NEPAL'S SIXTH NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY




Government of Nepal
Ministry of Forests and Environment (MoFE)
Singha Durbar, Kathmandu, Nepal
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Government of Nepal
Ministry of Forests and Environment
P.O.Box No. 3987, Singha Durbar, Kathmandu
Ph.: 4211567
4211892
Fax: 4211868

Ref. No.

Government of Nepal
Ministry of Forests & Environment
Singhadurbar, Kathmandu

Foreword

30 December 2018

Convention on Biological Diversity (CBD) was ratified by Nepalese parliament on November 23, 1993 and has been enforced since February 21, 1994. Nepal as a party to the Convention on Biological Diversity (CBD) is committed to conservation of biodiversity, sustainable use of its components, and fair and equitable sharing of the benefits from the utilization of genetic resources. **Nepal's Sixth National Report to the Convention on Biological Diversity assesses the status and potential of the actions Nepal has taken to achieve the commitments.**

The report was prepared in an iterative, inclusive, transformative, transparent and participatory approach. It is structured to provide a realistic appraisal of information on Aichi Biodiversity Targets (ABT) being pursued at the national level, implementation measures taken to achieve national targets set in the 5th National Report of the NBSAP, assessment of the progress towards each national target, and explanation of the national contribution to the ABT achievements at the national, regional and global level. Contribution of the ABT to achieve the Sustainable Development Goals (SDGs) of Nepal, and Global Strategy for Plant Conservation (GSPC) targets have been assessed as well as current state of knowledge of biodiversity is updated. The contribution of Indigenous Peoples and Local Communities (IPLCs) to biodiversity conservation and ecosystem services has also been highlighted.

Nepal after preparation of National Biodiversity Strategy and Action Plan (NBSAP) 2014-2020 entered into a new federal structure. The promulgation of new Constitution of Nepal in 2015 provided an opportunity to adequately pay an attention to the conservation and sustainable use of biodiversity that plays a crucial role in securing our current and future lives.

Implementation of NBSAP has been effective in Nepal due to implementation of international treaties and agreements on biodiversity, strengthening of regional collaboration for the restoration of biodiversity across the trans-boundary scale, and national commitment to the conservation of biodiversity. Nepal uses an effective conservation planning of protected areas at landscape level to conserve biodiversity along north-south and east-west gradients. The report addresses vital concern of biodiversity conservation from Aichi Biodiversity Targets perspectives. Many of the sections provide concrete recommendations for action and they call attention to take measures that must be pursued with intensity.

Nepal is also planning for the post-2020 strategy and will consider the 2050 Vision of "Living in Harmony with Nature" of the Strategic Plan for Biodiversity 2011-2020, the 2030 Agenda for Sustainable Development, other relevant international processes. The post-2020 biodiversity framework of Nepal would be built upon the achievements of the NBSAP 2014-2020.

I am thankful to all actors who were involved in preparing this report. I also urge all stakeholders to work together with the Ministry of Forests and Environment to achieve objectives set by the CBD and the associated targets.

Bishwa Nath Oli, PhD
Secretary

Government of Nepal
Ministry of Forests and Environment
P.O. Box No. 3987
Singha Durbar, Kathmandu
Ph. 4211567
4211892
Fax. 4211868

Ref. No.

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Acknowledgements

Nepal as a contracting party to the Convention on Biological Diversity is obliged to fulfill all the three objectives of the CBD including the conservation of biological diversity, its sustainable use, and fair and equitable sharing of benefits from the utilization of genetic resources. As of the Article 26, as a Contracting Party to the Convention, submission of country report is obligatory in every four years. Therefore, after subsequent submission of the fourth in 2009 and the fifth in 2014, this sixth national report is largely prepared on the participatory and consultative process.

