DCA
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POLICY REVIEW

NATURE-BASED SOLUTIONS

A potential strategy to reduce climate-induced loss and damage

Publisher: DanChurchAid (DCA in Nepal)

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Citation
DCA (2023). Nature Based Solutions, A potential strategy to reduce climate-induced loss and damage.

ISBN: 978-9937-149143

Acknowledgement
We would like to thank the representatives from the Govenment of Nepal and all respondents who participated in key informant interviews. We greatly appreciate and acknowledge your support and technical insights.

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FOREWORD

Nepal is one of the most vulnerable countries to climate change impacts. Climate change impacts have manifested in Nepal in the form of impacts to agriculture, biodiversity, water, and energy resources as well as related hydro-meteorological disasters, such as floods, landslides, droughts and other extreme weather events as well as slow weather events, that result in huge loss of lives, properties, and livelihoods. These impacts have caused huge amounts of loss and damage in various sectors, through extreme events like climate-induced disasters and slow onset events like drought and biodiversity loss. Nature Based Solutions (NbS) are considered robust and alternative measures to restore the degraded ecosystem, slope, and riverbank protection. NbS is getting popular not only for its effectiveness but also for its co-benefits in terms of livelihoods and biodiversity conservation. NbS also holds immense potential to prove as a sustainable and effective solution for climate change mitigation and adaptation measures, and ultimately to avert, avoid, and reduce climate-induced loss and damage.

NbS are more inclusive, cost-effective, and sustainable compared to other large-scale infrastructures for climate mitigation and adaptation, and ultimately to reduce climate-induced loss and damage. NbS isn't a new discourse for Nepal. Many Nepali farmers and indigenous communities have been practising NbS for many generations. There have been many development initiatives, particularly in the sector of sustainable forestry management, disaster risk reduction and agroecology that form an integral part of the NbS practices. These integrations are, however, done as one-off efforts rather than in a sustainable interconnected approach. This study found that the discussion on the potentiality of NbS as a climate solution is in its early stage. Despite the international climate-related discourse recognising NbS as a climate change-related solution, many climate-related policies in Nepal do not spell out and prioritise the NbS approach as a climate change mitigation and adaptation solution that will ultimately help reduce climate-induced loss and damage. Though Nepal's federal climate-related policies and other sectoral policies have enlisted NbS efforts, there is still a long way to go before NbS is recognised as a climate solution in Nepal. The provincial and local governments are yet to fully understand and prioritise NbS in their planning processes. Limited knowledge and technical capacity on NbS as a climate action is a major barrier as reflected by the policy review. The study strongly recommends that the government recognise the NbS approach as a climate solution, prepare a holistic coherent plan to develop a common understanding, build technical capacity at the provincial and local government levels on NbS approaches, and invite wider stakeholders including the private sector for complementary actions. The conclusions of this study are clear that the NbS approach must be recognised and emphasised to avert, avoid, and reduce climate-induced loss and damage.

I would like to thank Ms Krity Shrestha, who coordinated this study together with Ms Abhilasha Rajbhandari and Ms Pooja Gharti; as well as other members of the technical review team Mr Bimal Ghimire, Mr Lars Jacobsen, Ms Sidsel Koordt Vognsen, Mr Mattias Soderberg, Mr Dinesh Gurung, Mr Rigendra Khadka and Ms Alma Garcia for their constructive suggestions. I would like to thank Ms. Nirmala Limbu for her support in proof-reading, designing, and finalising the publication.

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LIST OF ABBREVIATIONS

AFOLU	Agriculture, Forestry and Other Land Uses
CBD	Convention on Biological Diversity
CBS	Central Bureau of Statistics
CGIAR	Consultative Group for International Agricultural Research
CRI	Climate Risk Index
CoP	Community of Practice
EbA	Ecosystem-based Adaptation
EcoDRR	Ecosystem based Disaster Risk Reduction
ELD	Economic Loss and Damage
GCF	Green Climate Fund
GLOF	Glacial Lake Outburst Flood
GRID	Green, Resilient, and Inclusive Development
ICIMOD	International Centre for Integrated Mountain Development
ICT	Information and Communication Technology
IPBES	Inter-governmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Inter-governmental Panel on Climate Change
IPM	Integrated Pest Management
IPs	Indigenous Peoples
IUCN	International Union for the Conservation of Nature
LAPA	Local Adaptation Plan of Action
LCs	Local Communities
LDCRP	Local Disaster and Climate Resilience Plans
L&D	Loss and Damage
NAPA	National Adaptation Programme of Action
NbS	Nature-based Solutions
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NELD	Non-Economic Loss and Damage
NTFP	Non-Timber Forest Products
PES	Payment for Ecosystem Services
REDD+	Reducing Emissions from Deforestation and forest Degradation
SDGs	Sustainable Development Goals
TCFD	Task Force on Climate-related Financial Disclosures
TEEB	The Economics of Ecosystems and Biodiversity
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

EXECUTIVE SUMMARY

Nature based Solutions (NbS) as a climate solution

Climate change poses a fundamental threat to nature, species, and people. Nature provides key solutions for both carbon storage and building climate resilience – if the global community takes steps to protect, restore, and better manage our natural resources (IUCN, 2023). There is a growing shift towards harnessing nature to combat climate hazards and disaster risk through Nature-based Solutions (NbS). The term 'nature-based solutions' refers to a broad range of actions that are inspired and supported by nature and are adopted to help address the challenges people are facing because of climate change, poor governance and urbanisation, subsequent biodiversity loss, and environmental degradation (ICIMOD, 2023). The historical developments at the international level collectively demonstrate the evolution of NbS and integration into key global policy frameworks, such as the Paris Agreement and the UN SDGs. This evolution reflects the growing acknowledgement of NbS as an essential approach for addressing climate change, conserving biodiversity, promoting sustainable development, and reducing climate-induced loss and damage.

