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EVOLVING COMMITMENTS: A COMPARATIVE ANALYSIS OF NEPAL'S NATIONALLY DETERMINED CONTRIBUTIONS UNDER THE PARIS AGREEMENT

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ABSTRACT

Nepal first submitted its Intended Nationally Determined Contributions (INDC) in 2016 under the Paris Agreement (PA) of the United Nations Framework Convention on Climate Change (UNFCCC). Nationally Determined Contributions (NDCs) are climate action plans that a country commits to at the international level to address climate change. The implementation of country's NDCs and the achievement of its goals are growing concerns among policymakers and negotiators. We review and analyze Nepal's NDCs trajectory by comparing four key submissions: the INDC (February 11, 2016), the first NDC (October 5, 2016), second NDC (December 8, 2020) and the NDC3.0 (May 19, 2025). A systematic comparative analysis of the NDCs of Nepal shows a progressive increase in its ambition, sectoral coverage, quantification of mitigation targets, integrating adaptation strategies, stakeholder involvement, budget size, and transparency, but challenges remain in terms of its implementation capacity, financing, and long-term sustainability. This article provides a summary into Nepal's climate commitments for policymakers, researchers, and practitioners

Keywords: NDCs, climate change, adaptation, mitigation, climate policy

INTRODUCTION

Climate change presents an urgent global challenge since it is threatening ecosystems, economic development, human health, and

livelihood (Karki *et al.,* 2009). In response to this growing challenge, the international community adopted the Paris Agreement (PA) in 2015 under the UNFCCC. The PA established a legally binding goal of limiting global temperature rise to well below 2°C while pursuing efforts to limit it to 1.5°C above pre-industrial levels. A central mechanism to achieve the PA is the NDCs. It is a national climate action plans submitted by all Parties outlining efforts to reduce greenhouse gas (GHG) emissions, adapt to climate impacts and mobilize resources. Unlike the top-down approach of earlier climate deals, the PA adopts a bottom-up, nationally driven model, allowing countries to convert their commitments to their own capacities, priorities and development trajectories (De Pinto *et al.,* 2018). The five-year NDC cycle is specified in Article 4.9 of the PA. This requires Parties to submit updated NDCs every five years. The Enhanced Transparency Framework (ETF), operationalized through the Biennial Transparency Reports (BTRs) ensures accountability by requiring countries to report on GHG inventories, NDC implementation progress, adaptation actions and climate finance. Complementing this, the UNFCCC Secretariat's Synthesis Report analyzes all submitted NDCs to assess collective progress towards global goals, especially ahead of the Global Stocktake.

Least Developed Countries (LDCs) such as Nepal face many obstacles when it comes to developing and actually implementing their NDCs. Nepal's share of global GHG emissions is minimal, around 0.05% (MoFE, 2020), but it is at the forefront of experiencing climate impacts. Nepal faces with challenges of shrinking glaciers, bursting glacial lakes, landslides, avalanche, unpredictable rainfall patterns, and loss of biodiversity (Eriksson *et al.,* 2009; Bajracharya *et al.,* 2020; Thakuri *et al.,* 2020), but lacks ample resources and technical expertise, relying heavily on external funding. Despite this, the country continues to move forward with its climate initiatives. The first NDC mainly served to meet requirements for international funding. However, more recent NDCs show Nepal taking greater ownership, raising its ambitions, and aligning climate actions with its broader development objectives (Laudari *et al.,* 2021).

Over the last decade, Nepal has submitted four NDCs. The process began with the INDC in February 2016, followed by the First NDC in October 2016, just before COP22 (MoPE, 2016b). This was succeeded by the Second NDC on December 2020 with a dedicated its Implementation Plan (MoFE, 2020), and most recently, the Third NDC (NDC 3.0) in May 2025 (MoFE, 2025). These submissions show a noticeable shift; Nepal has moved from merely fulfilling international obligations to setting climate goals that genuinely reflect the country's needs. Nepal's vulnerability to climate change is highly linked with its geography and socio-economic

conditions. With the Himalaya hosting thousands of glaciers and glacial lakes, rising temperatures pose serious threats of GLOFs and water insecurity. A recent study identified 47 potentially dangerous glacial lakes (PDGLs) in the Koshi, Gandaki and Karnali river basins (Bajracharya *et al.,* 2020). Globally, about two-thirds of people depend on climate sensitive sectors like agriculture, forestry, and water resources (MoFE, 2019). On the mitigation aspect, Nepal has significant potential for low carbon development, particularly through hydropower, clean energy, clean cooking and forest conservation. With over 44% of its territory under forest cover and a vast, largely untapped hydropower potential, Nepal's climate goals are deeply connected to poverty reduction and advancing green development (Gunatilake *et al.,* 2020; Aryal *et al.,* 2024).

In this context, Nepal's NDCs deserve a more detailed a systematic comparative analysis. Most of the study so far has either focused on individual submissions or provided piecemeal information; they have not really analyzed how Nepal's NDCs have evolved and is in alignment with national priorities. The objective of this paper is to compare Nepal's NDCs by focusing on their process, ambition, and content. This analysis contributes to understanding how LDCs like Nepal can advocate for stronger climate action, ahead of its graduation in 2026, while addressing limited resource and capacity gap under the PA.