In bringing out the report to this stage, many organizations and individuals have been involved directly or indirectly. First and foremost, on behalf of the Ministry of Forests and Environment I would like to sincerely thank GEF through UNDP Nepal for understanding the need and providing the financial support for the 6th NR preparation. Similarly, I would like to thank the consultant team including Prof. Dr. Ram P. Chaudhary and Dr. Shalu Adhikari for their hard work and effort in documenting, writing, preparing and bringing out the report to the final stage. Nevertheless, Mr. Vijay Keshari, UNDP Nepal for supporting and working closely with our Ministry for the purpose. My Division members including Mr. R.C. Khatiwada and Mr. Gyanendra Kayastha deserves special thanks for supporting the consultant team and organizing all the necessities for the consultation workshop at all the seven states. Mr. Kiran Timilsina, Green Governance Nepal deserves appreciation for arranging all the consultations from center to the state level. I would also like to thank the members of the National Steering Committee for backstopping and proving inputs to the overall process for the preparation of 6th NR. All the Secretaries of Ministry of Industry, Tourism, Forests and Environment deserve special thanks for being cooperative and taking the lead in the consultation workshop in all the seven states. I would like to thank the Protected Areas managers, the head of division forest offices, director generals of the departments under MoFE, community based organizations, members of indigenous community network, agriculture research center, conservation groups, academicians, and individuals/local communities dedicated for biodiversity conservation, for their active participation, cooperation and providing relevant information during the consultation workshop at all the state.

I am also grateful to the reviewers for providing their valuable insight into the report. Dr. Buddhi Sagar Poudel has been so generous who critically provided inputs to value add the report.

Lastly, I am sure that this 6th NR will be helpful to showcase Nepal's efforts in biodiversity conservation regionally and globally.

Yajna Nath Dahal
Joint Secretary, MoFE
Chief, Environment and Biodiversity Division

Executive Summary

Background: Nepal as a contracting party to the Convention on Biological Diversity (CBD) is committed for making a significant reduction in the rate of loss of biodiversity. The CBD was ratified by Nepalese parliament on November 23, 1993, and enforced in Nepal since February 21, 1994. The revised Nepal's NBSAP for 2014-2020 is a comprehensive framework for translating the Aichi targets into national action and achieving the nation's goals to conserve the biodiversity. As of the Article 26 of the Convention, Nepal as a Contracting Parties is required to submit national reports to the CBD Secretariat on measures taken and the progress achieved since the adoption of the National Biodiversity Strategy and Action Plan (NBSAP), and the effectiveness of those actions in meeting the Convention's objectives since the 5th national report was submitted. The 6th NR is largely based on review of documents, and consultative and participatory process with relevant stakeholders. The main objective of this report is to document progress in-line to the Technical Review Framework (Version 2, April 2018) provided by the Secretariat. The report also includes findings of the newly formed state level consultation/workshops that had been conducted at all seven states as well as consultation with communities in 26 districts.

Implementation measures: The implementation for NBSAP have been undertaken by Nepal through various measures including the legal preparedness, institutional arrangements, stakeholders' engagement, capacity enhancement, communication strategy, monitoring and evaluation, and international and regional cooperation to effectively implement the action plans despite political changes since 2015 when the country entered into new constitutions building and political federal structure. The positive results of the mid-term M&E are that many of the Government level decisions and implementation processes such as those concerning protected areas, forest policy, ITPGRFA, ex-situ conservation of agrobiodiversity, CITES Act (2017) implementation, landscape level management, promotion of category of protected areas, and the reformed legislation - all promote and support to the achievement of national indicators of the NBSAP. At the same time several national targets either have not been met or are unlikely to be met by 2020. Significant additional efforts are therefore required to achieve these targets. Some of the important recommendation and adaptive management has been provided to make revision for the effective implementation of NBSAP including revision in the organization structure and adjustments in the targets,

Assessment of NBSAP progress: The NBSAP progress has been assessed against 58 national indicators for meeting the 20 Aichi Biodiversity Targets (ABT) under five strategic goals. The assessment reveled that out of 58 targets, 3 (5.2%) targets were achieved before deadline 2020, 12 (20.7%) targets were on track to achieve by 2020, 38 (65.5%) targets were towards progress but at an insufficient rate and there was no overall progress for 5 (8.6%) targets. A detail assessment of national targets contributing to the ABT has been presented.