Identified Policy Gaps for NbS

The policies related to NbS are evolving in Nepal. NbS have proven effective in addressing climate change impacts and minimising, averting, and avoiding climate-induced loss and damage. Nepal has yet to acknowledge NbS as a climate solution for reducing climate-induced loss and damage, despite the fact that NbS is not a new concept for Nepal. Many Nepali farmers and indigenous communities, have for generations, adopted NbS and their contributions are reflected in scientific publications as well as applied research documents. Many government policies related to climate change and other sectoral policies have also proposed and applied NbS interventions for sustainable agricultural, environmental and hazard risk reduction solutions. There is a healthy mention of NbS in the sectoral policies of Nepal, especially at the federal level. For example, National Climate Change Policy (2019), Agriculture Development Strategy (2015-2035), National Urban Development Strategy (2017), and National Adaptation Plan (2021-2050). The provincial government and local governments, however, have limited understanding and technical capacity for NbS prioritisation as a climate solution. Many of the sampled municipalities and provincial governments for this study have mentioned NbS-related activities in their plans and programmes, but it is highly fragmented and is not adequately recognised as a climate solution. Moreover, the scope of NbS is limited to environmental conservation; in a few cases, has extended to sustainable agriculture, tourism, and forestry management and in one case has extended to disaster risk reduction.

These challenges can be attributed to a lack of coherence in the NbS approach and common understanding, lack of coherence in documenting evidences on NbS benefits and knowledge, insufficient awareness of climate change and the scope of NbS to address climate impacts, and less technical capacity among policymakers and the public stakeholders.

Study Recommendations

The study has come up with the following recommendations:

1. **Conduct adequate study, research, and generate evidence on the sustainability and cost-effectiveness of NbS as climate solution for climate impact mitigation and adaptation,** which is ultimately a potential strategy to reduce climate-induced loss and damage. The benefits of NbS to reduce economic and non-economic loss and damage associated with a climate-induced hazard should be documented. Apart from reducing loss and damage, NbS can play a pivotal role in addressing loss and damage e.g. addressing biodiversity loss and supporting communities with resilient recovery options. This option of addressing loss and damage also needs to be explored and documented.

2. **Improve common understanding of NbS, and its benefits and facilitate the technical capacity of government stakeholders across three government levels with a clear strategy of mainstreaming across key focal institutions.** NbS interventions are often conceptualised and implemented in a fragmented way. This could be improved by adopting a holistic and harmonised approach to integrate/mainstream NbS as a climate solution across sectoral policies including infrastructure and economic development at all government levels and ensure ownership of NbS by all sectoral agencies. A set standard, such as the IUCN Gold Standard for NbS (IUCN, 2020), can be followed to standardise NbS practices in Nepal to enable common understanding.

3. **Allocate dedicated financing at the provincial and local government level for prioritisation of NbS as a climate solution.** Dedicated financing is essential to mainstream NbS in their sectoral plans and programmes. The provincial governments and local governments should dedicate required resources to pilot and implement NbS in their development plans and programmes.

4. **Improve collaboration with stakeholders** particularly development stakeholders, civil society organisations, community-based grassroots organisations, right activists, and researchers through **Community of Practice (CoP) formation** that will carry forward NbS-related policy discourse, studies, and advocacy at federal, provincial, and local government levels to identify and fulfill policy and practice gaps.

5. **Initiate monitoring and documentation process for NbS related interventions** at local and provincial government level with its investments and co-benefits through clear indicators and monitoring framework. A knowledge hub dedicated for NbS solutions can be instrumental. The CoP can facilitate the knowledge hub formation and operationalisation.

6. **Invite private sector collaboration in NbS** that will help to generate more resources and investment for NbS prioritisation and implementation. The private sector may not directly see NbS benefits at once and may be hesitant to invest. For this, the NbS design can include a portfolio of resourcing options such as market-based, public sector, voluntary commitments, and actions to support regulatory compliance.

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CHAPTER 1

INTRODUCTION

1.1 Rationale of NbS as climate solution in Nepal

Climate change is impacting lives, livelihoods, and ecosystems around the world. It is affecting the frequency, intensity, and geographical distribution of extreme weather events such as storms, floods and heatwaves, and slow-onset events such as sea level rise, ocean acidification, loss of biodiversity and desertification. Climate change impacts must either be mitigated or communities/societies must adapt to the changing conditions. When climate change impacts are not avoided, mitigated, or minimised, the "residual impacts" that are unavoidable occur and are termed "Loss and Damage" (L&D). Simply put, when adaptation and mitigation efforts fail to avert, avoid, or minimise risks, L&D occur. L&D can be both economic and non-economic. Economic loss and damage (ELD) may include damage to crops, and infrastructures. Non-economic loss and damage (NELD) may include harm to human health and mobility; loss of access to territory, cultural heritage, and indigenous and local knowledge; and loss of and damage to biodiversity and habitats (LSE, 2022). Millions of people are facing immediate and unavoidable impacts of climate change through both slow onset events (increasing temperatures, droughts, loss of biodiversity and ecosystem services and glacial retreat) and rapid onset events (such as floods, and landslides), leading to economic and non-economic losses. The loss and degradation of ecosystems, exacerbated by climate change, is a major component of L&D (FEBA and PEDRR, 2022).

Actions to avert, minimise and reduce loss and damage – particularly those underpinned by the conservation, restoration, and sustainable management of ecosystems can support vulnerable communities to mitigate risks, and adapt to and cope with climate hazards. Investment in NbS provides one of the most cost-effective means to create climate resilience for vulnerable and marginalised communities and the ecosystems they depend on and offers one pathway to reducing L&D. (FEBA and PEDRR, 2022). The scope of NbS is high in reducing ELD associated with a climate-induced hazard. In the case of reducing NELD, NbS can play a significant role, as it effectively identifies and addresses the societal challenges and the vulnerabilities associated with it. All stakeholders, especially right holders and beneficiaries of the NbS, are involved in the decision-making process used for identifying the priority challenge and addressing them; as well as while sharing the ecosystem and livelihood-related benefits from the solution. NbS will acknowledge, involve, and respond to the concerns of a variety of stakeholders, especially right holders, and enhance inclusive governance. Apart from reducing L&D, NbS can play a pivotal role in addressing L&D after it occurs e.g. addressing biodiversity loss and supporting communities with resilient recovery options.

NbS can prove to be a pivotal approach for sustainable development and climate resilience in Nepal. They harness the inherent capabilities of ecosystems to provide multifaceted benefits to society while

promoting environmental sustainability (IUCN, 2016). International Union for the Conservation of Nature (IUCN) defines "NbS as actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits". Estimates suggest that NbS can provide 37% of the mitigation needed until 2030 to achieve the targets of the Paris Climate Agreement (World Bank, 2022). They can help mitigate risks arising from climate change impacts; provide communities with resources to adapt to climate change impacts and build climate resilience. NbS consists of a spectrum of strategies, policies, and practices designed to protect, sustainably manage and restore natural or modified ecosystems. As Griscom et al. (2017) emphasises, NbS offer a cost-effective and sustainable response to a wide range of challenges, encompassing climate change mitigation and adaptation, disaster risk reduction (DRR), food and water security, and human health enhancement.

