devghat hydrological station on the Narayani River reached approximately 5,850 m³/s. Between 14:10 and 18:00, the total flow volume was estimated at 57.40 million m³, including approximately 19.96 million m³ above the estimated base-flow volume. Flood Forecasting Division records also indicate that 679,295 early-warning SMS messages were disseminated through Nepal Telecom and Ncell to populations in identified downstream risk areas. Unstable slopes, accumulated sediment, obstructed channels and continuing rainfall created risks of further debris flows and secondary flooding. Erosion, sediment deposition and flooding affected settlements, agricultural land, productive assets and critical infrastructure. Damage to interconnected transport, electricity, water-supply and communications networks disrupted public services and economic activity and constrained access for response and recovery.

This Rapid Damage and Needs Assessment was prepared under the leadership of the National Disaster Risk Reduction and Management Authority, with support from the National Planning Commission and contributions from relevant government institutions. It consolidates information received up to the reporting cut-off of 3 September 2026 and presents a rapid multisectoral assessment of physical damage, economic losses, effects on people and essential services, and priority recovery and reconstruction needs. The report was subsequently reviewed and finalised on 10 September 2026. It is intended to support disaster response and early recovery planning, government decision-making and resource mobilisation, while providing a basis for subsequent verification and more detailed assessment, including a Post-Disaster Needs Assessment where undertaken. It also identifies opportunities to reduce future risk through safer siting, strengthened early-warning systems, the voluntary exchange of hydrological and hazard information through existing bilateral and regional mechanisms, and risk-informed reconstruction.

The assessment draws on government sector submissions, situation reports, administrative records, field observations and geospatial analysis received up to 3 September 2026. Compiled sector information was available for the five core assessment districts of Rasuwa, Nuwakot, Dhading, Gorkha and Chitwan. Reported effects in Tanahun and Nawalparasi were included where information was available, but these districts were not assessed to the same extent. Restricted access, continuing emergency operations and differences in sectoral reporting limited the coverage and verification of some information.



CHAPTER 1

INTRODUCTION AND ASSESSMENT APPROACH

CHAPTER 1: INTRODUCTION AND ASSESSMENT APPROACH

This chapter presents the context of the 26 August 2026 disaster and the approach used to assess its effects along the Bhotekoshi–Trishuli–Narayani river corridor. It outlines the Government's leadership and coordination arrangements, the geographic and sectoral scope of the RDNA, and the data sources, estimation methods and validation procedures used to assess damage, economic losses, human and service effects, and recovery needs. It also explains the reporting cut-off, the application of household and population estimates, and the limitations that should be considered when interpreting the findings in subsequent chapters.

1.1 INTRODUCTION

1.1.1 Background

The disaster of 26 August 2026 affected settlements, agricultural land, productive assets, infrastructure and public services. Reported effects extended along the Bhotekoshi–Trishuli–Narayani river corridor through Rasuwa, Nuwakot, Dhading, Gorkha, Chitwan, Tanahun and Nawalparasi. The core RDNA assessment covers Rasuwa, Nuwakot, Dhading, Gorkha and Chitwan, where sector information was compiled for assessment. References to Tanahun and Nawalparasi describe the wider reported impact corridor and should not be interpreted as equivalent to full sectoral assessment coverage.

The RDNA consolidates the available sector information within a common assessment structure. Physical damage, economic losses, human and service effects, and recovery needs are presented with their respective estimation methods and limitations. The assessment reflects information available as of 10 September 2026.

1.1.2 Disaster Overview

The event originated as an ice-and-rock avalanche in the upper Lhende Khola watershed, approximately 20 km upstream of the Rasuwagadhi border point. The mass movement entered the Lhende Khola and developed into a debris flow and flood that propagated downstream through the Bhotekoshi, Trishuli and Narayani river systems. The core assessment covers reported effects in Rasuwa, Nuwakot, Dhading, Gorkha and Chitwan, while available information from Tanahun and Nawalparasi is used to describe the wider affected corridor.

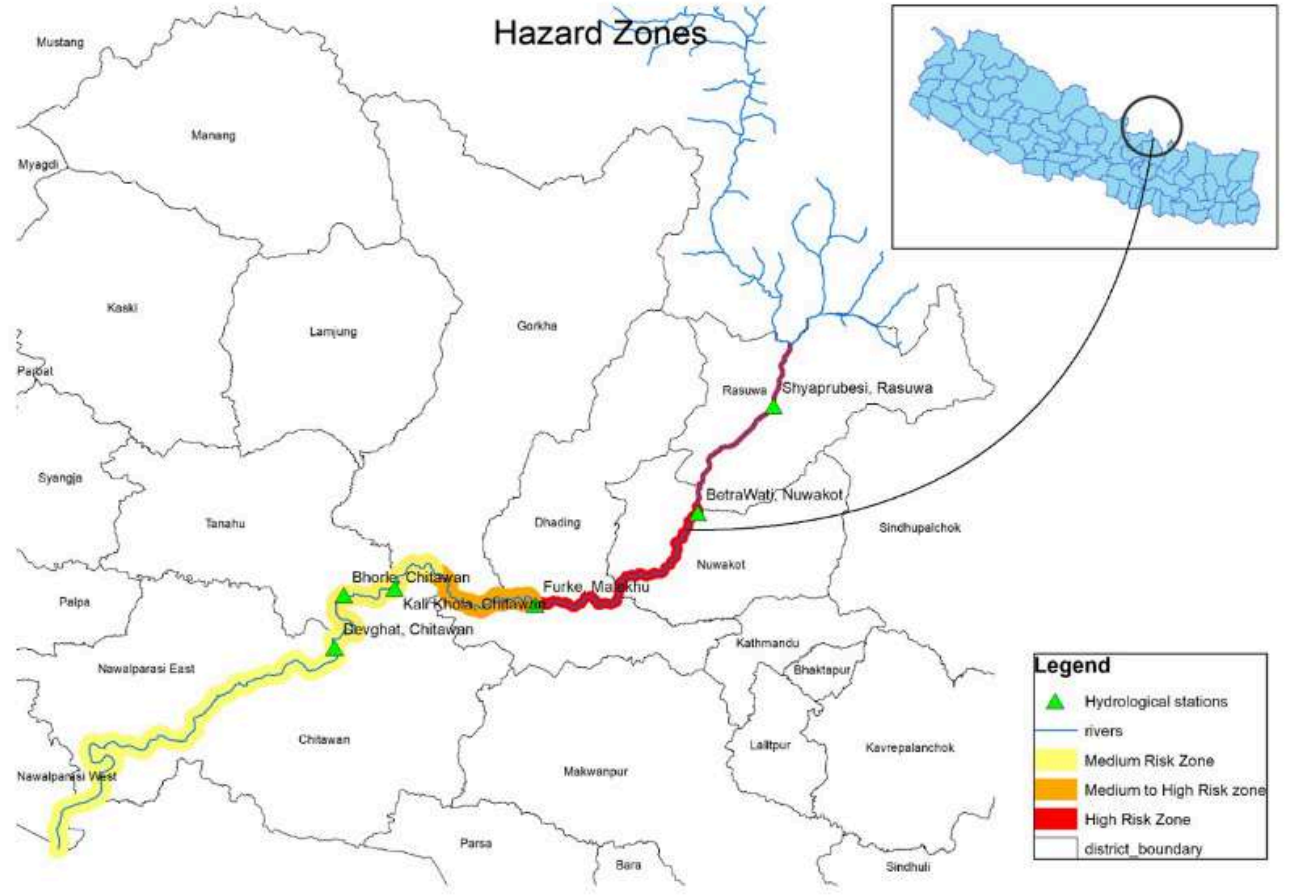


Figure 1: Reported Hazard Zones and Hydrological Stations along the Bhotekoshi–Trishuli–Narayani River Corridor[2]

The event involved sediment entrainment, riverbank erosion and debris deposition, causing damage to settlements and infrastructure along the river corridor. The initial mass movement and the downstream processes it triggered formed a cascading hazard sequence. Damage to transport, electricity, communications and water-supply systems extended the effects by disrupting interconnected services and economic activities.

During the assessment period, unstable slopes, accumulated sediment, channel obstruction and continuing rainfall presented risks of further debris flows and secondary flooding. These conditions require consideration in access restoration, the safety of recovery operations and the assessment of reconstruction sites. The relationship between climate change, cryospheric change, cascading hazards and compounding disaster risk is discussed in Section 2.4. The potential influence of changing climatic and cryospheric conditions on this event warrants further investigation through detailed scientific analysis, including event-attribution studies, and should be examined in subsequent assessments and reports.

1.1.3 Government leadership and assessment coordination

The RDNA was undertaken under the institutional leadership and coordination of the National Disaster Risk Reduction and Management Authority (NDRRMA), with support from the National Planning Commission (NPC) and contributions from the National Statistics Office (NSO), the Ministry of Agriculture, Forest and Environment (MoAFE), the Ministry of Energy, Water Resources and Irrigation (MoEWRI), the Ministry of Education and Sports (MoES), the Department of Local Infrastructure Development (DoLID), the Department of Urban

[2] *Flood Forecasting Division, Hydrology and Water Resources Research Centre, Technical Report on the 2083 Bhotekoshi–Trishuli–Narayani Flood, Section 4.*

Development and Building Construction (DUDBC), the Department of Water Supply and Sewerage Management (DWSSM), the Department of Roads (DoR) and the Department of Tourism (DoT). Submissions from these institutions were consolidated with administrative records, field-based technical information, geospatial analysis, and other evidence relevant to their respective mandates.

Sector information was consolidated for the assessment, with differences in coverage, estimation methods and verification status identified in the relevant sections. The Multisectoral RDNA Committee comprised officials and technical specialists from the participating institutions. The institutional arrangements for preparing and reviewing the assessment are distinct from the responsibilities for implementing recovery interventions.

1.2 ASSESSMENT SCOPE AND METHODOLOGY

1.2.1 Objectives and intended uses

The assessment was undertaken to consolidate available evidence on disaster effects and establish preliminary recovery and reconstruction requirements. Its specific objectives are to:

- ➔ estimate physical asset damage and economic losses across the assessed sectors;
- ➔ identify effects on households, livelihoods and essential services;
- ➔ estimate early and longer-term recovery needs to support government prioritisation and resource mobilisation; and
- ➔ identify information requiring verification or further assessment before detailed recovery programmes are approved.

The findings provide an initial basis for recovery planning. Asset-level engineering assessment, household verification and detailed intervention costing will form part of subsequent assessment and programme-preparation processes.

1.2.2 Geographic and Sectoral Coverage

The core assessment covers reported effects in Rasuwa, Nuwakot, Dhading, Gorkha and Chitwan along the Bhotekoshi–Trishuli–Narayani river corridor. Household and population estimates cover selected wards within the 15 local levels listed in Table 5. Reported effects in Tanahun and Nawalparasi are included where information was available, but these districts were not covered to the same extent as the five core assessment districts. Sector inventories therefore differ in geographic coverage according to the locations and information contained in the respective submissions.

Sector findings are consolidated under four major groups.

Table 1: Sectoral Coverage of the RDNA

Major sector	Sectors
Social	Private housing; public buildings and facilities; education; health; cultural heritage
Productive	Agriculture; fisheries; livestock; banking and financial services; economic activities and livelihoods
Infrastructure	Hydropower and electricity grid; household renewable energy; roads; bridges; telecommunications; water supply and sanitation; irrigation and river-training infrastructure
Cross-cutting	Debris management; disaster risk reduction; inclusive recovery

Land and cadastral impacts, environmental conditions, institutional continuity and protection concerns are addressed within the relevant assessments and recovery considerations. [3]

1.2.3 Reporting cut-off

The assessment reflects information received and consolidated up to 3 September 2026. Subsequent revisions and editorial review continued until 10 September 2026. Information received after the assessment cut-off is not reflected unless expressly stated.

1.2.4 Data sources and collection methods

The assessment combined sector submissions from relevant ministries/departments, administrative records, satellite imagery, drone surveys, geospatial datasets and census information. Sector submissions provided reported asset quantities, damage classifications, service-interruption information and preliminary cost estimates. Where direct inventories were incomplete, estimates were developed using mapped exposure, statistical relationships and costing assumptions.

Satellite and drone imagery, together with available building and infrastructure mapping, supported the identification of assets within the assessed corridor. Population and Housing Census 2021 parameters were used to estimate households and population associated with affected buildings and to distribute housing estimates by construction category. Agricultural and economic census information supported the estimation of livestock and affected establishments. Costing inputs included sector-submitted rates, district rates, equipment prices, project costs and reference benchmarks, with adjustments where specified. The methods applied to each sector are summarised in Table 2.

1.2.5 Sectoral Estimation Methods

Table 2: Sectoral Estimation Methods

Sector	Data inputs and assumptions	Estimation method
Affected buildings, households and population	Satellite and drone imagery, including Landsat 9 and Copernicus Sentinel imagery; available building mapping, including fAIR-HOT data; affected-building counts; and Census 2021 parameters for households per building and average household size.	Estimated households = affected buildings × average households per building. Estimated population = estimated households × average household size. The results represent the estimated households and population associated with affected buildings and not verified displacement figures.
Private buildings	Affected-building counts, Census 2021 construction-type distributions, assumed floor areas, construction rates adjusted to current prices, and estimated household-asset values.	Affected buildings were distributed among mud-bonded, cement-bonded and RCC or other construction categories using Census 2021 proportions. Assumed floor areas of 600, 900 and 3,000 sq ft and respective construction rates of NPR 1,250, NPR 2,150 and NPR 3,600 per sq ft were applied. Estimated household-asset values were calculated separately and added to structural damage. The 2015 PDNA methodology was used as a reference.

[3] *Their discussion does not establish an additional monetary estimate unless a corresponding amount is included in the consolidated assessment.*

Sector	Data inputs and assumptions	Estimation method
Public buildings and facilities	Inventory of partially and completely damaged public buildings, plinth areas, building types, asset values, applicable plinth-area rates and inflation adjustments submitted by the responsible department.	Completely damaged buildings were valued at 100 per cent of the applicable replacement cost. Partially damaged buildings were valued at 30 per cent of replacement cost. Contents and other assets were included where reported separately. The 2015 PDNA methodology was used as a reference.
Education	Numbers of affected classrooms, assessed damage condition, estimated classroom floor area, construction rates and reported values of furniture, equipment and other contents.	Classroom damage was estimated using an indicative floor area of 35 m² per classroom and a construction rate of approximately NPR 75,000 per m². Completely damaged classrooms were valued at full replacement cost, while the stated partial-damage factor was applied to partially damaged classrooms. Reported values of furniture, equipment and other contents were added separately. The Education Regulation 2059 B.S. was used as a reference.
Health	Inventory of seven affected health facilities, comprising four completely damaged and three partially damaged facilities, together with facility type, damage condition and reported equipment and asset values.	The applicable repair or reconstruction rate was applied according to facility type and damage condition. Reported values of damaged medical equipment, furniture and other contents were added separately.
Cultural Heritage	Sector submissions identifying affected heritage sites, asset categories, reported damage conditions, restoration requirements and available costing information.	Physical damage was estimated using the submitted restoration or replacement costs. Economic losses were calculated separately where a defined loss period and valuation basis were available.
Agriculture	Reported affected crop area, crop yields, market prices, remote-sensing analysis, sector field observations submitted by MoAFE and parameters from the National Agriculture Census 2021.	Estimated production loss was calculated by multiplying the affected area by the applicable yield and crop-price assumptions. The calculation covers 697.05 hectares.
Fisheries	Itemised inventory of damaged buildings, ponds, raceways, equipment, vehicles and fish stocks, together with quantities, damage conditions and unit values submitted by the responsible institutions.	The affected quantity of each asset or stock category was multiplied by its applicable unit value. Partial-damage factors were applied where specified, and the resulting amounts were aggregated to estimate total fisheries damage.
Livestock and poultry	Estimated affected households, agricultural-household proportions, livestock-keeping proportions, average animal holdings by species, species-specific unit values and parameters from the National Agriculture Census 2021.	The number of affected livestock-keeping households was estimated using census-based agricultural and livestock-ownership proportions. Average holdings by species were then applied to estimate affected animal numbers, which were multiplied by the respective unit values. These are modelled estimates and not verified animal-loss or compensation records.
Banking	Institution-reported values of affected premises, equipment, ATMs, vaults, counters and cash, compiled through Nepal Rastra Bank.	Reported asset values were consolidated by institution and location. Cash was recorded separately and added only where it was not already included in the reported asset total.
Economic activities and livelihoods	The assessment used asset inventories submitted by the responsible institutions, the National Economic Census 2025 establishment listing, industry weights from the National Economic Census 2018, information submitted by FNCCI and estimates of affected buildings and households.	Economic losses were estimated by applying the stated business-interruption periods to average daily turnover and distributing the results across industries using the applicable industry classifications. The resulting figures are modelled estimates and not verified losses for individual establishments.

Sector	Data inputs and assumptions	Estimation method
Energy: hydropower and grid	Information submitted by NEA, DoED and MoEWRI on affected hydropower projects, installed capacity, pre-disaster project status, capital costs, assessed damage proportions, grid infrastructure, substations and reported outage periods.	Where the capital cost of a hydropower project was available, the assessed damage percentage was applied to that cost. Where the project's capital cost was unavailable, an indicative capital cost of NPR 24 crore per MW was applied. Transmission and distribution lines were valued using representative costs per kilometre from comparable projects, while substations were valued using their recorded capital costs. Generation losses were estimated separately using the applicable wet-season and dry-season generation assumptions and outage periods.
Household renewable energy	Reported affected quantities of solar home systems, biogas plants, institutional solar systems, micro-hydropower systems, water mills and improved cookstoves.	Damage was estimated by multiplying the affected quantity of each technology by the applicable maximum retail price for fiscal year 2080/81 B.S.
Roads	Affected road lengths were identified from satellite and drone imagery and information submitted by the Department of Roads.	The assessed length of each affected road section was multiplied by the applicable repair or reconstruction rate according to its reported damage condition. Where project-specific reconstruction rates were unavailable, indicative construction costs of NPR 15–25 crore per kilometre for two-lane highways were applied, based on Department of Roads rates or comparable projects.
Motorable bridges	Affected bridges and their approximate lengths were identified using satellite and drone imagery and the damage inventory submitted by the Department of Roads.	The affected length of each bridge was multiplied by the applicable construction rate. The assessed damage condition or approved valuation factor was then applied to distinguish partial repair from complete replacement.
Trail bridges	Inventory of affected trail bridges, bridge type, assessed length, damage condition and applicable construction rates, supported by satellite and drone imagery where available.	The affected length of each bridge was multiplied by the applicable rate: approximately NPR 117,000 per metre for D-type bridges and NPR 168,000 per metre for N-type bridges. Partial-damage factors were applied where specified.
Telecommunications	Operator-reported information on affected towers, fibre-optic networks, transmission equipment, FTTH infrastructure and internet-service-provider assets, together with quantities and unit or replacement costs.	The affected quantity of each asset category was multiplied by the applicable operator-reported unit or replacement cost. Service-interruption losses were estimated separately where the interruption period and revenue basis were available.
WASH	Information was obtained from water supply and sewerage management offices under DWSSM and supplemented by GIS-based analysis using NWASH-MIS where direct field information was unavailable.	Water-supply and sanitation assets located within the specified one-kilometre buffer from the affected river corridor were identified through GIS analysis and valued using indicative unit costs. These results represent exposure-based estimates unless confirmed through field inspection.
Irrigation and river training	Inventories and cost information for affected surface and lift-irrigation schemes, deep tubewells, river-training structures, gabion and concrete works, and six gauging stations, submitted by the responsible departments and field offices. Local-level river-training works were excluded from the estimate.	Reported affected quantities were valued using current district rates and applicable departmental norms. Project-specific costs were used where available.

Sector	Data inputs and assumptions	Estimation method
Building-debris clearance	Estimated numbers, construction types and floor areas of affected buildings; construction-specific debris-generation factors; and applicable government clearance rates.	Estimated building floor areas were converted into debris volumes using construction-specific factors. The clearance estimate covers 15 per cent of the calculated RCC debris volume, representing the portion assumed to require mechanical removal. The selected volume was multiplied by the applicable government unit rate.
Mud and sediment clearance	Estimated gross block volumes, block-specific deposition factors, settlement-affected-length ratios, assumed mechanical-clearance proportions and the applicable unit cost.	Gross block volumes were adjusted to estimate deposited material, the portion affecting settlements and the proportion requiring mechanical clearance. The resulting clearance volume was multiplied by the unit cost of NPR 166.50 per m³.
Disaster risk reduction	Estimated affected river-reach length, average treatment depth, effective treatment width, proposed interventions and applicable government rates. Interventions include nature-based solutions, embankments, slope stabilisation and multi-hazard early-warning measures.	River-corridor risk-reduction requirements were estimated for approximately 40 km of affected river reach using the adopted treatment depth, effective width and applicable government rates. Treatment areas on both banks were included where identified. Early-warning and other non-structural measures were costed separately where activity-based estimates were available.
Inclusive recovery	Identified accessibility, participation, protection and inclusion requirements affecting access to recovery assistance and essential services.	A provisional planning allocation was included for inclusive recovery. Detailed activities, beneficiary coverage, implementation responsibilities and unit costs will be established during programme preparation.

Recovery needs combine indicative intervention costing and sector-specific estimation factors. Where a factor was applied to damage or another cost base, the resulting amount represents an indicative planning requirement. Early recovery allocations cover 0–6 months, while longer-term requirements cover more than six months.

Total disaster effects comprise damage plus economic losses. Recovery needs are presented separately.

Comparisons with Nepal's gross domestic product indicate the scale of assessed disaster effects and recovery needs relative to annual national economic output; they do not estimate the disaster-induced reduction in GDP. Poverty and human-development indicators describe pre-disaster socioeconomic conditions relevant to recovery capacity. For this RDNA, district-level socioeconomic conditions are examined using the assessment of gender equality and social inclusion, livelihoods and socioeconomic conditions. Local-level conditions are examined using the assessment of rural and urban settlements. These assessments form part of the national VRA programme supporting adaptation planning.

Methods and verification coverage vary across sectors. Reported inventories, geospatial exposure estimates and census-based models are therefore distinguished when interpreting the findings. Detailed assumptions, loss periods and outstanding verification requirements are retained in the respective sector assessments.

1.2.6 Application of Household and Population Estimates

Household and population estimates are prepared for the selected wards within the 15 local levels. The calculation sequence is presented in Table 2. Average household size is derived from the census population and household counts for those selected wards.

The estimation applies census-based occupancy relationships to the affected-building count. It therefore assumes that the adopted households-per-building coefficients and household sizes are applicable to the

buildings identified in the assessment. Changes in occupancy, migration and household composition between the census and the disaster are not directly measured by this procedure.

The resulting figures represent estimated households and population associated with the assessed buildings. Building habitability, actual occupancy during the event and relocation requirements require separate verification. Recorded displacement and temporary-shelter occupancy are presented according to their respective reporting dates and geographic coverage and are not added to the estimated affected population.

1.2.7 Data Validation and Consolidation

The Multisectoral RDNA Committee reviewed sector submissions for internal consistency, geographic coverage, reporting periods, valuation bases, calculation accuracy and possible duplication. Information was compared across administrative records, situation reports, technical observations and geospatial evidence where available. Figures based on different definitions, dates or geographic coverage were retained separately unless they could be reconciled, and exposure estimates were not treated as confirmed damage without supporting evidence. Unresolved discrepancies were referred to the responsible ministry or agency. Confirmed revisions were incorporated into the consolidated assessment, while figures that could not be verified were qualified or identified for further field verification.

1.2.8 Technical Review and Senior-Level Consultation

Following the initial consolidation of sector submissions, the draft findings were reviewed through technical and senior-level consultations. A technical expert review was undertaken to examine the assumptions, estimation methods, sector findings and areas of uncertainty. Directors General and senior officials from the responsible government departments and institutions reviewed the information relating to their respective sectors, while members of the National Planning Commission considered the coherence of the findings with national recovery and development priorities. Ministerial-level discussions with the Ministry of Finance examined the fiscal implications, financing requirements and potential resource mobilization arrangements. Development partners and United Nations agencies also provided feedback on the assessment approach, sector findings, cross-cutting concerns and links between humanitarian response and recovery. Comments received through these processes were reviewed by the Multisectoral RDNA Committee and incorporated where supported by the available evidence. Issues that could not be resolved were retained as limitations or identified for further verification during the Post-Disaster Needs Assessment.

1.3 LIMITATIONS AND INTERPRETATION

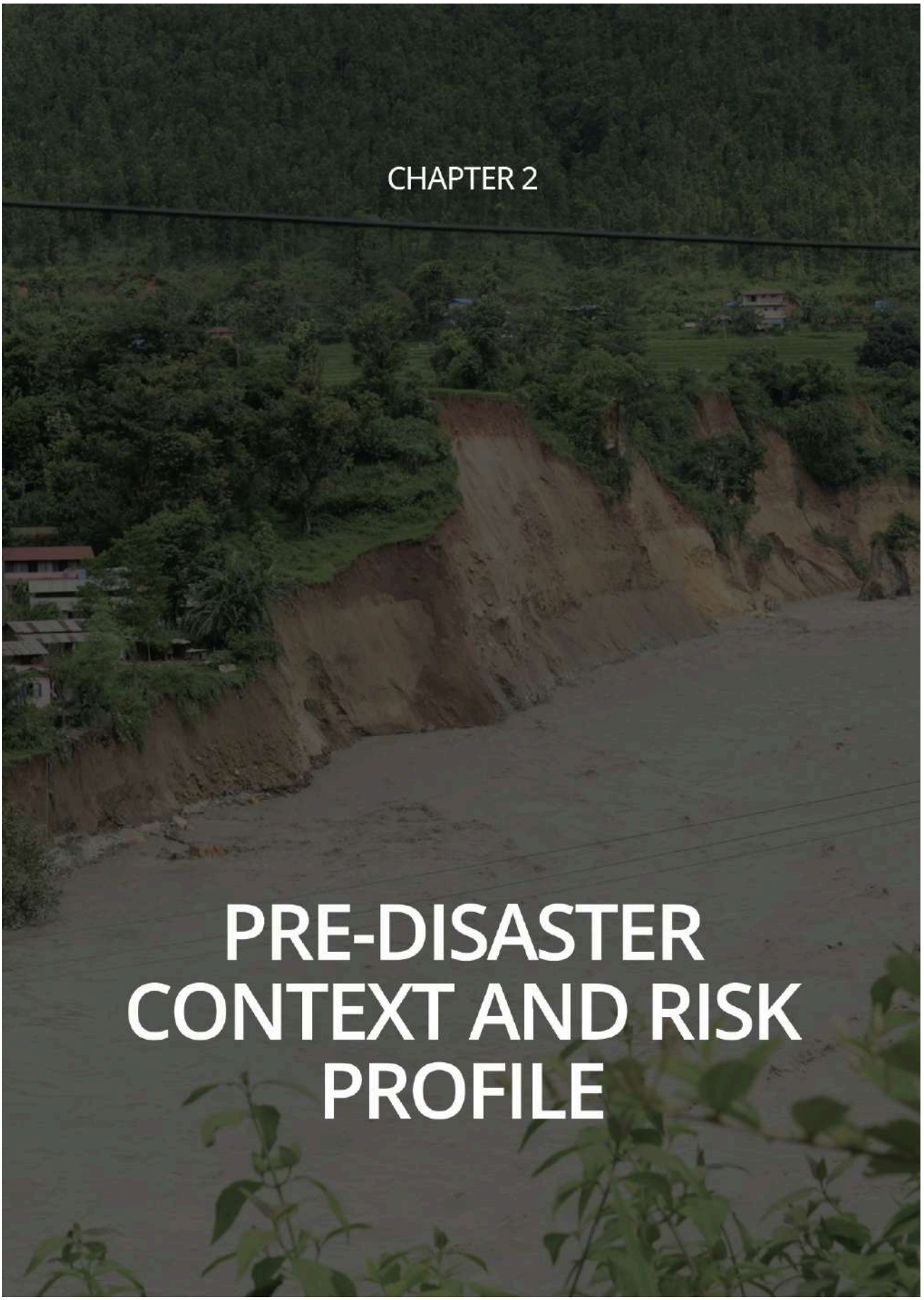
The assessment relied largely on secondary records and the triangulation of information from multiple datasets. Census relationships do not establish the number, occupancy, construction type, livestock holdings, or business activity of each affected building at the time of the event. The building-based estimates do not capture all people affected outside the mapped corridor.