MATERIALS AND METHODS

Research Design

We used a content analysis method to carry out a systematic review of Nepal's NDCs [INDC (2016), First NDC (2016), Second NDC (2020), Third NDC or NDC 3.0 (2025)]. Content analysis is an approach in climate policy studies for analyzing the content, structure, and development of official policy documents, especially to track changes over time (Krippendorff, 2019; Hurlbert *et al.,* 2019). Using this method after collecting national NDCs reports and the related documentation, we assess how Nepal's climate commitments have evolved, how priorities changed over time, and the extent to which it is scaling up its efforts in line with both national and global developments.

Data Sources

For this study, we collected and reviewed the NDC reports submitted by Nepal to the UNFCCC, including the Second NDC implementation plan. We also checked government reports and national policy documents, such as Nepal's Climate Change Policy 2019 (MoFE, 2019), the Long-Term Strategy for Net-Zero Emissions (LTS-NZE; GoN, 2021a), the National

Adaptation Plan 2021–2050 (GoN, 2021b), the Local Adaptation Plans for Action (LAPA; GoN, 2019), and sectoral strategies covering energy, transport, forestry, and disaster risk management.

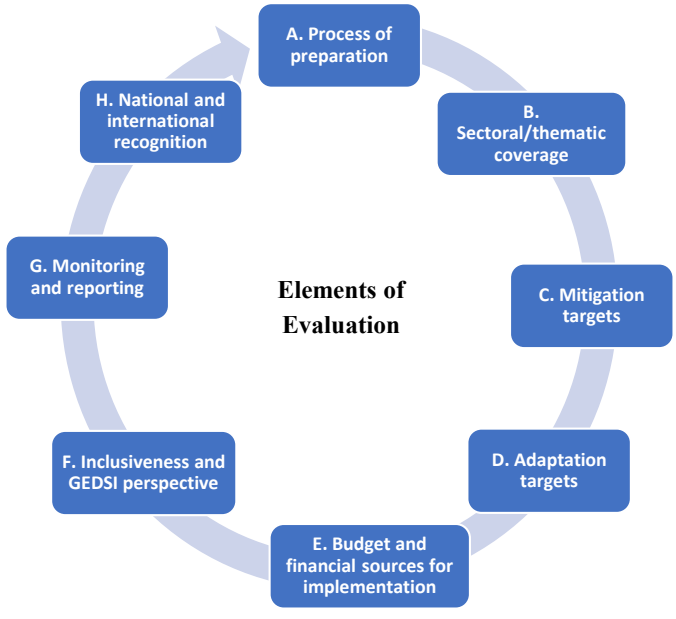
Furthermore, international assessments and independent evaluations were considered, including reports from the Climate Action Tracker (CAT, 2020), UNDP, the IPCC, and the Asian Development Bank (ADB), providing useful context. All documents were carefully checked for authenticity and completeness to ensure the reliability of the analysis.

Analytical Framework

For the comparative review of NDC reports, we developed a thematic coding framework based on established NDC review methods and the best practices in climate policy analysis (Hermwille *et al.,* 2017; UNEP, 2022). Each NDC was then systematically coded and assessed across eight key criteria (Figure 1).

Figure 1

Eight elements of evaluation criteria for the NDCs of Nepal



Comparative Analysis Procedure

The comparative analysis was carried out in two phases. First, each NDC report was reviewed individually to extract key information for different themes. Following this, a cross-NDC comparison was performed

by developing comparative matrices to track changes, consistencies and gaps across the four NDC submissions.

Validation and Triangulation

Data triangulation was used to enhance the rigor of the analysis. The information collected from official NDC texts was cross-validated with government reports, academic publications, and third-party assessments from independent global initiatives, for example, Climate Action Tracker, UNEP Gap Reports (UNEP, 2023).

RESULTS

Nepal's NDC Formulation and International Engagement

Nepal has been engaged in the UNFCCC negotiations since COP1 in 1995, advocating for mountain ecosystems and vulnerable nations. Its leadership thrived when it chaired the LDC Group in 2013–2014, helping prepare its INDC before the PA. Nepal's INDC was the country's first major climate pledge under the Paris framework. Although it was developed in short span of time with strong international technical support and limited domestic consultation, it highlighted Nepal's high vulnerability and prioritized adaptation. It also outlined mitigation in renewable energy, sustainable transport, and forestry. After ratifying the PA in October 2016, Nepal changed the INDC into its First NDC, marking its formal participation in the global climate framework.

In December 2020, Nepal submitted Second NDC with more provisions. In contrast to the first, it represented greater ambition and transparency, with detailed sectoral targets for clean energy, electric mobility, energy-efficient cooking, forest management, and integrated adaptation. It also included tentative costs and implementation needs, marking reliance on international climate finance, technology, and capacity support. Nepal began developing its Third NDC (NDC 3.0) in 2024 through a highly participatory national and subnational consultation process. NDC 3.0 sets more ambitious goals to 2035, expanding into new sectors, such as solid waste, public health, tourism, and urban systems, and further adding climate justice, gender equality, and loss and damage. It aligns adaptation priorities with the National Adaptation Plan (2021–2050), emphasizing resilient infrastructure, water management, biodiversity, and climate-smart agriculture.