NbS approaches have been implemented as conservation and environmental management initiatives for decades (UNEP, 2022). Rapid development and urbanisation have led to the degradation and loss of natural ecosystems, resulting in increased vulnerability to climate change, biodiversity loss, and declining human health and well-being. In response, the international community has increasingly recognised the pivotal role of NbS. The 2015 Paris Agreement on climate change explicitly acknowledges NbS as an essential tool for climate mitigation and adaptation, while the United Nations Sustainable Development Goals advocate for the protection and restoration of ecosystems, and the sustainable use of natural resources (UNFCCC, 2015).

Climate change impacts have manifested in Nepal in the form of impacts to agriculture, biodiversity, water, energy resources and infrastructures. The increase in hydro-meteorological disasters, such as floods, landslides, droughts and other extreme as well as slow weather events have resulted in losses and damages to lives, livelihoods and properties. Nepal is among the top 10 countries worldwide among the most affected by climatic disasters in the past two decades with 0.82 fatalities per 100,000 inhabitants, and 0.39% losses per unit GDP (D Eckstein, 2021). Climate-related disasters claimed 438 lives in 2021 and losses of over 2.5 billion Nepalese Rupees in property and destroyed 3,678 individual residences (MoHA, 2022).

Moreover, Nepal's agricultural sector faces substantial threats from climate change and unsustainable land practices. Various agroecological practices can also foster resilience and food security. Techniques like sustainable land management, crop diversification, and agro-forestry can enhance agricultural productivity while preserving ecosystem health. Similarly, for sustainable management of water resources, which is crucial for both agriculture and domestic use, NbS such as watershed management and forest protection can safeguard water sources and enhance water quality. These practices not only ensure access to clean water but also mitigate against the adverse impacts of water scarcity exacerbated by climate change.

Many traditional infrastructure projects in Nepal focus on conventional approaches mostly relying on grey construction practices and ignoring the assimilation of natural components; that can be more cost-effective, sustainable, and inclusive. These grey

infrastructures are highly cost-intensive, exclusive, led externally and tend to provide a false sense of security to communities. They tend to deteriorate with time, unlike NbS approaches that get stronger with time owing to the assimilation of green natural components in their design.

NbS can manifest in diverse forms and can be tailored to specific contexts. Ecosystem restoration, exemplified by activities like tree planting and wetland restoration, focuses on revitalising degraded ecosystems. Green infrastructure, such as biodykes, employs natural vegetation that grows stronger with time and provides riverbank protection. Nature-based agriculture promotes biodiversity and ecosystem health through practices like crop rotation and integrated pest management. Blue spaces, comprising rivers, lakes, and wetlands, provide benefits such as flood protection, water quality improvement and biodiversity conservation.

The benefits of NbS encompass climate change mitigation and adaptation by sequestering carbon dioxide and enhancing resilience (Griscom, 2017). DRR benefits by providing natural buffers against floods, food and water security by boosting productivity and protecting against pests and diseases, resilience building by strengthening financial and natural capitals, and improved human health and well-being by providing clean air and reducing mental stress.

1.2 Evolution of NbS in international discourse

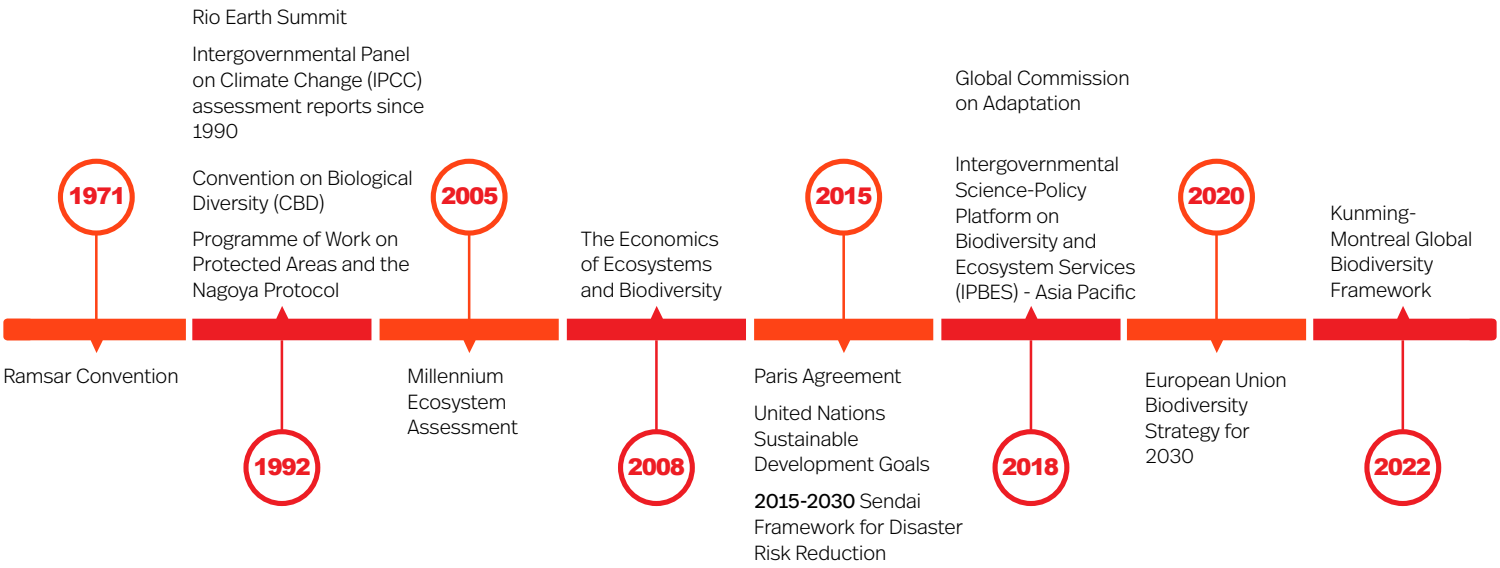
The international policy related to NbS has witnessed significant advancements, reflecting a growing recognition of the importance of NbS in addressing global climate challenges. As NbS are rapidly adopted, within the policies and work programmes of government and non-government institutions (Sneddon, 2021), they have simultaneously become closely associated with the idea of 'transformative change' (Woroniecki, 2020).

