EXPLORING POST LDC-GRADUATION ENVIRONMENTAL RISKS IN NEPAL

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1. Background

Least developed countries (LDCs) are low-income countries confronting severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets. There are currently 44 countries on the list of LDCs which are reviewed every three years by the Committee for Development Policy (CDP). The Least Developed Countries (LDC) category was established by the United Nations General Assembly (UNGA) in 1971 with 25 countries in the list including Nepal (United Nations, 1971). As of December 2024, there are 44 countries listed in the LDCs category with six countries from the list scheduled for graduation by 2029. Bangladesh, Lao People's Democratic Republic and Nepal are scheduled to graduate on 24 November 2026 in accordance with General Assembly resolution A/RES/76/8. Solomon Islands is scheduled to graduate on 13 December 2027 in accordance with General Assembly resolutions A/RES/73/133 and A/RES/77/323. Cambodia and Senegal are scheduled to graduate on 19 December 2029 in accordance with General Assembly resolution A/RES/79/230. Since its inception, only eight countries have successfully graduated from LDC status, based on assessments of income, human assets, and economic and environmental vulnerability criteria. Recently graduated countries include Vanuatu in 2020, Bhutan in 2023, Sao Tome and Principe in 2024 while graduating countries along with Nepal are Bangladesh and Lao PDR in 2026 and Cambodia in 2029.

In accordance with these criteria, Nepal met two of the three criteria Human Assets Index (HAI) and Economic and Environmental Vulnerability Index (EVI) in three consecutive triennial reviews (2015, 2018 and 2021) of CDP. Meeting these criteria in two consecutive triennials was enough for Nepal's graduation in 2018, However, Nepal government requested CDP for deferring Nepal's graduation considering the devastating effect of earthquake in 2015 and low Gross National Income and other vulnerabilities in 2018. Thus, CDP recommended deferring Nepal's graduation. Although Nepal further improved in two criteria, HAI and EVI, in following triennial review in 2021, it still failed to meet Gross National Income (GNI) per capita threshold of $1222. Based on the CDP recommendations and endorsement by the ECOSOC, the 40th Plenary of the 76th Session of the UN General Assembly held on 23 November 2021 unanimously adopted a resolution, endorsing Nepal's graduation from the LDC category. As per this recommendation, Nepal is expected to officially graduate from LDC status in November 2026 (UN CDP, 2021) with a 5 years transition period considering socioeconomic disruptions caused by COVID -19 pandemic and future uncertainties (NPC, 2024). It is the first and the only country considered for graduation without reaching the income criterion. Nepal's LDC graduation will be a milestone for its socio-economic development.

Problem Statement:

Nepal is scheduled to graduate from the Least Developed Country (LDC) category in 2026, following notable progress under the Istanbul Programme of Action (IPoA) in poverty reduction and social development. Despite improvements in the Human Assets Index (HAI) and the Economic and Environmental Vulnerability Index (EVI), the country continues to face persistent structural impediments, including low economic productivity, limited infrastructure, and weak governance capacity (NPC, 2023). These constraints raise critical concerns about Nepal's capacity to sustain development gains in the post-graduation period. One of the most pressing issues is trade vulnerability. Nepal currently benefits from LDC-specific preferences in 25 countries, with significant risks of export losses, particularly in the European Union, once preferential tariffs under the Everything But Arms (EBA) initiative are phased out (CEDECON, 2020). Furthermore, Nepal's limited institutional and technical capacity to comply with Non-Tariff Measures (NTMs) in export destinations is likely to reduce competitiveness and exacerbate external sector fragility (Kharel et al., 2024).

In parallel, Nepal remains among the most climate-vulnerable countries, ranked 44th out of 191 in the INFORM Risk Index (2022). Climate-induced disasters including floods, earthquakes, and landslides continue to undermine livelihoods, disrupt infrastructure, and destabilize the economy. Although Nepal has accessed global climate finance, including USD 87.8 million from the Green Climate Fund (GCF) and USD 39 million from the Global Environment Facility (GEF), substantial gaps persist in the mobilization and effective utilization of resources for implementing adaptation frameworks such as NAPA and LAPA (GEF, 2021). Graduation from LDC status will entail the loss of concessional climate finance and trade preferences, thereby compounding environmental and economic vulnerabilities. Without strengthened policy frameworks, improved data systems, and enhanced institutional capacity for monitoring, crisis response, and resilience-building, Nepal risks entering the post-LDC era with heightened fragility. The upward trajectory of Nepal's Economic and Environmental Vulnerability Index, rising from 24.7 in 2021 to 29.7 in 2024 (CDP, 2024), underscores the urgency of addressing these interconnected challenges to ensure a sustainable and resilient transition beyond graduation

While substantial research has examined Nepal's trade-related vulnerabilities in the context of LDC graduation particularly the implications of losing tariff preferences, export competitiveness, and compliance with non-tariff measures (CEDECON, 2020; Kharel et al., 2024) comparatively limited attention has been directed toward the environmental dimension of post-graduation risks. Existing literature on climate change, disaster risks, and adaptation frameworks has provided valuable insights at the sectoral level, but there remains a lack of integrated analysis connecting environmental vulnerabilities with the structural shifts associated with LDC graduation. This gap is significant because Nepal's post-LDC trajectory will be shaped not only by trade adjustments but also by its ability to withstand escalating climate-induced hazards, biodiversity loss, urbanization pressures, and institutional constraints in disaster governance.

Current policy frameworks, while comprehensive in scope, remain constrained by weak implementation capacity, financing gaps, and inadequate monitoring mechanisms (UNDP, 2023). Therefore, further research is needed to systematically identify the environmental risks most likely to escalate after graduation, assess how changes in climate finance and domestic institutional capacity will influence these risks, and explore strategies for resilience across multiple future conditions.

Research Questions:

- What environmental risks are most likely to escalate post-graduation?
- How will changes in climate finance and domestic institutional capacity influence these risks?
- What strategies can ensure resilience under different future conditions?

2. Literature Review:

2.1 Current Status of Nepal's LDC Graduation

Nepal, while still categorized as a Least Developed Country (LDC), has made notable strides in its development journey and is approaching graduation from the LDC group. Graduation is determined by meeting three key criteria established by the United Nations Committee for Development Policy (CDP): Gross National Income (GNI) per capita, the Human Assets Index (HAI), and the Economic and Environmental Vulnerability Index (EVI). Among these, Nepal has demonstrated significant progress in the HAI and EVI, although challenges remain in attaining the GNI per capita threshold. Nepal's GNI per capita rose from USD 659 in 2015 to USD 745 in 2018, reaching USD 1,027 in 2021, and is projected to climb to USD 1,300 by 2024. Despite this improvement, the figure still lags behind the graduation benchmark of USD 1,222 (as set in the 2021 review), indicating a persistent gap. In contrast, the HAI has consistently improved, increasing from 68.7 in 2015 to 71.2 in 2018, 74.9 in 2021, and an estimated 76.3 in 2024, comfortably surpassing the required threshold of 66. Similarly, Nepal's EVI has remained below the maximum threshold of 32, reflecting resilience in the face of economic and environmental shocks, with values of 26.8 in 2015, 28.4 in 2018, 24.7 in 2021, and a slightly higher 29.7 in 2024.

Despite these achievements, Nepal continues to face structural challenges, including the long-term impacts of the 2015 earthquake and the economic repercussions of the COVID-19 pandemic. These setbacks have hindered faster progress in income growth and economic diversification. In recognition of these constraints, the Government of Nepal requested and was granted an extension of the transition period from three to five years. This extension allows more time for the country to prepare for graduation and mitigate potential vulnerabilities. Nepal is now on track to graduate from LDC status by 2026. Moving forward, the country is focusing on

enhancing economic resilience by investing in human capital, improving infrastructure, diversifying the economy, and fostering an environment conducive to sustainable development. The government's commitment to addressing socio-economic disparities and building a robust, inclusive economy is essential for ensuring a smooth and successful transition from LDC status and sustaining development gains in the post-graduation phase.