Table 1 presents a comparative analysis of Nepal's INDC, first, second, and third NDCs and shows a clear growth in ambition, clarity, institutional maturity, and alignment with global climate governance.

Table 1

Comparative Analysis of NDC Evolution and Drivers

Feature	INDC	First NDC	Second NDC	NDC 3.0
Time horizon	~2025	~2025	2025–2030	2025–2035
Mitigation quantification	None	Sectoral targets, no national GHG	Quantified, 1.5–2 °C compact	More ambitious—renewables, EVs, industry
Approach to finance	Mostly international	bilateral and multilateral grant support	Cost estimates, partner support, and conditional financing.	Focus on domestic and international financing mechanism, conditional financing (85.32%)
Adaptation and equity	Discussed about the ongoing climate change adaptation related projects. Mentioned about LAPAs and NAPAs	Highlights about the ongoing climate change related projects and programs. Mentioned on LAPA framework and Nepal climate change support program (NCCSP)	Inclusive, LAPAs, gender responsive local action plan, National Climate Change Policy, 2019, Covered eight thematic and four cross-cutting areas. Adaptation targets were set.	Sectoral targets are set, ensure all the local governments set up LAPA, Sectoral Vulnerability and Risk Assessment, Incorporated water quality monitoring and evaluation, wetlands inventory and watershed health, Early warning systems, Climate Resilient WASH Plans, climate change and health has been added.
Stakeholder engagement	Prepared in the process of implementing the decision of the COPs through a broad-based stakeholder consultation process.	Government-led mentioned the same thing included in the preparation of INDCs.	Broad consult., Prepared citing the Articles 4.2 and 4.11 of the PA, and Decision 1/CP.21 paragraph 23 and 24	Systematically mentioned about the preparation process following Leave No One Behind (LNOB) by integrating GEDSI, CSOs, Local and Provincial government stakeholders' engagement, IPs, Persons with disabilities, experts, academia, development partners, funders, media and Member of Parliament.

Table 2

A concise Comparison Table Showing the Sectoral and Thematic Coverage in Nepal's Climate Commitments Across the NDCs

NDC	Mitigation Key Sectors Included	Adaptation Thematic and Cross-Cutting Coverage	Increased Scope over Previous Version
INDC / First NDC	- Renewable energy / energy mix (increase renewables) - Transport (electric vehicles, development of hydro-powered rail) - Forests / AFOLU (forest cover maintenance, carbon sequestration, REDD+)	- Agriculture - Forests, biodiversity - Climate-induced disasters - Themes identified: water and sanitation, health less detailed; some urban settlement/infrastructure in planning for NAP process - Cross-cutting: gender and social inclusion; livelihoods; governance; research and technology beginnings	The INDC set various targets but many were less quantitatively specified; somewhat limited waste sector / IPPU coverage; adaptation themes well-laid out but some sectors (public health, urban infrastructure) less explicit targets
Second NDC	- Energy generation (clean / renewable energy expansion) - Transport electrification (private and public vehicles) - Residential cooking / clean cooking (electric stoves, biogas, improved cookstoves) - AFOLU / Forest management (forest cover targets etc.) - Waste sector: wastewater, faecal sludge management.	- Adaptation priorities cover: agriculture, forest / watershed conservation; water resources and energy; disaster risk management. - Cross-cutting: gender, inclusion, capacity building. - Also, more detailed policy targets in sectors even where baseline data was weak (industries, solid waste)	More quantitative targets; broader sectoral scope; inclusion of waste more clearly; sharper mitigation + adaptation integration; stronger policy detail
NDC 3.0	- More ambitious targets in energy generation (renewable expansion) - Transport: EVs for private, public, freight; mass transit / electric rail ambitions - Clean cooking scaling up (electric stoves, improved cookstoves) - Industrial sector / IPPU: cleaner technologies (brick kilns, boilers etc.) - AFOLU: maintaining forest cover; improving forest management; agriculture improvements (irrigation, climate-friendly farms/villages) - Waste / waste-to-energy, wastewater and sludge treatment.	- Adaptation themes broadened: infrastructure resilience (schools, hospitals etc.), urban/rural settlement, heritage/ cultural heritage, tourism, health, drinking water and sanitation more explicit targets. - Local government involvement: gender-responsive adaptation plans in all local governments, enhanced governance, inclusion.	Sharp increase in ambition and specificity; more sectors with precise quantified targets; greater attention to institutional / governance, cross-sectoral cooperation; adaptation becoming more detailed

Process of Preparation

Nepal's NDC preparation process has progressively become more institutionalized, participatory, and scientifically informed over time. INDC was prepared in a short time frame leading up to COP21 with limited national consultation. Technical assistance was provided by international partners, but government ownership remained limited. First NDC was essentially a formal ratification of the INDC following Nepal's ratification of the PA with no major revisions. Second NDC was developed through extensive inter ministerial coordination led by the Ministry of Forests and Environment (MoFE). Consultations involved sectoral ministries, civil society and experts based on updated data modeling (LEAP) and supported by national climate policies (e.g., National Climate Change Policy 2019, LT-LEDS).