The Ramsar Convention (Ramsar Convention on Wetlands, 1971), focuses on the conservation and wise use of wetlands. It has recognised the critical role of wetlands as NbS and has contributed to the protection and restoration of these ecosystems. The concept of NbS began to gain more international attention at the United Nations Conference on Environment and Development, also known as the Rio Earth Summit (United Nations, 1992). This summit introduced the idea of "ecosystem-based management" to promote sustainable development by integrating environmental and developmental goals.

Inter-governmental Panel on Climate Change (IPCC)'s assessment reports since 1990 have consistently highlighted the importance of NbS in climate change mitigation and adaptation. These reports have informed international climate policy discussions, including those under the United Nations Framework Convention on Climate Change (UNFCCC). The Convention on Biological Diversity (CBD), established in 1992, also played a fundamental role in promoting NbS. Various CBD decisions and initiatives, such as the Programme of Work on Protected Areas and the Nagoya Protocol, emphasise the conservation and sustainable use of biodiversity, aligning with NbS goals. Moreover, the Millennium Ecosystem Assessment (2005) was a comprehensive global assessment of ecosystems initiated by the United Nations. It highlighted the crucial role of ecosystems in supporting human well-being and called for their protection and sustainable use. This assessment laid the foundation for the NbS approach.

In 2008, the Economics of Ecosystems and Biodiversity was launched as a study to assess the economic values of ecosystems and biodiversity. It underscored the economic benefits of protecting and restoring ecosystems and paved the way for NbS by emphasising the economic case for conservation. The IUCN played a pivotal role in promoting NbS, by publishing numerous reports, guidelines, and policy briefs advocating for the integration of NbS into international policy frameworks.

The Paris Agreement (2015), a landmark international treaty within the UNFCCC, recognised NbS as a crucial tool for addressing climate change. It specifically mentioned the importance of conserving and enhancing sinks and reservoirs of greenhouse gases, including forests and other ecosystems. The United Nations Sustainable Development Goals (SDGs 2015), particularly Goal 15 (Life on Land) and Goal 13 (Climate Action), underscore the significance of NbS



in achieving global sustainability. They call for the protection, restoration, and sustainable management of ecosystems as essential components of sustainable development.

The Sendai Framework for Disaster Risk Reduction (2015-2030) recognises the importance of ecosystem-based approaches, which align with NbS, in DRR (UNDRR, 2015). Nepal has also incorporated these principles into its DRR strategies (Government of Nepal, 2018). Similarly, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has produced several assessments highlighting the importance of biodiversity and ecosystems for human well-being, further reinforcing the NbS agenda.

The Global Commission on Adaptation launched in 2018 has given the mandate to accelerate adaptation by elevating the political visibility of adaptation. It has emphasised NbS as a cost-effective and scalable approach for building resilience to climate impacts. Their flagship report, "Adapt Now," advocates for increased investment in NbS. Similarly, the European Union Biodiversity Strategy for 2030 was released in 2020, which places NbS at its core. It commits to restoration of degraded ecosystems, creation of green infrastructure, and incorporation of NbS in urban planning.

UNEP has actively promoted NbS through various initiatives, including the Global Peatlands Initiative, which focuses on the restoration of peatlands, and the Global Ecosystem-based Adaptation (EbA) Fund, which supports NbS projects worldwide. Similarly, the G7 Nature Compact highlights NbS as a critical approach for biodiversity conservation and climate action. It commits to mainstreaming NbS in policymaking. Moreover, the Task Force on Climate-related Financial Disclosures (TCFD) recommendations have prompted financial institutions and businesses to consider the impact of climate change, including the role of NbS, in their risk assessments and disclosures.

Target 8 of the Kunming-Montreal Global Biodiversity Framework emphasises minimising the impact of climate change and ocean acidification on biodiversity and increasing its resilience through mitigation, adaptation, and DRR actions, including through NbS and/or ecosystem-based approaches while minimising negative and fostering positive impacts of climate action on biodiversity. Target 11 focuses on restoring, maintaining and enhancing nature's contributions to people, including ecosystem functions and services, such as the regulation of air, water and climate, soil health, pollination, and reduction of disease risk, as well as protection from natural hazards and disasters, through NbS and/or ecosystem-based approaches for the benefit of all people and nature (CBD, 2022).

1.3 Pioneer global organisations to influence NbS discourse in Nepal

The UNFCCC and the CGIAR (Consultative Group for International Agricultural Research) are both important international entities that played significant roles in policies related to NbS in Nepal and internationally. UNFCCC facilitates international negotiations and agreements, such as the Paris Agreement that recognises the importance of NbS in climate change mitigation and adaptation and encourages countries to integrate NbS into their climate strategies. CGIAR is a global partnership that conducts research to address food security, reduce poverty, and promote sustainable natural resource management. CGIAR research often includes NbS approaches in agriculture and land management. Their research and findings contributed significantly to the development of sustainable agricultural and land management policies and practices in Nepal.

Nepal has also collaborated with international organisations such as the United Nations Development Programme (UNDP), the IUCN, and the World Bank on NbS initiatives. Moreover, Nepal accesses climate funds like the Green Climate Fund (GCF) to support NbS projects.

Pioneer global organisations to influence NbS discourse in Nepal

1.4 Scope of the study

This study is based on the desk review of international, federal, provincial, and local government policies. The study reviewed more than 35 policies across international, federal, four provincial and four local government levels that are related to climate change, environmental conservation, forestry, agriculture, biodiversity, water resource management and other periodic plans. It also reviewed various national reports submitted by the Government of Nepal (GoN) to international mechanisms and entities.

To strengthen review findings, the study team conducted Key Informant Interviews (KII) with key policymakers, experts and practitioners on the opportunities and gaps for focused and efficient NbS integration and prioritisation as a climate solution across all levels. The information collected through KIIs have been used to validate gaps identified in the policy review and support recommendations of the study.

The main objective of the document is to highlight opportunities and challenges related to NbS prioritisation in Nepal as a climate solution approach. It aims to initiate discussion on the prioritisation of NbS for effective mitigation and adaptation to reduce and avoid potential loss and damage associated with climate change.