Strategic goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society comprises ABT 1 to ABT 4 which are as follows.
ABT 1. Biodiversity awareness: At least 70 audio-visual packages on different aspects of biodiversity have been prepared. In addition to this, conservation campaign, school based eco-club establishment, information center establishment at various PAs and Ramsar sites on issues and concerns of the area's biodiversity conservation have been conducted. The GoN is in the process of establishing National Zoological Garden and also planning to establish state level zoo and botanical gardens in all seven states. A national biodiversity clearing house mechanism has not been established and NBIMS is not operated. *An overall status is on track to achieve the target*
ABT 2. Biodiversity Mainstreaming: Ministry of Forests and Environment, the focal ministry has prepared implementing systems by setting up National Biodiversity Coordination Committee (NBCC), but it has not been fully functional to provide inputs and services at the state and local levels. Biodiversity has been effectively mainstreamed in MoFE & MoALD, however efforts are needed to mainstream in cross-sectoral Ministries including Irrigation, Energy, Physical infrastructure. Standard national format has not been developed for various ecosystems; however, methods/processes are available for economic valuation for ecosystem services. Institution setup at Federal, State and Local level has been established. Inventory of species in localized areas has been done, although comprehensive inventory of wetlands, grasslands, forests are partially done. *There is progress towards target but at an insufficient rate.*
ABT 3. Incentives and Subsides: Perverse incentives phase out plan in agriculture and forestry sectors has not been envisioned. However, GoN provide support services, such as vaccination, drenching, shed improvement are being provided to farmers involved in *in-situ* conservation of indigenous breeds of cattle, buffalo, sheep. Income from

protected areas is directly contributing to management of buffer zones and conservation areas. *There is progress towards target but at an insufficient rate*.

ABT 4. Sustainable Production and Consumption: National Strategic Framework for Sustainable Development (2015-2030) has been developed and measures taken to implement has been partially effective. Low Carbon Economic Development Strategy of Nepal 2015 has been developed. Climate-smart management plan of few PAs (Manaslu, Krishnasar, KTWR, Parsa and Annapurna) is prepared and implemented. NTFPs chapter is mainstreamed in DFO plans. The government has identified 10 important NTFPs, but separate management plan has been prepared only for Jatamashi (*Nardostachys grandiflora*) and Yar-tsa-gunboo (*Ophiocordyceps sinensis*). Grassland habitat mapping was done for Chitwan National Park (CNP) in 2016. Carrying capacity assessment is being initiated in CNP for tiger habitat. *The progress is on track to achieve target.*

Strategic goal B: Reduce the direct pressure on biodiversity and promote sustainable use comprises ABT 5 to ABT 10 as follows**.**

ABT 5. Habitat Fragmentation and Degradation: A number of programmes have been developed and implemented. The Chure–Tarai Madhesh Conservation and Management Strategy has been developed in 2017 to stop/reduce habitat fragmentation and degradation. As such, the landscape management strategy has not been revised and implemented by 2016 but Integrated Landscape Planning Directives, 2012 (2069 BS) were already in place. Strategic plans for individual landscape (TAL, CHAL, KSL, HSL, KL) have also been developed and operationalized. Now, more than 88% of the country's area has come under the landscape level conservation. Community managed forests in these landscapes have a conservation-friendly management as the focus is to conserve biodiversity and natural environment. GoN has enacted Forest Encroachment Control Strategy (2012). *The progress is on track to achieve target.*

ABT 6. Sustainable Fisheries: For the purpose of sustainable fisheries, wetlands were found not declared as fish sanctuaries but restriction of fishing has been put in certain stretch of Koshi, Kaligandaki and certain area in Phewa lake. No rivers are declared as unhindered N-S biological connectivity. There is no control over the spread of invasive fish species. Mahasheer in Phewa, Buhari in Banke & Bara, Asala in Syangja Districts have been piloted. Efforts are underway to control eutrophication of wetlands across Nepal. During the reporting period, no commercial fish farming in hydropower reservoir was initiated. *The progress is towards target but at an insufficient rate.*