Sector coverage, asset boundaries and valuation methods differ, and many economic and service losses remain unquantified. Tenure, informal work, displacement, poverty, protection, environmental effects and inclusion remain less well documented than visible infrastructure. Missing baseline capacity and outage records prevent reliable estimates of learners or patients without services, lost worker-days, reopening curves and access-related welfare losses. The selected business annual-loss estimates are particularly sensitive to their turnover and duration assumptions.

Restricted access and continuing response operations limited verification in upstream and isolated locations. No household survey, key informant interviews, focus groups, structured community consultation, or detailed engineering assessment was undertaken specifically for the RDNA. Available sector observations and

operational visits provided information on specific locations and assets, with limited coverage for comprehensive field validation.

Temporary impoundments, unstable slopes, river obstruction and continuing rainfall remained operational concerns during the assessment period. These conditions may affect access restoration, the safety of recovery operations and the suitability of reconstruction sites. Further technical assessment and monitoring will accompany access restoration and detailed recovery planning, with unresolved information and subsequent revisions recorded in the relevant sector assessments.



CHAPTER 2

PRE-DISASTER CONTEXT AND RISK PROFILE

CHAPTER 2:
PRE-DISASTER CONTEXT AND RISK PROFILE

This chapter presents the pre-disaster geographic, demographic, socioeconomic and infrastructure conditions of Rasuwa, Nuwakot, Dhading, Gorkha and Chitwan. These conditions provide the baseline for interpreting the disaster effects presented in Chapter 3. District and local-level statistics describe their stated administrative areas and do not represent affected-population counts.

2.1 GEOGRAPHIC AND ENVIRONMENTAL SETTING

The Bhotekoshi–Trishuli–Narayani river corridor forms part of the transboundary Gandaki basin that covers approximately 36,497 km² upstream of the Nepal–India border, which is used in the River Basin Atlas as the downstream boundary for calculating the basin area. Of this area, approximately 32,148 km² lies within Nepal and 4,349 km² within China.[4] The Trishuli joins the Kali Gandaki at Devghat, downstream of which the river is known as the Narayani. This connected drainage system links Himalayan headwaters, mountain valleys and middle-hill settlements with the downstream plains.

Across the wider basin, elevations range from approximately 79 metres to 8,167 metres above sea level, encompassing glaciated mountain terrain, steep slopes, confined river valleys and lower-elevation floodplains. The corridor also connects areas of environmental and cultural significance. Langtang National Park covers 1,710 km², including parts of Rasuwa, Nuwakot and Sindhupalchok, while Chitwan National Park covers 952.63 km² and includes important Narayani riverine environments. These landscapes support biodiversity, tourism, pilgrimage and local livelihoods.

The physical setting permits interaction between floods, slope failures, riverbank erosion and sediment movement. Processes originating in the upper watershed can propagate downstream through the connected river system, while rainfall and channel obstruction can compound these hazards. Forests, protected areas, agricultural land and aquatic habitats are also exposed to changes in river flow, sediment deposition and debris.

[4] *Water and Energy Commission Secretariat. (2024). River Basin Atlas of Nepal. Government of Nepal. Gandaki basin profile, p. 45; hydropower mapping, p. 57,.*

2.2 POPULATION, SETTLEMENTS AND SOCIOECONOMIC CONDITIONS

2.2.1 Population distribution and settlement characteristics

The 2021 National Population and Housing Census recorded a total population of **1,606,676 people in 414,632 households** across the five districts.[5] Population density varied from 30 people per km² in Rasuwa to 325 people per km² in Chitwan. The district context therefore encompasses both sparsely populated mountain areas and substantially more densely populated downstream settlements.

Table 3: District Population, Households and Selected Demographic Characteristics, 2021[6]

District	Population	Households	Population Density (people/km²)	Literacy Rate (%), age 5 years and above
Rasuwa	46,689	11,140	30	69.60%
Nuwakot	263,391	68,679	235	69.07%
Dhading	325,710	83,642	169	72.40%
Gorkha	251,027	71,826	70	72.37%
Chitwan	719,859	179,345	325	83.68%
Total	**1,606,676**	**414,632**	-	-

Source: National Statistics Office, National Population and Housing Census 2021.

Population change before the disaster also differed between districts. Between the 2011 and 2021 censuses, the annual population growth rate was 2.07% in Chitwan and 0.72% in Rasuwa, compared with −0.50% in Nuwakot, −0.30% in Dhading and −0.74% in Gorkha. These contrasting trends indicate that settlement conditions and demographic pressures were not uniform along the corridor.

At the local level, the 15 local levels covered by the household assessment contained 336,549 people in 85,552 households in 2021. Bidur Municipality had the largest population among these local levels, with 59,227 people, followed by Belkotgadhi Municipality with 35,224 and Benighat Rorang Rural Municipality with 33,854. These figures describe the full administrative populations of the selected local levels, including settlements outside the assessed river corridor.

[5] *National Statistics Office. (2023). National Population and Housing Census 2021.*
[6] *Source:* NSO, National Population and Housing Census 2021

2.2.2 Housing conditions and tenure

The housing baseline indicates differences in construction characteristics and occupancy arrangements. In 2021, households occupying housing units with mud-bonded brick or stone foundations accounted for 39.9% in Rasuwa, 38.0% in Nuwakot, 42.0% in Dhading and 42.6% in Gorkha, compared with 15.3% in Chitwan.

Rental occupancy also varied, from 2.2% of households in Rasuwa to 18.0% in Chitwan. Recovery planning consequently requires separate consideration of building owners, tenants and households occupying accommodation under other arrangements.

Table 4: Selected Household and Service Characteristics of the Five Assessment Districts, 2021

District	Households in rented housing (%)	Female-headed households (%)	Households with members living abroad (%)	Households reporting internet access (%)	Households with piped water within premises (%)
Rasuwa	2.2	20.7	16.2	22.1	37.1
Nuwakot	3.8	28.1	17.5	28.7	35.1
Dhading	6.4	29.4	17.8	24.6	38.7
Gorkha	6.7	37.1	24.2	25.6	39.9
Chitwan	18.0	34.2	26.1	59.3	50.7

2.2.3 Poverty, migration and household recovery capacity

Monetary poverty varies substantially among the assessed local levels. The NSO's Small Area Estimation of Poverty, 2023, published in January 2026, combines information from the Nepal Living Standards Survey 2022/23 and the 2021 census to estimate monetary poverty at district and local levels. The national poverty headcount rate was 20.27%, but substantial differences existed between local levels represented in this assessment.[7]

[7] *These estimates refer to consumption poverty and are derived from the Nepal Living Standards Survey 2022/23 and the 2021 census. They describe pre-disaster conditions and do not measure poverty caused by this event.*

Table 5: Population, Households and Estimated Monetary Poverty in Local Levels Covered in the Household Assessment

District	Local level	Population, 2021	Households, 2021	Estimated Poverty Headcount, 2023
Rasuwa	Gosaikunda RM	7,788	2,038	16.32%
	Aamachhodingmo RM	6,673	1,664	28.90%
	Uttargaya RM	8,555	2,188	8.82%
	Kalika RM	10,115	2,447	14.39%
Nuwakot	Bidur Municipality	59,227	15,234	7.97%
	Belkotgadhi Municipality	35,224	9,222	31.30%
	Kispang RM	14,235	3,929	20.60%
	Tarakeshwor RM	14,184	3,879	18.51%
Dhading	Benighat Rorang RM	33,854	7,601	35.06%
	Gajuri RM	28,634	6,839	12.33%
	Galchhi RM	23,733	5,975	12.50%
	Siddhalek RM	22,214	5,836	7.50%
Gorkha	Shahid Lakhan RM	23,076	6,856	2.76%
	Gandaki RM	21,394	5,659	22.01%
Chitwan	Ichchhyakamana RM	27,643	6,185	38.11%
Total	**15 Local Levels**	**336,549**	**85,552**	-

Source: National Statistics Office, Small Area Estimation of Poverty 2023 and National Population and Housing Census 2021.

The estimated monetary poverty headcount shown in Figure 2 exceeded the national rate in Ichchhyakamana, Benighat Rorang, Belkotgadhi, Aamachhodingmo, Gandaki and Kispang. The contrast between Bidur at 7.97% and Belkotgadhi at 31.30%, within Nuwakot district, demonstrates why district averages alone are insufficient to describe socioeconomic conditions along the assessed corridor.

Between 16.2% and 26.1% of households across the five districts reported members living abroad in 2021.[8] Female-headed households constituted between 20.7% and 37.1% of households. Household livelihoods are also linked to employment and businesses associated with Rasuwagadhi border trade, as described in Section 2.3.

[8] *The presence of a household member abroad does not establish remittance receipt or the availability of funds for recovery.*

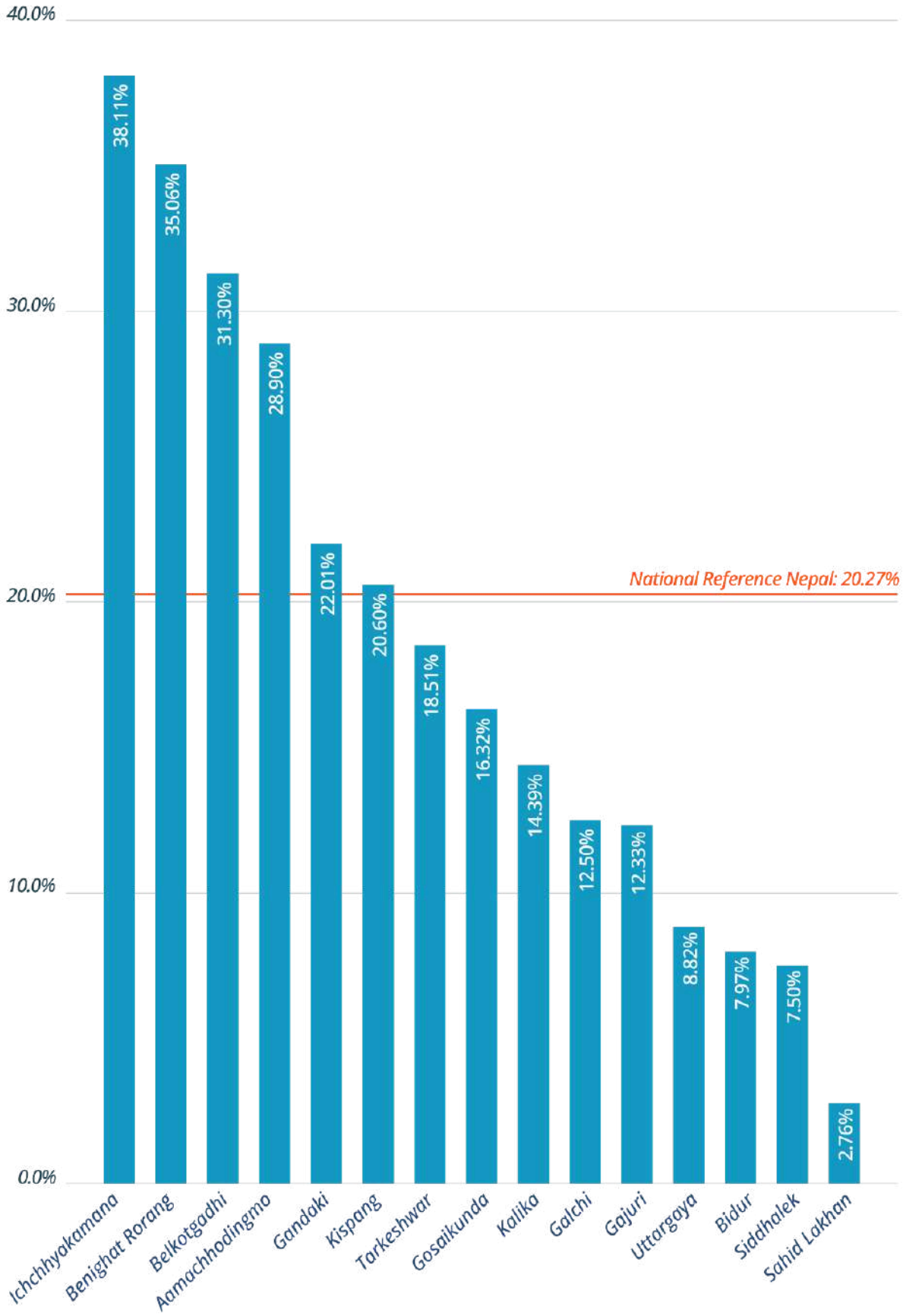


Figure 2: Estimated Monetary Poverty in the Local Levels Covered by the Household Assessment

Source: National Statistics Office, Small Area Estimation of Poverty 2023 and National Population and Housing Census 2021.

These estimates provide a basis for identifying areas where the capacity to finance temporary accommodation, replace household assets or sustain livelihoods may be constrained. Individual assistance requirements nevertheless depend on household circumstances, including income, savings, debt, dependants and access to support. Differences between local-level poverty estimates should be interpreted with the uncertainty reported in the source publication.

2.2.4 Population characteristics and access to services

In 2021, children below 15 years of age constituted approximately 23–26 per cent of the population across the five assessment districts. The proportion of people aged 65 years and above ranged from 7.3% in Chitwan to 12% in Gorkha. Household dependence on electricity was already extensive before the disaster. In 2021, electricity was reported as the usual source of lighting by 97.34% of households in Rasuwa, 98.48% in Nuwakot, 95.74% in Dhading, 96.71% in Gorkha, and 96.23% in Chitwan. These percentages were calculated using the household counts reported in the 2021 census.

These characteristics are relevant to accessible evacuation, temporary accommodation, continuity of care, and the design of public information and assistance arrangements. They do not identify the number of affected persons requiring such support. Differences in literacy, presented in Table 3, and household internet access support the use of multiple communication channels, accessible formats, and in-person assistance for recovery information and registration.

2.3 ECONOMIC ACTIVITIES AND ESSENTIAL INFRASTRUCTURE

2.3.1 Agriculture and local economic activities

Agriculture, forestry and fishing constitute a substantial component of the economic activity recorded in the five districts. Among persons aged 10 and above who reported economic activity during the 12 months preceding the 2021 census, these activities accounted for approximately 65.1% in Rasuwa, 72.1% in Nuwakot, 71.0% in Dhading, 72.3% in Gorkha and 47.4% in Chitwan.

The baseline indicates that agricultural land, irrigation, livestock, farm inputs and market access are relevant to livelihood recovery alongside commercial and public infrastructure. Production and marketing depend on connected transport, electricity, water and financial services. Assessment of livelihood interruption therefore requires consideration of seasonal production, access to inputs and markets, and the availability of household labour, as well as physical asset damage.

2.3.2 Cross-border trade and logistics

Rasuwagadhi, in Gosaikunda Rural Municipality, is a Nepal–China border gateway linking the corridor to international trade. According to information provided by Rasuwa Customs for this assessment, major imports through the crossing include electrical goods, garments, footwear, construction materials, telecommunications equipment, vehicles and industrial machinery. Reported exports include carpets, handicrafts, woollen products, medicinal herbs and agricultural goods. The crossing also supports cross-border travel, including pilgrimage travel towards Kailash and Manasarovar, while the wider corridor serves domestic pilgrimage travel to Gosaikunda.

The associated logistics system encompasses customs clearance, freight handling, onward transport and supporting commercial services. Rasuwa Customs reported the use of ASYCUDA World and the Nepal National Single Window, highlighting the dependence of customs processing on telecommunications and electricity. Local economic linkages include transport operators, loading and unloading workers, customs agents, accommodation providers and small businesses.

For assessment purposes, the economic function of the crossing extends beyond the replacement cost of border facilities. Its operation supports the movement of goods and the delivery of logistics services. Merchandise trade values, customs revenue and domestic production or service income measure different economic flows.

2.3.3 Transport connectivity and supporting infrastructure

The Department of Roads identifies the Galchhi–Trishuli–Mailung–Syafrubesi–Rasuwagadhi road project as a strategic trade connection with a total project length of 82 kilometres. Its published scope comprises 46 kilometres from Galchhi to Mailung through Trishuli, 19 kilometres from Mailung to Syafrubesi, and 17 kilometres from Syafrubesi to Rasuwagadhi.

Road access, bridges, customs processing, freight-handling arrangements and supporting utilities form an interdependent transport and logistics system. Restoration of an individual asset may therefore be insufficient to restore trade or local access if another essential component remains unavailable.

2.3.4 Energy, water and essential service networks

The Water and Energy Commission Secretariat's (WECS) River Basin Atlas records 49 existing hydropower stations with a combined installed capacity of 808.7 MW across the wider Gandaki basin, based on the Department of Electricity Development inventory of March 2023. These figures describe the basin-wide pre-disaster context and not the number or capacity of projects affected by this event.

Hydropower generation depends on the functioning of civil works, electromechanical equipment, access routes and grid connections. Water supply and irrigation similarly depend on linked intakes, conveyance structures, distribution systems and, where applicable, electricity. Transport and telecommunications also support access to health care, education, markets and administrative services.

These interdependencies provide the basis for examining service disruption and sequencing recovery interventions. Pre-disaster installed capacity, actual operating conditions, service areas and the duration of interruption require separate identification in the relevant sector assessments.

2.4 CLIMATE CHANGE, CASCADING AND COMPOUNDING DISASTER RISK

The IPCC confirms that human activities, principally through greenhouse gas emissions, have caused global warming, with global surface temperature reaching approximately 1.1°C above the 1850–1900 average during 2011–2020. Glacier retreat, permafrost thaw and changes in meltwater conditions can reduce mountain-slope stability and influence the occurrence of landslides and rock-and-ice avalanches. Regional research indicates that continued warming and cryospheric change may alter the conditions associated with rock-and-ice slope failures, although changes in the frequency and magnitude of such events remain subject to scientific uncertainty.

According to the Government of Nepal's Climate Change Scenarios for Nepal (2019), prepared as technical input to the National Adaptation Plan process, national average annual mean temperature is projected to increase by approximately 1.30°C under RCP 4.5 and 1.82°C under RCP 8.5 during 2036–2065, relative to 1981–2010. These are national-level projections under alternative emissions scenarios, and conditions at specific locations may vary according to elevation, topography and season.

When a mass movement enters a river channel, it can incorporate water, sediment and debris and generate downstream flooding, riverbank erosion, channel obstruction and sediment deposition. This constitutes a

cascading hazard sequence because the initial process triggers subsequent hazards and extends the effects beyond the source area.

Compounding risk arises when several hazards or contributing conditions occur together or in close succession and intensify their combined effects. Along the Bhotekoshi–Trishuli–Narayani corridor, unstable slopes, accumulated sediment, channel obstruction, temporary impoundments, continuing rainfall and elevated river flows may interact to increase the likelihood or severity of further debris flows, sudden breaches and secondary flooding. Damage to transport, electricity, water-supply and communication networks may compound these effects by reducing access, interrupting essential services and constraining response capacity while physical risks remain.

The disaster sequence described in Section 1.1.2 demonstrates the need to assess the Bhotekoshi–Trishuli–Narayani corridor as a connected system. Risks to settlements, agricultural land, hydropower facilities, transport links and public services require consideration of upstream processes, downstream consequences and interactions between hazards and disrupted infrastructure. Cryospheric change may also influence erosion and sediment delivery, with implications for river channels, water quality and infrastructure operations. Reconstruction-site assessment, infrastructure design and protective measures should therefore consider upstream slope conditions, sediment movement, interacting hazards and projected climatic conditions over the anticipated service life of proposed works. The potential influence of changing climatic and cryospheric conditions on this event warrants further investigation through detailed scientific analysis, including event-attribution studies, in subsequent assessments and reports.

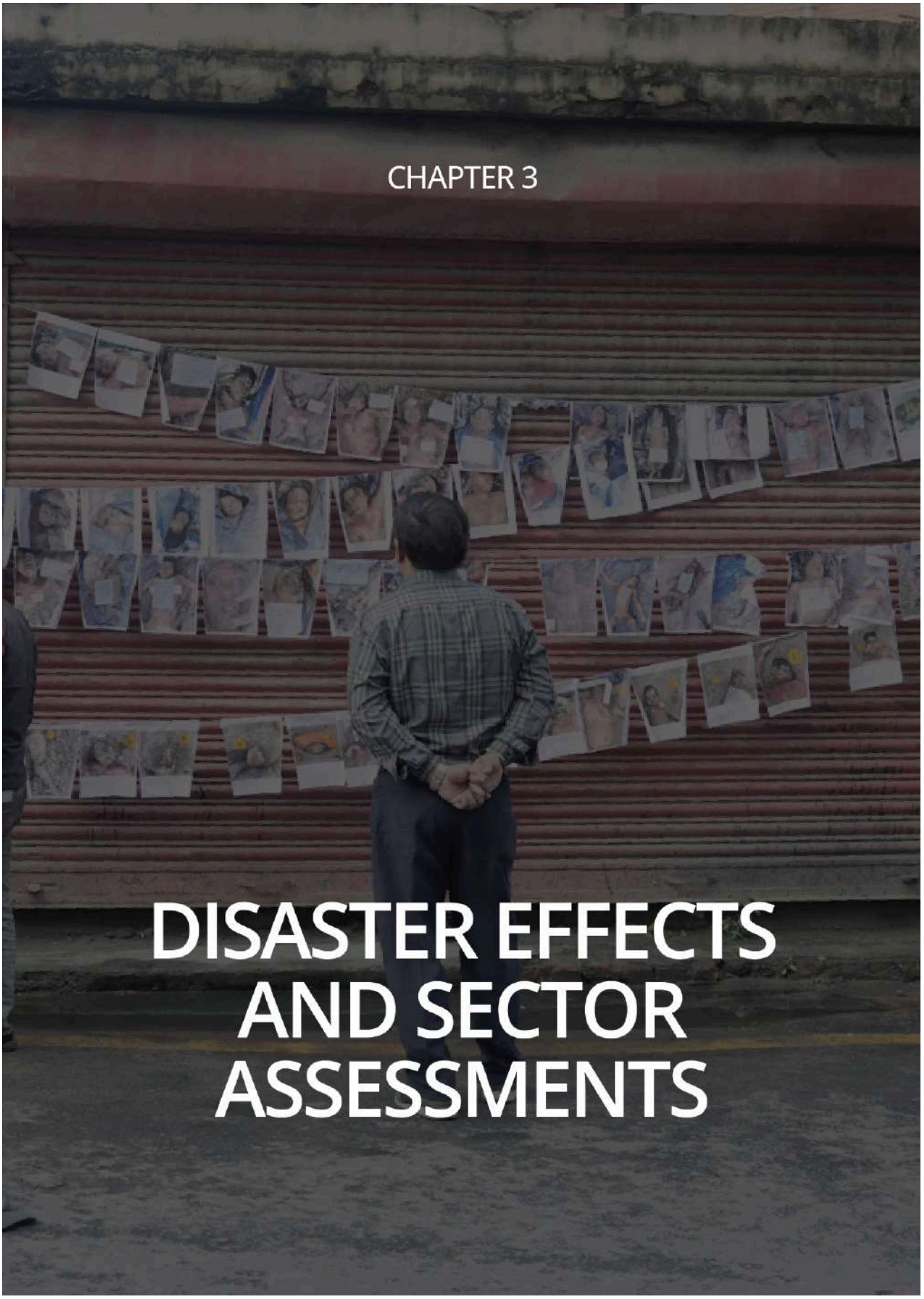
2.5 RISK, VULNERABILITY AND IMPLICATIONS FOR RESILIENT RECOVERY

Within the gender equality and social inclusion, livelihoods and socioeconomic conditions component of the Government of Nepal's 2021 Vulnerability and Risk Assessment, 27 of Nepal's 77 districts, or 35.1 per cent, were classified as having high or extreme vulnerability, while 23 districts, or 29.9 per cent, were classified as having high or very high baseline climate risk.[9,10] These percentages represent shares of districts rather than shares of Nepal's population and should be interpreted within the thematic scope of that assessment.

The national greenhouse gas inventory reported in Nepal's First Biennial Transparency Report, together with the mitigation commitments presented in its Third Nationally Determined Contribution, reflects Nepal's comparatively small emissions profile. At the same time, its communities and infrastructure remain exposed to the changing hazards described in Section 2.4. The Intergovernmental Panel on Climate Change (IPCC) identifies disproportionate impacts on vulnerable communities that have contributed least to climate change. Poverty, dependence on exposed livelihoods and limited access to finance and essential services can constrain preparedness and prolong recovery.

These conditions support the inclusion of disaster risk reduction and climate adaptation measures within recovery and reconstruction needs, where interventions address assessed risks to affected settlements, livelihoods and essential services. Prioritisation should consider exposure, vulnerability and the consequences of recurrent disruption, alongside the monetary value of damaged assets. Proposed interventions should be supported by site-specific assessment, defined protection objectives and cost estimates.

[9] *Ministry of Forests and Environment (2021). Vulnerability and Risk Assessment and Identifying Adaptation Options in GESI, Livelihood and Socio-Economic Sector in Nepal. Tables 15–16, pp. 58 and 63. Percentages calculated from the published district counts.*
[10] *Ministry of Forests and Environment (2021). Vulnerability and Risk Assessment and Identifying Adaptation Options in Rural and Urban Settlements. Tables 35 and 39.*



CHAPTER 3

DISASTER EFFECTS AND SECTOR ASSESSMENTS

CHAPTER 3: DISASTER EFFECTS AND SECTOR ASSESSMENTS

This chapter presents the overall effects of the disaster on people, settlements, livelihoods, economic activity, infrastructure and essential services across the assessed river corridor. It consolidates the available estimates of physical damage, economic losses and affected households and population, while showing how impacts vary across districts, local levels and sectors. The chapter also examines the wider economic, social and human consequences of the disaster and establishes the overall evidence base for the detailed sector assessments presented in Chapter 4.

3.1 AFFECTED POPULATION AND HUMAN IMPACTS

The sector assessments reflect information consolidated up to 3 September 2026. Human-impact, temporary-accommodation and selected operational figures were subsequently updated to 10 September 2026 and are identified by their respective reporting dates. The disaster affected households through damage to homes and productive assets, displacement, restricted access and disruption of essential services. This section presents the estimated population associated with affected buildings, separately reported temporary-accommodation figures and implications for household recovery.

As of 6:00 p.m. on 10 September 2026, official records reported 1,377 recovered bodies and records of human remains, 5,130 people recorded as missing and 13,676 people rescued. These categories remain subject to verification and should not be interpreted as mutually exclusive counts of individuals. The missing-person total was revised after 104 identified bodies were removed from the missing-person records. Further reconciliation is required because the remaining records may include unidentified deceased persons, duplicate reports or people subsequently rescued.

3.1.1 Estimated Affected Buildings, Households and Population

The assessment identifies an estimated 7,570 affected private buildings, associated with an estimated 8,317 households and 32,963 people, across selected wards in 15 local levels.[11]

Table 6: Estimated Affected Buildings, Households and Associated Population by District

District	Affected buildings	Estimated affected households	Estimated associated population
Rasuwa	1,779	1,923	7,633
Nuwakot	3,977	4,418	17,082
Dhading	1,451	1,588	6,638
Gorkha	263	274	1,096
Chitwan	100	114	514
Total	**7,570**	**8,317**	**32,963**

[11] *These figures describe the population associated with the assessed buildings and do not represent a complete enumeration of everyone affected through service disruption, livelihood interruption, or other consequences of the disaster.*

The distribution is concentrated in Nuwakot, which accounts for 52.5% of estimated affected buildings, followed by Rasuwa at 23.5% and Dhading at 19.2% (Table 6). At the local level, Bidur Municipality records the largest count, with 3,026 buildings, followed by Gosaikunda Rural Municipality with 1,043 and Benighat Rorang Rural Municipality with 1,037. Together, these three local levels account for 67.5% of the assessed building count.