1.5 Limitations of the study

The policy review at the provincial level is limited to 4 provinces only - Bagmati, Karnali, Lumbini and Sudurpaschim. The local government policies that have been included in this study are from Nilkantha Municipality (Dhading), Birendranagar Municipality (Surkhet), Barbardiya Municipality (Bardiya) and Bheemdatt Municipality (Kanchanpur). These municipalities belong to above listed provinces. These municipalities are selected based on DCA Nepal's working priority areas and experience.

Some of the KIIs were conducted over the telephone, while several were taken during face-to-face meetings. The interviews are limited to national stakeholders and lack insights from provincial and local government stakeholders.

CHAPTER 2

EXISTING POLICIES IN NbS PRIORITISATION IN NEPAL

Nepal promulgated the Federal Republic Constitution in 2015 and the previous centralised unitary structure. This constitution has restructured the state into three tiers of government with devolution/ distribution of power between them so that the country institutionalises the norms and values of economic prosperity, self-rule, autonomy, secularism, and social inclusion. These three layers of federal, provincial, and local governments are horizontally integrated, and they are mandated to follow the principles of cooperation, coexistence and coordination. Focusing on the power devolved to the local government, it is intended to move to effective delivery and distribution of sub-national public goods and services to the citizens.

Broadly, the federal government is responsible for national security, financial affairs, macroeconomic stability, and foreign relations; the provinces are responsible for economic development, infrastructure, human capital development and social equity; and local government is responsible for basic service delivery. The federal government can only regulate the issues and agendas related to national interest and national context; thus, the provincial and local government can make their plans and policies in the sectors and responsibilities that are allocated to them. The constitution has also formed various commissions to strengthen fiscal and administrative federalism.

The study has delved into policies that facilitate the prioritisation of NbS as a climate solution across different government structures.

2.1 Policy initiatives for Nature-based Solutions prioritisation at the federal level

There are no specific plans or policies for NbS as a climate solution for the reduction of loss and damages; albeit it has been included in federal plans and policies, under the broad umbrella of climate change adaptation, risk mitigation, resilience building and environment conservation.

The Constitution of Nepal does not directly refer to NbS, but it does contain provisions relating to environmental protection and sustainability, which are linked to NbS efforts. Article 30 of the constitution recognises the right of every citizen to a clean environment. It emphasises the protection and improvement of the environment. Similarly, article 51 includes directives related to the conservation of biodiversity, protection of forests and wildlife and sustainable development. Article 56 mandates the protection and sustainable utilisation of natural resources including land, water, forests, and minerals. Article 57 underscores the importance of conserving biodiversity, genetic resources, and traditional knowledge associated with biodiversity. Article 58 outlines directives for forest and soil conservation, including community-based forest management. Additionally, article 59 recognises the

importance of protecting and promoting indigenous knowledge and practices (The Constitution of Nepal, 2015).

The 15th periodic plan (National Planning Commission, 2020) has strategised to conserve and utilise natural resources and improve resilience, ensure climate adaptation, and reduce disaster risks and commits to adopting a sustainable agricultural system with climate-friendly agriculture practices that involve science, technology, and biodiversity. The 15th periodic plan has also strategised 9 areas that slightly touch various components of NbS mainly in the sector of water resources management, watershed approach for flood and landslide hazard management, nature-based tourism, biodiversity conservation and management with gender quality and social inclusion for equitable distribution of benefits. However, the recently launched concept paper on the 16th periodic plan has somehow missed NbS as a key priority area. The 16th periodic plan-concept paper should mention and prioritise NbS as a climate change solution with its biodiversity and livelihood co-benefits. The National Planning Commission (NPC) is currently undertaking a series of consultations to include NbS as a key priority area for climate solutions.

National Biodiversity Strategy and Action Plan (NBSAP) aligns with international biodiversity conservation agreements and highlights NbS as a key strategy for biodiversity conservation (Government of Nepal, 2014). Similarly, the updated Environment Protection Act 2019 (MoFE, 2019) and Environment Protection Rule 2020 (MoFE, 2020) fails to mention NbS; but EPA 2019 directs federal, provincial, and local government level to take necessary steps for environment conservation.

The Climate Change Policy 2019 (GoN, 2019) broadly mentions components of NbS under key areas through sectoral policy, strategies and working policies. For example, under the agriculture and food security sector, components of NbS are mentioned as agroforestry, biodiversity and watershed conservation, and plantation interventions, amongst others. The policy is yet to establish NbS as cross-cutting approach for climate mitigation, adaptation and towards minimising climate-induced loss and damage.

FEDERAL LEVEL NbS RELATED POLICIES

2011
- National Adaptation Programme of Action (NAPA), 2011
- National Framework on Local Adaptation Plan of Action, 2011

2014
- National Biodiversity Strategy and Action Plan (NBSAP), 2014

2015
- Constitution of Nepal, 2015
- Agriculture Development Strategy, 2015
- Nepal National Voluntary Report, Mid-term Review- Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030

2017
- National Urban Development Strategy, 2017
- LDCRP Guidelines, 2017

2018
- National Forest Policy, 2018
- Chure Master Plan, 2018

2019
- Environmental Protection Act, 2019
- Climate Change Policy, 2019
- National Agroforestry Policy, 2019
- Watershed Management Strategy, 2019
- National Environment Policy, 2019

2020
- Environmental Protection Rule, 2020
- 15th Periodic Plan, 2020
- Nationally Determined Contributions, 2020
- National Water Resource Act, 2020

2021
- National Adaptation Plan, 2021
- National framework for climate induced loss and damage, 2021

Nepal's National Adaptation Programme of Action (NAPA) was developed to address the urgent and immediate adaptation needs of the country in response to climate change. The NAPA outlines specific projects and initiatives to enhance the resilience of vulnerable communities and ecosystems that are related to NbS, which includes ecosystem-based adaptation (EbA) approaches, climate-resilient agricultural practices, involving local communities in planning and implementing NbS through community-based adaptation, water resource management amongst others (GoN, 2010). Local Adaptation Plan of Action (LAPA) has also proposed similar interventions, as NAPA, but focused at the local level which helps to contextualise and localise climate change solutions to a larger extent. LAPA highlights the bottom-up approach and helps put communities in the driving seat for locally-led adaptation and integration of NbS as a climate solution (GoN, 2011).

National Adaptation Plan (NAP) (2021-2050) has identified river-based and forest-based watershed resources as key areas to intervene as NbS for climate solutions, for medium to long-term adaptation planning. It rightly highlights necessary plans to enhance the adaptive capacity of Indigenous Peoples (IPs) and local communities (LCs); identify IPs and document their Indigenous and traditional knowledge for and support to upscale appropriate interventions. The document highlights NbS opportunities and scope for adaptation in watershed management, diversification livelihood strategies, ecosystem management and DRR, amongst others (GoN, 2021) .