ABT 7. Sustainable Resource Management: Government of Nepal developed and enacted Scientific Forest Management Guidelines in 2014 to advance the sustainable management in production forests. As of March, 2018, 81,500 ha of the production forest has been brought under the Scientific Forest Management by 285 CF, 30 CFM and 6 DFO. During the reporting period, 535,808 ha government managed forest was brought under community based management. All forest management regimes include biodiversity chapter. Only 1 wetland is enlisted as Ramsar sites (Lake Clusters of Pokhara Valley) during the reporting period. Community based management of agrobiodiversity has already been expanded in 21 districts. *The progress is on track to achieve target.*

ABT 8. Pollution: V**e**ry limited updated information exists regarding the country's industrial pollution and its impact detrimental to ecosystem function and biodiversity. National Pollution Control Strategy and Action Plan (2017-2032) has been prepared and waiting for endorsement. Similarly, pollution management measures are incorporated in Lake Cluster of Pokhara Valley. *There is progress towards target but at an insufficient rate*.

ABT 9. Invasive Alien species: Regarding detail survey of the coverage and research in IAs, Nepal has initiated to develop distribution maps, conduct inventories, develop strategy, improve awareness and monitor results. The massive plant species identified are *Chromolaena odorata, Eichhornia crassipes, Parthenium hysterophorus* and *Lantana camara*. This target has been implemented in wetlands including Beeshhazari (Chitwan), Jokhad (Kailali), Betana (Morang) to name a few to raise awareness; however, developing biological control agent needs scientific knowledge and expertise in a country like ours. The IAS Management Strategy has been prepared but not endorsed to this date. *There is progress towards target but at an insufficient rate*.

ABT 10. Vulnerable Ecosystems: To maintain the integrity of the ecosystems, EbA project has been piloted in mountain ecosystem in Panchase area. Recently IUCN has expanded EbA project to Rasuwa district but effectiveness is yet to be reported and more than 3,000 CFUG adopt climate change planning. During the project period (2011-2016), 120 ha (1.8%) of 72 vulnerable sites degraded land was intervened with land rehabilitation measures; Effect of climate change on alpine plants and people are in progress under GLORIA research in the Himalayas by GoN. and Tribhuvan University, focusing on mountain ecosystem. *There is progress towards target but at an insufficient rate.*

Strategic goal C: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity comprises ABT 11 to ABT 13 which are as follows.

ABT 11. Protected Areas: Currently, Nepal's 23.39% (i.e. 34,419.75 sq km) land area is under PAs that comprises 12 National Parks, 1 Wildlife Reserve, 1 Hunting Reserve, 6 Conservation Areas, and 13 Buffer Zones. There has

been increase in area coverage of the national parks from 32% to 34%. Community forests in particular have conservation-friendly management as a focus to conserve biodiversity and support local livelihoods in major corridors. Kailash Sacred, Chitwan-Annapurna, Kangchenjunga and Western Mountain Landscape were identified and declared as conservation landscape having north-south linkage as complement to the PAs management. Most of the CFs support conservation friendly management but not all. Very limited knowledge on climate refugia identification and mapping exist, hence demands more research and validation. Currently, Nepal has declared 10 Protection Forests and additional 9 forests are in the process of declaration. Three underpasses were built in Barandabhar corridor; the result shows suitable for small mammals only. Others are planned in Chitwan and Nawalparasi; and also Guidelines for Smart Green Infrastructure have been drafted. National Zoo Policy has been drafted but waiting for endorsement. *The progress is on track to achieve target.*

ABT 12. Species and Extinction: The IUCN Regional Red List on the Status of Nepal's Mammals was done in 2011. To date, Conservation Action Plans of ten faunal species (Bengal Florican, Blackbuck, Gharial, Pangolin, Rhino, Tiger, Snow leopard, Vulture, Elephant and Red Panda) prepared, and Pheasants are under development. For floral species, Conservation Action plan is prepared for Bijayasal (*Pterocarpus marsupium*), and Laligurans (*Rhododendron* species). Action plan for Satisal *(Dalbergia latifolia*), Rudraksha (*Elaeocarpus sphaericus*), Okhar (*Juglans regia*), are under development. Master plan for a zoo at Suryabinayak has been approved, MoFE has plans to establish at least one zoological garden in each state. The human-wildlife (HWC) is high in all states. In PAs of Tarai, different adaptive measures for elephants, rhinos and common leopard are implemented. Awareness training on different PAs is given, predator proof corral (low cost) was distributed to vulnerable communities in Tarai PAs. *The progress is on track to achieve target.*