NDC 3.0 is highly inclusive, used bottom-up process including provincial and local government participation, close collaboration with line ministries and Provincial Governments with an extensive and inclusive stakeholder consultation process involving private sector, indigenous communities, women's groups and youth networks. Institutional leadership was strengthened through cross sectoral coordination platforms. The third NDC was prepared following the concept of Leave No One Behind (LNOB) integrating the principles of Just Transition, as well as GEDSI.

Sectoral and Thematic Coverage

The NDCs had sectoral and thematic coverage in the mitigation and adaptation targets (Table 2).

Mitigation Targets

Mitigation ambition and quantification have become progressively more detailed and aligned with long-term low-emission development goals (Table 3).

Table 3

Key Mitigation Commitments in the NDCs of Nepal

Submission	Type of Target	Key Mitigation Commitments
INDC	Non-quantified, aspirational	Promote renewable energy (hydropower, solar, biogas, Improved Cooking Stoves-ICS); maintain 40% forest cover; electric railway, introduction of fuel tax and bicycle promotion, 12,000 MW of hydroelectricity by 2030.
First NDC	Non-quantified, continuation of INDC	Identical to INDC; no quantified GHG targets.
Second NDC	Partially quantified	15,000 MW clean energy by 2030 (5,000 MW unconditional); 90% public transport electric by 2030; 25% electric private vehicles by 2025; 200 km electric rail by 2030; 28% decrease in emissions from transport sectors ensuring the increase in e-vehicles; net-zero deforestation; Maintain 45% of the total area of the country under forest cover; 380 million liters/day of wastewater treatment by 2025; implementation of of nature-based tourism plans in at least five main tourist destinations in 2025; number of improved cattle sheds.
NDC 3.0	Fully quantified, sectoral pathways	28,500 MW clean energy by 2035; 95% electric private vehicles by 2035; electrify 50 km public transit corridors by 2030; 200 km electric rail network by 2030; industrial de carbonization (bioenergy, electric furnaces); methane reduction in waste sector; treat 510 millions of waste water per day before being discharged by 2035.

This shows a shift from sectoral intentions to more integrated, economy-wide mitigation pathways with clear sectoral transformation targets, particularly in energy, transport, industry and waste.

Adaptation Targets

Nepal has always prioritized adaptation due to its high vulnerability but adaptation planning has become more localized, integrated, and equity-oriented over time (Table 4).

Table 4

Key Adaptation Commitments in the NDCs of Nepal

Submission	Key Adaptation Commitments
INDC / First NDC	Stressed on the implementation of LAPA framework, but lacked integration into national development plans. Both reports talked about the ongoing climate change related projects in the implementation of climate change adaptation and resilience.
Second NDC	Mentioned about the adaptation priorities and actions as per the National Climate Change Policy, 2019. Focused on adopting an integrated approach to cover climate-sensitive sectors exemplifying the inter-sectoral nature of the response. Adaptation priorities focused on eight thematic and four cross-cutting areas. Full integration of LAPA by 2030 into 753 local governments; sector-specific adaptation actions in agriculture, forestry, health, water resources, and urban resilience; gender-responsive adaptation included; Institutional mechanisms establishment between the governmental and non-governmental organizations, research institutions; climate-sensitive diseases surveillance systems strengthening through the integration of climate and weather information into existing surveillance systems; national strategy and action plan on Loss and Damage (L&D) associated with CC devised.
NDC 3.0	Further mainstreams adaptation into sectoral development plans and budgets; introduces loss and damage considerations; expands adaptive social protection and climate-resilient infrastructure; recognizes climate-induced displacement and migration; Adaptation priorities focused by NAP areas; Gender-responsive local adaptation plans (GoN, 2019) in all 753 local governments by 2035; reduce forest fire incidents by 2035;climate resilient protected area management planning framework development by 2030; assess change in glacier mass balance study of 20 glaciers by 2030; 5,000 health professional training by 2035; Targets on awareness raising and capacity building are set including 2,000 climate change adaptation resources persons mobilization by 2030.

Budget and Financial Sources for Implementation

From INDC to second NDC and the latest NDC 3.0, there is a clear escalation in both ambition and in the clarity of financing needs (Table 5). The First NDC had relatively vague cost estimates and leant mostly on domestic resources plus international partner support, without a detailed breakdown of conditional vs unconditional financing. By second NDC,

Nepal articulated more precise costs: for instance, ~USD 25 billion for conditional mitigation and ~USD 3.4 billion for unconditional portions, and a total implementation plan needing ~USD 33 billion through 2030. With NDC 3.0, the financing requirements jump significantly: around USD 73.7 billion for mitigation by 2035 plus another ~USD 18–20 billion for adaptation; however, only a small fraction (~14–15%) is expected to be covered from domestic / unconditional resources, with the rest conditional on international climate finance, technology transfer, and capacity building. Strategies to mobilize resources have become more structured: institutionalizing climate finance planning, developing climate finance tracking, stronger engagement of bilateral/multilateral donors, seeking concessional funds/grants, and better integrating climate targets into national budgets. Still, the gap between what is needed and what can likely be mobilized domestically remains large, making external support a central factor in Nepal's ability to implement its more ambitious NDCs.