Table 1. Nepal's Performance in the CDP Triennial Reviews for LDC Graduation

Criteria	Graduation Threshold	Nepal's Performance			
		2015	2018	2021	2024
GNI Per Capita	≥ USD 1242 (2015) ≥ USD 1230 (2018) ≥ USD 1222 (2021)	USD 659	USD 745	USD 1027	USD 1300
Human Assets Index (HAI)	≥ 66	68.7	71.2	74.9	76.3
Economic and Environmental Vulnerability Index (EVI)	≤ 32	26.8	28.4	24.7	29.7

Source: (CDP, 2024)

Table 1 illustrates Nepal's notable progress in meeting the criteria for LDC graduation, particularly in the Human Assets Index (HAI), which has consistently remained above the threshold since 2015, reflecting significant improvements in health and education. The Gross National Income (GNI) per capita, while initially below the required benchmark, has shown a steady rise from USD 659 in 2015 to a projected USD 1,329 in 2024 surpassing the graduation threshold of USD 1,222 set in 2021. However, a critical concern emerges with the increasing trend in the Economic and Environmental Vulnerability Index (EVI). After improving to 24.7 in 2021, the EVI is projected to rise to 29.7 in 2024 and 28.96 in 2025, approaching the maximum threshold of 32 (CDP, 2025). This upward trend indicates growing exposure to economic and environmental shocks, possibly due to climate-related disasters, global economic fluctuations, and structural fragilities in sectors like agriculture and tourism. While Nepal is on track to graduate from LDC status by 2026, the rising EVI underscores the urgency of strengthening climate resilience, diversifying the economy, and improving disaster preparedness. Without addressing these vulnerabilities, the gains from

graduation may be undermined in the post-LDC era, threatening long-term development sustainability.

Nepal's score on the composite PCI (40) is way above the average score of LDCs (30.9) in 2022. With this score, not only is Nepal fast distancing itself from the performance of LDCs but it is also increasingly converging towards the performance of ODCs (46.8). Nepal performed particularly well in the Human Capital, ICTs, Structural Change, and Institutions categories. However, the country lagged behind ODCs in the Energy and Transport categories although its performance in these two categories was far better than the average for LDCs. For Nepal, to reach the level of ODCs, it needs to address gaps in the Energy and Transport categories and move forward with the graduation processes.

Table 2. Nepal's comparative sector wise performance with ODCs and LDCs

	PCI	Human Capital	Natural Capital	Energy	Transport	ICT	Institutions	Private Sector	Structural Change
Nepal	40.4	41	43.1	33.8	25.4	43.2	44.2	46.3	52.5
ODCs	46.8	44.3	38.4	61.2	34.1	49.6	51.1	50.9	53.2
LDCs	30.9	27.9	49.8	26.3	19.7	25.2	38.3	37.8	41

Source: UNCTADstat

2.2 Sector wise review

As Nepal approaches its graduation from the Least Developed Country (LDC) category in 2026, literature from other LDC-transition experiences provides critical insights into the challenges and policy directions required for a smooth and resilient transition. Bangladesh's case demonstrates that while domestic support to agriculture remains within the WTO's allowable thresholds, the withdrawal of LDC-specific privileges, such as export subsidies and duty-free market access under the EU's Everything But Arms (EBA) scheme, could significantly affect agricultural exports (Zaman, 2024). To offset these impacts, countries like Bangladesh are pursuing eligibility under the Generalised Scheme of Preferences Plus (GSP+), though it comes with conditions related to human rights, labor standards, and environmental conventions. Nepal is expected to face similar shifts, making it imperative to secure Net Food-Importing Developing Country (NFIDC) status, which would allow it to retain certain policy flexibilities under WTO

provisions (Rahman, 2023). Additionally, building domestic capacity in product standardization, marketing infrastructure, and sustainable production is essential for medium- to long-term agricultural competitiveness.

In trade, transitioning from preference-led to productivity-led competitiveness is vital. Bangladesh's emphasis on enhancing trade logistics, reducing border delays through mutual recognition agreements (MRAs), and regional economic integration provides a model for Nepal. Rahman (2023) stresses the importance of investing in technological upgrading, customs harmonization, and value chain development to ensure market access in a post-preference era. Nepal's engagement in regional frameworks like the Asia-Pacific Trade Agreement (APTA) could support this transition. On climate change, Nepal still lacks a dedicated climate finance transition strategy. Unlike countries that have advanced in mobilizing Green Climate Fund (GCF) investments, Nepal has largely relied on readiness grants and small-scale adaptation projects (NPC, 2024). This highlights the need for institutional strengthening and strategic planning. Lessons from Lao PDR also underscore the importance of reinvesting natural resource revenues into human capital sectors like education and health (Southichack, 2017), as well as aligning legal and business frameworks with international standards. Overall, these studies emphasize that Nepal must integrate scenario-based planning with sector-specific resilience strategies and institutional reforms to navigate the risks and harness the opportunities of its post-LDC future.

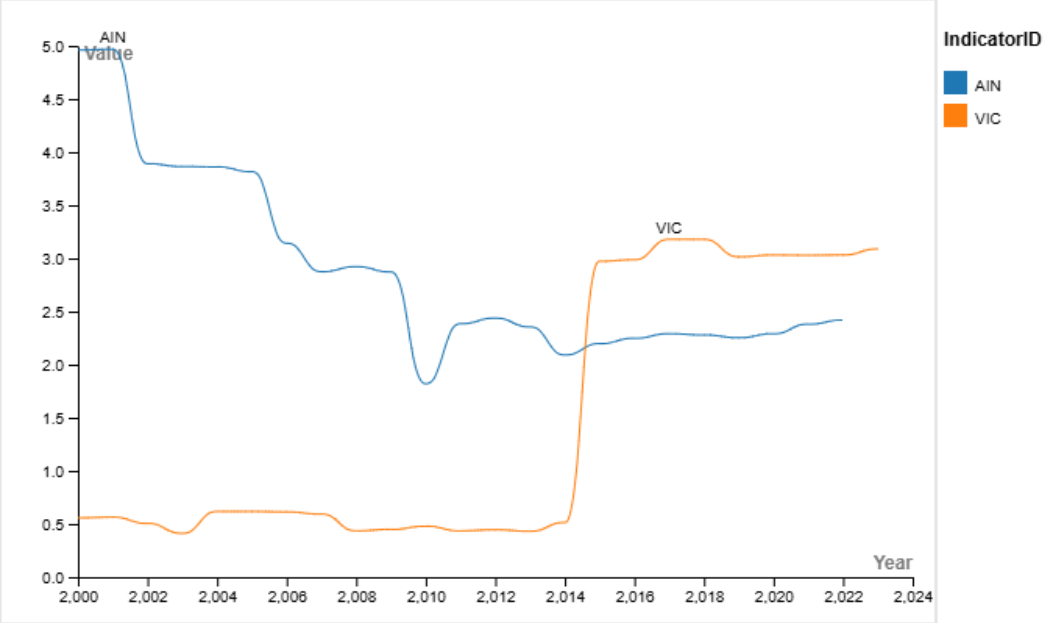
2.3 Environmental Vulnerability indicators trends in Nepal

Economic and Environmental Vulnerability Index (EVI) is measured using eight indicators with four indicators representing each domain. Economic vulnerability includes share of agriculture, forestry & fishing in GDP, remoteness and landlockedness, Merchandise export concentration and, instability of exports of goods and services while environmental vulnerability includes share of population living in low elevated coastal zones, share of population living in drylands, instability of agricultural production(AIN) and victims of disasters(VIC).Environmental vulnerability represents a persistent constraint to sustainable development in Least Developed Countries (LDCs), particularly in nations such as Nepal where topographic complexity, climatic variability, and socio-economic fragility intersect (UNOHRLLS, 2020). The Environmental Vulnerability Index (EVI), developed by the South Pacific Applied Geoscience Commission (SOPAC) and the United Nations Environment Programme (UNEP), aggregates multiple indicators to quantify a country's exposure, sensitivity, and adaptive capacity to environmental risks. Among these, the instability of Agricultural Production (AIN) and victims of disasters (VIC) are especially relevant for Nepal, where agriculture is a dominant livelihood and natural hazards are frequent and severe.

An analysis of temporal trends in these two indicators from 2000 to 2023 reveals differential trajectories. The AIN indicator, which captures year-to-year variability in agricultural output,

demonstrated a marked decline from a high of 5.0 in the early 2000s to below 2.0 by 2010. This downward trend is suggestive of enhanced agricultural stability, likely attributable to increased access to irrigation, improved seed and input systems, and gradual diffusion of climate-smart agricultural practices (Paudel et al., 2021). Nevertheless, from 2011 onwards, the indicator exhibits mild fluctuations and a modest upward trend, indicating persistent production related vulnerabilities potentially linked to extreme weather events, erratic monsoons, and resource degradation. Conversely, the VIC indicator, reflecting the number of individuals affected by disasters, remained relatively stable at low levels until 2014. A pronounced surge is observed in 2015, coinciding with the catastrophic Gorkha earthquake, which resulted in widespread loss of life, displacement, and infrastructure damage. Post 2015, the indicator maintains elevated values, indicating a sustained vulnerability to natural hazards such as landslides, floods, and glacial lake outburst floods (GLOFs), which are projected to intensify under climate change scenarios (MoFE, 2019).