The Local Disaster and Climate Resilience Plans (LDCRP) Guidelines 2017, endorsed by the Ministry of Federal Affairs and General Administration (MoFAGA) mention the NbS approach for DRR and climate resilience. The guidelines can be helpful to aware and align local governments to adopt NbS. However, it doesn't explore NbS as a measure to address climate-induced L&D.

The second Nationally Determined Contribution (NDC) 2020 has highlighted NbS in mitigation components in sectoral areas, particularly in Agriculture, Forestry and Other Land Uses (AFOLU). The second NDC ambitiously targets maintaining forest cover and mentions equitable sharing of benefits through ensuring fair and equitable benefits (carbon and non-carbon) from sustainable forest management, watershed management, and biodiversity conservation among LCs, women, and IPs. In the agriculture sector, by 2030, the NDC targets to promote agroforestry, intercropping, conservation tillage, and livestock and agricultural waste management; and protect, promote, and support climate-resilient indigenous seeds/crop varieties through community seed banks and national gene banks (GoN, 2020).

National forest policy 2018, emphasises the conservation of forests, protected areas, wetlands, and biodiversity for better service products and self-sustenance of the locals and IPs through sustainable use and participatory management. It aims to increase the watershed and land productivity through integrated water, land conservation and management;

as well as to promote forest-based green enterprises through the promotion and extension of forest areas and encourage production and proper utilisation of wood for the reduction of carbon emissions.

The Chure Master Plan specifically focuses on the Chure region, an ecologically significant area in Nepal, aiming to conserve and rehabilitate its fragile ecosystem. It incorporates NbS policies aimed at mitigating deforestation, soil erosion, and land degradation (Chure-Tarai Madhesh Conservation Development Board, 2018). These policies encompass a range of NbS approaches, including afforestation, reforestation, and sustainable land management.

The National Water Resource Policy 2020, underpinned by NbS principles, caters to broader watershed areas in Nepal. This strategy strongly integrates NbS within its framework and adopts various NbS measures, such as afforestation, community forestry programmes, soil and water conservation initiatives, integrated watershed management, and the implementation of payment for ecosystem services (PES) (GoN, 2020).

Similarly, the National Agroforestry Policy 2019 aims to create opportunities for livelihood, employment, and income generation along with food security of the LCs by widely promoting agroforestry (GoN, 2019). The National Environment Policy 2076 (2019) aims to promote NbS at the household level through interventions such as rooftop farming, rainwater harvesting, improved cookstoves; plantation and green spaces promotion in industrial areas, educational institutions, and public areas (GoN, 2019).

The National Urban Development Strategy 2017 focuses on saving, protecting, and promoting greenery- green parks, green open spaces, urban agriculture, and forestry (GoN, 2017). It also emphasises the strengthening of production-distribution-consumption linkages between urban and rural areas, thereby promoting a circular economy and nature-friendly practices.

The Agriculture Development Strategy (2015-2035) has incorporated various aspects of agroecology as a part of the NbS approach and aims to accelerate agricultural sector growth through four strategic components related to governance, productivity, profitable commercialisation, and competitiveness. The ADS focuses on inclusiveness, sustainability (both natural resources and economic), development of private sector and cooperative sector, connectivity to market infrastructure, information infrastructure and ICT, and power infrastructure. The strategy further aims to improve the co-benefits between agriculture and sustainable forestry management with a holistic approach that utilises a community-based landscape approach to natural resource management and livelihood improvement. The strategy also plans to make use of existing policies on climate change at various levels such as LAPA, NAP, and Reducing Emissions from Deforestation and Forest Degradation (REDD +) strategy and achieve its target of climate change adaptation and mitigation through NbS with biodiversity conservation and livelihoods improvements as major co-benefits (GoN, 2015).

Apart from these key sectoral policies and plans, that highlight NbS as its core approach, various other sectoral policies have integrated NbS as their primary approach. Nepal's community forestry programme, a widely recognised NbS initiative, empowers LCs to manage and protect forests sustainably (GoN, 2018). As a part of voluntary reporting to Sendai Framework, the GoN has endorsed a strategic approach to promote green, resilient, and inclusive development (GRID), as the central development strategy of the country to overcome this challenge. This approach centres around sustainability, green growth, jobs, resilient infrastructure, and addressing exclusion and vulnerability. The GoN has built synergies between DRR, climate change adaptation (CCA), and SDGs by incorporating environmental and sustainability concerns into DRRM.

More importantly, the GoN has introduced a framework for L&D which provides an opportunity to promote approaches such as NbS to reduce both economic and non-economic L&D (MoFE, 2021). The framework identifies NbS practices and knowledge on NbS as an effective indicator for the adaptive capacity to deal with extreme climate events.

2.2 Policy initiatives for Nature-based Solutions prioritisation at provincial level

The Sudurpaschim Provincial Government has incorporated NbS in its plans and policies for the conservation of the environment. In its Annual Programme Implementation Procedure, 2022, the government has allocated a budget for the plantation and production of timber and non-timber forest products (Sudurpaschim Province Government, 2022). It aims to include NbS approaches for greenery promotion, wetlands conservation and green livelihood benefits focused on youths. To minimise the anticipated risks from hazards such as landslides and soil erosion, NbS approaches have been prioritised for cost-effective land conservation in a mix of a grey-green hybrid approach. Similarly, NbS approaches have been deployed to increase the water level and recharge capacity of the watershed areas, protect households and agricultural fields from inundation, and riverbank protection, amongst others.

The Karnali Provincial Government, in its policy and programme 2018/19 prioritises the NbS approach through proper management and enhancement of organic agriculture, agro-based production, fruits and animal husbandry commercialisation based on agroecology. The plans also outline biodiversity conservation for livelihood benefits for the Dalits and the underprivileged families of Karnali. Karnali Government has also prioritised scientific forest management as NbS and linked it with livelihood opportunities. It however fails to mention the scope of NbS approaches for watershed conservation and DRR measures (Karnali Provincial Government, 2019).

The Lumbini Provincial Government also has similar activities in place that are largely influenced by the federal Environmental Protection Act and regulations. The province gazette mentions the promotion of forest products/ Non-Timber Forest Products (NTFP), tree plantation, forest area restoration, buffer zones, and wetland conservation, among other plans (Lumbini Provincial Government, 2022).