Table 5

Finance and Conditionality in the Nepal's NDCs

Submission	Financial Estimates	Conditionality
INDC	No cost estimates provided	Entire implementation conditional on external support.
First NDC	No cost estimates	Fully dependent on bilateral and multilateral grant support in formulation and implementation of NAP, NAPA and LAPAs; convert waste to energy; capacity building; carbon financing; electric rail network
Second NDC	USD ~28.4 billion by 2030 (USD ~33 billion in its IP)	Unconditional and conditional targets specified; about 88% of mitigation and adaptation costs conditional (25.0 billion USD) on international finance, technology transfer, and capacity building. Unconditional targets outlined are about 3.4 billion USD, which is about 12% of the total financial estimates. The Second NDC Implementation Plan has a budget of above USD 33 billion.
NDC 3.0	USD ~73.74 billion by 2035	Increased domestic contribution (~14.7% unconditional and 85.3% conditional); conditionality remains for major mitigation projects and adaptation scaling; focused on mobilizing domestic and international resources prioritizing grants for adaptation and loss and damage, national budgets, private sectors involvement, public-partnership engagement, carbon taxes.

Inclusiveness and GEDSI Perspective

Nepal's NDC process has evolved to become more participatory, inclusive, and grounded in equity principles. The INDC involved limited consultation, mainly engaging government institutions and with little public engagement. The first NDC did not significantly expand participation and gave minimal attention to gender equality, disability, and social inclusion (GEDSI). The Second NDC introduced a more participatory approach, with national workshops and multi-stakeholder consultations involving government agencies, civil society, academia, development partners, and the private sector. NDC 3.0 further ensured inclusive stakeholder engagement, deliberately involving indigenous and marginalized groups, women, youth, local governments, and climate-vulnerable communities. It integrates climate justice, equity, and GEDSI, is guided by Leave No One Behind, and strengthens coherence with national climate policies and commitments.

Monitoring and Reporting

Nepal has continuously improved its MRV process, making in line with international transparency needs. The INDC and first NDC had no formal MRV framework. The second NDC was a turning point, introducing a structured MRV system, using tools like the LEAP model, following the IPCC 2006 Guidelines, and committing to report the BTR under the PA's ETF. NDC 3.0 builds on this by institutionalizing MRV across emissions, mitigation, adaptation, and climate finance. It also sets up national registry systems and coordinated data flows, includes gender and social inclusion indicators, and highlights capacity gaps and the need for international support.

National and International Recognition

Over time, Nepal's NDCs have received increasing recognition nationally and internationally. The INDC/First NDC established Nepal's early engagement in the Paris process, indicating climate action despite limited capacity. The Second NDC received praise for quantified targets, wider sector coverage, and timely submission, with bodies like the Climate Action Tracker rating its ambition as "Almost Sufficient" while noting implementation gaps. It presented stronger mitigation and adaptation plans and clearer requests for international support. NDC 3.0 further enhanced Nepal's standing, aligning with the first Global Stocktake, raising net-zero ambitions, and showcasing progress at events like *Sagarmatha Sambaad*

and COP29; however, international attention now carries greater scrutiny regarding finance, capacity, and implementation, reflecting a trajectory of growing ambition paired with rising expectations.

Table 6

A Brief Summary of National and International Recognition of Nepal's NDCs

NDC	Key International/National Reactions/Recognition	Highlighted in Media or Institutions
INDC	Submitted as part of global INDCs ahead of Paris Agreement; available on UNFCCC platform among other parties' INDCs	Demonstrated Nepal's commitment despite its low emission share; early recognition that Nepal is aligning with global climate action
First NDC	Less well distinguished separately, mainly part of national reporting processes; included in national communications and NAP alignment.	Registered as part of Nepal's adaptation and mitigation baseline, but fewer critiques / praise compared to later updates; served as groundwork.
Second NDC	● Widely recognized: observed positively for submitting in time, increasing sectoral and quantitative ambition. ● Climate Action Tracker rated Nepal's targets "Almost Sufficient" under some metrics. ● ADB, media, and international development partners noted improved clarity.	Seen as a substantial step forward; enhanced credibility; signaled Nepal is serious about both mitigation and adaptation and seeking international financial and technical support.
NDC 3.0	● Seen internationally as more ambitious and in line with the first Global Stocktake outcomes. ● Media and observers note that Nepal clearly seeks global support, including finance and technology, in its new submission. ● Nepal gained diplomatic recognition through events like *Sagarmatha Sambad* and handover to the COP29 President, boosting its international visibility.	Nepal is stepping up its role in international climate diplomacy, with its stronger targets gaining more visibility, but this recognition also brings expectations, to follow through on implementation and to secure international support.

Table 7

Evolution of NDC and SDG Linkages

NDC	Primary SDG linkages (most direct)
INDC	SDG13 (Climate Action); SDG7 (Affordable, Clean Energy); SDG1 (No Poverty); SDG2 (Zero Hunger) (through resilient agriculture); SDG6 (Water); SDG11 (Cities) via reconstruction/building codes.
First NDC	SDG7; SDG13; SDG15 (Life on Land) (forestry/REDD+); SDG3 (Health) (reduced indoor air pollution); SDG11/9 (transport infrastructure and resilient reconstruction).
Second NDC	SDG7, SDG13, SDG2, SDG6, SDG11, SDG15 with increasing emphasis on SDG8 (Decent Work and Growth) through green jobs and infrastructure.
NDC 3.0	SDG13 (central), SDG7 (major energy targets), SDG6 (wastewater, WASH), SDG3 (health via low-carbon health facilities), SDG8 (green jobs/just transition), SDG15 (forests), SDG11 (urban resilience/ transport). NDC 3.0 explicitly links NDC outcomes to SDG achievement and poverty eradication.