These divergent patterns highlight a dual reality. While there has been measurable progress in reducing agricultural production volatility, exposure to and impacts from natural disasters remain acute. This has direct implications for Nepal's post LDC trajectory. As concessional financing and technical support from international partners are gradually withdrawn following graduation, the country's ability to invest in disaster risk reduction (DRR), resilient infrastructure, and climate adaptation measures may be constrained (UN CDP, 2021). Given the country's ecological fragility and socioeconomic vulnerabilities, maintaining environmental resilience must remain a policy priority beyond graduation.



Source: (UNDESA, 2025)

Figure 1. Time series of instability of agricultural production (AIN) and victims of disasters (VIC) indicators in Nepal (2000–2023)

2.4. Determinants of instability in agricultural production

Agricultural production instability in Nepal is shaped by a convergence of climatic, environmental, and socio-economic stressors, each amplifying vulnerability in a predominantly subsistence-based system. Climate change is a primary driver, with rising temperatures and erratic rainfall patterns increasingly disrupting crop cycles, particularly in rain-fed regions that constitute the bulk of Nepal's farmland (Shrestha et al., 2024). Extreme events like floods and droughts have intensified, leading to fluctuating yields and heightened food insecurity among smallholder farmers. Environmental degradation, especially soil erosion, nutrient depletion, and declining water availability further destabilizes productivity. Limited irrigation coverage and degraded land reduce resilience to climatic shocks, locking farmers into a cycle of volatility (Karki et al., 2021). Socio-economic barriers such as poverty, weak market integration, and limited access to quality inputs and information systems exacerbate this instability, particularly for marginalized and female farmers (FAO & WFP, 2022; Karki et al., 2021). While adaptation efforts such as climate-smart agriculture, crop simulation tools, and digital agro-advisories offer promise, uptake remains uneven due to infrastructural and knowledge gaps (Thomas et al., 2024). These layered determinants reflect how production instability in Nepal is not just environmental but deeply structural, demanding integrated responses that address both climatic and systemic inequities.

2.4 Determinants of disasters in Nepal

Nepal's vulnerability to disasters arises from the intersection of natural hazards, climate extremes, rapid urbanization, environmental degradation, and institutional fragility each interacting in increasingly unpredictable ways. This multifaceted risk environment is not only intensifying but also becoming more difficult to manage due to compounding and cascading effects. In recent years, climate-induced hazards have grown more frequent and destructive, particularly in the form of extreme rainfall events and flash floods. The record-breaking monsoon of late September 2024 brought over 700 mm of rain to parts of the Kathmandu Valley in just three days, causing floods and landslides that resulted in 244 deaths and major infrastructure collapse (Le Monde, 2024). Attribution analyses confirm that such heavy rainfall events are now 70% more likely and 10% more intense due to anthropogenic warming, which has raised Nepal's average temperature by more than 1.3°C since the pre-industrial period (Earth.org, 2024). These

events challenge the predictability of future risks and strain emergency response capacity in both rural and urban areas.

Urbanization has exacerbated these hazards. Between 1990 and 2020, Kathmandu's built-up area increased by over 300%, while green cover and natural drainage zones declined significantly (World Weather Attribution, 2024). Poor land-use planning, uncontrolled settlement on floodplains, and encroachment of rivers have intensified the depth and reach of urban flooding, turning heavy rain into major disasters even in areas previously considered safe (Himalini, 2024). This rapid expansion, largely informal and unregulated, introduces new risk patterns that undermine the reliability of hazard zonation and expose an ever-growing population to hydrometeorological threats. Meanwhile, high mountain regions face growing risks from glacier related hazards. In August 2024, two glacial lake outburst floods (GLOFs) occurred in the Thame region of Solukhumbu, displacing communities and damaging downstream hydropower infrastructure (ICIMOD, 2024) Similarly, a July 2025 flood caused by supraglacial lake drainage on the Nepal China border led to at least nine deaths and significant cross border trade disruption (Reuters, 2025). Scientific assessments confirm that glacier melt and supraglacial lake formation are accelerating in the eastern Himalayas, driven by rising temperatures and retreating ice masses (ICIMOD, 2023). These phenomena signal not only the emergence of new hazards but also the increasing unpredictability of disaster onset and scale.

In addition to biophysical drivers, institutional limitations severely hamper disaster risk governance. The 2024 monsoon disaster revealed critical gaps in Nepal's disaster response apparatus, as rescue and relief efforts were delayed due to a lack of trained personnel, inadequate logistics, and insufficient coordination among government tiers (Kathmandu Post, 2024). Despite the establishment of the National Disaster Risk Reduction and Management Authority (NDRRMA), subnational implementation remains fragmented, with local governments lacking sufficient capacity, funding, or clarity of mandate (UN Nepal, 2024). The state's reliance on ad-hoc mechanisms rather than long-term risk reduction strategies further deepens systemic vulnerability. The economic and social costs of these disasters continue to mount. The Government of Nepal estimated that floods and landslides in 2024 alone caused damages exceeding NPR 46.7 billion (approximately USD 350 million), affecting agriculture, roads, hydropower, and housing sectors (NDRMA, 2024). These losses are not isolated incidents but part of a broader trend of increasing disaster frequency and intensity, signaling a shift in risk profiles that standard hazard classifications no longer adequately capture. Nepal's disaster landscape is therefore not only defined by natural processes but increasingly by socio-economic drivers, institutional choices, and human-environment interactions that are evolving rapidly. These interlinked factors render risk environments deeply uncertain, complicating the identification of vulnerable zones, the timing of hazard events, and the efficacy of conventional mitigation measures. Recognizing the growing complexity and unpredictability of these drivers is

critical to understanding the urgency and magnitude of the challenge Nepal faces in managing its disaster risk landscape.

2.5 National Climate Policy Frameworks in Relation to Environmental Vulnerability and LDC Graduation in Nepal

Nepal's National Climate Change Policy 2019 provides a framework to integrate climate resilience into national development, emphasizing multi-sectoral adaptation, gender equity, and local empowerment (GoN, 2019). The National Adaptation Plan (NAP 2021–2050) further prioritizes nine sectors, including agriculture and water resources, with detailed programs to reduce vulnerability and mobilize climate finance (MOFE, 2021). Despite these policies, the United Nations Development Programme (UNDP, 2023) notes that institutional capacities, especially at provincial and local levels, remain insufficient for effective implementation. Moreover, a recent peer-reviewed study highlights that coordination gaps between federal and local governments, combined with limited monitoring and reporting mechanisms, undermine the scaling of climate adaptation efforts (Shrestha et al., 2023). The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2020) stresses that Nepal's graduation from LDC status will reduce access to concessional climate finance and technical support, necessitating stronger domestic policies and institutional frameworks to maintain environmental resilience. Furthermore, the lack of clear metrics for loss and damage and limited inclusion of vulnerable sectors such as health and infrastructure are key policy gaps needing urgent attention (MOFE, 2021).

2.6 Key Environmental Risks for Nepal Post-LDC Graduation

Nepal's graduation from the Least Developed Countries (LDC) category in 2026 marks a significant development milestone but also presents critical environmental challenges that could threaten sustainable growth and resilience. The reduction in international support mechanisms, including concessional climate finance and technology transfers, places greater responsibility on Nepal to manage environmental risks effectively (ESCAP, 2020). Climate change remains the foremost environmental risk. Scientific assessments project increased temperature rise of 1.5–2°C by 2050, accompanied by erratic precipitation patterns, intensifying droughts, floods, and landslides (Government of Nepal, 2021). These climate extremes directly threaten Nepal's predominantly rain-fed agriculture, exacerbate water scarcity, and increase soil erosion risks in its fragile mountainous terrain (Shrestha et al., 2023). The Himalayan glaciers, crucial for sustained river flows, are retreating rapidly, jeopardizing long-term water availability for millions (Kattel et al., 2020). Biodiversity loss is another critical concern. Rapid urbanization, deforestation, and unsustainable resource extraction contribute to habitat fragmentation, threatening endemic and endangered species (MoFE, 2022). This loss undermines ecosystem services vital for agriculture, disaster regulation, and community livelihoods, thereby increasing vulnerability to

environmental shocks (UNDP, 2023). Moreover, air and water pollution are emerging public health risks in Nepal's growing urban centers. Industrial emissions, vehicular pollution, and improper waste management degrade air quality, while contamination of rivers affects both human and ecological health (WHO Nepal, 2022). Addressing these issues is essential to avoid secondary environmental crises that could burden the health system post-graduation. Disaster risk remains high due to Nepal's geophysical setting. The country's vulnerability to earthquakes, floods, and landslides is compounded by inadequate infrastructure and preparedness gaps, which must be urgently addressed to safeguard development gains (NPC Nepal, 2022). Nepal's post-LDC phase demands integrated environmental risk management focusing on climate change adaptation, biodiversity conservation, pollution control, and disaster resilience. Strengthened institutional capacity, increased domestic resource mobilization, and improved policy coherence are essential to manage these interlinked risks effectively (UNDP, 2023).