The available ward-level distribution records estimated affected buildings in 52 wards across 15 local levels. The largest building impacts are recorded in Kispang Ward 5 (696 buildings), Gosaikunda Ward 2 (571), and Benighat Rorang Ward 3 (553). Together, these wards account for 1,820 buildings, or 24.0% of the total. In Bidur, the count is distributed across 11 wards, indicating that recovery requirements extend across multiple locations within the municipality. The distribution identifies concentrations of estimated affected buildings and can inform the geographic prioritisation of further verification and recovery planning.

District	Local Levels \ Wards	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Wards	Affected Buildings
	Aamachhodingmo	10				47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	57
Rasuwa	Gosaikunda	117	571	33		322		N/A	N/A	N/A	N/A	N/A	N/A	N/A	6	1,043
Rasuwa	Kalika	112					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	112
Rasuwa	Uttargaya	74	131		45	317	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	567
Nuwakot	Belkotgadhi					38		90	84						13	212
Nuwakot	Bidur	502	9	229	298	382	236	400	132	261	505		72		13	3,026
Nuwakot	Kispang					696	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	696
Nuwakot	Tarakeshwor		4		39			N/A	N/A	N/A	N/A	N/A	N/A	N/A	6	43
Dhading	Benighat Rorang			553		30		224	3	156	71	N/A	N/A	N/A	10	1,037
Dhading	Gajuri		95			10	2			N/A	N/A	N/A	N/A	N/A	8	107
Dhading	Galchhi	26	3		8		14		28	N/A	N/A	N/A	N/A	N/A	8	79
Dhading	Siddhalek						118	110	N/A	N/A	N/A	N/A	N/A	N/A	7	228
Gorkha	Gandaki	84					80		84	N/A	N/A	N/A	N/A	N/A	8	248
Gorkha	Shahid Lakhan			3	12						N/A	N/A	N/A	N/A	9	15
Chitwan	Ichchhakamana			80	17	3			N/A	N/A	N/A	N/A	N/A	N/A	7	100
															Total affected buildings	7,570

0 100 200 300 400 500 600 700

Figure 3: Estimated Affected Buildings by Ward as of 10 September 2026

Note: Counts do not indicate the percentage of each ward's building stock affected or the severity of damage. Blank cells indicate that an affected-building count is not available in the assessment dataset; they do not establish an absence of impact.

3.1.2 Reported Displacement, Temporary Accommodation and Housing Habitability

As of 10 September 2026, 3,685 people were accommodated in 37 holding centres across Rasuwa, Nuwakot and Dhading. Nuwakot accounted for 2,615 people, followed by Rasuwa with 775 and Dhading with 295 (Table 7). These figures describe reported temporary accommodation and do not constitute a comprehensive estimate of displacement across the five assessment districts.

Table 7: Reported Temporary Accommodation by District

Districts	Reported holding centres	People accommodated
Rasuwa	9	775
Nuwakot	25	2,615
Dhading	3	295
Total	**37**	**3,685**

These figures describe occupancy in recorded holding centres and do not constitute a comprehensive count of displaced people. A consolidated account of people staying with host families or in other accommodation, households that have returned home, and those requiring continued accommodation support is not available. Information on centre capacities and service conditions is insufficient to assess crowding or shelter adequacy.

Housing habitability has not been systematically established for the affected-building inventory. Temporary accommodation and safe-return requirements depend on structural condition, residual site hazards, access and essential services. Building- and site-level assessments linked to household information will distinguish requirements for repair, reconstruction and possible relocation.

The RDNA did not systematically assess conditions within holding centres and other temporary accommodation, including overcrowding, secondary displacement, host-family pressures, length of stay and intentions to return. Information was also incomplete on privacy, accessibility, lighting, water and sanitation, cooking arrangements, fire safety and protection risks. Housing, land and property concerns affecting owners, tenants, landless households and people without documentation were not comprehensively examined. These gaps limit the assessment of temporary shelter requirements and longer-term housing solutions.

Site-level assessment and household registration are required to establish temporary accommodation needs and support safe return. Temporary sites should provide accessible and sex-segregated sanitation, adequate lighting, safe cooking arrangements, privacy and confidential complaints mechanisms. Planning should distinguish between households able to return following minor repairs, those requiring reconstruction and those that may require relocation because of continuing risk. Temporary shelter requirements and permanent housing recovery costs should be calculated separately.

3.1.3 Disruption of Essential Services and Livelihoods

Sector inventories record damage to 18 schools and seven health facilities, alongside affected water systems, electricity infrastructure, telecommunications, roads and bridges. A consolidated number of learners affected by school disruption and the duration of interrupted education remain unavailable. As of 10 September 2026, 337 people had received treatment at 19 hospitals, with 261 discharged. These hospitals form the recorded treatment network and are distinct from the seven health facilities recorded as damaged in the sector

assessment. Separate records indicate medical treatment provided by the Nepal Army to 3,559 people and by the Armed Police Force to 3,759 people.

These impacts have implications for access to education, health care, safe water, markets and administrative services. The available information does not establish a consolidated count of affected learners, patients or service users, or the duration of interruption across all locations.
Damage to agricultural land, livestock, fisheries and business assets has affected the resources on which household livelihoods depend. Transport disruption and interruptions to electricity, communications and financial services can also constrain production, trading and access to income. The estimated 4,800 affected infrastructure including health facilities, water systems, electricity infrastructure, telecommunications, etc. provide an indication of the scale of business exposure; they do not constitute an estimate of workers who lost employment or income.

Household recovery consequently depends on the restoration of connected services and access, as well as housing and productive assets.

3.1.4 Differential Impacts and Barriers to Recovery

The socioeconomic conditions described in Chapter 2 indicate differences in households' capacity. Households with limited savings, restricted access to credit or dependence on a single livelihood may have difficulty financing temporary accommodation, replacing essential assets and resuming income-generating activities. Continued expenditure on food, transport, health care and education may place additional pressure on household resources during recovery. Assistance requirements should therefore be assessed alongside household recovery capacity and the availability of other support.

Children, older persons, persons with disabilities, people requiring continuing medical care and pregnant or breastfeeding women may face additional difficulties where access, accommodation and services are disrupted. Language, literacy, mobility and documentation requirements may also affect access to information and assistance. These are considerations for identifying recovery barriers; the available assessment does not quantify their prevalence among affected households.

Owners, tenants and households occupying land or buildings under informal arrangements may face different recovery requirements. Building ownership alone does not identify all households requiring assistance. Loss or absence of identity, occupancy and land records may also create barriers to registration and access to support. Household verification should record these circumstances and identify cases requiring assistance with documentation or tenure clarification. It should establish actual occupancy, displacement status, housing tenure, livelihood interruption, assistance received and unmet needs, with appropriate sex-, age- and disability-disaggregated information.

This would support the identification of households requiring additional assistance and inform accessible recovery arrangements. Detailed inclusion, protection and accountability provisions are addressed in the cross-cutting assessment and recovery chapter.

3.2 SUMMARY OF DAMAGE, LOSSES AND RECOVERY NEEDS

Total disaster effects are estimated at USD 2,695.33 million, comprising USD 1,812.01 million in physical damage and USD 883.32 million in economic losses. These amounts are equivalent to NPR 40,828.91 crore, including NPR 27,448.32 crore in damage and NPR 13,380.58 crore in losses (Table 8).

Total recovery and reconstruction needs are estimated at USD 4,774.99 million, equivalent to NPR 72,331.52 crore. Early recovery needs for the first six months are estimated at USD 57.66 million, while recovery and reconstruction needs beyond six months are estimated at USD 4,717.32 million. Table 8 presents the consolidated estimates for all assessed sectors and subsectors.

Recovery needs exceed the assessed value of damage and losses because they include reconstruction, disaster risk reduction and resilience measures that extend beyond the replacement of damaged assets. The largest differences arise in the energy and disaster risk reduction estimates, which remain subject to detailed engineering, financing and implementation review.

Table 8: Summary of Total Effects and Needs

Sector	Total Damage and Loss				Recovery Needs			
	Damage	Losses (NPR Crore)	Total Disaster Effects		Early recovery (0-6 months) (NPR crore)	Long Term Recovery (beyond 6 months) (NPR crore)	Total Recovery Needs	
	NPR, Crore		NPR, Crore	US$, Million			NPR, Crore	US$, Million
1. Social Sector	**6785.10**	**2.00**	**6787.10**	**448.05**	**82.80**	**10272.19**	**10354.99**	**683.59**
1.1. Private buildings	6388.48	-	6388.48	421.74	48	9534.72	9582.72	632.61
1.2. Public Buildings and Facilities	264.59	-	264.59	17.47	11.8	411.55	423.35	27.95
1.3. Education	93.73	-	93.73	6.19	10.5	223.82	234.32	15.47
1.4. Health	23.66	-	23.66	1.56	12.5	65.5	78	5.15
1.5. Cultural Heritage	14.64	2.00	16.64	1.10	-	36.60	36.60	2.42
2. Productive Sector	**3428.53**	**11608.89**	**15037.42**	**992.70**	**50.40**	**5027.09**	**5077.49**	**335.19**
2.1. Agriculture	109.30	-	109.30	7.22	35	107.10	142.10	9.38
2.2 Fisheries	71.59	-	71.59	4.73	0.4	106.99	107.39	7.09
2.3. Livestock	144.81	-	144.81	9.56	15	158.77	173.77	11.47
2.4. Banking	72.40	19.59	91.99	6.07	-	108.60	108.60	7.17
2.5. Economic activities / livelihoods	3030.43	11589.30	14619.73	965.13	-	4545.65	4545.65	300.08
3. Infrastructure Sector	**17234.69**	**1769.69**	**19004.39**	**1254.58**	**674.30**	**46682.89**	**47357.19**	**3126.30**
3.1. Energy (hydropower and grid)	13469.76	1634.69	15104.45	997.13	105	38957.30	39062.30	2578.71
3.2. Household renewable energy	56.84	-	56.84	3.75	10	154.82	164.82	10.88
3.3. Roads	2207.25	135.00	2342.25	154.62	319	5199.13	5518.13	364.28
3.4. Bridges	1135.11	-	1135.11	74.93	155	1661.17	1816.17	119.90
3.5. Telecommunication	62.87	-	62.87	4.15	34	60.30	94.30	6.23

Sector	Total Damage and Loss				Recovery Needs			
	Damage	Losses (NPR Crore)	Total Disaster Effects		Early recovery (0-6 months) (NPR crore)	Long Term Recovery (beyond 6 months) (NPR crore)	Total Recovery Needs	
	NPR, Crore		NPR, Crore	US$, Million			NPR, Crore	US$, Million
3.6. WASH	138.11	-	138.11	9.12	51.3	155.86	207.16	13.68
3.7. Irrigation and river training	164.77	-	164.77	10.88	-	494.30	494.30	32.63
4. Cross-cutting Sector	**0.00**	**0.00**	**0.00**	**0.00**	**66.00**	**9475.85**	**9541.85**	**629.91**
4.1. Debris	0.00	-	-	-	16	35.54	51.54	3.40
4.2. Disaster Risk Reduction	-	-	-	-	35	9440.31	9475.31	625.52
4.3. Inclusive Recovery	-	-	-	-	15	-	15	0.99
Total	**27448.32**	**13380.58**	**40828.91**	**2695.33**	**873.50**	**71458.02**	**72331.52**	**4774.99**

Note: Monetary values are rounded to two decimal places. Totals calculated from unrounded values may differ slightly from the sum of displayed entries. USD equivalents are calculated using NPR 151.48 per USD (NRB exchange rate on 09 September, 2026).

Recovery needs cover the restoration of housing, productive assets, infrastructure and services, together with disaster risk reduction, debris management and inclusive recovery measures. They represent the estimated cost of recovery interventions rather than the sum of damage and economic losses. The cross-cutting category therefore includes recovery requirements without a corresponding separate damage or loss estimate.

Infrastructure accounts for **46.55% of** total disaster effects, followed by the productive sector at **36.83%** and the social sector at **16.62%**. Recovery needs have a different distribution: infrastructure accounts for **65.47%**, social sectors for **14.32%**, cross-cutting sectors for **13.19%**, and productive sectors for **7.02%**. The difference reflects the composition of assessed damage and economic losses, together with the scope of proposed recovery and risk reduction interventions.

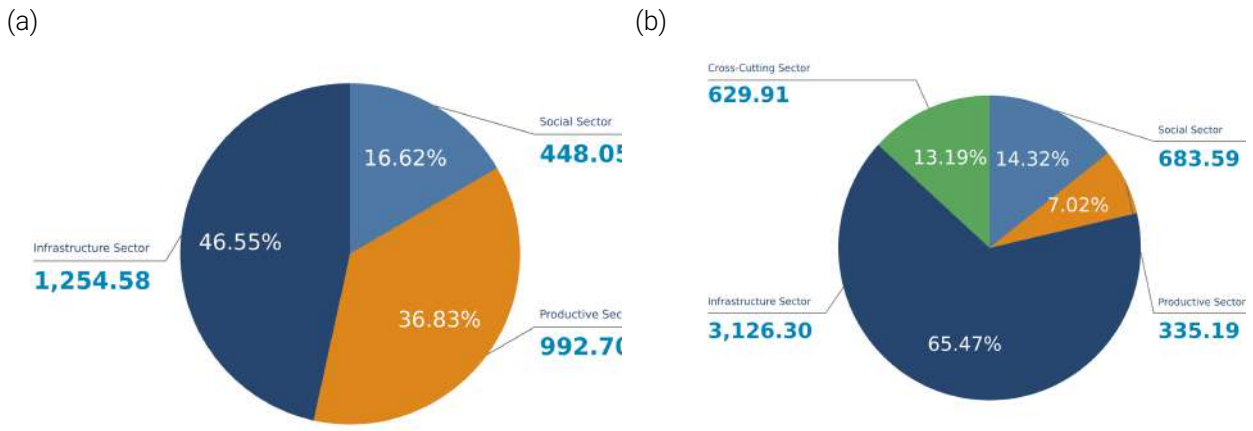


Figure 4: Total Disaster Effects (a) and Total Recovery Needs (b) in US$ million by Major Sector

Within the social sector, private buildings account for **USD 421.74 million**, or **94.15% of sector damage**, and **USD 632.61 million** in recovery needs. The remaining needs cover public buildings and facilities, education, health, and cultural heritage. Their smaller financial share does not establish a lower priority for restoring essential services.

Productive-sector effects are dominated by economic activities and livelihoods, with **USD 200.05 million in damage** and **USD 765.07 million in economic losses**. This subsector accounts for **86.61% of all assessed economic losses**. Its recovery needs are estimated at **USD 300.08 million**. Agriculture, fisheries, livestock and banking account for the remaining productive-sector requirements. Recovery needs are not calculated as reimbursement of accumulated economic losses; the difference between these estimates does not, by itself, indicate a financing shortfall.

Within infrastructure, energy (hydropower and grid) accounts for **USD 889.21 million in damage**, equivalent to **49.07% of total assessed damage**, and **USD 107.91 million in economic losses**. Energy recovery needs are estimated at **USD 2,578.71 million**, followed by roads at **USD 364.28 million** and bridges at **USD 119.90 million**. Additional requirements cover household renewable energy, telecommunications, water supply and sanitation, and irrigation and river-training infrastructure. Restoration of these systems affects access to services, markets and reconstruction sites.

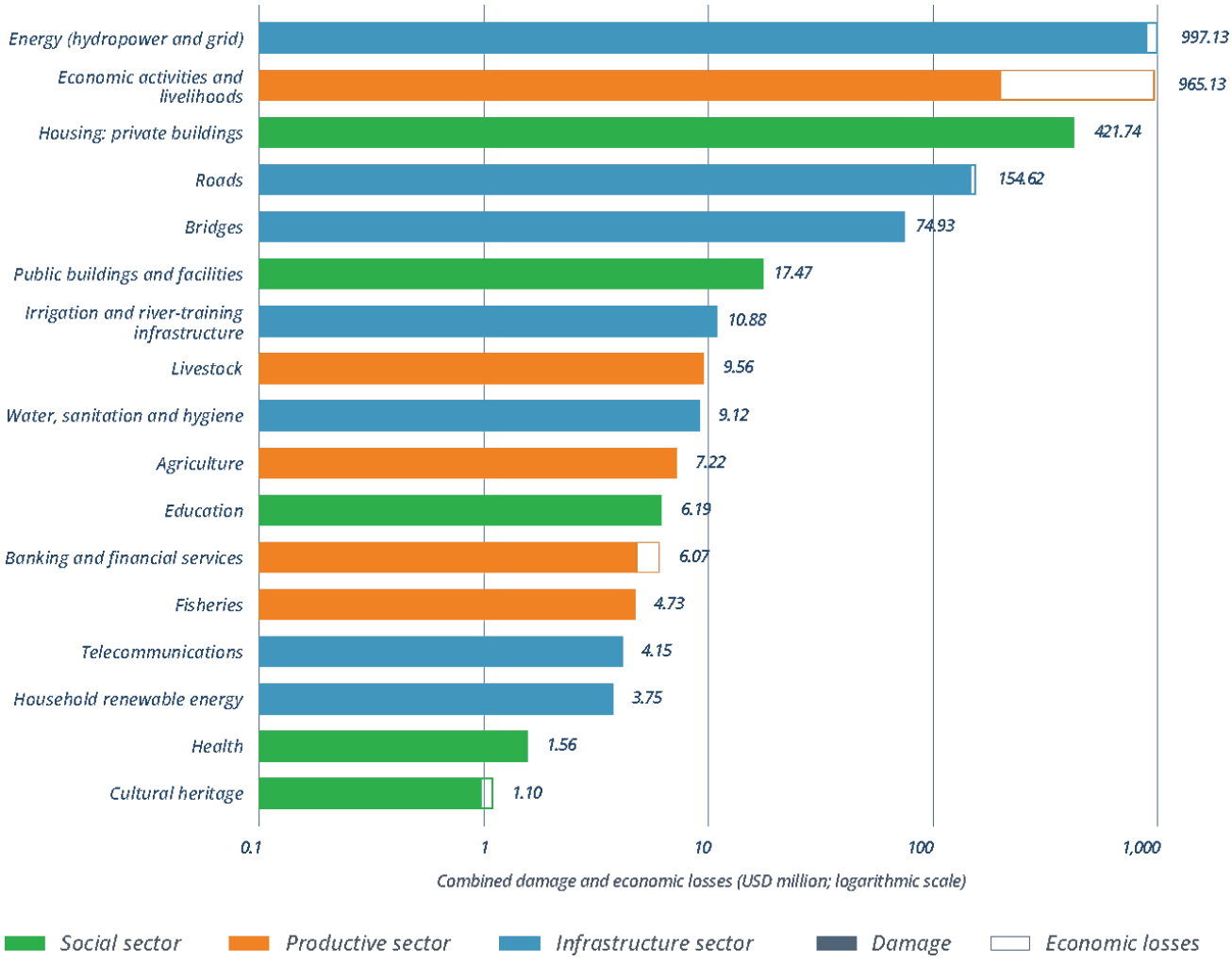


Figure 5: Total Disaster Effects (Damage and Losses) by Subsector

Cross-cutting recovery needs a total **USD 629.91 million**. Disaster risk reduction accounts for **USD 625.52 million**, with the remainder allocated to debris management and inclusive recovery. These requirements include measures to reduce future risk and support recovery implementation. The absence of separately recorded monetary damage in this category does not imply an absence of recovery requirements.

Energy, private buildings and disaster risk reduction together account for **USD 3,836.83 million**, or **80.35% of total recovery needs**. This concentration identifies the interventions that will have the greatest influence on the overall cost and implementation schedule. Detailed engineering, site assessment and activity-level costing in these areas will therefore be particularly relevant to subsequent refinement of the recovery programme.

Early recovery needs total **USD 57.66 million**, representing **1.21% of total recovery needs**; the remaining **USD 4,717.32 million** is assigned to recovery beyond six months. Infrastructure accounts for **77.20% of early recovery needs**, with roads and bridges together accounting for **54.26%**. This allocation indicates a substantial emphasis on restoring access. The adequacy of allocations for other immediate requirements will need to be assessed against intended outputs, implementation schedules, and assistance already provided.

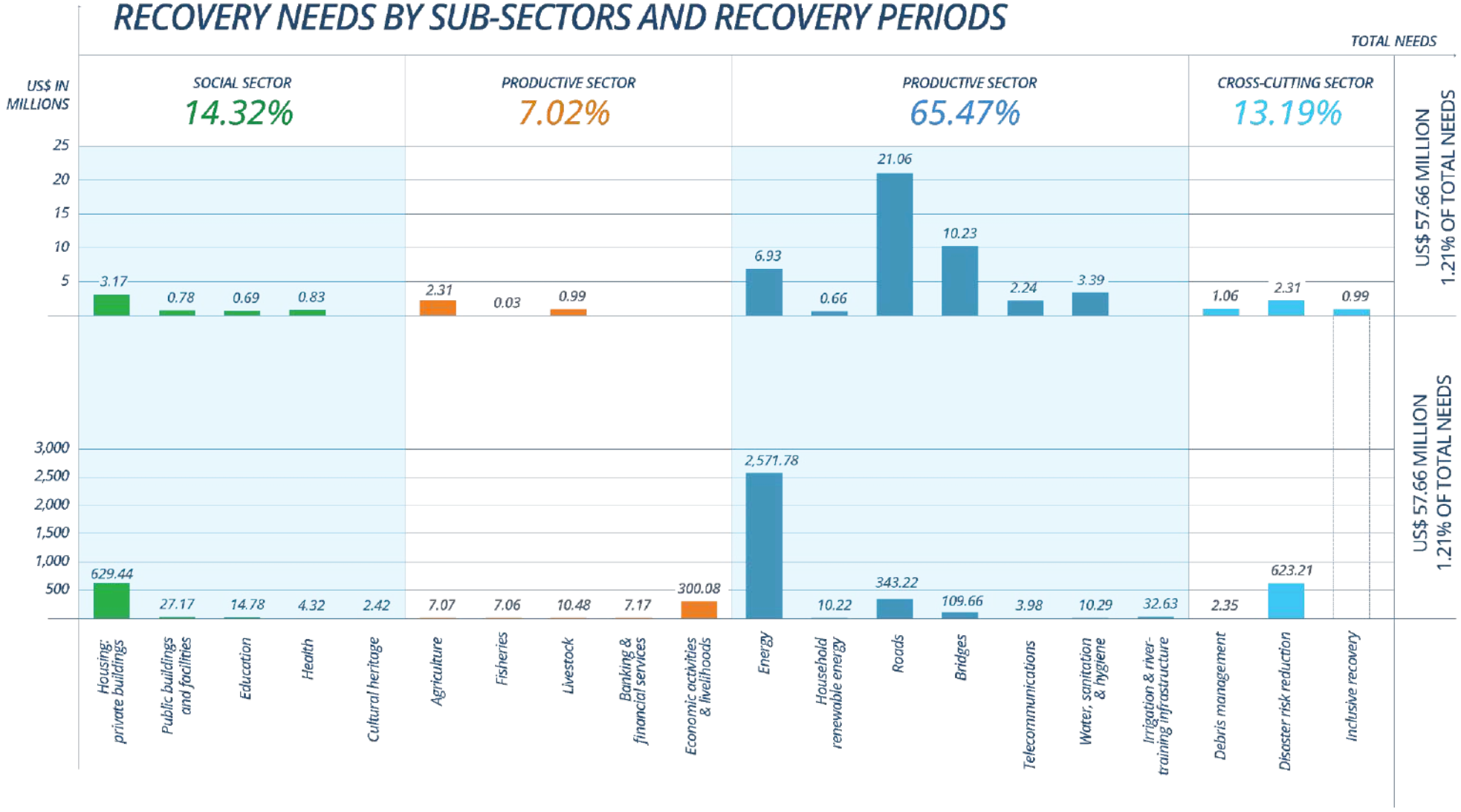


Figure 6: Recovery Needs by Subsector and Recovery Period

Financial magnitude provides one basis for prioritisation. Decisions also require consideration of life safety, continuity of essential services, household recovery capacity, residual hazards and dependencies between interventions.

3.3 ECONOMIC AND SOCIOECONOMIC IMPLICATIONS

The assessment indicates a substantial economic burden, although it does not estimate the Rasuwa Bhotekoshi Flood 2026's effect on national GDP growth. For a historical comparison of scale, total disaster effects and recovery needs are equivalent to approximately 6.69% and 11.84%, respectively, of Nepal's preliminary nominal GDP for FY 2024/25, reported at NPR 6,107.22 billion.[12]

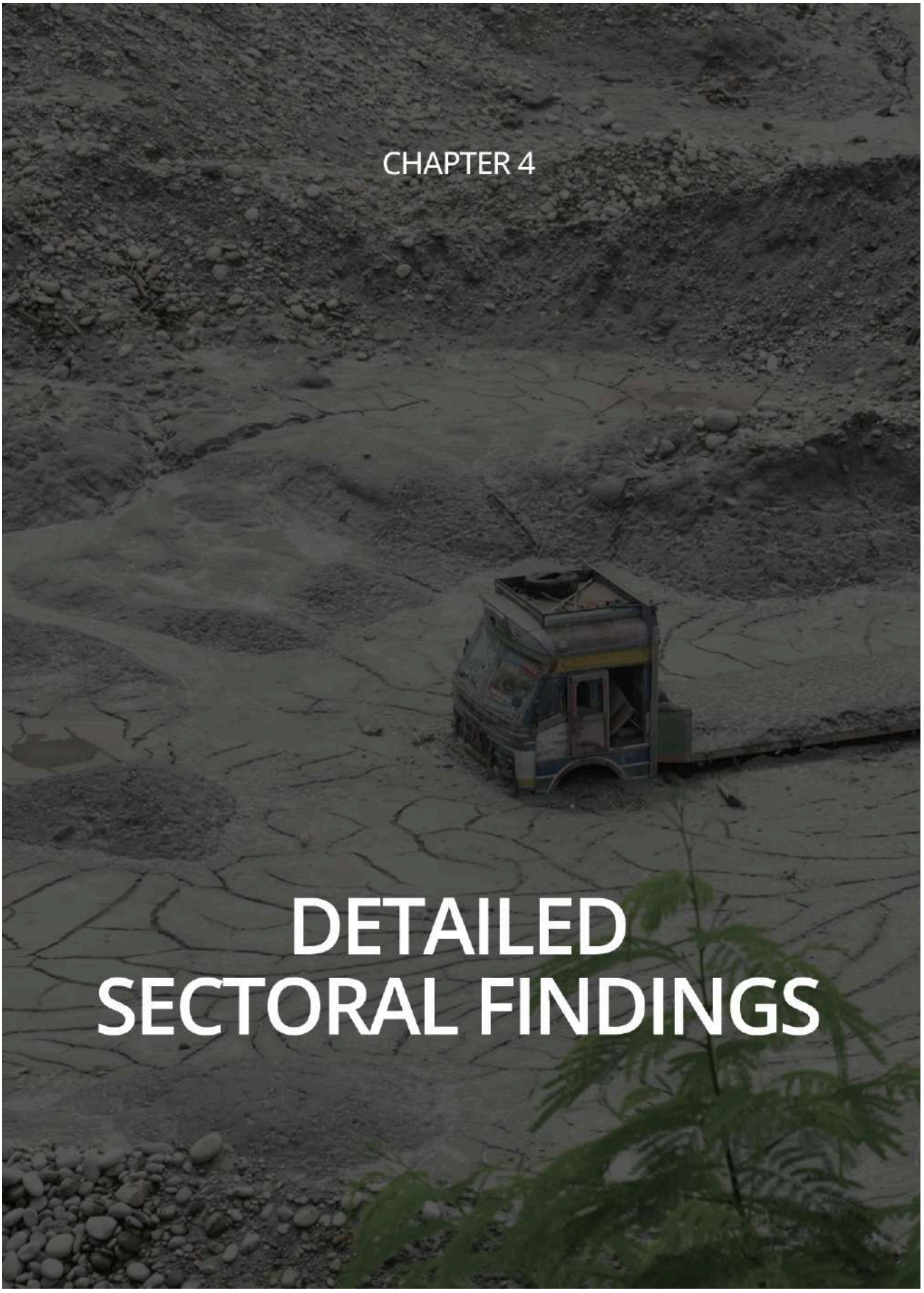
Disruption along the affected transport and trading corridor can transmit economic effects beyond the locations where assets were damaged. Delayed deliveries, longer alternative routes and interrupted market access can raise business costs and affect suppliers and customers elsewhere. However, trade diverted to another route is not necessarily lost to the national economy. Similarly, interruptions at operating hydropower plants affect existing generation, while damage to projects under construction can delay future production and investment returns. Quantifying these effects would require evidence on interruption periods, actual output, rerouted trade and revised commissioning schedules.