Similarly, Bagmati Province focuses on environmental conservation and prohibits the damage and destruction to natural resources such as water resources, land, forests, faunas, and biodiversity sites (Government, 2019). Through the Province Forest Act 2019, the Bagmati provincial government encourages the use, management, conservation, and development as well as selling and distribution of forest products by the forest user groups, for livelihood benefit. The act also highlights

NBS RELATED POLICIES AT PROVINCIAL LEVEL

BAGMATI PROVINCE

- Province gazette, Bagmati province, Ministry of Internal affairs and law, 2019
- Bagmati Province Forest Act, 2019
- Bagmati EPA, 2019
- Bagmati EPR, 2020

LUMBINI PROVINCE

- Lumbini Province EPR, 2020
- Lumbini Province Gazette, Forest Management Criteria Based on Forest Promotion System, 2022
- Lumbini Province forest Regulation, 2023

KARNALI PROVINCE

- Policy and Programme of The Government of Karnali Province, 2018
- Province gazette, Karnali province, Ministry of Forests and Environment, 2019

SUDURPASCHIM PROVINCE

- Sudurpaschim Province forest Regulation, 2021
- Annual Programme Implementation Procedure, 2022, Sudurpaschim Province Government

NbS approaches such as plantation, agroforestry promotion and animal husbandry (Bagmati Province Government, 2019).

Amongst the four provincial plans reviewed in this study, NbS hasn't been explicitly mentioned as a climate change solution; let alone a measure for addressing loss and damage. The Sudurpashim provincial government has prioritised NbS approaches in various sectoral areas, but the three other provincial government have not been able to do so. Very few provinces have presented NbS approach for DRR, biodiversity, and livelihood benefits. The provincial government plans and programmes reflect the province government's capacity and priority to showcase NbS approaches as a climate solution. There is a huge capacity gap in terms of national and provincial level policy flow for NbS prioritisation. Very few policy wins and strengths from federal policies have trickled into provincial government plans and programmes.

2.3 Policy initiatives for Nature-based Solutions prioritisation at the local level

The Birendranagar municipality in Surkhet has incorporated NbS approaches in its sectoral plans and programmes mainly for agriculture promotion and agro-based enterprises. The municipality emphasises ecosystem-based disaster risk reduction (Eco-DRR) approaches such as bioengineering and forest landscape restoration which have been promoted to control landslide and soil erosion. The municipality has incorporated various innovative practices as a part of agroecology, sustainable forestry management and DRR (Birendranagar, 2019).

Nilkantha Municipality in Dhading has issued and implemented local forest acts in plans and programmes for environment and climate-friendly infrastructure development. Urban forest area conservation, herbs development programme, and land protection programme have been prioritised along with plans for community awareness, tree plantation, roadside plantation, and conservation of forest, amongst others (Nilkantha Municipality, 2019).

Barbardiya Municipality in Bardiya, emphasises the municipal approach for biodiversity conservation, including agricultural biodiversity, environment conservation, and conservation of traditional, local, and indigenous knowledge and practices. Barbardiya Municipality has explicitly mentioned conservation and management of wetlands, natural resource conservation for the social and economic benefit of the locals; conservation and forest management and marketing of forest products; operation and management of agro-forests and forest-based enterprises, amongst others. The municipality focuses on the promotion of the sustainable

utilisation of forest resources and the adoption of effective conservation and impact-reducing practices among local communities. The municipality aims to collaborate with organisations and LCs to jointly facilitate the development and management of urban forests (Barbadiya Municipality, 2020).

Bheemdatt Municipality (Kanchanpur) has formulated several legislative frameworks including the Local Forest Act 2021, Environment and Natural Resources Conservation Act 2021, and City Disaster Management Act 2021; all of which have provided opportunities to promote NbS in the municipality. The municipality underscores the preservation and promotion of traditional knowledge and practices through conservation and development efforts (Bheemdatt Municipality, 2022).

The review of plans and programmes of the 4 municipalities show that NbS approaches have been mentioned, but more as activities for environment conservation. NbS hasn't been proposed either as a climate adaptation and mitigation solution, nor as a measure to address L&D. The approaches are extremely fragmented and incoherent and are not implemented through a structured work plan nor guided by a long-term vision. This also reflects the capacity needs of local governments in terms of NbS awareness and understanding of its scope as a broader climate solution.

NbS RELATED POLICIES AT SELECTED MUNICIPALITIES

Nilkantha Municipality Good Governance Gazette, 2019

Nilkantha Municipality Water Resource Act 2020

Nilkantha Municipality Land Use Regulation 2022

Barbardiya Disaster Risk Reduction and Management Act, 2018

Barbardiya Municipality Environment and Natural Resources Conservation Act, 2020

Risk Sensitive Land Use Policy of Birendranagar Municipality, 2021

Birendranagar Municipality Local disaster risk reduction Strategic Action Plan 2022

Bheemdatt Municipality Disaster Risk Reduction and Management Act, 2022

Bheemdatt Municipality Environment and Natural Resources Conservation Act 2022

Bheemdatt Gazette, Local Forest Act, 2022

CHAPTER 3

GAPS AND CHALLENGES

The policy landscape of NbS in Nepal is evolving. NbS at the federal level has largely been incorporated in policies related to environment, climate change, agroforestry policy and other sectoral strategies. These sectoral policies, especially the ones for the agriculture and forestry sector, are more progressive as they consider other principles of NbS such as inclusion and biodiversity conservation. These policies acknowledge the role of NbS in climate adaptation, risk reduction and resilience building. MoFAGA has also released Local Disaster and Climate Resilience Plans (LDCRP) guidelines, that can act as an important vehicle to take forward NbS at the provincial and local government levels. A few key sectoral policies such as policies related to physical planning and infrastructure development however have missed integration of NbS.

This can be largely attributed to the tendency, of limiting scope of NbS to environment and/or conservation solutions only. NbS mainstreaming will play a key role in safeguarding development gains such as infrastructure protection and promoting sustainable livelihood opportunities. It is important that the sectoral policies recognise and mainstream NbS in their plans and programmes.

There is an inadequate common understanding on scope of NbS amidst different sectoral ministries. All sectoral ministries across three government levels have different understandings of NbS and its scope. Since climate change is a cross-cutting issue, the prioritisation of NbS as a climate solution hasn't been mainstreamed across all sectoral ministries. The knowledge and understanding that are present at the federal level have not been effectively translated across provincial and local government levels. While federal policies and guidelines like LDCRP, EPA and EPR can play crucial roles in facilitating this translation, other sectoral policies fail to recognise and facilitate NbS across all levels.