Chapter 3: Research Design and Method

METHODOLOGY

Data for this study were collected through a scenario planning exercise, a systematic tool designed to stimulate creative thinking and generate policy options for complex and uncertain futures (Joseph, 2000; Nyaupane & Buzinde, 2017). Unlike forecasting, which seeks to predict a specific outcome, scenario planning develops plausible narratives of alternative futures by examining how different drivers and their interactions may shape long-term trajectories (Peterson et al., 2003). According to Kahn and Wiener (1967, p. 6), a scenario is "a set of hypothetical events set in the future … constructed to clarify a possible chain of causal events as well as their decision points." In this sense, scenarios are dynamic storylines that capture uncertainties in the evolution of the system under study (Peterson et al., 2003). Scenario planning has been widely applied by private enterprises, government agencies, and development organizations as both a strategic and adaptive decision-making framework (Rowland et al., 2014). It is used not only to envision desirable futures but also to prepare for potentially adverse conditions (Nyaupane & Buzinde, 2017). The value of this method lies in its ability to: (i) challenge the status quo and encourage strategic thinking, (ii) adopt a systems perspective to capture interconnections across sectors, (iii) consider the complex interactions among multiple drivers, (iv) describe possible outcomes in detail, and (v) help institutions remain flexible and adaptive in the face of uncertainty (Amer et al., 2013; Nyaupane & Buzinde, 2017).

Two main approaches to scenario planning exist: quantitative modeling and qualitative expert-driven scenario building (Amer et al., 2013). This study employed the qualitative approach

because of its exploratory purpose and the high degree of uncertainty associated with Nepal's transition from Least Developed Country (LDC) status.

Scenario Planning Process

An adapted three-step process guided the exercise (Peterson et al., 2003):

1. Identification and Prioritization of Critical Drivers

   Stakeholders and experts first engaged in structured brainstorming to identify the most important drivers of post-LDC environmental and disaster risk. Drivers considered included climate extremes, land degradation, migration, urbanization, financial resources, and governance capacity. Through prioritization, finance and governance were selected as the two most influential and uncertain drivers.

2. Construction of the Scenario Matrix
   A 2 × 2 matrix was developed, using finance (strong/weak) on one axis and governance (strong/weak) on the other. This framework produced four plausible scenarios:

   - Strong Finance + Strong Governance
   - Strong Finance + Weak Governance
   - Weak Finance + Strong Governance
   - Weak Finance + Weak Governance

3. Scenario Narratives and Sectoral Analysis
   Each scenario was elaborated into a narrative describing implications for key sectors: agriculture, energy, infrastructure, tourism, and industry. Narratives captured institutional responses, vulnerabilities, and adaptation strategies under each configuration. International case studies were incorporated to validate plausibility and provide comparative lessons.

Data Collection and Validation

Data were collected through a virtual focus group scenario planning session with expert participants representing multiple stakeholder groups including government agencies, academia, development professionals, and sectoral specialists. Participants engaged in guided discussions to define drivers, construct scenarios, and elaborate potential sectoral impacts. Their responses were synthesized into scenario narratives and cross-checked with participants to ensure accuracy and transparency.

Analytical Framework

The analysis emphasized systems thinking to account for cross-sectoral linkages and feedback loops, combined with expert judgment to ground scenarios in Nepal's institutional realities. International practices were reviewed to enhance the robustness of findings and situate Nepal's potential trajectories in a broader global context. Scenario planning was selected because Nepal's post-LDC transition presents high uncertainty, complex interactions among drivers, and significant stakes for long-term development. This approach is particularly suited to disaster and environmental risk management, where outcomes depend on interacting social, financial, institutional, and ecological factors. The methodology thus provides a structured basis for identifying vulnerabilities, exploring alternative policy pathways, and informing long-term planning under uncertainty.

RESULTS

The scenario planning exercise was designed to examine how Nepal's disaster risk management and environmental resilience might evolve as the country prepares to graduate from Least Developed Country (LDC) status in 2026. The analysis began by identifying a set of critical drivers of uncertainty that shape the country's environmental and disaster risks. These drivers were grouped into four domains: environmental factors, including climate extremes, land degradation, air pollution, urbanization, and global warming linked to carbon emissions from large economies; financial factors, such as access to development funds for adaptation and mitigation, concessional terms in finance, risk transfer mechanisms, and deficits due to declining international support; governance factors, encompassing institutional capacity, transparency, localization of management measures, legal obligations, and infrastructure development; and resource-related factors, including exploitation of natural resources for revenue, multi-hazard risks, human capital for disaster risk reduction, unplanned settlements, municipal waste, plastic use, and industrial wastewater.

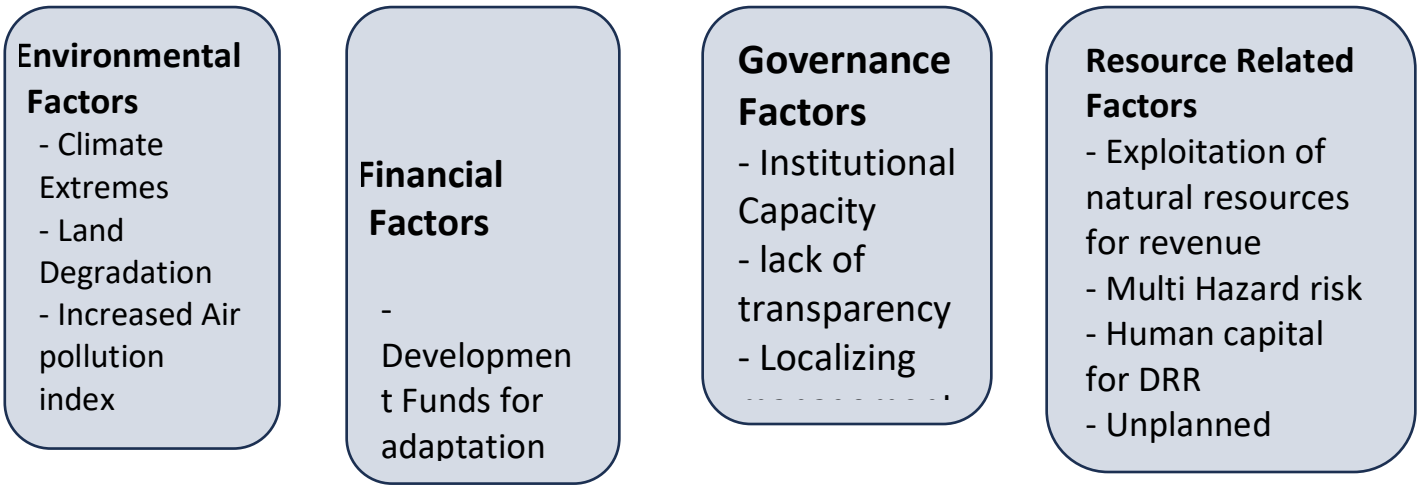


Figure 2. Critical drivers of environmental risks in Nepal

Among these, finance and governance capacity emerged as the two most decisive and uncertain variables influencing Nepal's ability to strengthen resilience. These variables were therefore chosen as the axes for scenario development, producing a matrix that generated four plausible configurations. The resulting scenarios are: strong finance combined with strong governance; strong finance combined with weak governance; weak finance combined with strong governance; and weak finance combined with weak governance

Scenario 1:

Strong Finance + Strong Governance

Proactive, prevention-oriented disaster risk management

Coordinated, multi-sectoral response mechanisms

Rapid recovery supported by resilient infrastructure investment

High public trust and strong international confidence

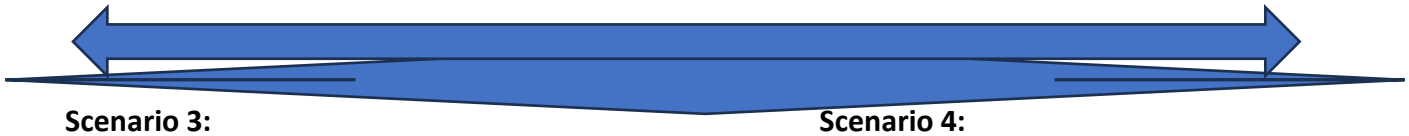
Scenario 2:

Strong Finance + Weak Governance

Adequate funds available but inefficiently utilized

Short-term relief prioritized over long-term prevention

Elite capture, corruption, and weak oversight undermine outcomes



Scenario 3:

Weak Finance + Strong Governance

Transparent and equitable resource allocation despite fiscal limits

Critical services prioritized for vulnerable populations

Slow but high-quality reconstruction and resilience measures

Strong community participation and sustained

Scenario 4:

Weak Finance + Weak Governance

Chronic underfunding coupled with weak institutional oversight

Fragmented, reactive, and poorly coordinated disaster response

Substandard infrastructure repeatedly exposed to disaster losses

Severe erosion of public trust and

Figure 3. Scenario planning with finance and governance as major driver of environmental risks

Scenario 1: Strong Finance and Strong Governance

In a scenario where both financial capacity and governance systems are strong, disaster risk management in Nepal becomes proactive, integrated, and sectorally coordinated. The Ministry of Finance (MoF) allocates predictable resources not only for immediate relief but also for preventive and adaptive strategies, shifting investment priorities from short-term response toward long-term resilience. Domestic mechanisms such as the Prime Minister's Relief Fund and the Disaster Relief Fund are complemented by green financing from Nepal Rastra Bank, and by international sources including the Loss and Damage Fund and climate adaptation financing. Crucially, cost–benefit analysis is institutionalized to determine whether reliance on domestic disaster funds or premium payments for risk transfer instruments yields greater resilience returns. This financial robustness is matched by governance strength: the National Disaster Risk Reduction and Management Authority (NDRRMA) leads coordinated risk assessments, manages multi-hazard frameworks, and oversees the emerging disaster budgeting system designed to prioritize prevention. In the agricultural sector, robust financial flows and accountable governance transform vulnerability into resilience. With a dedicated livestock insurance budget already established, risk transfer mechanisms are expanded to cover broader agricultural value chains. Post-disaster agricultural infrastructure, historically a low priority, is rebuilt promptly and to disaster-resilient standards, while preventive investments in soil health, pest management, and resilient irrigation systems reduce systemic risks. Value chain actors collaborate under NDRRMA's guidance, supported by partnerships with banks and the central bank to enhance access to credit and financing for climate-smart practices. The energy and infrastructure sectors also demonstrate resilience under this scenario. Finance enables the construction of geology-friendly infrastructure and the modernization of energy grids, while governance ensures compliance with resilient building codes and transparent monitoring of contractors. Irrigation systems are redesigned to withstand flood and drought cycles, reducing agricultural losses and safeguarding food security. Tourism and industry benefit from coordinated recovery planning, rapid infrastructure restoration, and strict adherence to safety standards, restoring investor and visitor confidence.

At the governance level, interministerial collaboration strengthens, linking MoF, NDRRMA, and sectoral ministries in coherent planning and resource allocation. Local governments operationalize localized financing mechanisms, deploying their fixed shares of disaster funds efficiently under clear regulations. Early warning systems are reliable, actionable, and trusted by communities. International partners, including donors and UN agencies, engage confidently with state structures due to strong accountability and transparency measures. Overall, this scenario demonstrates how financial strength and governance capacity reinforce one another. Finance enables investment in preventive systems, while governance ensures that financial resources are deployed equitably, efficiently, and transparently. The outcome is a disaster risk management

system that reduces recovery time, minimizes human and economic losses, and builds multi-sectoral resilience consistent with the Sendai Framework for Disaster Risk Reduction and Nepal's national development priorities.

Scenario 2: Strong Finance and Weak Governance

In a context where financial resources for disaster risk management are relatively abundant but governance systems remain weak, Nepal faces a paradox of capacity without effectiveness. The Ministry of Finance (MoF) allocates funds through mechanisms such as the Prime Minister's Relief Fund, the Disaster Relief Fund, and green financing windows via Nepal Rastra Bank. International flows from the Loss and Damage Fund and climate adaptation financing complement domestic resources, ensuring that disaster response is not constrained by a lack of capital. Yet, weak governance manifests through fragmented institutional coordination, weak enforcement of regulations, and low efficiency in fund utilization. Although finance is available, the prioritization of disaster investment remains skewed toward short-term relief, food security, and housing reconstruction, with preventive and adaptive measures underfunded despite their proven long-term cost-effectiveness. Agriculture illustrates this imbalance clearly. Despite a significant allocation for livestock insurance (NPR 2 Arba 30 crore), weak oversight leads to delays in payouts, uneven coverage, and exclusion of vulnerable farmers. Recovery of agricultural disaster losses remains low, and reconstruction of post-disaster infrastructure continues to be deprioritized. The absence of robust risk transfer strategies, basket funds, or reliable agricultural data further undermines the effectiveness of financial allocations. Similarly, value chain disruptions remain acute because collaboration between farmers, banks, and central institutions is poorly coordinated. The result is that while resources exist, they do not systematically translate into resilience gains for the sector.

The tourism and industrial sectors also suffer under weak governance. Tourism receives adequate financial backing for reconstruction, but the absence of transparent planning and monitoring leads to delays in restoring cultural sites and hospitality infrastructure, eroding international visitor confidence. Industrial recovery programs are funded, but contracts for reconstruction and supply chain restoration are often captured by elites or compromised by corruption, resulting in low-quality outcomes. In the energy sector, funds are available for grid restoration and renewable energy expansion, yet weak enforcement of safety standards and poor oversight compromise system reliability. NDRRMA, though institutionally mandated to coordinate disaster risk reduction, struggles to enforce coherent strategies under this scenario. Early warning systems may be financed but remain unreliable due to weak institutional follow-up and limited public trust. The disaster budgeting system, though technically prepared, fails to achieve its preventive orientation as funds continue to be channeled reactively. Interministerial

collaboration remains weak, limiting the ability of NDRRMA and MoF to align priorities across agriculture, infrastructure, and social protection. Local governments, while allocated a fixed share of disaster funds, often deploy resources inefficiently due to political capture and lack of capacity. At the societal level, public trust in disaster governance erodes as financial flows fail to produce equitable outcomes. Communities perceive relief distribution as politically biased, and preventive measures as under-implemented despite available funding. This gap is increasingly filled by civil society organizations, NGOs, and INGOs, whose parallel systems ensure some delivery but also fragment overall disaster risk management. International partners remain hesitant to channel resources directly through government systems, preferring project-based approaches that bypass state structures, which in turn perpetuates weak institutional accountability.

This scenario demonstrates that finance alone is insufficient to deliver resilience outcomes. Without governance reforms particularly in transparency, accountability, and institutional coordination disaster management risks remaining reactive, inequitable, and inefficient. Policy implications point to the need for robust monitoring and evaluation mechanisms, enforcement of standards across sectors, and reforms that strengthen NDRRMA's authority in aligning multi-sectoral disaster risk management strategies. Only then can financial resources be translated into effective, equitable, and sustainable resilience.

Scenario 3: Weak Finance and Strong Governance

When governance systems are strong but financial resources are constrained, disaster risk management in Nepal functions on the principle of prioritization, equity, and accountability, but struggles to achieve scale. The Ministry of Finance (MoF) faces fiscal limitations that prevent significant investments in large-scale preventive infrastructure or comprehensive risk transfer mechanisms. Domestic funds such as the Prime Minister's Relief Fund and the Disaster Relief Fund are available but insufficient for long-term resilience building. International mechanisms, including climate adaptation financing and the Loss and Damage Fund, play a critical role in supplementing domestic resources, yet reliance on external support introduces vulnerability to donor priorities. Despite these financial limitations, strong governance capacity anchored in the National Disaster Risk Reduction and Management Authority (NDRRMA) ensures that available resources are allocated equitably, transparently, and in alignment with national and local priorities. In agriculture, scarce financial resources mean that large-scale infrastructure such as irrigation canals or resilient storage systems cannot be rapidly expanded. However, governance strength ensures that the existing livestock insurance budget and risk management measures are directed to the most vulnerable farmers rather than being captured by elites. Preventive measures, including soil conservation, pest and disease monitoring, and localized irrigation

support, are prioritized despite resource scarcity. Interministerial collaboration allows agricultural disaster risk management plans to advance, and data collection is strengthened, even when resources are limited. Farmers and value chain actors benefit from inclusive coordination processes, building trust in institutions.