Recovery financing involves both public and private expenditure. The government's eventual financing requirement will depend on asset ownership, insurance coverage, assistance commitments and the scope of publicly supported interventions.
Capital expenditure reached 32.5% of the original annual budget allocation during the first eleven months of FY 2025/26[13]. For recovery planning, timely expenditure will depend on project preparation, procurement readiness, technical capacity and coordination alongside the availability of finance. Preparing designs, cost estimates and implementation arrangements can support the timely restoration of infrastructure and services. Reconstruction may also generate employment and demand for local goods and services as productive activity resumes.

Proposed early recovery measures focus on restoring access and essential services, providing temporary accommodation, clearing debris and supporting the resumption of livelihoods. Longer-term interventions cover the repair or reconstruction of housing, public facilities and infrastructure, restoration of productive assets, and disaster risk reduction. Decisions on repair, reconstruction or relocation depend on building condition, site safety and further technical assessment.

[12] *These comparisons use nominal amounts without adjustment for differences in price periods. Damage measures affected assets, losses cover sector-specific periods, and recovery needs extend over multiple years; the ratios therefore do not represent an annual decline in output or an annual public expenditure requirement. Source: National Statistics Office, reproduced in Nepal Rastra Bank, Monetary Policy for 2025/26, Table 2.*

[13] *Nepal Rastra Bank, Macroeconomic Report, July 2026, Section 2.4, Table 2.2, p. 24, drawing on Financial Comptroller General Office data.*



CHAPTER 4

DETAILED SECTORAL FINDINGS

CHAPTER 4: DETAILED SECTORAL FINDINGS

This chapter presents a detailed assessment of disaster effects across the social, productive, infrastructure and cross-cutting sectors. Each sector assessment describes the affected assets and services, geographic distribution of impacts, valuation approach, damage and economic losses, service and livelihood implications, recovery needs, proposed interventions and limitations. The findings combine reported inventories, geospatial analysis and modelled estimates, with distinctions maintained between confirmed damage and estimated exposure. Potential overlaps between sectors are identified to support reconciliation and prevent the same assets, losses or recovery activities from being counted more than once.

4.1 SOCIAL SECTORS

This section assesses the disaster's effects on private buildings and household assets, public buildings and facilities, education, health and cultural heritage. It presents the reported damage, valuation methods, service disruptions and recovery requirements for each subsector. The assessment distinguishes the replacement or repair of damaged assets from the measures required to restore essential services, support affected households and reduce future risk. Differences in data coverage and verification are identified within the respective subsections.

4.1.1 Private Buildings

Total damage to private buildings and household assets is estimated at **NPR 6,388.48 crore (USD 421.74 million),** inclusive of replacement cost. The assessment covers 7,570 affected buildings across fifteen local levels in five districts.

Composition of total damage

Building structures account for NPR 3,893.38 crore, or 60.9% of total damage, and household assets account for NPR 2,495.10 crore, or 39.1%. Household assets are calculated for 8,317 estimated affected households.

Table 9: Components of Total Damage to Private Buildings and Household Assets

Component	Total damage (NPR crore)
Building structures	3,893.38
Household assets	2,495.10
Total	**6,388.48**

Distribution by local level

Bidur municipality in Nuwakot district records the largest total damage, at NPR 2,877.63 crore, followed by Gosaikunda at NPR 1,030.70 crore and Benighat Rorang at NPR 757.33 crore, collectively accounting for 73.0% of the total damage. Monetary differences reflect building counts, construction types, assumed floor areas, and associated household assets.

Table 10: Affected Private Buildings and Damage by Local Level

District / local level	Affected buildings	Mud-bonded	Cement-bonded	RCC / other	Total damage, including household assets (NPR crore)
Rasuwa					
Gosaikunda	1,043	271	370	402	1,030.70
Kalika	112	27	59	26	88.78
Aamachhodingmo	57	32	16	9	37.18
Uttargaya	567	127	344	96	411.6
Nuwakot					
Belkotgadhi	212	72	108	32	145.42
Bidur	3,026	596	1,407	1,023	2,877.63
Kispang	696	231	342	123	497.54
Tarakeshwor	43	22	16	5	26.69
Dhading					
Benighat Rorang	1,037	565	264	208	757.33
Gajuri	107	45	40	22	81.34
Galchhi	79	29	33	17	61.1
Siddhalek	228	113	94	21	134.65
Gorkha					
Gandaki	248	134	89	25	147.95
Shahid Lakhan	15	8	5	2	9.65
Chitwan					
Ichchhyakamana	100	47	28	25	80.93
Total	**7,570**	**2,319**	**3,215**	**2,036**	**6,388.48**

Building typology and valuation

Cement-bonded buildings account for 42.5% of the estimated affected inventory, followed by mud-bonded buildings at 30.6% and RCC or other buildings at 26.9%. However, RCC and other buildings account for 73.4% of structural damage, reflecting their larger assumed floor area and higher construction rate.

The valuation assumes floor areas of 600, 900 and 3,000 sq ft for mud-bonded, cement-bonded and RCC or other buildings, respectively.

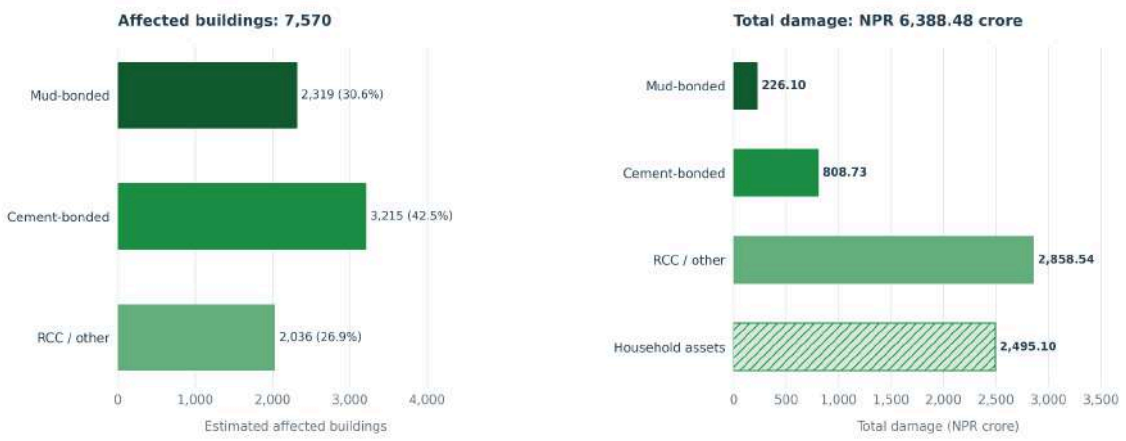


Figure 7: Estimated Affected Buildings by Construction Type and Composition of Total Damage

No separate economic-loss amount is included for private buildings in the assessment. Rental-income losses and additional household accommodation expenditure have not been separately quantified.

Recovery needs and proposed interventions

Recovery needs total NPR 9,582.72 crore (USD 632.61 million). Proposed early interventions comprise residential-site debris clearance and fencing, transitional shelter with WASH facilities, and detailed damage assessments. Longer-term interventions cover repair or reconstruction and restoration of essential household assets. Where site conditions prevent safe rebuilding, relocation options would require technical assessment and consultation with affected households.

Table 11: Private-Building Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	48	3.17
Longer-term recovery: beyond 6 months	9,534.72	629.44
Total	**9,582.72**	**632.61**

Limitations: The valuation does not distinguish repairable buildings from those requiring complete reconstruction. Actual floor areas, structural condition, and household contents may differ from the model assumptions. Building inspections and household verification would support refinement of costs and the allocation between temporary accommodation, repair, reconstruction and any relocation.

4.1.2 Public Buildings and Facilities

Total damage to public buildings and facilities is estimated at NPR 264.59 crore (USD 17.47 million), including building assets and replacement cost. The inventory records 48 affected buildings and facilities, comprising 35 completely damaged and 13 partially damaged entries.

Damage profile

The inventory covers administrative, security, community, religious, recreational, and other public facilities. Customs buildings account for the largest total damage, at NPR 93.77 crore, followed by police posts at NPR 29.79 crore and government offices at NPR 23.31 crore.

Table 12: Public Buildings and Facilities

Building or facility type	Partially damaged	Completely damaged	Total affected	Total damage, including assets (NPR crore)
Army posts/blocks	0	2	2	15.65
Covered halls	0	2	2	7.32
Prison buildings	2	0	2	13.17
Sports ground buildings	1	1	2	3.58
Senior citizens' building	0	1	1	13.55
Religious sites	2	4	6	17.1
Park	1	0	1	1.65
Police posts	1	4	5	29.79
Customs buildings	0	2	2	93.77
Cremation sites	1	7	8	12.08
Assembly hall	1	0	1	1.65
Government offices	1	5	6	23.31
Government bank building	0	1	1	3.83
Community buildings	1	2	3	9.42
Health facility buildings	2	2	4	13.22
Other facilities	0	2	2	5.5
Total	**13**	**35**	**48**	**264.59**

Completely damaged entries represent 72.9% of the affected inventory. The financial distribution differs from the distribution of facility counts: two customs buildings account for approximately 35.4% of total damage, while eight cremation sites account for 4.6%.

Facility counts and monetary values therefore describe different aspects of the impact. Neither establishes the number of users affected or the duration of interrupted services.

Valuation and service implications

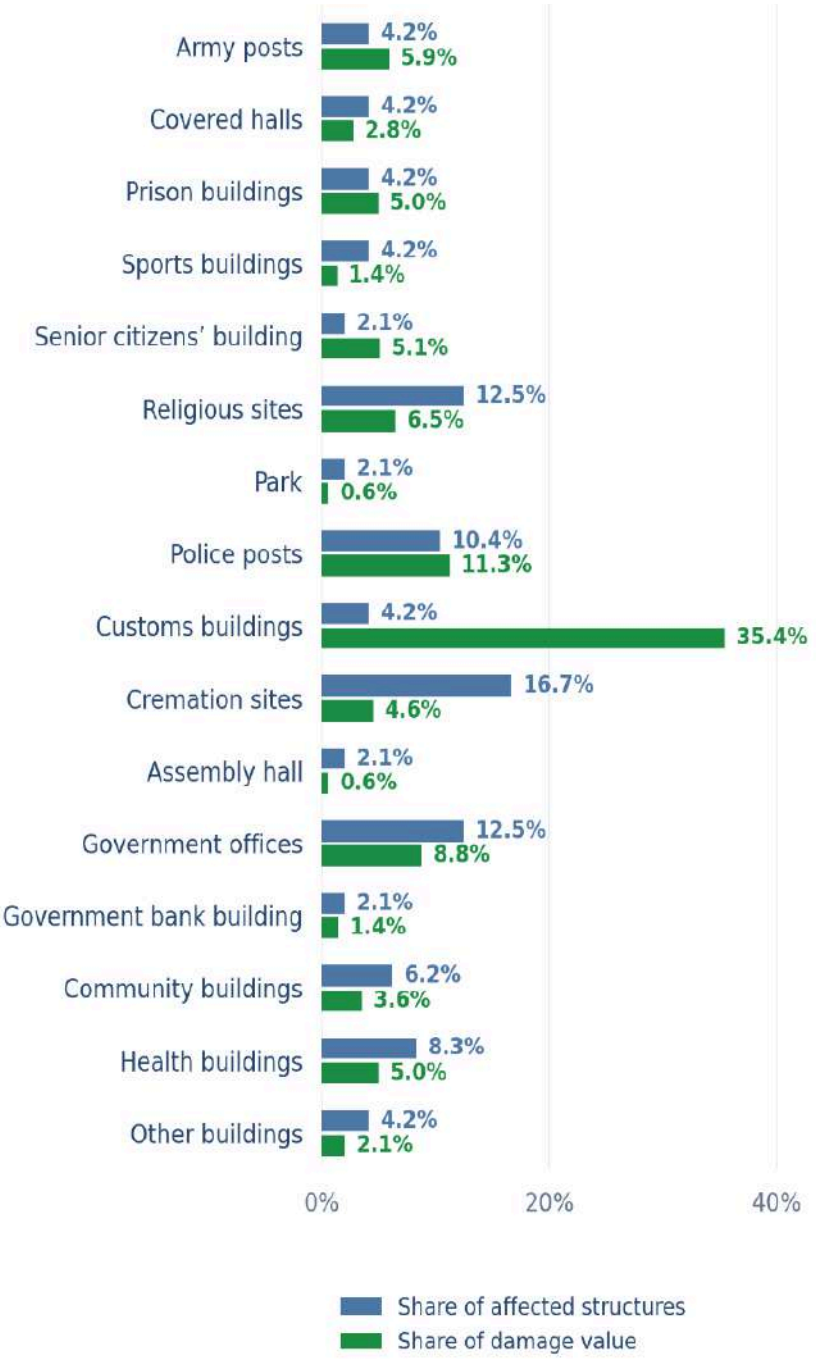


Figure 8: Percentage of Public Buildings Damage Count and Damage Value

The **total damage is estimated at NPR 198.11** crore for public buildings and structures and **NPR 66.49 crore for assets inside the buildings** and facilities. The assets valuation uses a uniform allowance per recorded building or facility, rather than an itemised inventory for each function.

Damage to customs buildings, government offices and security facilities affects premises used for trade administration, public administration and security services. Community, religious and cremation facilities support other local functions. The inventory does not establish whether these services ceased entirely, continued at reduced capacity, or moved to alternative premises.

No separate economic-loss amount is included for this sector in the assessment. Additional operating costs and costs of providing services from alternative premises have not been separately quantified as losses.

Recovery needs and proposed interventions

Recovery needs are estimated at a total of NPR 423.35 crore (USD 27.95 million), including NPR 11.80 crore for early recovery.

Table 13: Public-Building and Facility Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	11.8	0.78
Longer-term recovery: beyond 6 months	411.55	27.17
Total	**423.35**	**27.95**

Proposed early interventions include debris clearance and site fencing, rapid structural safety assessments, restoration of basic utilities in usable buildings, and temporary premises for interrupted public services. Detailed damage and geohazard assessments would inform repair, retrofitting, or reconstruction options.

Longer-term interventions concern restoration of permanent facilities and their equipment. The sequence of works would depend on structural condition, site safety, service importance and the availability of alternative premises.

Limitations: The inventory provides damage categories and aggregate values but does not consistently identify repair quantities, facility-specific contents or service interruption periods. The uniform asset value may not reflect differences between offices, security facilities, parks and other public spaces. Facility-level verification would support refinement of these components and identification of the works required to restore each service.

4.1.3 Education

Total damage to education facilities is estimated at NPR 93.73 crore (USD 6.19 million), including replacement costs and educational assets. The inventory records 18 affected schools, comprising seven partially damaged and eleven completely damaged schools, across six local levels in Rasuwa, Nuwakot and Dhading.

Damage profile

The affected schools contain 56 damaged buildings and 308 damaged rooms. These are nested inventory measures: school, building, and room counts describe the same facilities at different levels and are not added together. Of the affected rooms, 152 are partially damaged, and 156 are completely damaged.

Table 14: Education Facilities: Inventory and Structural Damage by Local Level

District / local level	Affected schools	Affected buildings	Partially damaged rooms	Completely damaged rooms	Total damage, including educational assets (NPR crore)
Rasuwa / Gosaikunda	1	2	0	11	3.75
Rasuwa / Uttargaya	3	6	0	36	12.29
Nuwakot / Bidur	9	32	61	89	36.62
Dhading / Galchhi	3	10	77	8	10.61
Dhading / Benighat Rorang	1	2	0	12	4.1
Dhading / Siddhalek	1	4	14	0	1.43
Structural subtotal	**18**	**56**	**152**	**156**	**68.8**
Educational assets, recorded separately	—	—	—	—	24.93
Total damage	**—**	**—**	**—**	**—**	**93.73**

Bidur accounts for 150 affected rooms, including 89 completely damaged rooms, and 53.2% of structural damage. Galchhi records 85 affected rooms, of which 77 are partially damaged. This distinction affects the estimated repair and reconstruction workload.

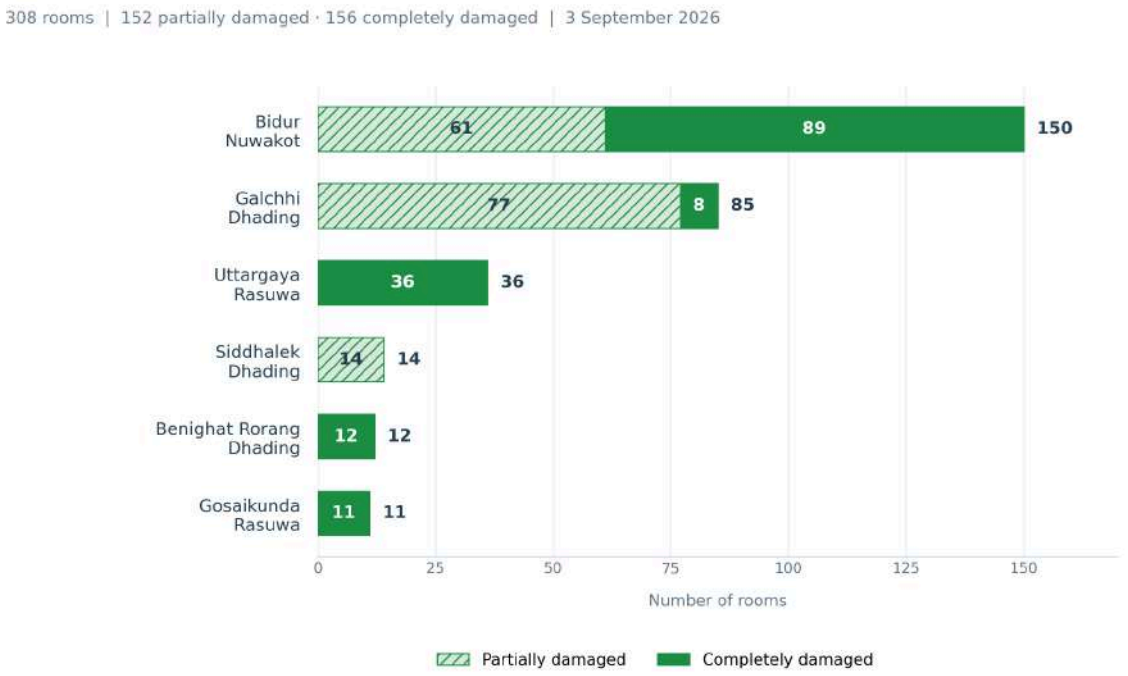


Figure 9: Affected School Rooms by Local Level and Damage Category

Valuation and education continuity

The structural valuation assumes a room area of 35 m², with partial damage valued at 30% of the corresponding full structural cost, followed by the replacement costs adjustment. Educational assets are included separately within total damage.

The inventory does not establish whether affected schools ceased operating or continued teaching in usable buildings or alternative premises. Affected learner numbers, interruption periods and temporary-learning capacity have not been consolidated. Economic-loss amounts have been separately quantified as losses in economic activities under the productive sector.

Recovery needs and proposed interventions

Recovery needs are estimated at a total of NPR 234.32 crore (USD 15.47 million), including NPR 10.50 crore for early recovery.

Table 15: Education Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	10.5	0.69
Longer-term recovery: beyond 6 months	223.82	14.78
Total	**234.32**	**15.47**

The planned early-recovery schedule allocates NPR 5.00 crore to rapid assessment and temporary learning centres, NPR 5.00 crore to learning materials, and NPR 0.50 crore to psychosocial counselling for students. These activities are included within the early-recovery provision.

Longer-term interventions concern repair or reconstruction of school buildings and replacement of educational assets. Structural safety, site conditions, accessibility, and functioning WASH facilities would inform the suitability of restored premises for teaching.

Limitations: Room-based valuation does not provide building-specific engineering quantities or distinguish all repair requirements. Educational assets also lack a facility-level breakdown. School-level assessments would establish usable teaching space, repair requirements, equipment needs, enrolment, attendance and arrangements for displaced learners.

4.1.4 Health

Total damage to health facilities is estimated at NPR 23.66 crore (USD 1.56 million), including health assets and replacement costs. The inventory records seven affected facilities: one partially damaged public hospital, four completely damaged health posts and two partially damaged primary health care centres.

Damage profile and valuation

The structural component damage is estimated at NPR 19.50 crore, with health assets accounting for a further NPR 4.16 crore. Structural damage valuation uses facility-type benchmarks and the reported damage category. Health assets are recorded at sector level without a facility-specific allocation.

Table 16: Health Facilities: Damage Inventory and Valuation

Facility type	Partially damaged	Completely damaged	Total affected	Structural damage (NPR crore)
Public hospital	1	0	1	6.5
Health posts	0	4	4	7.8
Primary health care centres	2	0	2	5.2
Structural subtotal	**3**	**4**	**7**	**19.5**
Health assets, recorded separately	—	—	—	4.16
Total damage	**—**	**—**	**—**	**23.66**

Complete damage to four health posts indicates a requirement for replacement facilities or alternative premises for the services they provided. Repair requirements at the hospital and primary health care centres depend on the condition of individual buildings and clinical spaces.

Service implications

Facility damage can interrupt consultations, treatment, diagnostics, medicine storage and referral services. However, the inventory does not establish which services remained operational, whether alternative facilities absorbed demand, or how many people experienced reduced access.

No separate economic-loss amount is included under the health sector. Revenue forgone and additional expenditure on temporary services, disease prevention and staff reassignment have been separately quantified as losses in economic activities under the productive sector.

Recovery needs and proposed interventions

Recovery needs are estimated at a total of NPR 78.00 crore (USD 5.15 million), including NPR 12.50 crore for early recovery and NPR 65.50 crore for recovery beyond six months.

Table 17: Health Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	12.5	0.83
Longer-term recovery: beyond 6 months	65.5	4.32
Total	**78**	**5.15**

Proposed early interventions include mobile health services, disease surveillance, restoration of damaged facilities, psychosocial support, risk communication, community engagement and management of the deceased. The detailed activity schedule requires further allocation within the assessed early-recovery provision.

Longer-term interventions concern repair or reconstruction of health facilities and replacement of equipment. Restoration planning would consider clinical-service requirements, staffing, electricity, water, sanitation, cold-chain capacity and referral access alongside building works.

Limitations: Facility-specific equipment inventories, engineering quantities, catchment populations and dated service-functionality records are incomplete. These records would support identification of service gaps, refinement of repair and reconstruction requirements, and completion of activity-level recovery costing.

4.1.5 Cultural Heritage

Total damage to cultural heritage is estimated at NPR 14.64 crore (USD 0.97 million). Estimated annual losses of NPR 2.00 crore bring combined damage and losses to NPR 16.64 crore (USD 1.10 million).

Damage profile

The inventory records damage to religious sites, mosques, monuments and archaeological assets. It contains 47 assets, comprising four partially damaged and 43 completely damaged assets (Table 18). These counts remain subject to verification against a register of individual sites.

Table 18: Provisional Cultural Heritage Damage Inventory

Source category	Partially damaged	Completely damaged	Total Assets	Total damage (NPR crore)
Religious sites	3	23	26	7.24
Mosques	1	2	3	1.07
Churches	0	0	0	0
Other religious sites	0	1	1	1.3
Monuments	0	16	16	3.73
Archaeological sites	0	1	1	1.3
Historical sites	—	—	—	–
Museums	0	0	0	0
Total Assets	**4**	**43**	**47**	14.64

Religious sites and monuments together account for approximately 75% of total cultural heritage damage, as shown in Figure 10.

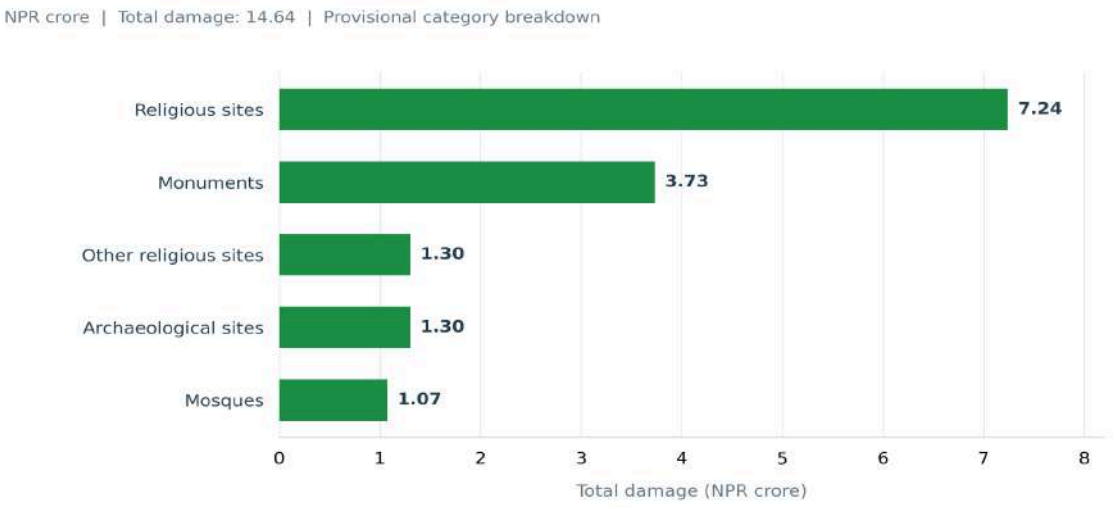


Figure 10: Total Damage to Cultural Heritage by Asset Category

Reported effects include damage to the Betrawati treaty stone (Sandhishila), temples and sacred cremation grounds, alongside interrupted access to pilgrimage destinations. These effects concern both physical heritage and the continuity of cultural and religious practices.

Valuation and economic losses

The sector assessment describes using previous conservation expenditures and costs of comparable structures to estimate damage. Site-specific conservation requirements remain important because traditional materials, craftsmanship and cultural significance may require treatments beyond standard building replacement.

A loss of NPR 2.00 crore in estimated annual losses was reported for this sector.

Recovery needs

Recovery needs are estimated at a total of NPR 36.60 crore (USD 2.42 million), allocated to the long-term recovery period.

Table 19: Cultural Heritage Recovery Needs

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	—	—
Long-term recovery: beyond 6 months	36.6	2.42
Total recovery needs	**36.6**	**2.42**

Proposed recovery measures include documenting damaged assets, stabilising vulnerable remains, protecting artefacts during debris removal and preparing site-specific conservation plans. Restoration would require consultation with custodians and communities, attention to traditional materials and craftsmanship, and safe access for cultural use. Urgent protective measures may be necessary before restoration begins, although the recovery plan does not provide a separate early-recovery budget.