With federalism in its second term, there have been visible improvements in terms of policy developments and integration. Most of the municipalities and provincial governments considered for this study do not mention NbS as a climate change solution. However, components of NbS are present largely under environment protection, forestry, and agriculture. This can be good for a start but reflects the limited scope of understanding of NbS at these two governance levels. There is also an issue of duality of policies. Most federal ministries have their policies and their own implementation mechanism for their sector. This causes a big confusion at the newly formed provincial and local government level. The federal government and development partners must step in and invest in developing awareness and capacity in terms of NbS prioritisation at these governance levels.

There are challenges in technical understanding related to NbS mainstreaming and prioritisation- especially at provincial and local government level- the impact of which is starkly visible in terms of NbS prioritisation and implementation, at these

government levels. At the provincial level, there are already existing ministries that look at the agriculture and forestry sectors, who can play a key role in mainstreaming NbS explicitly in their sectoral plans and policies, their periodic plans, and programmes. Capacity-building initiatives regarding NbS mainstreaming are very crucial. The Provincial Policy Commission can be a key entry point for NbS mainstreaming discourse.

The newly formed provincial and local governments are increasingly prioritising physical infrastructure development. Most of the projects and programmes developed at these levels- particularly at the local level have focused on improving the road network. If these development plans fail to integrate environmental, climate and social safeguards in place, they are headed towards loss and damage. It is hence crucial, that NbS are understood and mainstreamed into development plans for sustainability.

Another challenge in NbS mainstreaming is the fragmentation of NbS related efforts. In terms of NbS practices, many development organisations have been carrying it in their programmes and projects across agriculture, biodiversity, DRR and management and broad climate mitigation and adaptation projects. Many IPs and LCs been practising NbS in their communities for resource management and hazard reduction. The gains and benefits of these interventions are felt by the communities, but they fail to be collectively presented and quantified which directly hinders their scalability and replicability. This is due to a gap between policy and practice and lack of a NbS focused knowledge hub and a community of practice (CoP), that can collect and store NbS knowledge and evidences, influence policy and programmes and facilitate translation of NbS related knowledge and learnings to policy and plans.

The lack of contextualised evidence of economic benefits due to a particular NbS initiative also hinders interest and prioritisation of NbS. There is a dearth of case studies that document economic benefits whether it is ecological, hazard, biodiversity or livelihood related. Various programmes, that have integrated NbS components, do not adequately quantify and measure effectiveness regarding the loss and damages that are reduced averted through a particular NbS intervention. As a result, it has been challenging to upscale the interventions in other areas, and facilitate mainstream NbS in policy and programmes. This also limits the scope of broader stakeholder engagement, especially engagement of the private sector. It will be much easier to attract private sector investment if the cost-benefit of NbS intervention can be presented to private sector stakeholders, along with effective market incentives that will enable them to invest in NbS. Since NbS initiatives tend to take a longer time than other grey infrastructures- it can be a turn-off factor for the private sector.

There is a huge gap in understanding the scope of NbS to avoid, avert and minimise climate-induced loss and damages. Well-designed NbS can contribute to both climate adaptation and mitigation, and investment in NbS can offer one means to avert and minimise L&D. When implemented properly and following robust standards and criteria, NbS can enhance the resilience of ecosystems and the societies that depend on them to respond to climate hazards such as more frequent and intense flooding, droughts, heatwaves, and wildfires. These NbS strategies can also deliver significant biodiversity benefits in a manner that safeguards and promotes the rights and interests of vulnerable and historically marginalised communities, enabling a just society. There are very few studies and discussions that explore the scope of NbS in loss and damage in Nepal. More research and evidence are needed to explore this opportunity in Nepal.

CHAPTER 4

RECOMMENDATIONS AND WAY AHEAD

FOLLOWING ARE THE KEY RECOMMENDATIONS OF THE STUDY TO PRIORITISE AND MAINSTREAM NbS IN NEPAL:

1. **Conduct adequate study, research, and generate evidence on the sustainability and cost-effectiveness of NbS as climate solution for climate impact mitigation and adaptation,** which is ultimately a potential strategy to reduce climate-induced loss and damages. The benefits of NbS to reduce economic and non-economic loss and damage associated with a climate-induced hazard should be documented. Apart from reducing loss and damage, NbS can play a pivotal role in addressing loss and damage e.g. addressing biodiversity loss and supporting communities with resilient recovery options. This scope of addressing loss and damage also needs to be explored and documented.

2. **Improve common understanding of NbS, and its benefits and facilitate the technical capacity of government stakeholders across three government levels with a clear strategy of mainstreaming across key focal institutions.** NbS interventions are often conceptualised and implemented in a fragmented way. This could be improved by adopting a holistic and harmonised approach to integrate/mainstream NbS as a climate solution across sectoral policies including infrastructure and economic development at all government levels and ensure ownership of NbS by all sectoral agencies. A set standard, such as the IUCN Gold Standard for NbS (IUCN, 2020), can be followed to standardise NbS practices in Nepal to enable common understanding.

3. **Allocate dedicated financing at the provincial and local government level for prioritisation of NbS as a climate solution.** Dedicated financing is essential to mainstream NbS in their sectoral plans and programmes. The provincial governments and local governments should dedicate required resources to pilot and implement NbS in their development plans and programmes.

4. **Improve collaboration with stakeholders** particularly development stakeholders, civil society organisations, community-based grassroots organisations, right activists, and researchers through **Community of Practice (CoP) formation** that will carry forward NbS-related policy discourse, studies, and advocacy at federal, provincial, and local government levels to identify and fulfil policy and practice gaps.

5. **Initiate monitoring and documentation process for NbS related interventions** at local and provincial government level with its investments and co-benefits through clear indicators and monitoring framework. A knowledge hub dedicated for NbS solutions can be instrumental. The CoP can facilitate the knowledge hub formation and operationalisation.

6. **Invite private sector collaboration in NbS** that will help to generate more resources and investment for NbS prioritisation and implementation. The private sector may not directly see NbS benefits at once and may be hesitant to invest. For this, the NbS design can include a portfolio of resourcing options such as market-based, public sector, voluntary commitments, and actions to support regulatory compliance.

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