Tourism and industry also demonstrate the strengths of governance under constrained finance. Recovery of heritage sites and tourist infrastructure occurs more slowly due to limited resources, but prioritization mechanisms ensure that critical assets are restored first, preserving the sector's competitiveness. In industry, while SMEs cannot access large-scale financial assistance, governance systems ensure fair distribution of smaller grants and technical support. Transparent regulation provides policy certainty, encouraging the private sector to co-finance recovery and resilience initiatives. The energy and infrastructure sectors exemplify the trade-offs in this scenario. Funding gaps constrain the expansion of renewable energy and the modernization of the national grid. However, governance ensures that what little funding exists is deployed to maintain essential services equitably, with critical facilities such as hospitals prioritized for uninterrupted power supply. In physical infrastructure, reconstruction is slow but consistently adheres to geology-friendly and disaster-resilient standards, as governance mechanisms prevent corruption and low-quality construction. Irrigation development lags, but transparent governance prioritizes support to smallholder farmers, and donor-funded irrigation projects are implemented effectively without elite capture.

Institutionally, NDRRMA's authority and coordination capacity ensure that weak finance does not lead to governance fragmentation. The disaster budgeting system is operationalized with a focus on prevention, even when the total budget envelope is small. Early warning systems are maintained and trusted by communities, and local governments effectively use their fixed share of disaster funds under clear regulatory frameworks. Donors and international organizations prefer to engage with government systems because strong governance minimizes fiduciary risks and maximizes accountability. At the community level, trust in institutions remains high despite slow recovery. Communities actively participate in preparedness activities, often contributing their own resources, labor, or traditional knowledge. Civil society organizations complement state capacity, ensuring that local resilience initiatives align with national strategies. The overall outcome is a disaster risk management system that performs equitably and strategically, but remains vulnerable to recurrent shocks due to chronic underinvestment in long-term resilience infrastructure.

This scenario demonstrates that governance strength can compensate for weak finance to some extent, ensuring that resources are used effectively, inclusively, and transparently. Yet, resilience outcomes remain capped by the availability of funds. The policy implication is clear: Nepal must diversify its disaster financing instruments, strengthen risk transfer mechanisms, and expand

regional and international partnerships to match strong governance with the financial resources required for sustainable resilience.

Scenario 4: Weak Finance and Weak Governance

In a scenario where both finance and governance are weak, disaster risk management in Nepal faces systemic fragility and recurrent setbacks. The Ministry of Finance (MoF) struggles to allocate sufficient resources for disaster preparedness or resilience building. Domestic mechanisms such as the Prime Minister's Relief Fund and the Disaster Relief Fund remain small, reactive, and often politicized, while innovative instruments such as risk transfer strategies, basket funds, or comprehensive insurance mechanisms are absent. International climate financing and donor contributions may be available, but weak institutional capacity and limited accountability discourage large-scale direct support. Governance weaknesses manifest through fragmented interministerial collaboration, poorly enforced regulations, and low public trust in institutions. The absence of a functional disaster budgeting system locks resource allocation into response and relief, with little room for preventive investment. The agriculture sector is among the hardest hit. Post-disaster agricultural infrastructure reconstruction remains a low priority, and recovery of crop and livestock losses is consistently inadequate. Even with a designated livestock insurance budget, weak oversight and low state capacity prevent effective implementation, leaving farmers without meaningful protection. Data systems are fragile, undermining efforts to address secondary agricultural disasters such as soil degradation, pests, and disease outbreaks. Value chain disruptions are acute, and weak collaboration among actors, government agencies, banks, and central institutions further reduces resilience.

Tourism and industry sectors also face structural decline. In tourism, financial and governance deficits delay the restoration of heritage sites and hospitality infrastructure, severely undermining visitor confidence. Industry suffers prolonged recovery times, as financial assistance fails to reach SMEs and elite capture diverts available resources. Corruption and poor contract enforcement lead to low-quality reconstruction, exposing industrial zones to repeated disaster losses. In energy and infrastructure, systemic vulnerabilities deepen. Limited financial allocations prevent the modernization of energy grids or the expansion of renewable systems. Weak enforcement of standards and poor oversight of contractors result in frequent power failures and unsafe construction practices. Physical infrastructure including roads, bridges, and housing is rebuilt slowly, often to substandard specifications, leading to repeated damage in subsequent disasters. Irrigation systems deteriorate without meaningful investment or regulatory enforcement, leaving farmers exposed to droughts and floods, and accelerating rural–urban migration. NDRRMA, under this scenario, lacks the authority and resources to lead disaster risk reduction effectively. Early warning systems are unreliable, multi-hazard risk assessments are

incomplete, and localized financing mechanisms exist only nominally. Local governments, despite having nominal disaster funds, deploy them inefficiently under political pressure and without clear regulatory frameworks. Collaboration with donors, INGOs, and UN agencies remains fragmented, as international actors often bypass government structures due to weak fiduciary safeguards, further weakening state legitimacy. At the societal level, the erosion of public trust is severe. Relief distribution is widely perceived as politically biased, communities feel abandoned, and compliance with disaster risk reduction measures is low. Civil society organizations and community networks provide some coping capacity, but these remain reactive and insufficient against systemic risks. As a result, disaster events produce repeated humanitarian crises, erode development gains, and exacerbate poverty and inequality.

This scenario represents the most vulnerable trajectory for Nepal's disaster risk management system. Weak finance limits the scale and scope of intervention, while weak governance ensures that even available resources are poorly utilized. The outcome is a fragile equilibrium where disasters trigger prolonged recovery, undermine long-term development, and deepen structural inequalities. Policy implications highlight the urgent need for foundational reforms in fiscal resilience, institutional strengthening, and accountability. Without simultaneous improvements in financial systems and governance capacity, disaster risk management will remain reactive, inequitable, and unable to break cycles of vulnerability.

International Case References Across Scenario Dimensions

To contextualize the scenarios, the analysis draws on a review of international practices in disaster risk management and climate resilience. Comparative evidence is critical because it allows Nepal's potential trajectories to be assessed not only in light of domestic drivers but also against global experiences that illustrate how other countries have addressed similar challenges. By examining case studies across agriculture, energy, infrastructure, tourism, industry, and governance systems, the findings highlight both successful models and cautionary lessons that carry relevance for Nepal's post-LDC transition. The international practices reviewed here are not presented as prescriptive solutions but as reference points that demonstrate how different combinations of financial systems, institutional capacity, and policy frameworks can produce distinct resilience outcomes. They also serve as an external validity check for the four scenarios, showing how variations in finance and governance have played out in diverse contexts ranging from high-income to resource-constrained countries

Each practice is linked to a specific sector or institutional arrangement and is analyzed in terms of its design, implementation, and outcomes. The cases illustrate how strong governance can maximize the benefits of limited financial resources, how financial strength can be undermined by weak oversight, and how simultaneous strength in both domains can produce durable resilience gains. In bringing these examples together, the section provides a comparative lens that enriches the scenario narratives and identifies transferable insights for Nepal as it navigates new responsibilities and vulnerabilities after LDC graduation.

Scenario 1: Strong Finance + Strong Governance

Table 3. International examples relevant to scenario 1.

Sector	International Practice	Detailed Explanation
Agriculture	Japan's NOSAI crop insurance	The Ministry of Agriculture, Forestry and Fisheries (MAFF) runs a nationwide mutual crop insurance system (NOSAI). Farmers contribute premiums, the government subsidizes costs, and payouts are rapid and rules-based. Strong regulatory oversight and integration with early warning systems ensure predictability and trust.

Sector	International Practice	Detailed Explanation
Finance	New Zealand's Natural Hazards Commission (EQC)	EQC provides statutory national disaster insurance covering residential property against earthquakes, floods, and other hazards. It pools risk nationally, is funded by premiums on insurance contracts, and is backed by government reinsurance. This cushions fiscal shocks and ensures efficient payouts.
Governance/NDRRMA	Bangladesh Cyclone Preparedness Programme (CPP)	Jointly run by the government and the Red Crescent, CPP trains 75,000+ volunteers, operates early warning systems, and organizes mass evacuations. It institutionalizes state–community coordination with clear lines of authority and dedicated funding.
Tourism	Iceland Tourism Crisis Response	After volcanic eruptions, Iceland established a Tourism Response Team under its civil protection system. It used transparent communication, real-time safety updates, and coordinated visitor management to restore confidence quickly.
Industry	South Korea Business Continuity Law	South Korea requires public institutions and critical private industries to maintain Business Continuity Plans (BCPs). Firms receive government support to prepare, and regulators enforce compliance. This ensures supply chains remain functional during disasters.
Energy	Germany's Energiewende resilience	Germany's long-term energy transition (Energiewende) includes grid modernization, renewable integration, and regular monitoring by the Federal Ministry for Economic Affairs. The IEA highlights how governance mechanisms ensured energy resilience and competitiveness simultaneously.
Infrastructure	Chile seismic building code (NCh 433)	After major earthquakes, Chile strengthened seismic building codes and mandated strict enforcement. Compliance is monitored by independent engineers

Sector	International Practice	Detailed Explanation
		and municipal governments. This reduced casualties and economic losses in subsequent quakes.
Irrigation	Israel drip irrigation and water governance	Israel pioneered drip irrigation with public R&D and government subsidies. The Ministry of Agriculture supports widespread adoption, reducing drought vulnerability and making agriculture climate-resilient despite water scarcity.