INDC/First NDC present climate action as essential for development and SDGs (especially poverty reduction, energy access; Table 7). NDC 3.0 embeds explicit quantified sectoral targets and costed measures, and clearly states that implementation yields SDG co-benefits (energy security, reduced air pollution, health, jobs, ecosystem services). Early NDCs prioritized energy, forests and adaptation (SDG7, SDG15, SDG13). Over time transport, waste, health, WASH, education and green jobs were added as explicit NDC targets, broadening linkage across SDGs (SDG3, SDG4, SDG6, SDG8, SDG11). NDC 3.0's targets for wastewater treatment, green schools, low-carbon HCFs and green skills demonstrate this expansion. NDC 3.0 quantifies finance needs and shows what is conditional on international support, making the SDG-climate financing nexus explicit (i.e., achieving SDG gains often depends on conditional funding). NDC 3.0 uses modelling (LEAP), a 2011 base inventory, and links to the LTS-NZE and the Global Stocktake, strengthening credibility of SDG co-benefit claims.

DISCUSSION

Nepal has submitted its NDC 3.0 to the UNFCCC, reflecting a shift from short-term to longer-term planning (2025–2035). Unlike earlier submissions with activity-based commitments, NDC 3.0 sets quantifiable, economy-wide GHG reduction targets. Adaptation has evolved from general projects (LAPAs, NAPAs) to integrated, equity-focused, gender-responsive,

and localized actions embedded in national and local development plans, including new priorities such as climate-resilient infrastructure, health, and Loss and Damage. Financial planning is not just about seeking international grants these days. Now, it is more of a blend, you have both domestic and international funding, involvement from private sector actors, and innovative approaches like carbon taxes emerging. The scope has broadened as well. It is not limited to a single area. We are looking at renewable energy, electric vehicles, methane reduction, smarter agriculture, water quality, glacier monitoring, and strengthening health sector capacity. On the monitoring and reporting front, things have advanced. Nepal is aligning with the PA's standards, making use of IPCC guidelines, LEAP modeling, biennial reports, and ensuring gender and social inclusion are part of the process. Observing the evolution of Nepal's NDCs, you can see growing ambition, increased technical capacity, and more mature institutions. There are valuable lessons here for other vulnerable LDCs.

Increasing Ambition amid Practical Challenges

Nepal's NDCs have become much more ambitious over time, especially in mitigation. The INDC and first NDC focused more on broad ideas than on specific actions. They mentioned improving energy access, reforestation, and connecting climate efforts to sustainable development, but they did not set many firm targets. Even so, that first NDC helped lay the groundwork for a more serious and long-term approach to climate issues. After that, the second NDC stepped thing up. Nepal introduced both conditional and unconditional targets in multiple sectors. The goals included increasing electric vehicle use, expanding renewable energy, adding new measures, such as climate-smart agriculture and adaptation plans designed for local communities to help people deal with the impacts of climate change.

Now, with NDC 3.0, Nepal is not just showing ambition, they are backing it up with concrete numbers. It is setting specific targets for areas like energy, transport, industry, and waste, all aligned with their goal to reach net-zero emissions by 2045, as set out in its Long-Term Strategy (LTS-NZE, GoN, 2021a). Still, it is important to keep things in context. Nepal is a developing country with significant needs, and it has contributed very little to global warming, less than 0.05% of global emissions from Nepal, but faces severe climate impacts: glacial lake floods, landslides,

droughts, and unpredictable monsoons. So, while the ambition is there, the real-world challenges are just as significant.

Adaptation as a Persistent Priority

In all the NDCs, adaptation has been a major priority for Nepal. Nepal's growing recognition of the links between adaptation, disaster risk reduction and sustainable development is evident in the integration of national and subnational adaptation plans into the NDC framework. While early submissions largely emphasized the LAPA, later iterations expanded the scope to include sectoral adaptation (agriculture, water, health, infrastructure), climate-resilient development planning, and loss and damage considerations. NDC 3.0 introduces recognition of climate induced displacement, migration and social protection which reflects a growing understanding of the complex socio-economic consequences of climate change in highly vulnerable societies. Furthermore, the inclusion of gender-responsive adaptation measures and the consideration of marginalized and indigenous populations indicate growing commitment to integrating climate justice principles into its adaptation agenda.

Institutionalization of the NDC Process

The transition from externally driven technical preparation in 2015 to nationally owned, multi-stakeholder processes in 2020 and 2025 reflects growing domestic capacity, policy coherence and inter-agency coordination. The institutional leadership of the Ministry of Forests and Environment combined with sectoral ministries and the involvement of provincial and local governments suggests the emergence of a decentralized, whole-of-government approach to climate action.