ABT 13. Genetic Diversity: Nepal is rich in agrobiodiversity. The draft of Agriculture Diversity Conservation Act is ready for endorsement to this date. Out of 30,000 existing estimated accessions, the national gene bank has preservation of 11,389 accessions. Out of 74 crops and 145 horticultural crops' genetic material have been conserved for 40 crop and horticultural species (458 samples). Annually about 1,000 accessions are collected, community based conservation has been expanded in 31 districts. Some 65 accessions of 16 wild relatives of crops have been conserved *in-situ* and *ex-situ*. Community participatory programs for conservation and utilization of indigenous animal genetic resources in Nepal is established at different districts for Yak, Sheep, Goat, and Cow. *The progress is on track to exceed target.*

Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services comprises ABT 14 to ABT 16 as follows.

ABT 14. Ecosystem Services: In Nepal, ecosystem services are in decreasing trend due to over use of natural resources like in other countries. A total of 64 critical watershed/river system identified by Master Plan of PCTMCD, former DSCWM, and DSCO have been implementing integrated soil and water conservation initiatives. CARE Nepal prepared 10 ISWMPs in CHAL and are under implementation. As of May 2018, total area under leasehold forestry programme is 43,317 ha covering 71,753 poor households. *The progress in on track to achieve target.*

ABT 15. Climate Resilience: Climate change can cause extinction of critical ecosystems as well as huge impact in the environment. Nepal National REDD+ Strategy was finalized and approved in 2018. Biodiversity Monitoring Protocol for REDD+ is also prepared. The NBSAP target for restoration through REDD+ program is 298,000 hectares. Currently, Environmental and Social Management Framework program of REDD+ will restore forests in 13 districts of Tarai and Chure range through the Emission Reduction Program. *The progress is on track to achieve target.*

ABT 16. Access and Benefit Sharing: The formulation of a specific ABS Act has been started since 2000. The present proposed ABS Bill has made an attempt to cover some relevant issues related to the protection of rights of the indigenous peoples' and local communities (IPLCs) over biological/genetic resources; access to genetic resources and associated traditional knowledge (TK); benefit sharing process; mechanism of access to genetic resources for preliminary scientific study; and institutional mechanism to implement the ABS Bill; etc. Nepal accessed to the Nagoya Protocol on August 29, 2018 by the House of Representative, and September 11, 2018 by National Assembly of Nepal (Nepal Gazette). *There is progress towards target but at an insufficient rate.*

Strategic goal E: Enhance implementation through participatory planning, knowledge management and capacity building from ABT 17 to ABT 20 as follows.

ABT 17. NBSAP implemented: The NBSAP, 2014-2020 has been endorsed and implemented by the Government of Nepal since 2014. *The progress is on track to achieve target.*

ABT 18. Traditional Knowledge: For documentation of traditional knowledge, protocol was developed before 2010, but practiced at pilot scale, and practice was not extended at wider national scale. A draft for the amendment of 'Plant Variety Protection and Farmers' Right Bill is under progress. Intellectual Property Rights legislation has been drafted.