Scenario 2: Strong Finance + Weak Governance

Table 4. International examples relevant to scenario 2.

Sector	International Practice	Detailed Explanation
Agriculture	India's crop insurance (PMFBY)	Though heavily funded, CAG audits show delays in state transfers, weak data, and exclusion of smallholders. Political interference and weak oversight reduce scheme efficiency despite large outlays.
Finance	Nigeria oil revenues and PFM gaps	The World Bank's Public Finance Review highlights how poor controls and mismanagement of oil revenue undermine disaster and shock-response spending, even when resources exist.
Governance/NDRRMA	Philippines Typhoon Haiyan coordination failures	Despite billions in aid, post-disaster reports found fragmented coordination between government agencies, leading to overlapping programs and delayed recovery. Weak institutional structures diluted donor trust.
Tourism	Haiti heritage reconstruction after 2010 earthquake	Donor financing for cultural sites was slow to translate into results because of weak government oversight, unclear mandates, and limited capacity

Sector	International Practice	Detailed Explanation
		within tourism agencies. This delayed visitor return.
Industry	Pakistan flood recovery loans	Large post-flood credit lines and SME programs were undermined by corruption and weak loan-tracking. Many small enterprises never received intended support, highlighting governance deficits.
Energy	Puerto Rico post-hurricane grid funds	GAO found billions in federal disaster allocations stalled due to unclear rules, lack of capacity at the Puerto Rico Electric Power Authority (PREPA), and weak project pipelines.
Infrastructure	Indonesia tsunami reconstruction	In Aceh, weak oversight led to inflated contracts and poor quality work. Subsequent reforms required e-procurement and third-party monitoring, showing the importance of governance.
Irrigation	Sudan Gezira scheme	One of the world's largest irrigation systems, but plagued by governance failures—inequitable water distribution, mismanagement, and poor farmer participation despite donor funding.

Scenario 3: Weak Finance + Strong Governance

Table 5. International examples relevant to scenario 3.

Sector	International Practice	Detailed Explanation
Agriculture	Vietnam community DRR and irrigation	Vietnam empowers local committees to manage irrigation, soil protection, and pest monitoring. Scarce finance is pooled into community-managed risk-reduction funds, ensuring equitable use.

Sector	International Practice	Detailed Explanation
Finance	Costa Rica microfinance for resilience	National banks and cooperatives provide microfinance targeted to disaster-affected households. Risk-sharing with donors enables inclusive credit despite limited fiscal capacity.
Governance/NDRRMA	Cuba disaster governance	Strong central institutions run standardized early warning systems and evacuation drills. Despite low GDP, Cuba maintains some of the lowest disaster mortality rates globally.
Tourism	Nepal post-2015 earthquake tourism recovery	Transparent Post-Disaster Needs Assessments (PDNA) and prioritized heritage restoration reassured international visitors, allowing trekking and cultural tourism to recover gradually.
Industry	Sri Lanka post-tsunami SME programs	Donors and the government distributed grants and vouchers to SMEs through chambers of commerce. Strong governance ensured fair targeting despite limited funds.
Energy	Bhutan hydropower resilience	With limited resources, Bhutan relied on concessional ADB financing to safeguard critical hydropower plants and expand renewables in a climate-sensitive way.
Infrastructure	Rwanda quality-first reconstruction	Rwanda emphasized fewer but higher-quality reconstruction projects. Central oversight and community labor schemes maximized impact within tight fiscal limits.
Irrigation	Ethiopia PASIDP small-scale irrigation	FAO and World Bank-backed programs empower irrigation user associations to maintain canals, co-finance improvements, and extend irrigation to smallholders sustainably.

Scenario 4: Weak Finance + Weak Governance

Table 6. International examples relevant to scenario 4.

Sector	International Practice	Detailed Explanation
Agriculture	Somalia HRP/FAO programs	With no insurance or government safety nets, FAO provides emergency inputs and canal rehab under the Humanitarian Response Plan. Delivery depends on donors and NGOs, not state institutions.
Finance	South Sudan OCHA pooled fund	Donors bypass weak state systems by pooling resources in an independent humanitarian fund managed with strict fiduciary controls. Ensures minimum service delivery despite governance collapse.
Governance/NDRRMA	South Sudan humanitarian coordination	Minimum accountability standards (relief registries, public reporting) are enforced by UN agencies to prevent duplication and diversion in disaster response.
Tourism	UNWTO crisis management guidance	In fragile states, UNWTO recommends focusing on domestic tourism, staged reopening, and risk communication when governance and finance are weak.
Industry	Yemen UNDP–World Bank programs	Cash-for-work and micro-business grants provide stopgap support to livelihoods. Implementation is via NGOs and UNDP, given state incapacity.
Energy	Lebanon energy emergency plan	The World Bank's emergency plan focuses on stabilizing minimal electricity service through short-term fuel support and solar rollout, bypassing bankrupt utilities.
Infrastructure	Myanmar community-based DRM projects	In fragile governance, donors (e.g., World Bank, UNDP) directly fund small infrastructure projects with community oversight to build resilience incrementally.

Sector	International Practice	Detailed Explanation
Irrigation	Afghanistan canal rehab (FAO/World Bank)	Donor-funded rehab of small canals and watershed projects restore minimum irrigation capacity; NGOs ensure implementation and monitoring in absence of government.

CONCLUSION

The scenario analysis shows that Nepal's post-LDC resilience will be determined by the balance of finance and governance capacity. In a context of strong finance and strong governance, resilience becomes proactive and preventive, with international practices such as Japan's crop insurance or Chile's seismic building codes demonstrating how financial robustness matched by accountable institutions can generate lasting security. Where finance is strong but governance weak, Nepal risks inefficient spending and elite capture, a dynamic reflected in India's crop insurance and Nigeria's oil revenue management. This highlights that governance reforms are indispensable to translate resources into resilience. Conversely, when finance is weak but governance strong, Nepal can still safeguard vulnerable populations through transparent allocation and prioritization, as seen in Cuba's disaster governance and Vietnam's community-based irrigation systems. Here, institutional credibility stretches limited resources, but outcomes remain constrained without adequate financing. The most fragile path arises under weak finance and weak governance, where systemic vulnerability dominates and external actors bypass the state. International experiences from Somalia or South Sudan show that resilience under such conditions relies heavily on donor-led interventions, underscoring the risks of state marginalization. Taken together, these scenarios reveal that while finance provides scale, governance ensures effectiveness. International practices affirm that only by advancing both dimensions in tandem can Nepal sustain resilience and development gains after graduation.

POLICY RECOMMENDATION

While the analysis confirms that finance and governance are the most decisive factors shaping resilience outcomes, it also highlights that a wider set of drivers such as climate extremes, land degradation, rapid urbanization, migration pressures, and patterns of natural resource use interact in complex and often reinforcing ways. These drivers influence not only the scale of vulnerabilities but also the capacity of institutions and communities to adapt effectively. For Nepal, approaching graduation from LDC status, this complexity is particularly significant: declining access to concessional finance will coincide with rising expectations for nationally led disaster risk reduction, climate adaptation, and environmental management. Addressing these interconnected challenges requires more than ad hoc sectoral interventions; it demands a systematic capacity to anticipate multiple futures and evaluate cross-sectoral impacts. Establishing a dedicated Scenario Planning Unit within the National Planning Commission (NPC) would meet this need by providing a structured platform to monitor diverse risk drivers, generate and test plausible scenarios, and inform integrated policy responses. Such a unit would ensure that disaster and climate resilience remain at the center of national planning, while also offering a flexible framework that could later be extended to other domains of development policy such

as economic competitiveness, migration governance, or regional geopolitics once proven effective.