Additionally, the integration of the NDC into existing national frameworks, such as Nepal's Climate Change Policy (2019), National Adaptation Plan (NAP), and the LTS-NZE, enhances policy coherence and provides a roadmap for implementation; however, given the status and development capacity and lack of coordination between the federal institutions in developmental works can delay the ambition. For example, the NDC 3.0 focused on making a 50 km electric trolley bus inside the Kathmandu valley by 2030. It is impossible to meet this target as it takes more than 3 years to construct a small overhead bridge in the valley. Strengthening institutional capacity is important to ensure that NDC commitments turn into real action, rather than staying as promises on paper.

Evolving Financial Needs and Conditionality

Nepal, like many of the world's LDCs, keeps hitting the same obstacle, not quite enough reliable funding for climate action. In 2015 and 2016, its NDCs did not even include cost estimates, but by 2020, it has detailed projections, with even more updated figures by 2025. It is clear how its ability to plan for climate finance has improved over time. The growing share of domestic finance contributions in the NDC 3.0 also demonstrates increased national ownership. Nonetheless, the majority of Nepal's NDC implementation remains conditional upon international financial, technological and capacity-building support. The investment requirements for large-scale renewable energy deployment, electric mobility, climate-resilient infrastructure and adaptation scaling far exceed Nepal's current fiscal capacity.

Access to international climate finance remains challenging due to limited national capacity to prepare strong project proposals and to meet the increasingly stringent technical, fiduciary, and safeguard requirements of mechanisms for vertical funds such as the GCF, GEF, AF. These multilayered review processes place a heavy burden on LDCs including Nepal with constrained expertise and resources. Additionally, weak institutional leadership in developing a sustained pipeline of bankable projects, combined with low absorption and delivery performance in existing funded programmes, continues to hinder the timely and effective mobilization of climate finance.

Besides this, the institutional capacity in using the funds is very slow and the project completion is always in due and most of the funds remain unused in some cases like Building Resilient in the Chure Project.

Transparency and Monitoring Capacity Building

Adoption of transparency frameworks and the MRV systems shows an increase in technical capacity development. The first NDC lacked measurable baselines or formal MRV structures, the 2020 NDC introduced partial quantification, use of LEAP modeling and sectoral data systems. NDC 3.0 moves toward a fully integrated MRV system aligned with the Enhanced Transparency Framework of the PA supported by federal, provincial and local government data collection systems. The BTR is the key reporting instrument under the ETF of the PA, through which Parties provide information every two years on GHG inventories, progress in implementing and achieving their NDCs, adaptation actions and support

received and provided. The ETF ensures comparability, accountability, and trust among Parties by requiring common reporting formats and review processes. In parallel, the Synthesis Report of NDCs, periodically prepared by the UNFCCC Secretariat, aggregates and analyzes all Parties' NDC submissions to assess collective progress towards the long-term goals of the PA.

These mechanisms are important for transparency, trust-building and identifying ambition gaps while their regular frequency (BTRs every two years synthesis reports ahead of Global Stocktake) provides an evidence base for raising ambition and mobilizing support. Developing an MRV system will help to build international credibility and facilitate access to performance-based climate finance mechanisms. This shows Nepal's proactive approach to preparing for its first BTR positioning itself to meet emerging reporting obligations under the PA's implementation phase.

Inclusivity and Climate Justice in NDC Development

The first INDC was prepared with limited public consultation subsequent NDCs involved provincial governments, civil society organizations, private sector stakeholders, indigenous groups, youth and women's organizations, disabled and people from minority groups. This participatory approach helps in ownership, ensuring policy legitimacy and inclusive climate governance. Emphasis on gender equity, indigenous knowledge, disabled people and social protection mechanisms in the NDC 3.0 further embeds principles of climate justice into Nepal's climate policy framework. This may serve as a model for other LDCs seeking to balance ambitious climate goals with social equity considerations.

Nepal's Experience in the Global Context

Nepal is experienced in the climate negotiations process including its reflections in LDCs and developing countries under the PAs' ratchet mechanism, which encourages periodic enhancement of NDC ambition. Nepal has not allowed its limited resources to hold it back. The nation has made significant efforts to develop its technical skills and strengthen its institutions, establishing itself as a forward-thinking leader among the LDCs. While it is true that the world needs major polluters to take action, that does not mean smaller or more vulnerable countries cannot achieve meaningful progress as well. With genuine political will, effective governance, and international support tailored to the country's needs, progress is possible. Nepal's evolution from an INDC with generalized

intentions to a fully costed, quantified and inclusive third NDC exemplifies how the PA's architecture can drive iterative policy improvement over time.

CONCLUSION AND POLICY IMPLICATIONS

Conclusion

It has been nearly a decade in Nepal's NDC pathway. The NDC evolution of Nepal shows progressively growing from a small, adaptation-focused INDC to a far-reaching NDC 3.0. This also shows that a LDC can progressively enhance climate ambition and institutional maturity under the PA framework. Nepal's climate policy trajectory has moved from high-level intentions toward sect orally integrated, costed, and quantified targets till the third NDC backed by institutional coordination, and inclusive stakeholder engagement. We conclude that Nepal's NDCs show the increase in ambition in the energy, transport and forestry sectors.