Limitations: Site identities, ownership, damage classifications, and detailed valuation records require verification.

4.2 PRODUCTIVE SECTORS

The productive-sector assessment covers agriculture, fisheries, livestock, banking and financial services, and economic activities and livelihoods. It examines damage to productive assets, crops, livestock, business premises, equipment, stocks and financial-service infrastructure, together with reported losses arising from disrupted production and economic activity. The assessment combines institution-reported inventories with estimates derived from census baselines, affected-building data and sector-specific valuation assumptions. Consequently, some figures represent recorded damage, while others are modelled estimates that require field verification.

The effects extend beyond damaged assets. Disruption to transport, electricity, telecommunications, water supply and market access has affected production, trade, employment, household income and access to financial services. Recovery therefore requires coordinated restoration of productive assets and the infrastructure and services on which economic activity depends. Operating losses are consolidated under economic activities and livelihoods and are not added again under the individual productive subsectors. Shared assets, beneficiaries and recovery interventions must also be reconciled across sectors to prevent double counting.

4.2.1 Agriculture

Total agricultural crop damage is estimated at NPR 109.30 crore (USD 7.22 million). The assessment includes standing-crop damage and estimates of subsequent-season production effects within this amount. Economic-loss amounts have been separately quantified as losses in economic activities under the productive sector.

Crop damage and geographic distribution

The crop inventory records 1,806 ha affected, comprising 1,669 ha of paddy and 137 ha of vegetables. The local-level production (Table 20) estimates a total of 7,687 tonnes, comprising 5,843 tonnes of paddy and 1,844 tonnes of vegetables.

Table 20: Crop baseline, affected area and production by local level

District / local level	Paddy baseline ha	Paddy affected ha	Paddy tonnes	Veg. baseline ha	Veg. affected ha	Veg. tonnes
Rasuwa / Gosaikunda	234	140	491	0	0	0
Rasuwa / Uttargaya	238	143	500	0	0	0
Dhading / Benighat Rorang	1,530	25	89	3,200	9	122
Dhading / Gajuri	3,556	75	264	1,949	7	95
Dhading / Sidhhalek	2,320	58	204	2,615	2	27
Dhading / Galchhi	3,460	87	303	2,775	14	182
Nuwakot / Bidur	1,415	700	2,450	490	98	1,323
Nuwakot / Belkotgadi	1,673	200	700	0	0	0
Nuwakot / Likhu	550	230	805	0	0	0

District / local level	Paddy baseline ha	Paddy affected ha	Paddy tonnes	Veg. baseline ha	Veg. affected ha	Veg. tonnes
Chitwan / Ichchhyakamana	0	0	0	0	0	0
Chitwan / Bharatpur	0	0	0	0	0	0
Gorkha / Gandaki	371	4	14	1,756	4	54
Gorkha / Shahid Lakhan	1,778	7	23	2,315	3	41
Tanahun / Bandipur	0	0	0	0	0	0
Tanahun / Devghat	0	0	0	0	0	0
Tanahun / Aanbu Khaireni	0	0	0	0	0	0
Reported Total	**17,125**	**1,669**	**5,843**	**15,100**	**137**	**1,844**

Note: Geographic coverage follows the agricultural source inventory and differs from the household assessment. Zero entries are retained as recorded and do not independently establish an absence of effects.

Nuwakot accounts for 68.0% of recorded affected crop area, with the largest concentration in Bidur. Rasuwa and Dhading account for 15.7% and 15.3%, respectively. These shares describe the available crop inventory and do not establish the full distribution of agricultural impacts across the flood corridor.

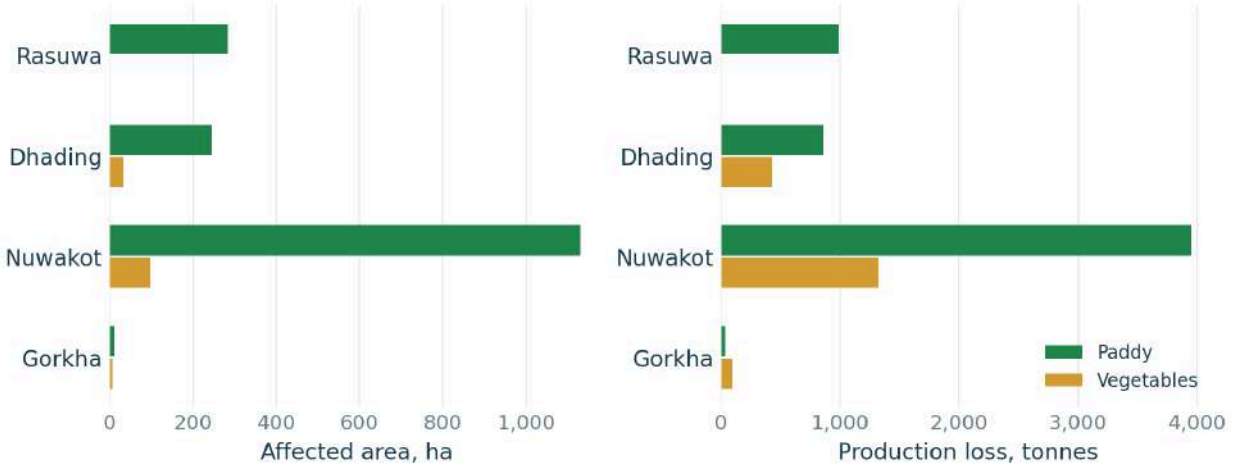


Figure 11. Recorded Crop Area and Production Loss Affected by District

Paddy accounts for most of the affected area and estimated production loss. Vegetables represent 7.6% of affected area but approximately 24.0% of production loss by weight, reflecting differences in crop yields. These proportions describe crop composition and do not measure relative monetary damage or household income effects.

Table 21: Baseline Agricultural Holdings and Land Area by Local Level

Local level	Total No. of Holdings	Total area of Holdings (ha)	Total No. of Arable Land holdings	Total area of Arable area (ha)	Temporary Crop holdings (No.)	Temporary Crop area (ha)
Gosaikunda	1,313	655	1,300	514	1,290	382
Uttargaya	1,809	628	1,809	524	1,809	474
Benighat Rorang	5,866	2,282	5,825	1,933	5,804	1,879

Local level	Total No. of Holdings	Total area of Holdings (ha)	Total No. of Arable Land holdings	Total area of Arable area (ha)	Temporary Crop holdings (No.)	Temporary Crop area (ha)
Gajuri	5,024	2,143	4,982	1,868	4,962	1,745
Sidhhalek	5,523	2,658	5,496	2,283	5,496	2,143
Galchhi	4,958	2,125	4,887	1,896	4,887	1,703
Bidur	8,974	3,348	8,958	2,847	8,926	2,670
Belkotgadi	8,338	4,622	8,281	4,184	8,281	4,003
Likhu	3,945	1,640	3,932	1,375	3,932	1,319
Ichchhyakamana	4,488	1,936	4,463	1,575	4,463	1,418
Bharatpur	37,094	14,312	36,470	12,668	3,647	12,338
Gandaki	5,518	2,370	5,505	1,995	5,505	1,803
Shahid Lakhan	6,177	3,328	6,078	2,793	6,078	2,481
Bandipur	3,796	1,812	3,725	1,529	3,725	1,427
Devghat	2,946	1,560	2,897	1,092	2,897	1,002
Aanbu Khaireni	3,133	1,008	3,041	735	3,032	635

Table 21 describes baseline agricultural holdings and land area; it does not identify the number of holdings damaged by the disaster. The feasibility and timing of resumed cultivation will depend on sediment depth, drainage, soil condition, irrigation functionality and access to inputs.

Recovery needs

Agricultural recovery needs a total NPR 142.10 crore (USD 9.38 million). Early recovery accounts for NPR 35.00 crore, with NPR 107.10 crore allocated to the longer term.

Table 22: Agricultural Recovery Needs

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	35	2.31
Long-term recovery: beyond 6 months	107.1	7.07
Total recovery needs	**142.1**	**9.38**

Proposed measures include assessing field conditions, restoring cultivable land and drainage, and supporting access to seed, fertilizer, tools and other inputs before the next feasible planting window. Longer-term requirements include soil rehabilitation and restoration of productive capacity where immediate cultivation is not possible.

Agricultural recovery activities need to be coordinated with irrigation restoration and debris clearance. Shared works require a single cost allocation across the relevant subsectors so that the same intervention is not included more than once.

Limitations: The number of affected agricultural households is not established by the baseline holding counts.

4.2.2 Fisheries

Total damage recorded under fisheries is estimated at NPR 71.59 crore (USD 4.73 million), inclusive of replacement costs. The assessment covers the Trishuli Fisheries Research Centre in Nuwakot, including buildings, fish-production and research facilities, water infrastructure, equipment and fish stocks.

Damage profile

The inventory includes 24 carp ponds, 81 cemented raceways and two hatcheries. Of the raceways, 51 serve production and 30 serve research. Damage also affected the infrastructure supporting water supply, feed preparation, laboratory work and centre operations.

Table 23: Fisheries Damage Inventory: Principal Assets

Asset group	Recorded inventory
Buildings and accommodation	Two office buildings, ten staff quarters, two guard houses, one guest house, one duplex quarter, two feed stores and one canteen
Ponds, raceways and hatcheries	24 carp ponds; 51 production raceways; 30 research raceways; two hatcheries
Water infrastructure	Six reservoirs—three large and three small; one pump house; one overhead tank; a silt-free water-supply system
Equipment, furniture and electronics	Office and residential furniture; 25 laboratory machinery/tool units; four feed machines; computers, laptops and other electronics
Vehicles	Two pickups and one motorcycle
Fish stocks	Broodstock, fingerlings and food fish, including trout, carp, tilapia, ornamental and indigenous species
Compound wall	100 metres

Buildings and accommodation account for NPR 27.24 crore, while ponds, raceways and hatcheries account for NPR 26.65 crore. Together, these groups represent approximately 75.3% of total damage. Water infrastructure is the next largest component, reflecting its importance to both production and research facilities.

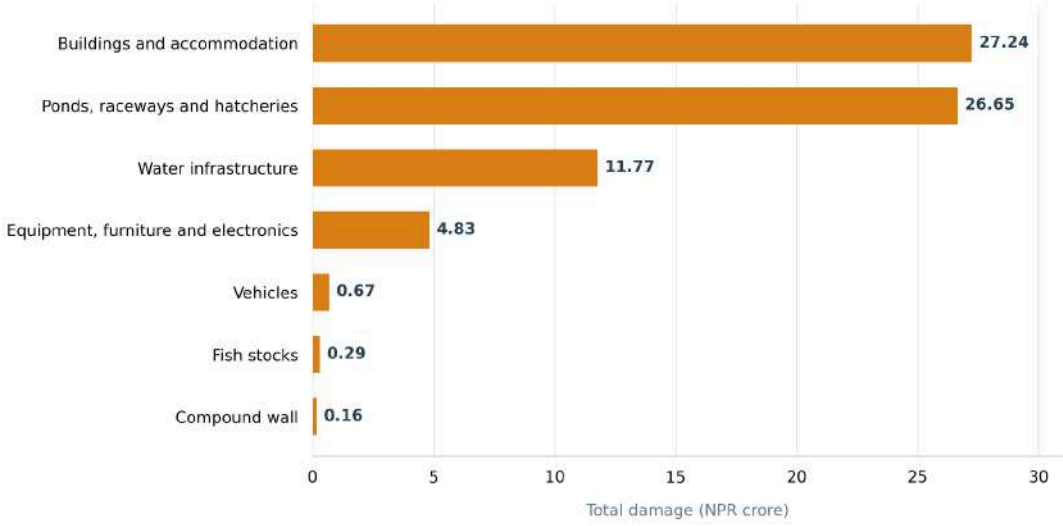


Figure 12: Composition of Total Damage at the Trishuli Fisheries Research Centre

Valuation and operational implications

Damage is calculated from recorded quantities and unit values, including replacement costs. Furniture, electronics and the silt-free water-supply system are recorded as lump-sum asset damage.

Damage to ponds, raceways, hatcheries and water systems affects the facilities available for breeding, rearing and research. Restoring buildings alone would not establish readiness to resume these functions; water supply, production equipment and suitable fish stocks also need to be available.

Economic-loss amounts were recorded separately under economic activities losses under the productive sector. The inventory does not quantify the duration of interrupted production or research, revenue forgone, or additional operating expenditure.

Recovery needs and proposed interventions

Recovery needs total NPR 107.39 crore (USD 7.09 million), including NPR 0.40 crore for early recovery.

Table 24: Fisheries Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	0.4	0.03
Longer-term recovery: beyond 6 months	106.99	7.06
Total	**107.39**	**7.09**

The early-recovery provision of NPR 0.40 crore covers rehabilitation of 8 ha of sand-deposited land, at NPR 500,000 per hectare.

Proposed longer-term interventions include repairing or reconstructing centre buildings, ponds, raceways and hatcheries; restoring water infrastructure; replacing equipment; and re-establishing fish stocks. The sequence would depend on site condition and the readiness of water and production systems. Any clearance works shared with other recovery programmes require a single cost allocation.

Limitations: The inventory covers the research centre and does not establish the extent of damage to other fish farms. Repair requirements, surviving equipment, stock quantities and operational interruption periods require verification. Centre buildings and shared infrastructure also require matching against other sector inventories to identify possible duplication.

4.2.3 Livestock

Total damage to livestock and poultry is estimated at NPR 144.81 crore (USD 9.56 million), inclusive of replacement costs. The assessment estimates 252,445 affected animals and birds using census-based livestock ownership patterns and estimated affected households. These quantities represent modelled impacts and do not constitute verified animal deaths.

Damage profile

Poultry accounts for most estimated animals and birds, while buffalo, goats and chyangra (himalayan mountain goat), and cattle account for most monetary damage. This difference reflects the species-specific unit values used in the assessment.

Table 25: Estimated Livestock and Poultry Quantities and Total Damage

Species	Estimated animals	Damage, crore	Count share	Value share
Cattle	4,479	23.29	1.8%	16.1%
Buffalo	4,572	59.43	1.8%	41.0%
Goat / Chyangra	26,087	50.87	10.3%	35.1%
Sheep	165	0.32	0.1%	0.2%
Pig / boar	784	2.55	0.3%	1.8%
Other livestock	1,041	1.35	0.4%	0.9%
Poultry	214,827	6.98	85.1%	4.8%
Other birds	489	0.02	0.2%	0.0%
Total	**252,445**	**144.81**	**100.0%**	**100.0%**

Note: Species quantities are rounded independently from fractional model estimates. They are only modelled impacts and are not verified animal deaths or compensation entitlements.

Poultry represents 85.1% of estimated numbers but 4.8% of total damage. Buffalo contributes 41.0% of damage, goats and chyangra 35.1%, and cattle 16.1%. Together, these three livestock groups account for 92.3% of total damage.

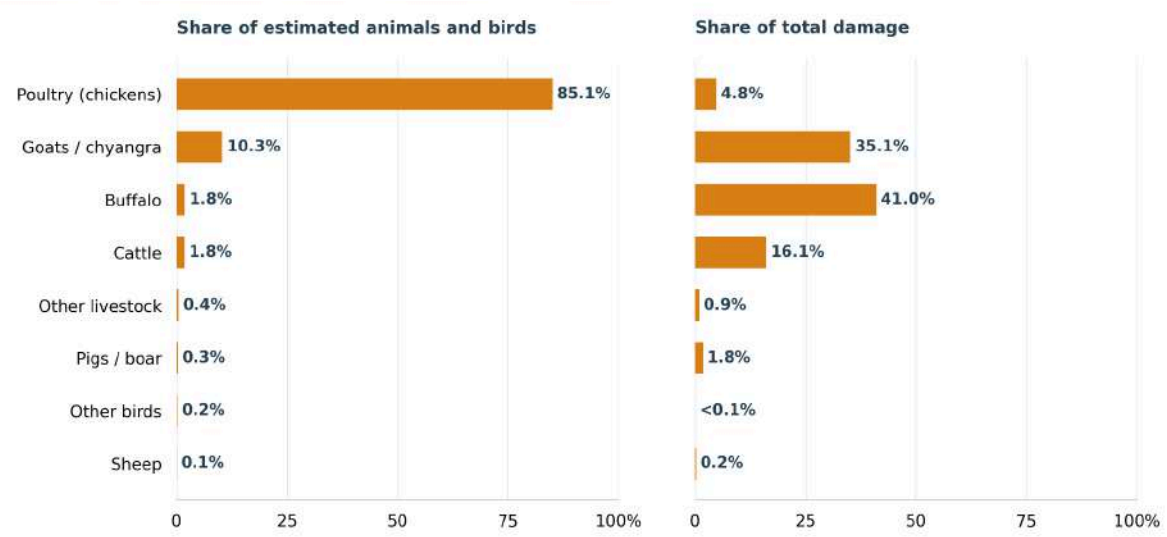


Figure 13: Shares of Estimated Livestock and Poultry Quantities and Total Damage by Species

Distribution by local level

Nuwakot accounts for approximately NPR 72.61 crore, followed by Dhading at NPR 36.51 crore and Rasuwa at NPR 32.46 crore. Bidur alone accounts for 35.3% of recorded total damage. These distributions reflect the model's household estimates and local livestock-ownership patterns.

Table 26: Estimated Livestock and Poultry Impacts by Local Level

District / local level	Cattle	Buffalo	Goat / chyangra	Sheep	Pig/boar	Other livestock	Poultry	Other birds	Total damage (NPR crore)
Chitwan / Ichchhyakamana	130	53	600	1	51	0	2,985	83	2.8
Dhading / Benighat Rorang	918	414	6,860	0	173	3	7,775	6	24.35
Dhading / Gajuri	66	93	560	1	5	0	2,708	4	2.75
Dhading / Galchhi	47	74	529	0	21	2	1,734	6	2.37
Dhading / Siddhalek	253	225	1,329	0	31	1	3,773	33	7.05
Gorkha / Gandaki	—	—	—	—	—	—	—	—	–
Gorkha / Shahid Lakhan	13	12	90	0	6	0	348	3	0.43
Nuwakot / Belkotgadhi	106	271	1,018	1	4	2	5,923	11	6.28
Nuwakot / Bidur	807	2,007	7,839	0	54	14	163,761	156	51.09
Nuwakot / Kispang	338	588	2,219	12	7	4	5,529	16	13.96
Nuwakot / Tarakeshwar	25	52	218	0	5	0	966	1	1.28
Rasuwa / Gosaikunda	1,393	272	1,778	0	219	980	5,073	39	16.4
Rasuwa / Kalika	40	110	427	3	16	1	3,573	7	2.65

District / local level	Cattle	Buffalo	Goat / chyangra	Sheep	Pig/boar	Other livestock	Poultry	Other birds	Total damage (NPR crore)
Rasuwa / Aamachhodingmo	157	8	222	43	5	24	557	0	1.5
Rasuwa / Uttargaya	187	393	2,396	102	187	9	10,120	125	11.91
Total	4,479	4,572	26,087	165	784	1,041	214,827	489	144.81

Valuation and livelihood implications

The estimation applies local agricultural-holding and livestock-ownership ratios to estimated affected households, then uses average numbers of each species per livestock-owning household. Species-specific unit values and replacement-cost adjustments determine the monetary estimate.

The calculation does not distinguish animals that died from those displaced, rescued or surviving. Consequently, the estimated quantities cannot be used directly as restocking targets or compensation entitlements.

Livestock impacts can affect household food supply, milk and egg production, breeding capacity and income. Economic loss amount was estimated separately under economic activities losses in the productive sector.

Recovery needs and proposed interventions

Recovery needs total NPR 173.77 crore (USD 11.47 million), including NPR 15.00 crore for early recovery.

Table 27: Livestock Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	15	0.99
Longer-term recovery: beyond 6 months	158.77	10.48
Total	**173.77**	**11.47**

Proposed early interventions include verifying affected livestock holdings, supporting veterinary services, and restoring access to feed, water, and temporary animal shelter. These measures would support surviving animals while household-level requirements are established.

Longer-term interventions concern restoring productive herds and flocks and the facilities and services needed to maintain them. Restocking would depend on verified losses, household preferences, suitable shelter, feed availability and veterinary support. Assistance to livestock-owning households requires coordination with agriculture, housing and livelihood programmes to avoid financing the same asset or activity more than once.

Limitations: Estimates depend on census averages and modelled household exposure. Species, ownership, age, productive status, mortality and survival require field verification. Information on animal shelters, feed stocks, veterinary-service disruption and subsequent production losses is also needed to refine recovery activities.

4.2.4 Banking and Financial Services

Damage to banking assets is estimated at NPR 72.40 crore (USD 4.78 million), including replacement-cost adjustments and excluding cash holdings. The inventory covers 17 affected branches operated by 12 banks in Nuwakot and Rasuwa. Cash held in ATMs, vaults and counters totalled NPR 19.59 crore, but its post-disaster status and recoverability remain unverified. This amount is provisionally included in the loss column, bringing the recorded total disaster effects amount to NPR 91.99 crore (USD 6.07 million).

Damage profile and geographic distribution

Four affected branches are located in Bidur, while thirteen are in Rasuwa: eleven in Gosaikunda and one each in Kalika and Uttargaya. Bidur accounts for most recorded asset damage, although Gosaikunda has the largest number of affected branches.

Table 28: Banking Inventory by Local Level

District / local level	Affected branches	Total damage (NPR crore)	Cash recorded separately (NPR crore)
Nuwakot / Bidur	4	67.13	6.04
Rasuwa / Gosaikunda	11	4.23	9.53
Rasuwa / Kalika	1	0.28	0.79
Rasuwa / Uttargaya	1	0.75	3.23
Total	**17**	**72.4**	**19.59**

Bidur represents 23.5% of affected branches but 92.7% of recorded damage. Gosaikunda represents 64.7% of affected branches and 5.8% of damage. These differences reflect reported asset values and do not establish the number of customers affected or the duration of service interruptions.

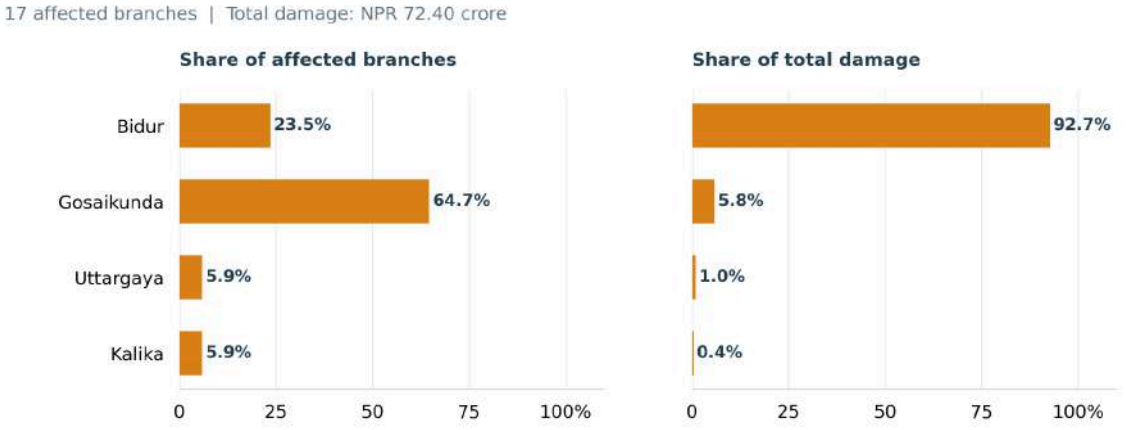


Figure 14: Distribution of Affected Bank Branches and Total Damage by Local Level

Cash holdings at affected branches

Cash held in ATMs, vaults and counters at affected branches totalled NPR 19.59 crore. Vaults accounted for 88.0% of this amount, with ATMs and counters each accounting for approximately 6.0% (Table 29). The post-disaster status and recoverability of these holdings remain unverified.

Table 29: Cash Holdings at Affected Bank Branches

Cash Location	Amount (NPR crore)	Share of Total Cash (%)
ATMs	1.17	6
Vaults	17.25	88
Counters	1.18	6
Total	**19.59**	**100**

Valuation, reported losses and service implications

The damage estimate includes replacement costs to institution-reported asset values. The source asset-value column explicitly excludes cash held in vaults. Cash holdings in ATMs, vaults and counters are classified as losses in this assessment. The recoverability of this cash remains to be confirmed. An estimate of forgone banking revenue or additional operating expenditure is calculated in economic activities in the productive sector.

Damage to branch premises and equipment can constrain cash withdrawals, deposits, payments and other services. However, the inventory does not identify which branches or ATMs remained operational, whether services moved to alternative premises, or the availability of other service channels.

Recovery needs and proposed interventions

Recovery needs total NPR 108.60 crore (USD 7.17 million), allocated entirely to the longer-term period. No separate early-recovery allocation is recorded.

Table 30: Banking and Financial Services Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	—	—
Longer-term recovery: beyond 6 months	108.6	7.17
Total	**108.6**	**7.17**

Proposed measures include assessing branch and ATM functionality, securing records and recoverable assets, establishing temporary service arrangements where necessary, and repairing or replacing damaged premises and equipment. Restoration planning would consider electricity, telecommunications, physical access and the availability of alternative branches alongside asset replacement. These activities require detailed costing within the assessed recovery provision.

Limitations: The post-disaster status of cash holdings, branch and ATM functionality, service-interruption periods and alternative service arrangements remain incompletely documented. Cash recovery records are needed to establish the amount actually lost. Matching branch assets with public-building and economic-activity inventories would establish whether any physical assets appear in more than one sector estimate.

4.2.5 Economic Activities and Livelihoods

Total damage to economic establishments is estimated at **NPR 3,030.43 crore (USD 200.05 million)**, inclusive of replacement costs. Reported annual economic losses total **NPR 11,589.30 crore (USD 765.07 million)**, bringing combined damage and losses to **NPR 14,619.73 crore (USD 965.13 million)**. Approximately **4,800 establishments** are estimated to be affected.

Operating-loss estimates are consolidated under economic activities and livelihoods. The industry classification includes education, health, utilities, finance and insurance, and agriculture, forestry and fishing. These categories differ in coverage from the individual sector inventories. Education and health have no separate economic-loss entries in their respective assessments, while energy losses are recorded separately. Agriculture

also includes subsequent-season production effects within its damage estimate. The extent of overlap between these components has not been established.

Business exposure and geographic distribution

The exposure estimate applies each local level's corridor building-impact share to its baseline establishment count. It estimates affected establishments across fifteen local levels in five districts. These estimates identify potential business exposure; they do not establish how many enterprises closed, how long they remained closed, or how many workers lost employment.

Table 31: Estimated Business Exposure by Local Level

District / local level	Corridor buildings	Impacted buildings	Building-impact share	Estimated affected establishments
Chitwan				
Ichchhyakamana	796	100	12.60%	142
Dhading				
Benighat Rorang	1,723	1,037	60.20%	893
Gajuri	353	107	30.30%	62
Galchhi	766	79	10.30%	105
Siddhalek	758	228	30.10%	106
Gorkha				
Gandaki	593	248	41.80%	271
Shahid Lakhan	138	15	10.90%	33
Nuwakot				
Belkotgadhi	1,083	212	19.60%	87
Bidur	5,228	3,026	57.90%	1,913
Kispang	906	696	76.80%	147
Tarakeshwor	178	43	24.20%	35
Rasuwa				
Gosaikunda	1,303	1,043	80.00%	338
Kalika	114	112	98.20%	303
Aamachhodingmo	76	57	75.00%	107
Uttargaya	665	567	85.30%	258
Total	**14,680**	**7,570**	**51.60%**	**4,800**

Bidur accounts for approximately 39.9% of estimated affected establishments, followed by Benighat Rorang at 18.6%. The highest local building-impact shares occur in Kalika, Uttargaya and Gosaikunda. The number of potentially affected businesses and the intensity of local exposure therefore describe different dimensions of the impact.