Strategy for a Sustainable Scenario Planning Unit (SPU) in Nepal

Timeline: 1 year (2026-2027) Immediate Post LDC Focus on Disaster Risks

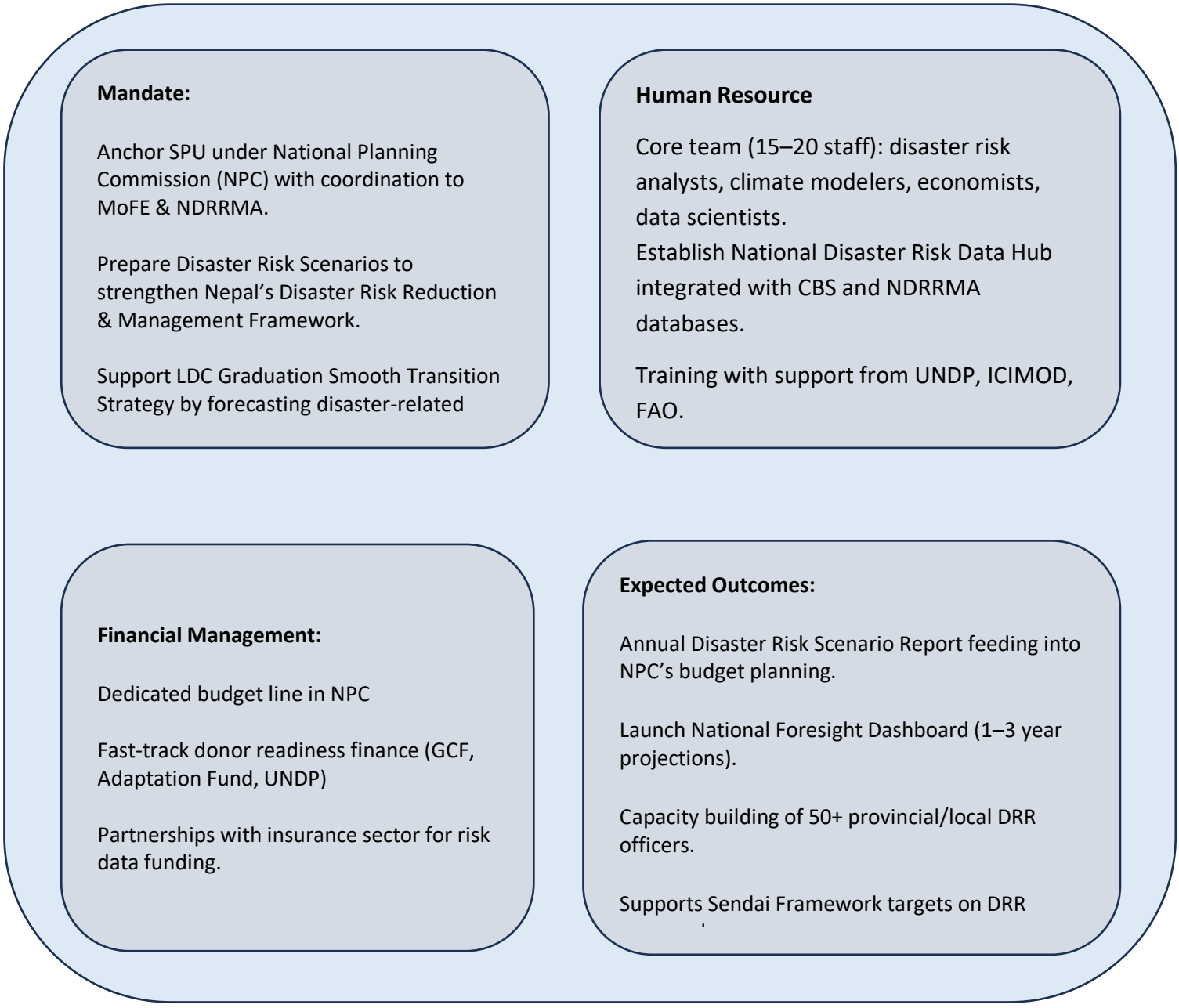


Figure 4. Strategic plan of implementing scenario planning unit in immediate effect

Timeline: 5-year (2027-2031) Expansion of SPU to Multi-Sector Environmental & Economic Risks

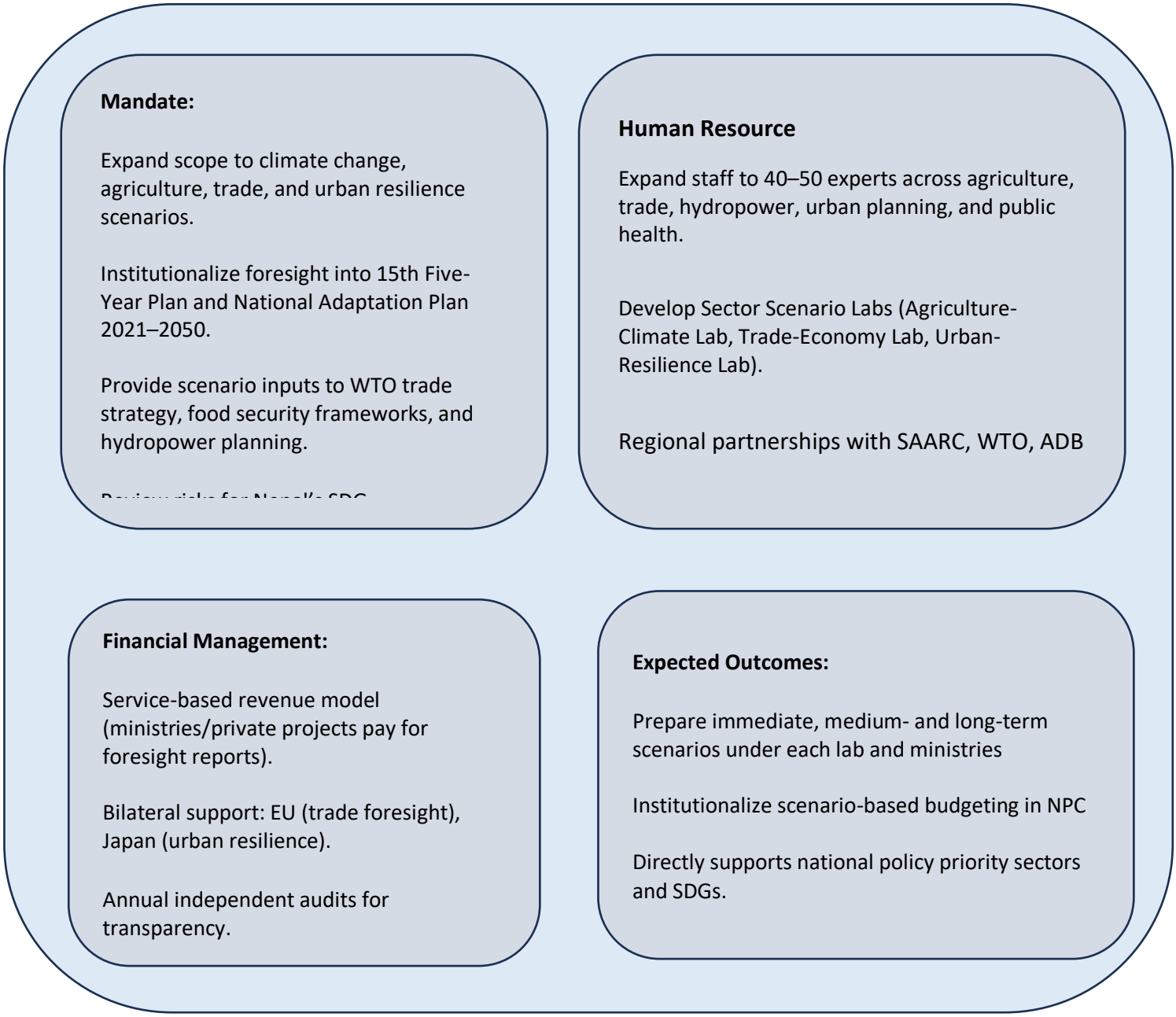


Figure 5. Strategic plan of implementing scenario planning unit for 5 years

Timeline: 10 year (2032-2042) Institutionalization of SPU

Mandate:

Integrate foresight into all national plans, budgets, and global negotiations.

Recognized as Nepal's National Knowledge Hub for foresight

Ensure resilience foresight aligns with Nepal's strategic goals and global development plans.

Human Resource

Scale up to 100+ professionals (permanent + fellows).

Create a National Resilience Foresight Centre with high-performance computing.

Use AI based sectoral forecasting models.

Regional training programs to strengthen local level foresight network.

Financial Management:

Establish a Sovereign Resilience Fund:
• Hydropower royalties.
• Carbon credits and climate trade revenues.
• Regional adaptation finance (cross-border river basin management).

Ensure 70% core govt. financing + 30% external partnerships.

Generate revenue by exporting foresight services to private and multinational sectors.

Expected Outcomes:

National Resilience Outlook 2040 (long-term integrated scenarios).

AI-driven foresight & early-warning platform accessible to all municipalities.

Strong alignment with international agreements and commitments.

Figure 6. Strategic plan of implementing scenario planning unit for 10 years

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