The summary of NBSAP was translated in Nepali language and disseminated. The GoN, has provision of the participation of women and "Dalits" (at least female) in the local governments and national and provincial assemblies to meet the target. Resource governance community organizations such as CFUGs ensured at least 33% meaningful participation of women, "dalits", and disadvantaged groups in their executive bodies. However, in the case of government policy and decision making levels including NBCC such participation has been inadequate. In all CFUGs, BZUC and in conservation projects, capacity building program (skill development, literacy, livelihood support) designed and implemented but not sufficiently addressed. The p*rogress is towards target but at an insufficient rate.*

ABT 19. Science and Research: Knowledge generation on biodiversity plays an important role in updating existing data as well as in improving science-policy interface. Academic institutions, research organizations, I/NGOs, private research institutions, and individuals have been contributing to strengthen science and technology based knowledge relating to biodiversity. Preparation of checklist of flowering plants of Nepal have been initiated. No systematic information exists on assessment of Nepal's ecosystems. DPR has carried out exploratory survey of areas with possible existence of endangered species of flora. Status of mammals and birds has been updated, and presently 886 bird species and 212 mammal's species with different IUCN categories have been documented. Baseline survey of NTFPs and animal genetic resources is not on track. *The progress is towards target but at an insufficient rate*

ABT 20. Resource Mobilization: The Government budget allocation in forestry sector was 35.82 billion NPR (July 2014-June 2018). Other partner organizations supported larger programmes such as MSFP (recently phased out), Hariyo Ban, REDD+, NCCSP contributing to biodiversity funding. Other ministries such as agriculture, livestock, environment, tourism also allocated budget to implement NBSAP related activities. The government does not yet have biodiversity budget code for budget allocation for NBSAP related activities and is not reflected in the reporting system. Progress is observed involving private/corporate sector in PES and exploring new sources. *The progress is towards target but at an insufficient rate.*

Other activities contributing to the achievement of the ABTs at the global and regional level: Implementation of NBSAP has been effective in Nepal due to implementation of international agreements on biodiversity, and strengthening of regional collaboration for the restoration of biodiversity across the transboundary scale. Nepal has established an effective regional collaboration with China and India as well as with Bhutan to reduce threats to biodiversity in the transboundary landscape that also include human-wildlife conflict and illegal trade across borders. Contribution of ABTs supporting the achievement of the Sustainable Development Goals (SDGs) has also been assessed.

Global Strategy for Plant Conservation (GSPC): The Global Strategy for Plant Conservation (GSPC) with its 16 targets seeks to assess the conservation status of the world vascular plants by 2020, and to guarantee that at least 75% threatened taxa are conserved *in situ*. The GSPC has not been widely acknowledged and implemented at the national level. An evaluation rank assessment of the targets made first time in Nepal shows that out of 16 targets, four targets have been on track to achieve target at national level, 10 targets fall under the category of progress towards target but at an insufficient rate, and 2 targets are having no significant change at national level.

Indigenous Peoples' and Local Communities (IPLCs): The IPLCs in Nepal are mainly settled in and around high biodiversity wilderness areas including protected areas and Chure range. The GoN legally recognizes 59 different indigenous peoples. The GoN has taken initiation to further recognize the status of IPLCs. A few examples of IPLCs contribution to achievement of the ABT include in Sustainable production and consumption (ABT 4); Sustainable resource management (ABT 7); PAs management (ABT 11); Species and extinction (ABT 12); Genetic diversity (ABT 13); Ecosystem services (ABT 14); Traditional Knowledge (ABT 18); and Science and research (ABT 19). Therefore, traditional knowledge, practices and innovations possessed by IPLCs should be valued, respected and considered as useful and necessary for biodiversity conservation and sustainable use as other forms of knowledge taking account free PIC, full and effective participations at all level in accordance with objective of the Convention Article 8 (j), 10c.

ABT Achievements contributing to UN SDGs: Each ABT shows direct or indirect link to achieve targets of the Sustainable Development Goals (SDGs). The SDGs contain goal-wise quantitative indicators; some explicitly deal with conservation and sustainable use of various ecosystems and biodiversity including access to genetic resources and benefit sharing. SDGs and its linkages with Aichi targets based on the relevancy, biodiversity status, gaps and projections have also been analyzed as part of the guiding principles to the 6th NR preparation.