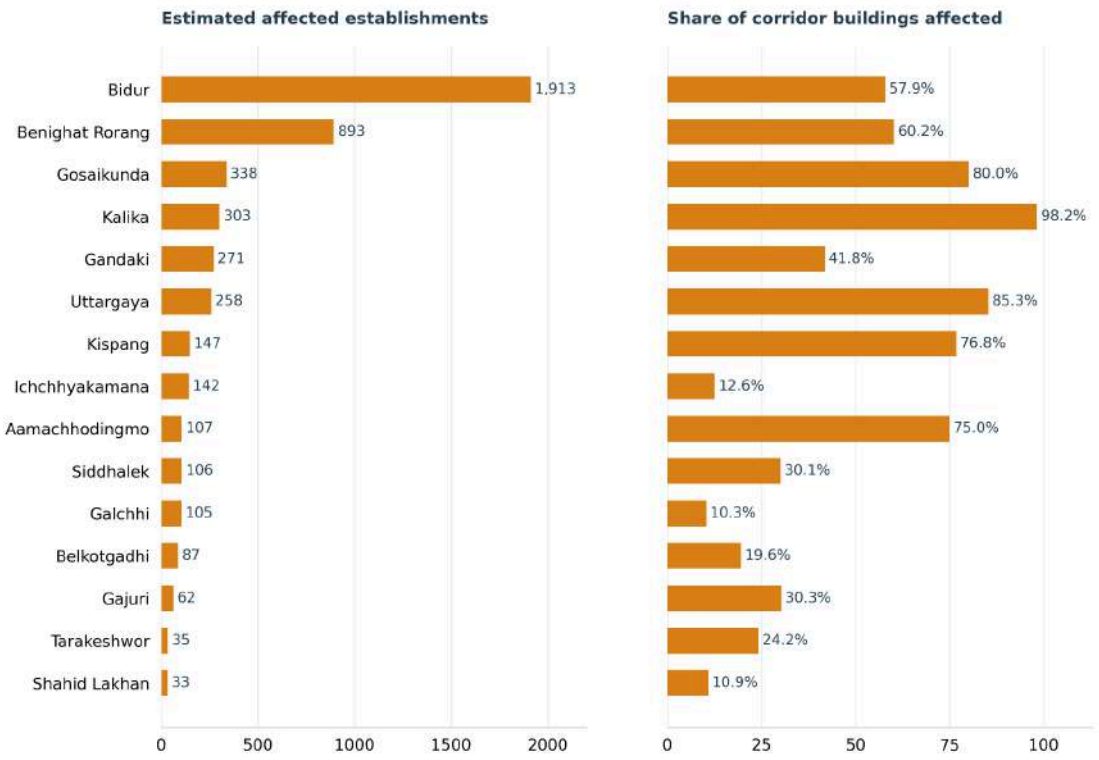


Figure 15: Business Exposure: Estimated Establishments and Local Buildings

Damage and losses by economic activity

Transportation assets and hotels and restaurants together account for approximately **73.6% of total damage**. Reported losses are concentrated in wholesale and retail trade, finance and insurance, and hotels and restaurants, which collectively account for approximately **82.0%**.

Table 32: Estimated Establishments, Total Damage and Reported Annual Losses by Economic Activity

Economic activity	Estimated affected establishments	Total damage (NPR crore)	Reported annual losses (NPR crore)
Hotels and restaurants	1,259	939.25	2,946.37
Wholesale and retail trade	1,212	630.23	3,490.52
Education	866	32.5	727.33
Electricity, gas and water	345	—	993.51
Manufacturing	263	106.99	24.49
Other service activities	227	—	14.27
Finance and insurance	190	—	3,073.66
Agriculture, forestry and fishing	179	31.2	226.02

Economic activity	Estimated affected establishments	Total damage (NPR crore)	Reported annual losses (NPR crore)
Human health and social work	171	—	61.68
Transportation	87	1,290.25	31.45
Total	**4,800**	**3,030.43**	**11,589.30**

Note: Estimated affected establishments are calculated by applying each local level's corridor building-impact share to its baseline establishment count. The estimates are not derived from matching individual enterprises to damaged buildings.

The industrial categories are broader than the corresponding facility inventories reported in the sector assessments. For example, the estimated finance and insurance establishments are not equivalent to the seventeen bank branches assessed in Section 4.2.4. Similarly, education and health establishments cannot be treated as additional counts of damaged schools or health facilities.

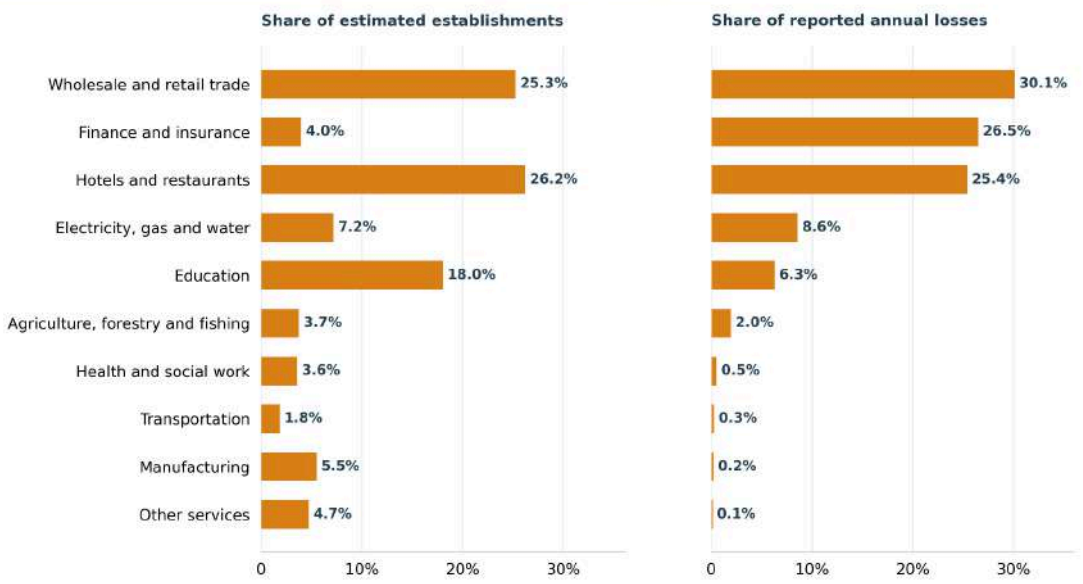


Figure 16: Industry Shares of Estimated Establishments and Reported Annual Losses

Valuation and livelihood implications

The loss estimate uses estimated establishment numbers and industry-specific annual turnover assumptions. These estimates describe reported turnover-related effects. They are not equivalent to net income, wages or value added and should not be interpreted directly as GDP losses. Actual losses will depend on closure periods, reduced operating capacity, avoided costs, alternative premises and the timing of resumed activity.

Business interruption can reduce household earnings and constrain access to goods, services and markets. The establishment estimates do not provide a consolidated count of affected workers, informal livelihoods or households experiencing income loss.

Recovery needs and proposed interventions

Recovery needs total NPR 4,545.65 crore (USD 300.08 million), allocated to the longer-term recovery period. No separate early-recovery allocation is recorded under this subsector.

Table 33: Economic Activities and Livelihoods Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	—	—
Longer-term recovery: beyond 6 months	4,545.65	300.08
Total	**4,545.65**	**300.08**

Proposed interventions include verifying affected enterprises and their operating status, restoring business premises and productive equipment, replacing essential stocks, and supporting the resumption of viable economic activities. Recovery planning would identify barriers associated with access, electricity, water, communications, suppliers and markets.

Enterprise support requires coordination with sector-specific assistance. Common beneficiary and asset records would help distinguish business recovery expenditure from housing, agricultural, fisheries, livestock and infrastructure assistance.

Limitations: Establishment counts and industry allocations are modelled rather than verified enterprise records. Detailed assessment requires information on damaged assets, stock, turnover, operating costs, closure periods, reopening and employment. Cumulating operating losses here avoids repeating these amounts under other productive sectors, but does not itself resolve possible overlap with agriculture estimates, utility losses or assets recorded elsewhere. Component-level reconciliation is needed to establish distinct coverage.

4.3 INFRASTRUCTURE SECTORS

4.3.1 Energy: Hydropower and Grid

Total damage to energy infrastructure is estimated at NPR 13,469.76 crore (USD 889.21 million), inclusive of replacement costs. Reported economic losses total NPR 1,634.69 crore (USD 107.91 million), bringing total damage and losses to NPR 15,104.45 crore (USD 997.13 million).

The assessed sector includes hydropower and solar projects, a substation, transmission lines, a switchyard, and distribution infrastructure. Household and community renewable-energy technologies are assessed separately in the following subsection.

Affected portfolio and pre-disaster status

The inventory records 13 hydropower projects with a combined capacity of 759.025 MW. Seven projects, representing 250.400 MW, were operating before the disaster; six projects, representing 508.625 MW, were under construction. Five operating solar plants add a further 24.360 MW.

Table 34: Assessed Generation Portfolio by Pre-Disaster Status

Technology	Operating projects	Operating capacity (MW)	Projects under construction	Capacity under construction (MW)	Total project capacity (MW)
Hydropower	7	250.4	6	508.625	759.025
Solar	5	24.36	0	0	24.36
Total	**12**	**274.76**	**6**	**508.625**	**783.385**

Approximately 67.0% of the assessed hydropower capacity was under construction. Damage therefore affects both existing electricity supply and the development of future generation. Construction-stage capacity cannot be treated as electricity generation already lost; any commissioning-delay effects require comparison with planned completion dates.

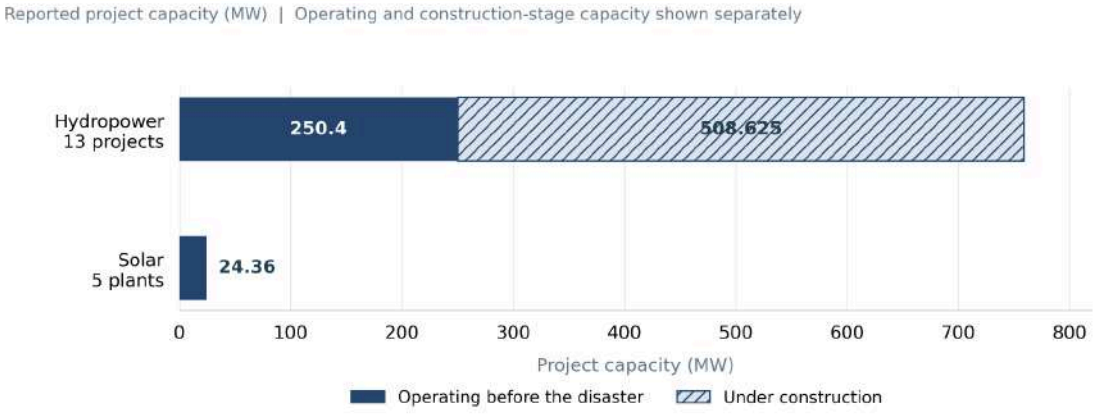


Figure 17: Reported Generation Capacity by Pre-Disaster Project Status

Damage profile

Hydropower accounts for NPR 11,995.56 crore, or 89.1% of total energy damage. The remaining damage concerns solar plants and the infrastructure needed to transmit, switch, and distribute electricity.

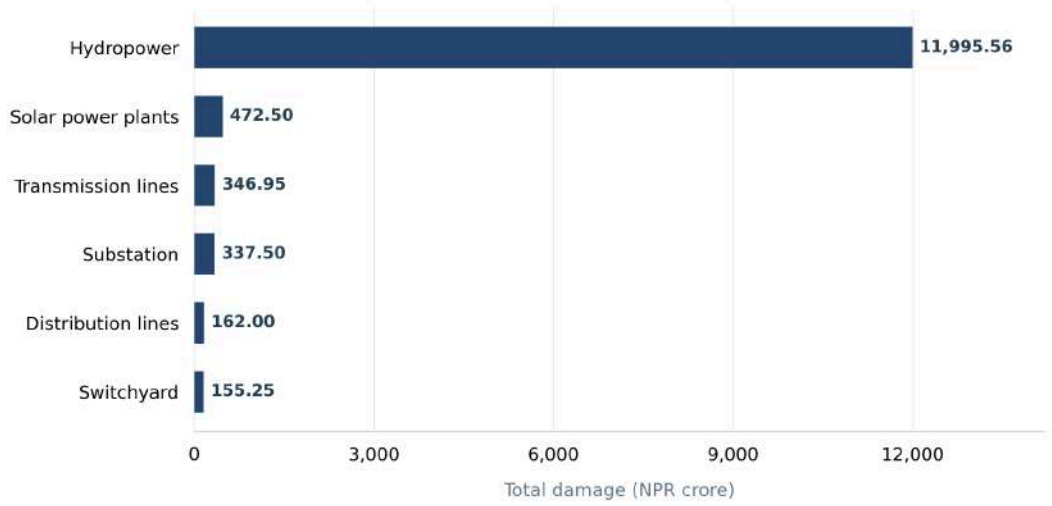


Figure 18: Composition of Total Energy-Sector Damage

The aggregate valuation does not establish the repair requirements or restoration cost of each project. Detailed engineering assessments would distinguish damaged civil works, electromechanical equipment, and network components, and identify the works required for safe operation.

Reported losses and service implications

The selected annual-loss calculation records 2,520 GWh for hydropower and 210.48 GWh for solar generation, valued at NPR 1,605.84 crore. An additional NPR 28.85 crore is recorded for energy royalty.

Table 35: Reported Energy-Loss Components

Component	Estimated Annual generation loss (GWh)	Reported loss (NPR crore)
Hydropower	2,520.00	1,482.00
Solar generation	210.48	123.84
Energy royalty	—	28.85
Total	**2,730.48**	**1,634.69**

Electricity restoration depends on the condition of both generation assets and the connected network. Access constraints, sediment, slope instability, equipment availability, and transmission connections can affect the sequence of repairs. The damage and loss inventory does not provide a consolidated count of customers without supply or project-specific outage and restart dates.

Recovery needs and proposed interventions

Recovery needs total NPR 39,062.30 crore (USD 2,578.71 million), including NPR 105.00 crore for early recovery. The recovery estimate represents an indicative planning requirement rather than an itemised programme cost.

Table 36: Energy Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	105	6.93
Longer-term recovery: beyond 6 months	38,957.30	2,571.78
Total	**39,062.30**	**2,578.71**

The early-recovery schedule allocates NPR 50.00 crore to transmission restoration, NPR 40.00 crore to substations, NPR 10.00 crore to distribution and NPR 5.00 crore to micro-hydro. The micro-hydro activities require matching with the household renewable-energy programme to ensure that each intervention is costed once.

Longer-term interventions concern restoring damaged generation and grid assets and completing necessary works at construction-stage projects. Prioritisation would consider site safety, engineering condition, achievable restoration dates and the network connections required to return usable capacity to service.

Ownership and recovery financing

The energy recovery estimate does not distinguish the portions expected to be financed by private project developers, Nepal Electricity Authority, insurance arrangements or the government budget. This distinction is particularly important because the assessed portfolio includes both operating projects and projects under construction. Asset ownership, concession and contractual responsibilities, insurance coverage and existing financing arrangements should be verified before the recovery estimate is interpreted as a public financing requirement. The recorded recovery need represents the estimated sector requirement and not an amount automatically payable by the Government of Nepal.

Limitations: Generation baselines, outage periods, tariffs, commissioning milestones, project ownership, insurance coverage and financing responsibilities are required to substantiate the damage, loss and recovery estimates.

4.3.2 Household Renewable Energy

Total damage to household and community renewable-energy technologies is estimated at NPR 56.84 crore (USD 3.75 million), inclusive of replacement costs. The inventory covers solar home systems, domestic biogas, institutional solar, micro-hydro, improved water mills and metallic improved cookstoves across Rasuwa, Nuwakot, Dhading, Gorkha and Tanahun.

Damage profile and geographic distribution

The assessment records 2,450 solar home systems, 2,740 domestic biogas systems, thirteen institutional solar systems, 185 improved water mills and 795 metallic improved cookstoves, together with 92 kW of micro-hydro capacity.

Table 37: Household and Community Renewable-Energy Inventory by District

Technology	Unit	Rasuwa	Nuwakot	Dhading	Gorkha	Tanahun	Total
Solar home systems	Number	405	325	1,200	70	450	2,450
Domestic biogas systems	Number	400	750	890	350	350	2,740
Institutional solar systems	Number	3	2	6	1	1	13
Micro-hydro	kW	45	15	20	0	12	92
Improved water mills	Number	60	75	50	0	0	185
Metallic improved cookstoves	Number	455	340	0	0	0	795

Dhading records the largest number of affected solar home systems and biogas systems, accounting for 49.0% and 32.5% of their respective totals. Rasuwa contains 45 kW, or 48.9%, of recorded micro-hydro capacity. The cookstove inventory is confined to Rasuwa and Nuwakot.

Composition of total damage

Domestic biogas systems account for NPR 40.69 crore, or 71.6% of total damage. Micro-hydro accounts for NPR 6.21 crore, followed by solar home systems at NPR 5.79 crore. Improved water mills, metallic improved cookstoves, and institutional solar systems account for the remaining damage.

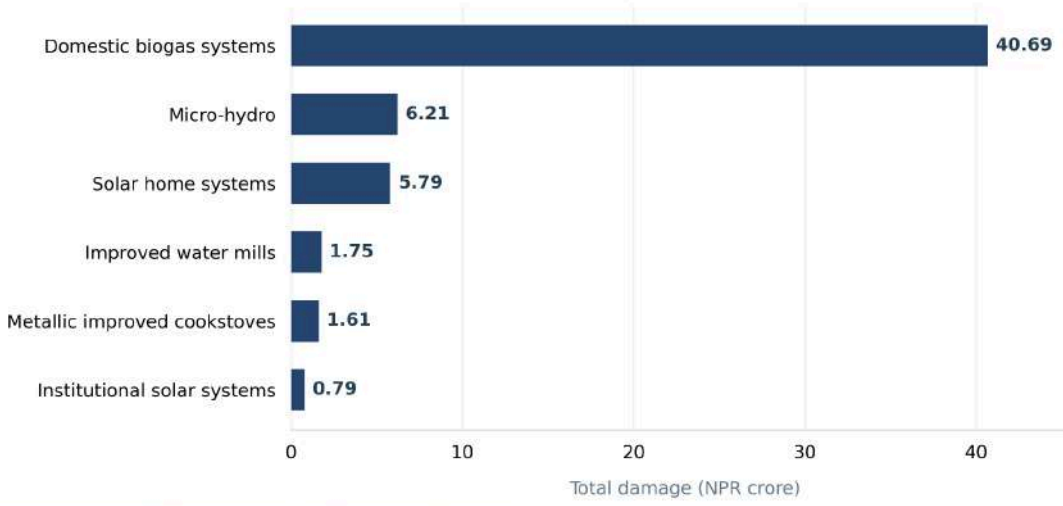


Figure 19: Total Damage to Household and Community Renewable-Energy Technologies

Valuation and service implications

The valuation applies technology-specific costs to recorded system quantities or capacity, with replacement-cost adjustments included in the final amounts. The inventory does not distinguish repairable components from systems requiring complete replacement.

These technologies support household lighting, cooking, local electricity supply, and productive activities such as milling. Their damage can affect different functions within the same household or community. System counts therefore cannot be added together to estimate affected households or people without energy access.

No separate economic-loss amount is recorded under household renewable energy. Additional household expenditure on alternative fuels or electricity is not quantified in this inventory.

Recovery needs and proposed interventions

Recovery needs total NPR 164.82 crore (USD 10.88 million), including NPR 10.00 crore for early recovery.

Table 38: Household Renewable-Energy Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	10	0.66
Longer-term recovery: beyond 6 months	154.82	10.22
Total	**164.82**	**10.88**

Proposed early interventions include verifying damaged systems, identifying households and institutions without adequate energy alternatives, and undertaking feasible repairs or providing interim lighting and cooking support. Technology selection would consider household needs, site conditions, fuel or feedstock availability, and access to maintenance.

Longer-term interventions concern repair or replacement of damaged systems and restoration of community energy services. These activities require coordination with housing reconstruction and grid restoration.

Limitations: The damage and loss inventory does not establish unique beneficiaries, pre-disaster functionality, present service availability, or component-level repair requirements. Verification of system locations, ownership, capacity and condition would support recovery targeting and costing. Household energy equipment also requires matching with household-asset records to identify any overlap.

4.3.3 Roads

The road assessment records 69 km of damaged road, with total damage of NPR 2,207.25 crore (USD 145.71 million), inclusive of replacement costs. Recorded losses of NPR 135.00 crore (USD 8.91 million) bring total effects to NPR 2,342.25 crore (USD 154.62 million). Recovery needs amount to NPR 5,518.13 crore (USD 364.28 million).

Damage profile

The costed inventory covers three sections along the Galchhi–Trishuli–Rasuwagadhi corridor. Of the assessed length, 14 km is classified as partially damaged and 55 km as completely damaged. Table 39 presents the surface types, damage classifications, and effective valuation rates used for these sections.

Table 39: Assessed Road Sections and Valuation Rates

Road section	Assessed damaged length (km)	Surface type	Recorded damage classification
Galchhi–Devighat	4	Blacktop	Partial
Devighat–Trishuli, Trishuli Bazaar and Trishuli Bazaar–Betrawati	10	Blacktop and gravel	Partial

Road section	Assessed damaged length (km)	Surface type	Recorded damage classification
Betrawati–Rasuwagadhi	55	Earthen	Complete
Total	**69**	—	—

Damage is concentrated in Betrawati–Rasuwagadhi, which accounts for 79.7% of assessed damaged length and 84.1% of total road damage. Its larger contribution reflects both the length classified as completely damaged and the higher effective valuation rate. The chart presents the resulting distribution across the three sections.

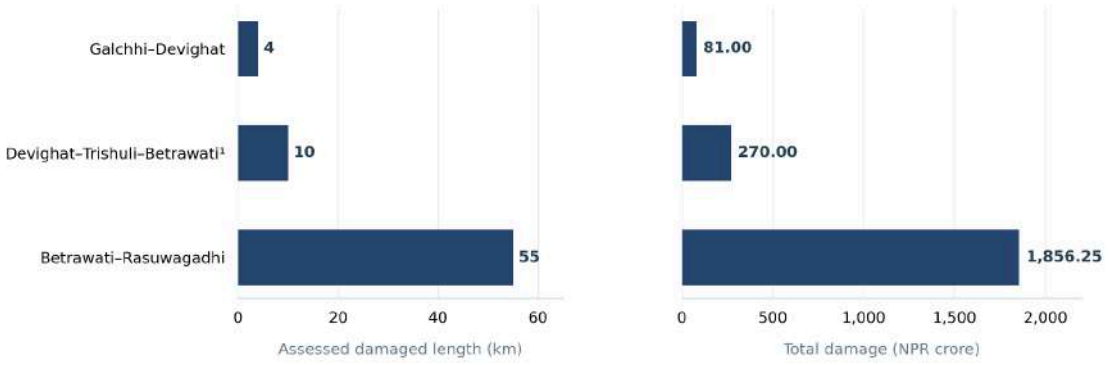


Figure 20: Assessed Road Length and Total Damage by Section

Losses and service implications

The workbook records road-sector losses separately from physical damage, but the detailed road inventory does not specify their duration or underlying components. The reported loss amount is therefore retained without attributing it to particular traffic, freight or revenue effects.

Restoring continuity along the corridor is important for emergency access, movement of goods and access to infrastructure repair sites. Construction sequencing should consider whether an intervention restores a usable connection between settlements and service centres, alongside the condition of individual damaged sections.

Recovery needs

Early-recovery needs are NPR 319.00 crore, with NPR 5,199.13 crore allocated to longer-term recovery (Table 40). Early recovery forms part of the total requirement.

Table 40: Road Recovery Needs by Period

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	319	21.06
Longer-term recovery: beyond 6 months	5,199.13	343.22
Total recovery needs	**5,518.13**	**364.28**

The joint road and bridge recovery schedule identifies debris clearance, track opening, temporary diversions, alternative-route maintenance, and emergency slope and bank protection among the immediate interventions.

Longer-term interventions should address permanent road reconstruction, drainage and slope protection, informed by engineering and geotechnical assessments. Road, bridge and river-protection works require coordinated designs and costing where they serve the same damaged location.

Limitations: The damage inventory provides section-level lengths and classifications without detailed chainage, quantities or site-specific engineering assessments. The classifications of partial and complete damage may change after accumulated mud and debris are cleared and physical access is restored, particularly along the road section beyond Betrawati. Detailed inspection is required to establish pavement, formation, drainage, slope, retaining-structure and riverbank conditions and to substantiate construction packages and recovery costs. Shared clearance and protection works should be assigned once across the relevant recovery budgets.

4.3.4 Bridges

The bridge assessment records 37 motorable bridges and 68 trail-bridge spans, with total damage of NPR 1,135.11 crore (USD 74.93 million), inclusive of replacement costs. Motorable bridges account for NPR 941.44 crore, and trail bridges for NPR 193.67 crore. No separate bridge-sector economic loss is recorded in the workbook. Total recovery needs are NPR 1,816.17 crore (USD 119.90 million).

Motorable bridges

The motorable-bridge inventory covers 3,032 m of bridge length across four districts. Of the 37 bridges, 33 were washed out, representing 2,792 m, while four bridges covering 240 m were partially damaged (Table 41).

Table 41: Motorable-Bridge Damage by District

District	Partially damaged bridges	Partial-damage length (m)	Washed-out bridges	Washed-out length (m)	Total damage (NPR crore)
Dhading	3	220	5	613	258.65
Gorkha	0	0	1	133	41.3
Nuwakot	1	20	14	1,480	465.75
Rasuwa	0	0	13	566	175.74
Total	**4**	**240**	**33**	**2,792**	**941.44**

Nuwakot accounts for 40.5% of affected motorable bridges and 49.5% of their total damage. Rasuwa records more affected bridges than Dhading, but a lower damage value because the recorded aggregate bridge length is shorter.

The valuation applies an effective uniform rate, inclusive of replacement costs, across washed-out and partially damaged bridge lengths. The partial-damage estimate therefore requires verification against the actual repair requirements of decks, foundations, abutments and approaches.

Trail bridges

The trail-bridge schedule records 49 D-type suspended spans and 19 N-type suspension spans, with a combined length of 10,670.86 m. N-type bridges account for 27.9% of spans but 41.6% of trail-bridge damage, reflecting their greater share of total length and higher valuation rate (Table 42).

Table 42: Trail-Bridge Inventory and Total Damage by Type and Local Level

District / local level	D-type no	D-type length (m)	N-type no	N-type length (m)	Total no	Total length (m)
Chitwan / Ichchhyakamana	4	582	5	904	9	1,486.00
Dhading / Benighat Rorang	6	917.4	10	2,058.60	16	2,976.00
Dhading / Gajuri	4	681	2	330	6	1,011.00
Dhading / Galchhi	5	1,118.20	1	200	6	1,318.20
Nuwakot / Belkotgadhi	9	1,901.00	0	0	9	1,901.00
Nuwakot / Bidur	6	627.8	0	0	6	627.8
Rasuwa / Gosaikunda	9	734.46	1	58.4	10	792.86
Rasuwa / Kalika	3	309.4	0	0	3	309.4
Rasuwa / Uttargaya	3	248.6	0	0	3	248.6
Total	**49**	**7,119.86**	**19**	**3,551.00**	**68**	**10,670.86**
Total Damage (NPR Crore)		**113.13**		**80.54**		

Recovery needs

Bridge recovery requires restoration of both vehicle and pedestrian connectivity. Early interventions include temporary modular crossings and repair of usable trail bridges and approaches. Permanent reconstruction should consider channel change, flood clearance, debris loads and foundation stability when determining whether to retain or relocate a crossing (Table 43).