Adaptation planning is not just about quick solutions anymore. Now, it is focused on building lasting climate resilience, ensuring social protection is in place, and allowing local communities to take the lead. Climate finance is clearer these days, with more transparency, and it does not just depend on foreign support, some funding now comes from within the country. Still, international funding remains important. Monitoring and transparency have also improved, and they are more in line with global practices.

Decision-making has changed significantly. It has shifted away from a top-down approach. Now, local governments, indigenous communities, women, and youth all have a real voice. Even without abundant financial or technical resources, Nepal has demonstrated what can be achieved through strong political commitment, sound national policies, and international backing. Challenges remain, financing and implementation are still tough, but Nepal's efforts to align its development priorities with global climate goals are notable. NDC 3.0 reflects that progress, offering lessons for other vulnerable nations looking to strengthen their own NDCs.

Policy Implications

Nepal's experience offers important lessons for policymakers and partners, both within the country and abroad.

For the Government of Nepal

For NDC 3.0 to succeed, everyone must understand their role, at every level of government, with absolute clarity. This requires the right expertise, sufficient resources, and concrete steps, not just empty commitments. Ultimately, though, nothing will truly work unless local governments are fully engaged, actively planning and implementing, especially regarding adaptation and the development of climate-resilient infrastructure. Continued investment is needed to strengthen MRV and data systems, enhancing transparency and supporting evaluation aligned with the ETF. To reduce reliance on external funding, Nepal must mobilize domestic finance through innovative mechanisms such as green bonds, carbon pricing pilots, and public-private partnerships. Finally, climate targets must be systematically mainstreamed within national development planning, public investment systems, and all relevant sectoral policies.

Nepal's NDC sequence moves from a broad, adaptation centered INDC that explicitly ties climate action to poverty reduction and basic services (hence to many SDGs), to sector-targeted First NDC with concrete renewable-energy and forestry targets, then to the Second NDC which added more activity-based/policy mitigation and clearer conditionality, and finally to NDC 3.0 which substantially expands quantified sectoral targets (energy, AFOLU, waste, transport, industry), cost estimates, and explicitly frames NDC implementation as contributing to a wide range of SDGs and to the country's LTS/net-zero pathway. The NDCs show a clear evolution from high-level adaptation and policy priorities to sectoral, quantified targets to longer horizon, modelling-informed, SDG-aligned implementation planning.

For International Development Partners and Climate Finance Institutions

For International Development Partners and Climate Finance Institutions, supporting Nepal's ambitious climate targets, particularly in energy transition and adaptation, requires providing scaled-up, predictable and easily accessible climate finance aligned with national systems. Ongoing technical support is equally important, practical training and technology sharing are key to improving emissions tracking, strengthening modeling abilities, and promoting climate-smart practices in sectors like agriculture, transportation, and industry. Nepal's contribution should not be underestimated either. As a least developed nation advancing its NDCs, Nepal deserves genuine acknowledgment. Recognition through global

platforms, peer learning, and official commendations for its achievements makes a significant difference.

For Other LDCs and Developing Countries

A path to stronger climate action starts with implementing ambition in the national context, setting targets that match local priorities, capacities, and the data presently available, then scaling up over time. Nepal's experience shows gender perspectives, indigenous knowledge, and social-protection measures into NDCs enhances their authenticity, feasibility, and fairness. Finally, the PA's built in 'ratchet' mechanism means each submission is not a one-off, but part of an iterative process, allowing countries even those with limited capacity to learn and progressively raise their commitments. Nepal's journey with its NDCs shows that climate leadership is not limited to wealthy or high-emitting nations. When political leaders are dedicated, policies align, international partners offer support, and everyone participates, even a resource-limited country can rise to the challenge and achieve meaningful progress on climate action. As global climate negotiations enter a decisive phase under the Global Stocktake process, Nepal's experience stands as both a model and a call to action for the international community: ambition must be supported, and equity must be embedded in global climate responses.

Action Recommendations

(a) Set and publish at least one quantified, unconditional, economy-wide mitigation marker, or a clear, timebound pathway, even if modest, as this enhances credibility and supports the mobilization of climate finance.

(b) Prepare and operationalize the NDC Financing Strategy into action by preparing a few investment-ready projects, like hydropower, renewables, resilient roads, and agro-climate services, with clear, standard documentation to attract climate and blended finance and link them to thematic bonds and relevant funding tools mentioned in the implementation materials.

(c) Integrate NDC 3.0 IP priorities into federal, provincial, and municipal budgets through climate budget tagging, and establish legal or formal responsibilities to ensure consistent funding over time.

(d) Invest in MRV and data systems by supporting better inventories, subnational reporting, gender-disaggregated adaptation KPIs, and an integrated NDC Monitoring Dashboard, while aligning capacity building with BTR cycles.

(e) Make GEDSI operational by setting clear KPIs, allocating dedicated budgets, and using community-led participatory monitoring.

(f) Engage the private sector by creating concessional financing options, guarantees, and PPP templates to attract investment in renewables and resilient infrastructure, using blended finance approaches outlined in NDC 3.0.

(g) Utilize mountain and cryosphere diplomacy through the use of Nepal's moral/technical leadership on mountain climate impacts to mobilize specialized global funds and partnerships.

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