National biodiversity profile: This section in the report presents major drivers of change to biodiversity and ecosystems; major changes in threats to biodiversity with an emphasis at the sub-national levels; and an updated profile of species richness. The major drivers of change in the country include demographic and socio-economic changes; environmental and human induced changes such as climate and land-use changes, forest cover change; development activities; and political changes. Threat Assessment at sub-national levels was conducted in order to develop the 6th NR in a participatory and consultative way by organizing workshops in all 7 states of the country. All ecosystems are suffering from threats but the threat category differs. Status of Nepal's species richness; ecosystem/habitat diversity; and threatened and endangered species of Nepal in the CITES list have been compiled from different sources. The results of species diversity show that there has been emphasis mainly on conservation of higher groups of fauna. A status of the threatened and endangered species of Nepal in the CITES Appendices has been improved.

The 6th National Reporting to the CBD analysis of progress toward international biodiversity targets result suggests that despite accelerating policy and management responses to the biodiversity crisis, political commitment and institutional mainstreaming at the federal, state and local levels are needed to be reflected in improved trend to achieve the ABT by 2020.

Abbreviations and Acronyms

ABS	Access to Genetic Resources and Benefit Sharing
ACA	Annapurna Conservation Area
AFU	Agriculture and Forestry University
AIPs	Alien Invasive Plants
ANCA	Api-Nampa Conservation Area
ASHA	Adaptation for Smallholders in Hilly Areas
BCN	Bird Conservation Nepal
BED	Biodiversity and Environment Division
BZMC	Buffer Zone Management Committee
CBD	Convention on Biological Diversity
CBOs	Community Based Organizations
CDB	Central Department of Botany
CDES	Central Department of Environmental Science
CDZ	Central Department of Zoology
CFs	Community Forests
CFM	Collaborative Forest Management
CHAL	Chitwan Annapurna Landscape
CNP	Chitwan National Park
COP	Conference of Parties
DFO	Division Forest Office
DNPWC	Department of National Parks and Wildlife Conservation
DoF	Department of Forests
DoFSC	Department of Forests and Soil Conservation
DPR	Department of Plant Resources
DSCO	Division Soil Conservation Office
DSCWM	Department of Soil Conservation and Watershed Management
EbA	Ecosystem Based Adaptation
FECOFUN	Federation of Community Forests Users Nepal
FRTC	Forest Research and Training Centre
GCA	Gaurishankar Conservation Area
GEF	Global Environment Facility
GLORIA	Global Observation Research Initiative in Alpine Environments
GSPC	Global Strategy for Plant Conservation
GTI	Global Taxonomy Initiative
HWC	Human Wildlife Conflict
I/NGOs	International/Non-Government Organizations
IAAS	Institute of Agriculture and Animal Sciences
IAPs	Invasive Alien Plants
IoF	Institute of Forestry
ICIMOD	International Center for Integrated Mountain Development
IPLCs	Indigenous Peoples' and Local Communities
ITPGRGA	International Treaty on Plant Genetic Resources for Food and Agriculture

IUCN	International Union for Conservation of Nature and Natural Resources
KCA	Kangchenjunga Conservation Area
KL	Kangchenjunga Landscape
KNA	Korea National Arboretum
KSL	Kailash Sacred Landscape
KTWR	Koshi Tappu Wildlife Reserve
KU	Kathmandu University
LH	Leasehold Forest
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
MAT	Mutually Agreed Terms
MoALD	Ministry of Agriculture and Livestock Development
MoFE	Ministry of Forests and Environment
MoITFE	Ministry of Industry, Tourism, Forest and Environment
MoLAMC	Ministry of Land Management, Agriculture and Cooperatives
NARC	Nepal Agriculture Research Council
NBCC	National Biodiversity Coordination Committee
NBSAP	National Biodiversity Strategy and Action Plan
NCCSP	National Climate Change Support Program
NP	National Park
NPWCA	National Park and Wildlife Conservation Act
NR	National Report
N-S	North-South
NTFPs	Non-Timber Forest Products
NTNC	National Trust for Nature Conservation
PAs	Protected Areas
PCTMCDB	President Chure-Tarai Madesh Conservation Development Board
PES	Payment for Ecosystem Services
PIC	Prior Informed Consent
PU	Pokhara University
RBGE	Royal Botanical Garden Edinburg
REDD	Reducing Emissions from Deforestation and Forest Degradation
SHL	Sacred Himalayan Landscape
TAL	Terai Arc Landscape
TOR	Terms of Reference
TU	Tribhuvan University, Nepal
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
WML	Western Mountain Landscape
WWF	World Wildlife Fund
ZSL	Zoological Society of London