Table 43: Bridge Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	155	10.23
Longer-term recovery: beyond 6 months	1,661.17	109.66
Total recovery needs	**1,816.17**	**119.90**

The early-recovery allocation is included in the joint road and bridge programme discussed in Section 4.3.3. Temporary crossings, approaches and protection works should be assigned to a single costed package to prevent duplication between two sectors. Detailed intervention sequencing is presented in Chapter 5.

Limitations: A crossing register linking location, bridge type, span length, damage severity and approach condition is needed to resolve geographic inconsistencies and substantiate repair and reconstruction costs. Pedestrian access and the availability of alternative crossings should inform prioritisation alongside damage values.

4.3.5 Telecommunications

The telecommunications assessment records total damage of NPR 62.87 crore (USD 4.15 million), inclusive of replacement costs. The inventory covers mobile towers, fibre networks, transmission systems, fibre-to-the-home (FTTH), and internet service provider (ISP) infrastructure. No separate telecommunications economic loss is recorded. Total recovery needs are estimated at NPR 94.30 crore (USD 6.23 million).

Damage profile

The assessed infrastructure includes four mobile towers, one belonging to Ncell and three to Nepal Telecom, and 152.3 km of fibre, comprising 61 km under Ncell and 91.3 km under Nepal Telecom. The inventory also records two Nepal Telecom transmission systems and three FTTH units, alongside ISP infrastructure.

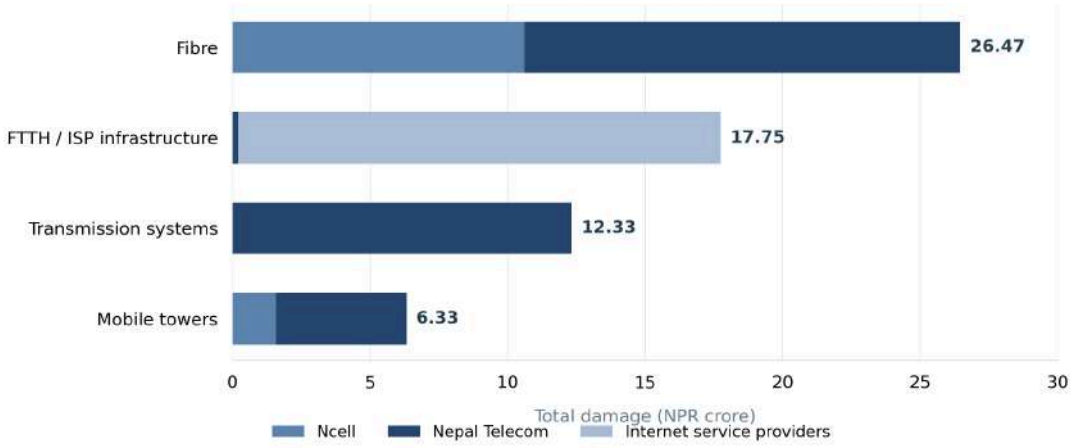


Figure 21: Telecommunications Total Damage by Component and Operator

Fibre accounts for 42.1% of component damage, followed by FTTH and ISP infrastructure at 28.2%. Nepal Telecom accounts for 52.7% of the detailed damage estimate, reflecting its recorded exposure across all four infrastructure categories.

Service implications and valuation

Infrastructure quantities do not establish the number of people without service or the duration of interruption. Restored service may depend on temporary equipment, alternative network routes, and backup power while permanent repairs continue. Operator outage and restoration records are needed to distinguish these arrangements from full asset reinstatement.

Operators should confirm the equipment and works covered by this estimate and establish their separation from the fibre component before detailed costing.

Recovery needs

Early recovery accounts for NPR 34.00 crore, with NPR 60.30 crore allocated to longer-term recovery (Table 44).

Table 44: Telecommunications Recovery Needs by Period

Recovery period	Needs (NPR crore)	Needs (USD million)
Early recovery: 0–6 months	34	2.24
Longer-term recovery: beyond 6 months	60.3	3.98
Total recovery needs	**94.3**	**6.23**

The submitted early-recovery schedule allocates NPR 12.00 crore to ISP restoration within 0–3 months and NPR 22.00 crore to telecommunications-system restoration within 0–4 months.

Longer-term interventions should restore permanent network infrastructure and improve reliability at exposed sites. Priorities include resilient routing, protection or relocation of vulnerable equipment where justified, and dependable backup power. Works affecting road corridors, bridge crossings or electricity connections should be coordinated with the respective infrastructure programmes.

Limitations: The assessment lacks a consolidated asset register linking locations, damage severity, repair requirements and outage duration. The ISP quantity and transmission-system cost basis require clarification. Unique asset identifiers and clearly defined work packages are needed to prevent overlap between fibre, transmission and customer-access infrastructure.

4.3.6 Water, Sanitation and Hygiene

The total WASH damage is estimated at NPR 138.11 crore (USD 9.12 million), inclusive of replacement costs, and recovery needs are estimated at a total of NPR 207.16 crore (USD 13.68 million). The assessment covers water-supply structures, pipelines, wastewater infrastructure, and a provisional toilet estimate.

Damage profile

The district inventory records 16 sump wells, 98 intakes, 160 reservoir tanks, 43 other chambers, and 443.90 km of pipeline. The valuation schedule also includes two wastewater treatment plants and one administrative facility.

Table 45: Recorded WASH Components and Total Damage

Component	Recorded quantity	Unit	Total damage (NPR crore)
Intakes	98	Number	2.65
Reservoir tanks and other chambers	203	Number	10.96
Sump wells	16	Number	39.43
Pipelines	443.9	km	15.28
Wastewater treatment plants	2	Number	18.56
Administrative facility	1	Number	0.03
Subtotal excluding toilets	-	-	86.91
Toilets	14,680	Source quantity	51.20
Total Component Damage	**-**	**-**	**138.11**

Geographic distribution

Dhading accounts for 68.3% of recorded pipeline length, alongside 65 of the 98 intakes and 119 of the 160 reservoir tanks (Figure 22). These quantities indicate the concentration of recorded infrastructure exposure; they do not establish the number of users without service.

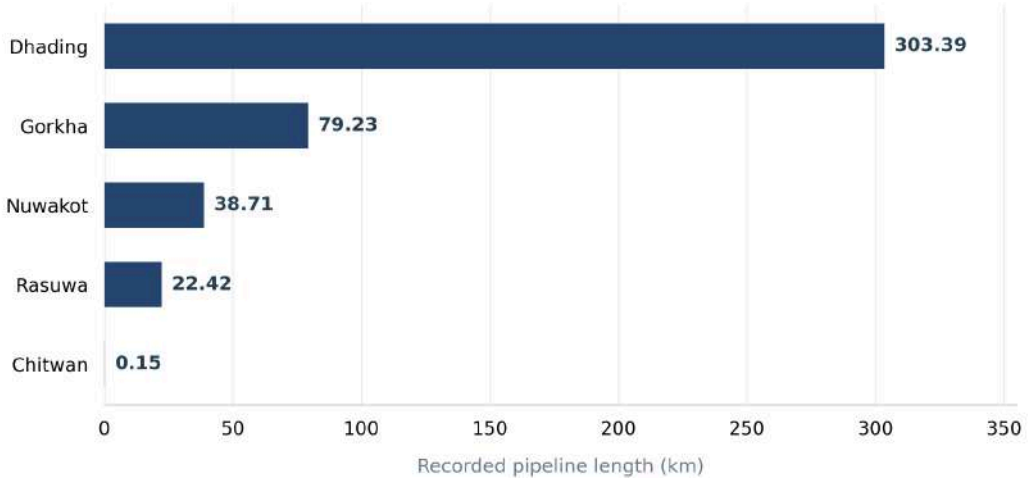


Figure 22: Recorded Pipeline Length by District

The NWASH pipeline subset and the office-level replacement schedules are supporting records and are not added to the district total.

Sanitation and service implications

The toilet estimate requires verification of both quantity and valuation. Its quantity column uses 14,680 corridor buildings, while the selected cost corresponds to 7,570 buildings at the underlying unit rate. Neither calculation establishes that every building had one toilet or that each toilet was destroyed. The allocation should also be checked against sanitation costs included in housing and public-building estimates.

Scheme submissions identify affected households at selected locations, including 4,000 households under the Bidur water-supply scheme. Coverage and possible overlap between submissions prevent aggregation into a reliable sector-wide affected-user total. Recovery monitoring should establish scheme functionality, water quality, service hours, and households receiving adequate supply.

Recovery needs

The final workbook allocates NPR 51.30 crore to early recovery and NPR 155.86 crore to longer-term recovery (Table 46).

Table 46: WASH Recovery Needs by Period

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	51.3	3.39
Longer-term recovery: beyond 6 months	155.86	10.29
Total recovery needs	**207.16**	**13.68**

The submitted activity schedule provides NPR 50.00 crore for water-supply systems within 0–3 months, NPR 0.25 crore for service-delivery restoration within 1–4 months, and NPR 1.00 crore for institutional strengthening and technical studies within 2–6 months.

Longer-term recovery should restore dependable water supply and wastewater services, with repairs coordinated around pumping power, access, and household return. Temporary sanitation and water-supply works included in shelter or public-building programmes should be identified separately to avoid financing the same intervention twice.

Limitations: Exposure inventories require confirmation through scheme and household inspections. Asset identifiers, damage severity, operational status and service coverage should be assessed during further assessments.

4.3.7 Irrigation, River-Training Works and Gauging Stations

The assessment records total damage of NPR 164.77 crore (USD 10.88 million), inclusive of replacement costs, across irrigation schemes, river-training works and hydrological gauging stations. Recovery needs total NPR 494.30 crore (USD 32.63 million). The final workbook does not allocate a separate economic loss to this subsector; productive-sector losses are consolidated under Section 4.2.5 and are not added again here.

Damage profile

The inventory covers 25 irrigation schemes, comprising ten surface-irrigation schemes, thirteen lift-irrigation schemes and two deep tubewells. It also records 4,990 m of river-training works, 1,970 m of gabion and 3,020 m of concrete or plum-concrete works, and six damaged gauging stations (Table 47).

Table 47: Irrigation and River-Training Damage by Authority and District

Authority/district	Irrigation damage (NPR crore)	River-training damage (NPR crore)	Gabion works (m)	Concrete works (m)	Total damage (NPR crore)
Federal / Nuwakot	11.48	0.58	196	0	12.06
Federal / Chitwan	—	33.75	0	3,000	33.75
Provincial / Rasuwa	9.18	2.43	33	20	11.61
Provincial / Nuwakot	27.54	4.01	36	0	31.55
Provincial / Dhading	54	17.15	1,705	0	71.15
Scheme and river-work subtotal	**102.2**	**57.92**	**1,970**	**3,020**	**160.11**
Gauging stations	—	—	—	—	4.66
Total Damage	**—**	**—**	**—**	**—**	**164.77**

Irrigation schemes account for 62.0% of total damage, followed by river-training works at 35.1% and gauging stations at 2.8%. The provincial Dhading entry contains the largest recorded irrigation damage value. Chitwan's federal entry consists of 3,000 m of concrete river-training works.

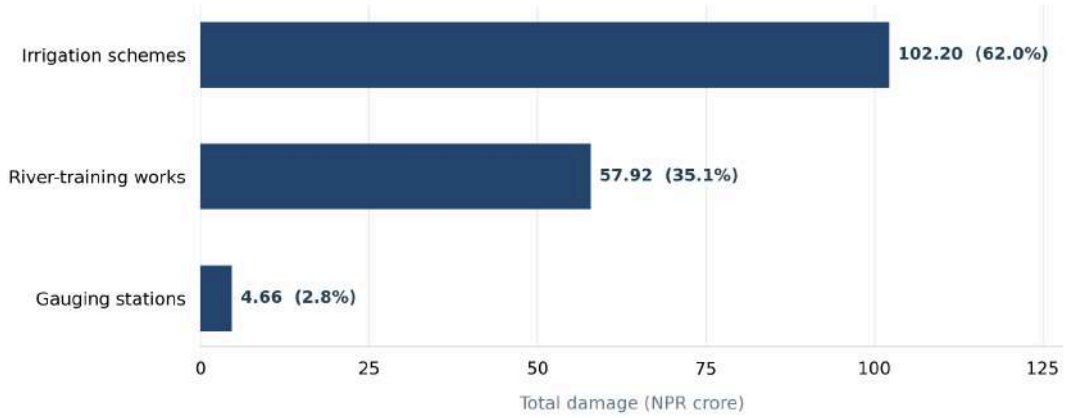


Figure 23: Total Damage to Irrigation, River-Training Works and Gauging Stations

River-training works and monitoring

The recorded protection works require site-specific assessment of bank erosion, channel movement, foundations and the stability of adjoining land. Reinstatement decisions should consider the revised river conditions and potential effects on neighbouring or downstream locations.

The six gauging stations are associated with the Bhotekoshi, Langtang, Falakhu and Trishuli river systems. Their restoration supports river monitoring, warning and the planning of reconstruction works. Station locations and equipment inventories should be confirmed before finalising replacement specifications.

The recorded damage estimate excludes local-level river-training works, land reclamation, slope stabilisation and unresolved relocation requirements. These exclusions limit the coverage of the assessment and should be addressed through subsequent surveys and recovery planning.

Recovery needs

The assessment allocates the full recovery requirement to the longer-term period, with no separate early-recovery amount identified for this subsector (Table 48).

Table 48: Irrigation, River-Training and Gauging Recovery Needs

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	Not separately allocated	Not separately allocated
Longer-term recovery: beyond 6 months	494.3	32.63
Total recovery needs	**494.3**	**32.63**

The absence of a separate early-recovery allocation does not establish that all interventions can wait. Urgent scheme repairs should be assessed against planting calendars, while monitoring and protection priorities should reflect site conditions. Any proposed works should be checked against road, bridge and disaster-risk-reduction packages to ensure that the same protection measures are costed once.

Limitations: Missing command areas, scheme identifiers, damage classifications and engineering quantities constrain detailed prioritisation. Recorded protection-work lengths do not establish the area or population protected. Local level River training works are not incorporated in the assessment.

4.4 CROSS-CUTTING SECTORS

Cross-cutting findings address land, institutions, environmental conditions and inclusion issues that influence recovery across the assessed sectors.

4.4.1 Land and Cadastral Impacts

Cadastral analysis is available for selected wards in Rasuwa and Nuwakot. It identifies where the mapped affected footprint intersects cadastral parcels and records the corresponding parcel counts and overlap areas. These results support land-record verification and recovery planning; they do not establish permanent land loss, ownership eligibility, or the extent of damage within each parcel.

The two districts show different patterns. Rasuwa has a larger mapped affected footprint, while Nuwakot records more intersected parcels and a greater cadastral overlap area. These differences reflect the spatial relationship between the affected footprint and the available cadastral layer, including differences in mapping coverage and parcel configuration.

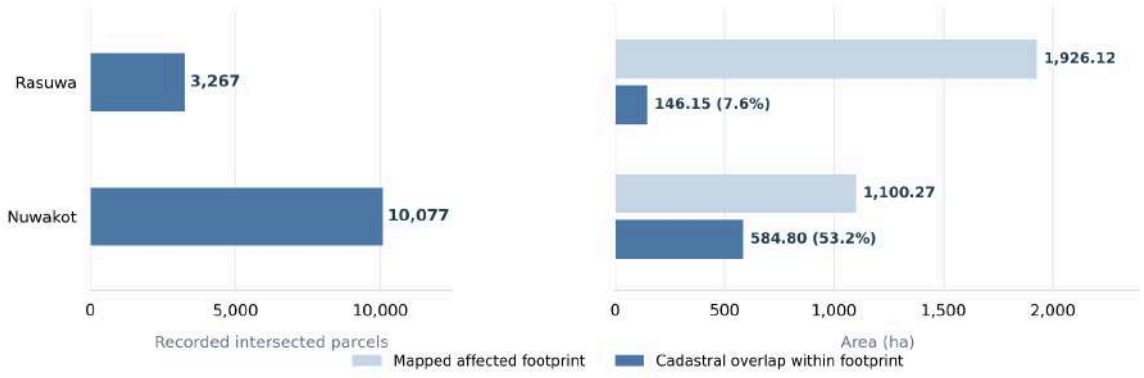


Figure 24: Cadastral Overlap within the Mapped Affected Footprint

Rasuwa

The Rasuwa inventory covers 14 wards in four local levels, recording 3,267 intersected cadastral parcels. The mapped affected footprint is 1,926.12 ha, of which 146.15 ha, or 7.6%, overlaps the cadastral layer.

Table 49: Rasuwa: Ward-Level Cadastral and Affected-Area Records

Local level	Ward	Intersected parcels	Ward area	Affected area	Affected / ward (%)	Cadastral overlap	Overlap/ ward (%)	Overlap / affected (%)
Aamachhodingmo	1	17	1,775.92	41.26	2.3	3.95	0.2	9.6
Aamachhodingmo	2	10	1,214.95	49.05	4	1.15	0.1	2.4
Aamachhodingmo	4	0	1,085.08	6.64	0.6	0	0	0
Aamachhodingmo	5	1	10,134.19	17.6	0.2	0.05	<0.1	0.3
Gosaikunda	1	1	6,461.40	91.8	1.4	0.04	<0.1	<0.1
Gosaikunda	2	608	15,647.94	1,118.54	7.1	23.2	0.1	2.1
Gosaikunda	3	56	5,418.48	93.18	1.7	2.14	<0.1	2.3
Gosaikunda	5	403	13,093.64	112.47	0.9	23.69	0.2	21.1
Gosaikunda	6	40	6,998.85	78.08	1.1	2.84	<0.1	3.6
Kalika	1	233	2,543.94	83.42	3.3	15.04	0.6	18
Uttargaya	1	105	7,966.26	71.33	0.9	6.37	0.1	8.9
Uttargaya	2	312	1,503.29	58.34	3.9	13.87	0.9	23.8
Uttargaya	4	144	731.72	37.67	5.1	12.15	1.7	32.3
Uttargaya	5	1,337	435.14	66.74	15.3	41.65	9.6	62.4
Total	**14**	**3,267**	**75,010.80**	**1,926.12**	**2.6**	**146.15**	**0.2**	

Note: Areas in hectares; percentages refer to the assessed ward or mapped affected footprint as indicated.

Gosaikunda Ward 2 accounts for 58.1% of Rasuwa's mapped affected footprint, but only 2.1% of that ward's affected footprint overlaps the cadastral layer. Uttargaya Ward 5 has a smaller affected footprint but records the highest parcel count, at 1,337, and the largest cadastral overlap area, at 41.65 ha. These contrasting patterns support targeted survey and land-record verification.

Nuwakot

The Nuwakot inventory covers 17 wards in four local levels, recording 10,077 intersected cadastral parcels. The mapped affected footprint totals 1,100.27 ha, with 584.80 ha of cadastral overlap, equivalent to 53.2% of that footprint.

Table 50: Nuwakot: Ward-Level Cadastral and Affected-Area Records

Local level	Ward	Intersected parcels	Ward area	Affected area	Affected / ward (%)	Cadastral overlap	Overlap/ward (%)
Belkotgadhi	5	63	961.9	42.77	4.4	2.27	0.2
Belkotgadhi	7	1,119	1,151.23	158.31	13.8	40.2	3.5
Belkotgadhi	8	420	1,138.40	38.74	3.4	17.44	1.5
Bidur	1	1,015	468.62	50.71	10.8	31.16	6.6
Bidur	2	33	843.64	0.22	<0.1	0.22	<0.1
Bidur	3	1,542	1,255.47	126.59	10.1	67.96	5.4
Bidur	4	461	191.89	50.48	26.3	36.22	18.9
Bidur	5	844	744.05	47.79	6.4	28.22	3.8
Bidur	6	953	598.27	112.57	18.8	98.17	16.4
Bidur	7	791	1,346.28	75.71	5.6	50.71	3.8
Bidur	8	23	790.61	5.69	0.7	3.88	0.5
Bidur	9	563	615.85	83.6	13.6	53.13	8.6
Bidur	10	1,059	1,357.96	96.49	7.1	61.32	4.5
Bidur	12	343	1,483.95	61.21	4.1	38.58	2.6
Kispang	5	361	1,026.59	54.64	5.3	26.73	2.6
Tarakeshwor	2	157	766.81	29.83	3.9	7.35	1
Tarakeshwor	4	330	1,701.15	64.91	3.8	21.23	1.2
Total	**17**	**10,077**	**16,442.66**	**1,100.27**	**6.7**	**584.8**	**3.6**

Note: Areas in hectares; percentages refer to the assessed ward or mapped affected footprint as indicated.

Bidur Ward 4 has the highest affected share of assessed ward area, at 26.3%, while Bidur Ward 6 records the largest cadastral overlap area, at 98.17 ha. Bidur Ward 3 has the largest parcel count, at 1,542. Parcel counts, overlap areas and affected shares therefore describe different aspects of the mapped impact and should be considered together.

Implications for recovery

The cadastral records provide locations for subsequent verification of erosion, deposition, remaining usable land and access. Linking these records with building assessments and site-hazard information can support decisions on land rehabilitation, repair, reconstruction and possible relocation. Parcel counts should not be converted into household or beneficiary counts without verification.

No monetary land-damage or recovery amount is derived from this overlay. Any subsequent land-related costing should identify its scope and check for overlap with housing, agriculture, debris clearance and river-protection interventions.

Limitations: Coverage is restricted to the assessed wards and available cadastral records. The results do not distinguish temporary inundation or deposition from permanent erosion. Survey geometry, parcel identifiers, land records and actual land use require verification. Absence from the cadastral layer does not establish that land is public, unoccupied or unused.

4.4.2 Governance and Public Institutions

Existing government coordination mechanisms supported the collection and consolidation of assessment information from local, district, provincial and federal institutions.

Institutional findings

The RDNA did not systematically assess staffing availability, administrative records, information systems or the capacity of affected institutions to maintain their functions. It therefore provides insufficient evidence to quantify institutional capacity losses or compare coordination performance across local governments.

Damage to public buildings and facilities is recorded under the social sector. Restoration of those assets addresses the physical requirements of service delivery, while the staffing, records, equipment and operating arrangements needed to resume services require institution-specific verification.

Information management and accountability

The sector findings demonstrate the need for consistent identification of assets, locations and proposed interventions. Records submitted through different agencies should be linked to the same asset or scheme where appropriate, while household and enterprise records require checks for duplicate entries and incomplete coverage.

A consolidated assessment register should retain the source, reporting date, verification status, and revision history of each record. This would allow subsequent field findings to update the assessment transparently and help distinguish changes in coverage from changes in damage or recovery estimates.

Implications for recovery

Local governments and sector institutions will require clearly assigned responsibilities and appropriate technical support for beneficiary verification, engineering assessment, procurement, community engagement and monitoring. The scale of this support should be established through an assessment of workloads and existing capacity.

Institutional support included within sector programmes or disaster-risk-reduction activities should be identified before any additional governance budget is proposed.

Limitations: Institutional requirements remain qualitative because staffing, systems, records and operating costs were not assessed comprehensively. These gaps should be addressed when preparing costed implementation plans.

4.4.3 Environment

The assessment documents riverbank erosion, sediment deposition, channel obstruction and changes in river morphology along the affected corridor. These processes have implications for land rehabilitation, water quality and river ecosystems. The RDNA did not include a comprehensive environmental assessment, and the extent, severity and persistence of ecological effects remain unquantified.

River channels and land condition

Reported erosion and deposition indicate different recovery requirements. Eroded land may require assessment of remaining usable area and bank stability, while deposited material requires examination of its depth, composition and effects on drainage. The cadastral analysis in Section 4.4.1 identifies locations for verification but does not distinguish these conditions or establish whether cultivation or habitation can safely resume.

Site assessments should document channel movement, unstable banks and drainage obstruction before permanent river works or infrastructure reinstatement. Proposed interventions should be assessed for their effects on neighbouring and downstream locations.

Ecosystems and protected-area assets

Initial reporting identifies damage to buildings and operational facilities associated with Langtang National Park at Timure, Syafrubesi, Mailung and Bandare. These are institutional assets; their damage does not provide a measure of habitat degradation, wildlife mortality or ecosystem-service losses.

The available assessment does not quantify changes in aquatic habitats, riparian vegetation, wildlife populations or ecosystem services. Field surveys and appropriate post-event information are needed to establish the nature and extent of these effects.

Water and soil quality

Sediment movement and damage to sanitation and other infrastructure identify locations where water and soil conditions require examination. The assessment does not contain sufficient sampling results to establish contamination levels or their geographic extent.

Targeted testing should inform decisions on water use, agricultural land rehabilitation and management of deposited material. Testing locations and parameters should reflect observed site conditions and potential contamination sources.

Implications for recovery

Environmental assessment should inform road reopening, bridge reconstruction, river-training works, settlement planning and disposal-site selection. Priorities include mapping erosion and deposition, assessing sensitive habitats, verifying protected-area damage and identifying suitable locations for material handling and disposal.

Environmental measures already included in infrastructure, debris-management or disaster-risk-reduction programmes should be identified before additional costs are proposed. Detailed activities and budgets should follow site assessment.

Limitations: Environmental findings are primarily descriptive. The absence of systematic ecological surveys, water and soil testing, and repeat observations prevents reliable estimates of environmental damage, ecosystem-service losses or restoration costs. This absence of valuation should not be interpreted as an absence of environmental effects.

4.4.4 Debris and Sediment Management

The final assessment provides NPR 51.54 crore (USD 3.40 million) for debris and sediment management. This comprises approximately NPR 30.73 crore for corridor clearance and NPR 20.80 crore for recorded building-debris clearance. These amounts are recovery requirements and are not added to physical damage or economic losses.

The estimates combine a seven-block corridor model with a separate building-debris calculation. They provide preliminary quantities for planning; surveyed clearance volumes, material characteristics, and disposal requirements remain to be established.

Corridor deposition and clearance model

The corridor model covers 94.075 km, divided into seven blocks. It estimates 30.52 million m³ of deposition, of which 7.29 million m³ is assigned to settlement areas. Applying further clearance assumptions gives 1.85 million m³ for removal. These are successive stages of the calculation and should not be added together (Table 51).

Table 51: Modelled Corridor Deposition and Clearance Requirements

Block	Reach	Length (m)	Modelled deposition (m³)	Modelled settlement debris (m³)	Clearance volume (m³)	Clearance cost (NPR crore)
1	Timure–Syafrubesi	5,571	3,478,017.70	695,603.54	69,560.35	1.16
2	Syafrubesi–Site 3	4,726	2,613,268.60	522,653.72	52,265.37	0.87
3	Site 3–near Dhunche	4,144	1,471,709.40	294,341.88	29,434.19	0.49
4	Near Dhunche–Haku	4,200	1,308,217.40	261,643.48	52,328.70	0.87
5	Haku–Devighat	39,333	16,110,445.50	4,833,133.65	1,449,940.10	24.14
6	Devighat–Galchhi	15,892	2,736,030.80	547,206.16	164,161.85	2.73
7	Galchhi–Malekhu	20,209	2,805,841.40	140,292.07	28,058.41	0.47
	Total	**94,075**	**30,523,530.80**	**7,294,874.50**	**1,845,748.97**	**30.73**

Block 5 accounts for 78.6% of modelled corridor clearance cost. This concentration reflects its large model volume and the higher fractions assigned to deposition, settlement exposure and clearance. It should guide verification of the estimate rather than be interpreted as a measured share of deposited material.

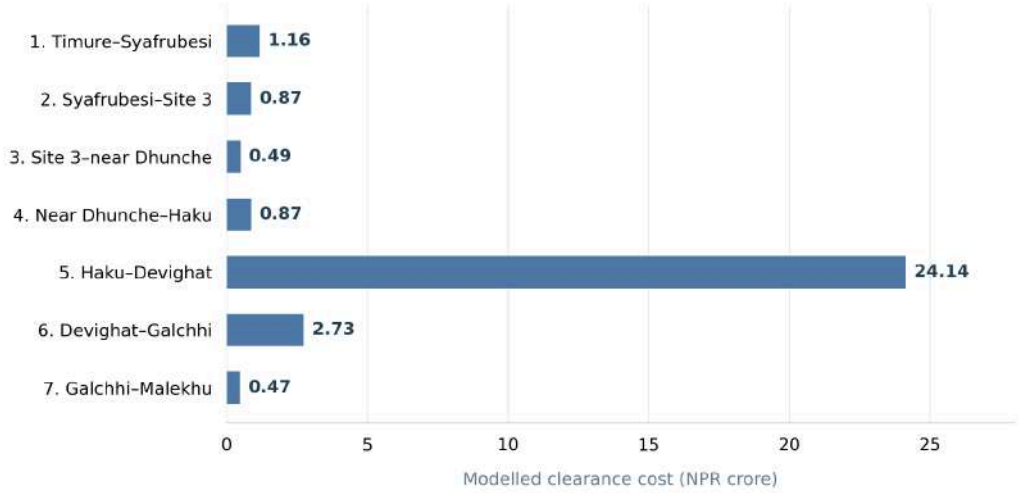


Figure 25: Modelled Corridor Debris-Clearance Cost by Block

Building-debris estimate

The building model uses the 7,570 affected-building inventory and construction-type assumptions to estimate 1.32 million m³ of gross building debris. Clearance quantities and costs are populated only for RCC and other structures (Table 52).

Table 52: Building-Debris Model and Recorded Clearance Costs

Construction type	Buildings	Assumed floor area per building (m²)	Volume factor (m³/m²)	Modelled gross debris (m³)	Recorded clearance (m³)	Rate (NPR/m³)	Recorded cost (NPR crore)
Mud-bonded brick or stone	2,319	55.76	1.29	166,812.83	Not populated	—	Not populated
Cement-bonded brick or stone	3,215	83.64	1.43	384,545.07	Not populated	—	Not populated
RCC and other structures	2,036	278.8	1.36	772,014.87	115,802.23	1,796.51	20.8
Total / populated entries	**7,570**	—	—	**1,323,372.77**	**115,802.23**	—	**20.8**

The recorded RCC clearance quantity is approximately 15% of its modelled gross debris volume. Building debris may be mixed with sediment within settlement areas. The two models therefore require site and material checks before their quantities can be treated as separate clearance packages.

Recovery needs

The combined detailed costs round to the final **NPR 51.54 crore** recovery requirement. The workbook assigns **NPR 16.00 crore to early recovery** and **NPR 35.54 crore to longer-term recovery** (Table 53).

Table 53: Debris and Sediment Management Recovery Needs

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	16	1.06
Longer-term recovery: beyond 6 months	35.54	2.35
Total recovery needs	**51.54**	**3.4**

The early-recovery activity schedule identifies NPR 16 crore for clearance in settlements and agricultural areas during months 1–6.

Clearance packages should identify locations, material types, quantities, transport distances, and disposal or reuse arrangements. Their scope should be checked against road, housing, public-building, and river-work budgets so that the same clearance is counted once.

Limitations: The estimates depend on assumed fractions and unit rates, provisional block geography and incomplete building-clearance entries. Field measurement should establish material depth and composition, access, machinery requirements and suitable disposal capacity. Modelled deposition should not be treated as a requirement to remove all material from the river corridor.

4.4.5 Disaster and Climate Risk Management

The disaster demonstrated how an upstream ice-and-rock avalanche can develop into a debris flow and downstream flood, affecting settlements and interconnected infrastructure. Reported channel obstruction, unstable slopes, and continued sediment movement indicate residual risks requiring further assessment. The RDNA did not quantify the likelihood or consequences of secondary failures or assess how future climate conditions could alter these hazards.

The assessment has estimated a total of NPR 9,475.31 crore (USD 625.52 million) for disaster risk reduction. This is a recovery provision, comprising NPR 35.00 crore for a multi-hazard early-warning system and NPR 9,440.31 crore for longer-term works. It is not an additional damage estimate.

Scope of the proposed works

The DRR model includes waterway clearance and associated filling, river and settlement protection, command-area development, landslide protection and irrigation restoration.

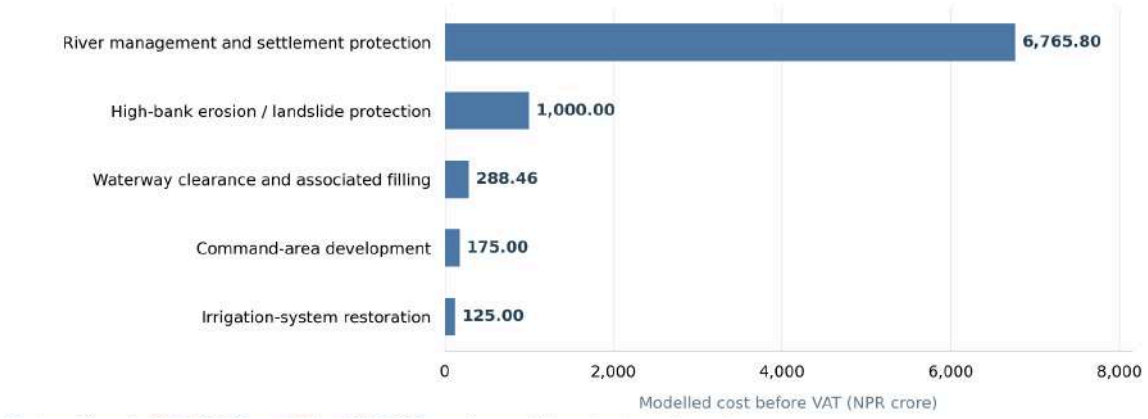


Figure 26: Modelled DRR Works by Cost Component

The model estimates 80 km of protection along both banks of a 40 km reach, with a further 24 km of settlement-protection works. Some structures may occupy the same locations, but their relationships are not defined. The landslide-protection quantity, unit rate, the locations and coverage of the 700 ha command-area provision require further verification. These are planning assumptions rather than verified measures of damaged or protected land.

Monitoring and early warning

The proposed early-warning allocation should be developed around identified monitoring gaps, warning thresholds, communication responsibilities and evacuation arrangements. Upstream information exchange, backup power and alternative communication channels are relevant where primary systems may fail.

The RDNA did not evaluate warning performance comprehensively. Subsequent assessment should examine whether warnings reached exposed communities in time and whether recipients could understand and act on them. Replacement of damaged gauging or telecommunications assets already recorded under infrastructure should be distinguished from additional warning-system capacity.

Table 54: DRR Recovery Needs by Period

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	35	2.31
Longer-term recovery: beyond 6 months	9,440.31	623.21
Total recovery needs	**9,475.31**	**625.52**

Limitations: The engineering quantities, unit rates, locations, and protection objectives are subject to review. Clearance, irrigation restoration and protection works overlap in description with earlier sector programmes. Asset and intervention matching is required to establish which costs represent additional risk reduction and prevent duplicate budgeting.

4.4.6 Gender Equality, Disability and Social Inclusion

Displacement, isolation and service disruption can affect recovery differently according to sex, age, disability, income, location, housing tenure and access to documentation. The RDNA's aggregate inventories do not establish how these factors influenced individual or household outcomes. No comprehensive household-level GEDSI assessment or structured consultation with affected population groups was undertaken.

Inclusive recovery needs

The assessment estimates a total of NPR 15.00 crore (USD 0.99 million) for inclusive recovery, entirely within the early-recovery period (Table 55). The allocation requires an activity-level breakdown identifying intended participants, geographic coverage, and responsible institutions.

Table 55: Inclusive-Recovery Provision

Recovery period	NPR crore	USD million
Early recovery: 0–6 months	15	0.99
Longer-term recovery: beyond 6 months	Not separately allocated	Not separately allocated
Total recovery needs	**15**	**0.99**

Priorities include accessible information and consultation, support for people facing documentation or mobility barriers, and participation by women's organisations, organisations of persons with disabilities and representative community groups. Sector assessments should identify the requirements of tenants, landless households, informal workers and others who may not be adequately represented through asset-ownership records.

Accessibility and inclusion measures already budgeted within housing, education, health, transport or other programmes should be identified before assigning costs to the separate inclusive-recovery provision. Inclusion requirements continue beyond the six-month allocation period and should be incorporated into longer-term sector plans.

Limitations: Available reporting does not support reliable estimates of differential losses or unmet needs by population group. Further assessment should combine appropriately disaggregated data with accessible

consultation and verification of barriers to assistance. The NPR 15.00 crore provision should not be interpreted as a comprehensive valuation of all inclusion requirements.

4.4.7 Protection, Safeguarding and Accountability to Affected People (AAP)

Reported deaths, displacement, separation and disruption of services identify circumstances requiring attention to protection and safeguarding. The RDNA did not systematically assess the incidence of gender-based violence, trafficking, child-protection concerns or exploitation and abuse. It also did not establish the coverage and capacity of referral services across all affected locations.

Protection and safeguarding

Recovery assessments should identify immediate protection concerns and barriers to accessing available support. Particular attention is required where people remain separated from family members, lack documentation or depend on others to obtain assistance. Sensitive information should be handled confidentially and linked to appropriate support services.

Protection from sexual exploitation, abuse and harassment is a requirement for recovery implementation. Personnel, contractors and volunteers should have clear standards of conduct, while affected people need accessible information about prohibited behaviour and confidential reporting options. The assessment does not provide evidence to evaluate the effectiveness of existing arrangements.

Participation and accountability

Affected people should receive clear information on eligibility, available assistance, implementation schedules and decisions affecting their recovery. Consultation and feedback arrangements should accommodate different languages, literacy levels and accessibility requirements.

Complaints and feedback should inform programme adjustments, including cases involving exclusion, delayed assistance or unsuitable recovery options.

Indigenous Peoples and mountain communities

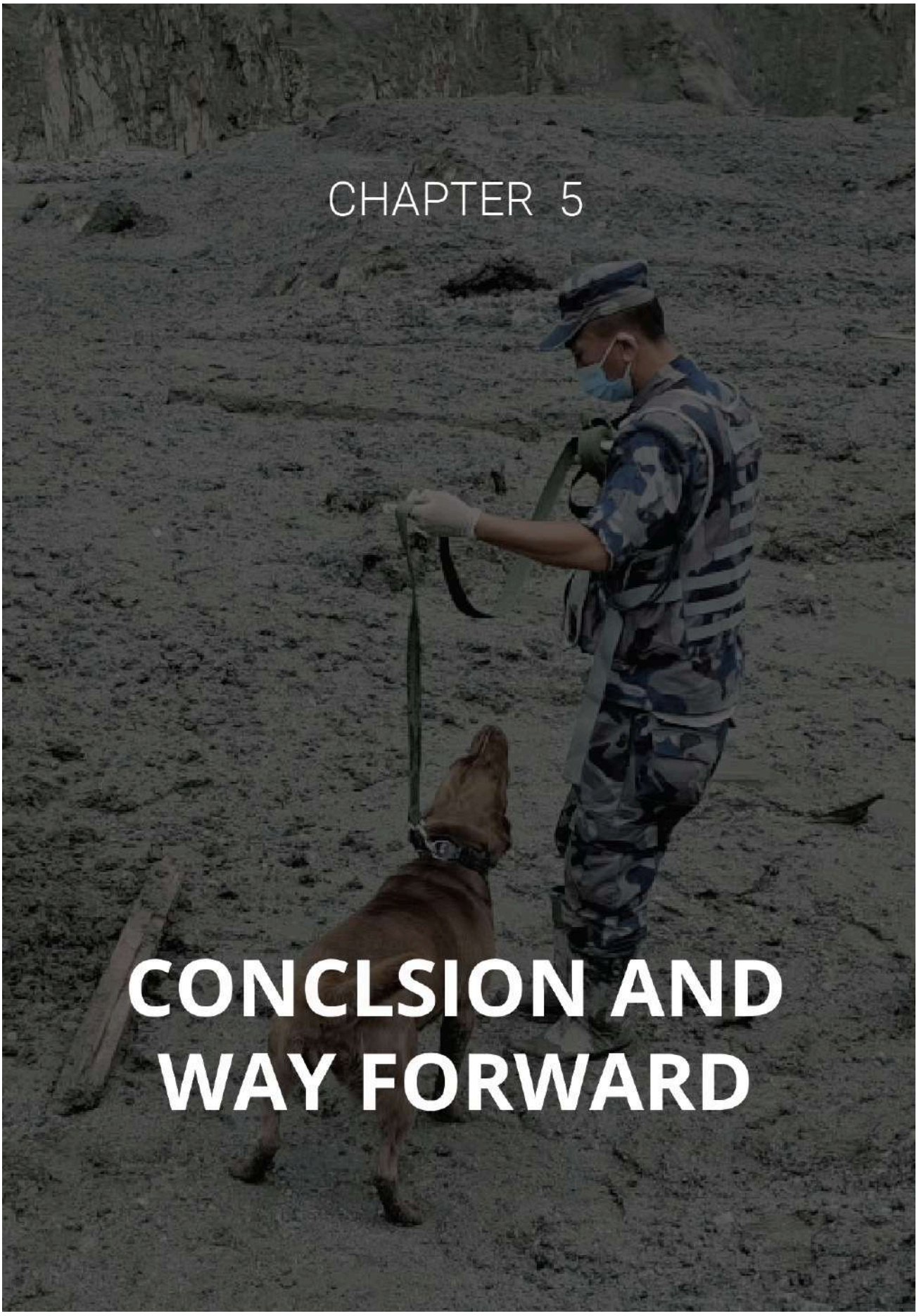
The assessment did not directly establish the extent of disruption to customary land use, sacred places, seasonal livelihoods or access to forests, rivers and pasture. These issues require engagement with affected households and representative Indigenous and community organisations.

Decisions on land rehabilitation, infrastructure alignment and possible relocation should document existing resource use, livelihood access and community preferences. Cadastral records alone cannot capture all customary use or cultural relationships with affected places.

Costing and assessment limits

Relevant activities should be identified within inclusive recovery and sector implementation budgets, with any additional requirements cost explicitly. The inclusive-recovery provision should not be assumed to cover all protection needs without a defined activity breakdown.

Further assessment is needed to establish referral capacity, accessibility of reporting mechanisms, and the needs of groups not adequately represented in current records. Public reporting should protect personal information while allowing affected communities to understand progress and raise concerns.


CHAPTER 5
CONCLSION AND WAY FORWARD

CHAPTER 5: CONCLUSION AND WAY FORWARD

This chapter sets out the proposed strategy and priority actions for restoring services, livelihoods, economic activity and damaged infrastructure while reducing future disaster risk. It organises recovery interventions into early and longer-term periods and outlines the associated sequencing, coordination, financing and monitoring requirements. Priorities are guided by urgency, service criticality, accessibility, technical feasibility and the needs of affected and vulnerable groups. The proposed activities and costs provide a basis for detailed programme preparation and resource mobilisation and remain subject to field verification, engineering assessment, consultation with affected communities and refined costing.

5.1 CONCLUSION

The disaster affected settlements, productive assets and essential infrastructure along the Bhotekoshi–Trishuli–Narayani river corridor. Its consequences extend beyond individual damaged assets because households, businesses and public services depend on connected transport, electricity, water and communications systems. Recovery therefore requires coordinated restoration of these systems alongside support for affected households and livelihoods.

The assessment identifies substantial recovery needs, concentrated in energy, private buildings and disaster risk reduction. Financial magnitude provides an indication of the scale of reconstruction, but priorities must also reflect life safety, continuity of essential services, livelihood dependence and the circumstances of people requiring assistance. Smaller financial provisions for health, education, water supply and inclusion remain important to household recovery.

The RDNA provides an initial basis for government prioritisation, recovery planning and resource mobilisation. Its estimates reflect the information available at the assessment cut-off and include both reported inventories and modelled requirements. They should guide the preparation of recovery programmes, with further verification informing the selection, location and scope of interventions. Decisions on permanent reconstruction and possible relocation require particular attention to residual hazards, site suitability and the preferences of affected communities.

5.2 PRIORITY RECOVERY ACTIVITIES

Early recovery should focus on restoring safe access, maintaining essential services, supporting temporary accommodation and enabling livelihoods to resume. Longer-term recovery should restore permanent housing, productive assets and infrastructure while addressing the risks that could cause renewed damage.

Table 56 consolidates the proposed activities described in the sector findings and the early-recovery schedule. The periods indicate the principal focus of each phase. Assessments, designs, and other preparation for longer-term works can begin within the first six months, while some service and household support may need to continue beyond that period.

Table 56: Summary of Priority Early and Longer-Term Recovery Activities

Sector/recovery area	Early recovery activities (0–6 months)	Longer-term recovery activities (beyond 6 months)
Private housing and settlements	Clear debris and secure affected residential sites; provide transitional shelter with WASH facilities; assess building damage and site hazards.	Repair or reconstruct housing and restore essential household assets. Where safe rebuilding is not feasible, develop relocation options through technical assessment and household consultation.
Public buildings and service delivery	Clear and secure sites; undertake structural safety assessments; restore basic utilities in usable buildings; establish temporary service premises; prepare damage assessments and restoration designs.	Repair, retrofit or reconstruct permanent facilities and replace equipment needed for public services.
Education	Undertake rapid school assessments; establish temporary learning centres; provide learning materials and psychosocial support to students.	Repair or reconstruct schools and replace educational assets, with attention to structural safety, accessibility and functioning WASH facilities.
Health and nutrition	Provide mobile health services, disease surveillance and initial facility restoration; support trauma care, psychosocial services, risk communication, community engagement and management of the dead bodies.	Repair or reconstruct health facilities and replace equipment, with the utilities and supporting arrangements required to restore clinical services.
Cultural heritage	Document affected assets and undertake urgent stabilisation and protection of artifacts where required.	Implement site-specific conservation and restoration measures in consultation with custodians and communities.
Agriculture	Assess field conditions; restore cultivable land and drainage; provide inputs and support livelihood restart in time for feasible planting windows.	Rehabilitate soils and restore productive capacity where immediate cultivation is not possible, coordinated with irrigation and land-restoration works.
Fisheries	Rehabilitate sand-deposited land identified in the assessed fisheries recovery provision.	Restore affected buildings, ponds, raceways, hatcheries and water systems; replace equipment and re-establish fish stocks as production facilities become usable.
Livestock	Verify affected holdings; support veterinary services, feed, water and temporary animal shelter; assist the recovery of surviving livestock.	Restore productive herds and flocks and associated facilities, based on verified losses, household preferences and the availability of feed and veterinary support.

Sector/recovery area	Early recovery activities (0–6 months)	Longer-term recovery activities (beyond 6 months)
Banking and financial services	Assess branch and ATM functionality, secure recoverable records and assets, and identify temporary service requirements. No separate early-recovery allocation is recorded.	Repair or replace damaged premises and equipment and restore services, coordinated with electricity, telecommunications and access restoration.
Economic activities and livelihoods	Enterprise verification and identification of barriers to reopening should inform subsequent assistance.	Restore business premises, productive equipment and essential stocks, and support the resumption of viable economic activities.
Energy and electricity	Restore transmission and distribution connections; rehabilitate substations; undertake micro-hydropower rehabilitation, coordinated with the household renewable-energy programme.	Restore damaged generation and grid assets and undertake necessary recovery works at projects under construction.
Household renewable energy	Verify affected systems and households without adequate alternatives; undertake feasible repairs and provide interim lighting and cooking support.	Repair or replace damaged systems and restore community energy services, coordinated with housing and grid restoration.
Roads and bridges	Clear debris, reopen tracks and establish diversions; improve alternative routes; undertake emergency slope and bank protection; install temporary modular and rope crossings; repair trail bridges and install wire-rope and steel-truss crossings where appropriate.	Reconstruct permanent roads, bridges and approaches, including drainage and protection works informed by geotechnical conditions and changes in river channels.
Telecommunications	Restore internet service providers and telecommunications systems.	Restore permanent networks and improve reliability through resilient routing, protection of exposed equipment and dependable backup power.
Water supply, sanitation and hygiene	Restore water-supply systems and service delivery; provide institutional and technical support and undertake necessary feasibility and water-related studies.	Restore dependable water supply, sanitation and wastewater services, coordinated with electricity restoration and household return.
Irrigation, river training and gauging	Assess urgent repair requirements against planting calendars and immediate monitoring and protection needs. No separate early-recovery allocation is recorded.	Restore damaged irrigation schemes, river-training infrastructure and gauging stations, with clearly defined locations and protection objectives.
Debris and sediment management	Clear priority settlement and agricultural sites, coordinated with clearance under housing, public facilities and transport programmes.	Continue necessary clearance and material management based on verified quantities, site conditions and suitable disposal or reuse arrangements.
Disaster and climate risk management	Develop the proposed multi-hazard early-warning system, including monitoring, warning communication and evacuation arrangements.	Undertake assessed river and settlement protection, landslide protection and associated works, informed by site-specific hazards and coordinated with infrastructure programmes.
Land and environment	Verify erosion, deposition, land use and access; assess environmental conditions relevant to safe return, cultivation and material handling.	Use verified land and environmental information to guide rehabilitation, settlement decisions and permanent works, including assessment of downstream effects.

Sector/recovery area	Early recovery activities (0–6 months)	Longer-term recovery activities (beyond 6 months)
Governance, inclusion and protection	Maintain consistent assessment records; provide accessible information and consultation; identify barriers to assistance and immediate protection concerns; support verification and feedback arrangements.	Maintain community participation, accessibility, protection and accountability throughout recovery, with institutional support based on assessed capacity requirements.

Restoration should address the connections between interventions. Road access and crossings enable the movement of personnel, materials and essential supplies. Electricity, water and communications support the reopening of public facilities and businesses. Site safety and basic services influence whether households can return. These dependencies should inform priorities alongside the severity of damage and the availability of alternative services.

Recovery costing will require a common record of assets and activities across sector programmes. Shared interventions, including debris clearance, temporary WASH facilities, micro-hydropower rehabilitation and river or slope protection need defined locations, scopes and cost allocations so that each component is counted once. Completed works, assistance already provided and confirmed financing also need to be reconciled before outstanding requirements are established.

5.3 FURTHER ASSESSMENT AND WAY FORWARD

Further assessment should focus on the information required to verify recovery needs, determine the appropriate location and scope of interventions and prepare implementable programmes. Detailed sector assessments, including a Post-Disaster Needs Assessment where undertaken, can refine the estimates presented in the RDNA while urgent restoration activities continue. Relevant government institutions may use the RDNA to identify immediate priorities and guide engagement with development partners and other stakeholders. The immediate objective is to restore safe living conditions, essential services and livelihoods, while longer-term investment should reduce exposure to recurrent hazards and strengthen the resilience of affected communities and infrastructure. The specific information gaps requiring further assessment are presented in Section 5.3.1.

5.3.1 Priority Data Gaps

Further assessment should prioritise information that could materially change recovery decisions and costs. Housing assessments should establish building condition, habitability, occupancy, tenure, displacement status and the need for repair, reconstruction or relocation. Enterprise assessments should verify physical damage, operating status, employment effects, interruption periods and income losses. Agriculture data should be extended to locations where impacts have not been confirmed, and zero or blank entries should not be interpreted as evidence of no impact without verification. Environmental assessment should examine erosion, sediment deposition, debris quantities, river-channel change, slope instability, ecosystem effects and possible contamination. Chitwan's comparatively limited sector coverage should also be verified before it is interpreted as indicating low exposure or limited effects.

Road damage classifications should be reviewed after debris clearance and restoration of access. Energy-sector assessment should establish asset ownership, insurance coverage and the respective financing responsibilities of private developers, Nepal Electricity Authority and the public budget. Education, health,

telecommunications, water supply and other service sectors require dated functionality information to establish the number of users affected, the duration of interruption and the availability of alternative services.

5.3.2 Status of Cross-Cutting Needs

The cross-cutting priorities identified in this assessment are based on available government information, sector submissions and supporting technical evidence. They do not constitute completed specialised assessments or fully designed recovery programmes. The responsible government institutions should validate the identified issues and define the interventions, quantities, locations, implementation periods, responsible agencies and financing arrangements. Existing allocations for disaster risk reduction, debris management and inclusive recovery should be treated as planning provisions until their activities and costs are specified and checked against sector programmes. Environmental or protection effects for which no monetary estimate has been established should be recorded as not yet assessed rather than assigned a zero value.

5.3.3 Risk-Informed and Inclusive Recovery

Recovery should restore essential services, livelihoods and connectivity while reducing future disaster risk. Reconstructing damaged assets in the same locations and to the same standards may reproduce existing exposure and vulnerability. Decisions concerning settlements, infrastructure and public services should therefore consider multi-hazard risk, slope stability, river morphology, sediment movement, environmental effects and projected climate conditions. Priority should be given to displaced and isolated households, people who have lost homes or livelihoods and groups facing barriers associated with poverty, disability, age, gender, social identity, tenure or location. Transport, energy, communications, water supply, health, education and markets should be treated as interconnected systems because disruption in one sector can affect the restoration of several others.

Monitoring of upstream slopes, river channels, sediment movement and temporary impoundments should continue during recovery. Early-warning arrangements, evacuation planning, safer siting and resilient design should be incorporated into relevant sector programmes. These measures should be supported by site-specific risk assessment rather than applied as uniform additions to reconstruction costs.

5.3.4 Climate Responsibility and International Commitments

Nepal has contributed comparatively little to global greenhouse gas emissions while remaining highly exposed to climate-related hazards. According to the World Bank's (WB) *Nepal Country Climate and Development Report 2022*, Nepal emitted approximately 48 million tonnes of greenhouse gases in 2019, representing about 0.1 per cent of global emissions. The United Nations Environment Programme's (UNEP) *Emissions Gap Report 2024* shows that global emissions remain concentrated among the largest emitting economies. This imbalance supports Nepal's case for international assistance for climate adaptation, disaster risk reduction and resilient recovery. The potential influence of changing climatic and cryospheric conditions on the August 2026 rock-and-ice avalanche and subsequent flooding warrants further investigation through detailed scientific analysis, including event-attribution studies.

Recovery should be guided by the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015–2030, the Sustainable Development Goals (SDG) and the Paris Agreement. The Sendai Framework recognises the primary responsibility of the state for reducing disaster risk while also emphasising international cooperation and shared action. The Paris Agreement reflects equity and the principle of common but differentiated responsibilities and respective capabilities and provides a basis for financial, technological and technical

support to developing countries. Nepal's *National Climate Change Policy 2019*, *National Adaptation Plan 2021–2050* and *Third Nationally Determined Contribution* provide the national policy basis for integrating climate adaptation, resilient infrastructure, sustainable land and water management and disaster preparedness into recovery. Opportunities to access disaster-risk, climate and loss-and-damage financing should be examined in accordance with national priorities, applicable funding criteria and government financing and coordination arrangements.

5.3.5 Governance, Financing and Implementation

The Government of Nepal should lead recovery through existing federal, provincial and local institutions. NDRRMA should coordinate the overall recovery framework, while responsible ministries and departments validate sector findings, prepare recovery programmes and provide technical oversight. Provincial and local institutions should coordinate implementation within their jurisdictions, with affected communities participating in priority-setting, implementation and monitoring. Each intervention should identify the lead agency, supporting institutions, target population, location, implementation period, estimated cost, available resources and financing gap.

Recovery financing should distinguish between public assets, privately owned assets, public-private infrastructure, insured losses and assistance to households or enterprises. National resources may be combined with international development, disaster-risk and climate finance. Before budgets are approved, common assets and activities should be matched across sectors to prevent repeated costing of debris clearance, temporary facilities, protection works, utilities and livelihood assistance.

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