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Reporting Party

Contracting Party	Nepal
NATIONAL FOCAL POINT	
Full name of the institution	Government of Nepal Ministry of Forests and Environment
Name and title of Contact person	Yajna Nath Dahal Joint Secretary and Chief Environment and Biodiversity Division Ministry of Forests and Environment
Mailing Address	Ministry of Forests and Environment, Singh Durbar, Kathmandu
Telephone	+977-1-4211567 Mobile: 9841208317
Email	**yndahal@mofe.gov.np** **yajannath.dahal@nepal.gov.np**
Signature of focal person	
Date of submission	**December 31, 2018**

SECTION ONE: INFORMATION ON TARGETS BEING PURSUED AT THE NATIONAL LEVEL

1.1 Background

Biodiversity underpins livelihoods of people and supports national economy of Nepal, a country located in the Himalayas. It plays a crucial role in securing our current and future lives. Nepal as a contracting party to the Convention on Biological Diversity (CBD) is committed for making a significant reduction in the rate of loss of biodiversity through conservation of biodiversity, sustainable use of biodiversity components, and fair and equitable sharing of the benefits from the utilization of genetic resources (UN 1992). The CBD was ratified by Nepalese parliament on November 23, 1993, and enforced in Nepal since February 21, 1994.

Relevant decision and guidelines of the CBD Conference of Parties (COP), particularly the COP 10 Decision XI/2 on Strategic Plan for Biodiversity 2011-2020 adopted by Parties in October 2010, and the Aichi Biodiversity Targets made mandatory the formulation of Biodiversity Strategy. Henceforth, following Article 6 of the CBD, the Government of Nepal came up with Nepal Biodiversity Strategy in 2002 and its implementation plan (2006-2010). The then Ministry of Forests and Soil Conservation revised the strategy in 2014 after rigorous and extensive consultations engaging a wide range of stakeholders as National Biodiversity Strategy and Action Plan (2014-2020). Nepal's National Biodiversity Strategy and Action Plan (NBSAP) aims to provide a strategic framework for the conservation and management of Nepal's biodiversity. It also commits to fulfill the international obligation being a member of CBD and also is the key instrument for translating the Aichi targets into national actions through national indicators, integration of biodiversity across sectors, and legal and institutional preparedness. The revised Nepal's NBSAP for 2014-2020 is a comprehensive framework for achieving the nation's goals to conserve the biodiversity for the coming six years (GoN-MoFSC 2014a). The conservation of biodiversity through the sustainable use of biological resources is the main biodiversity strategy to comply with the Convention on Biological Diversity (CBD).

The revised NBSAP was developed with the emphasis on access to genetic resources and equitable benefit sharing, development of conservation action plans of priority faunal and floral species, mainstreaming biodiversity conservation into sectoral and cross-sectoral policies and plans, assessing threat analysis to biodiversity, enhancing community's, and gender and social inclusion participation, establishing measures to payment for ecosystem services including REDD+, establishing methodology for long-term environmental and socio-economic management, enhancing *in-situ* conservation of agrobiodiversity, and collection of crop genetic resources in the national gene bank, developing and implementing landscape strategy and action plan, strengthening international and transboundary regional cooperation.

As of the Article 26 of the Convention, Contracting Parties are required to submit national reports to the COP on measures taken to implement it, and the effectiveness of those actions in meeting the Convention's objectives. Likewise, Nepal has also made significant efforts by preparing and submitting Fourth and Fifth National Reports (NR) to the CBD in 2009 and 2014

respectively. Since, the Global Strategic Plan for Biodiversity is terminating in 2020, the Parties need to have their progress in implementing the Plan by the preparation of 6th NR to the CBD Secretariat considering and following the guidelines passed in the 13th meeting in December 2016, Cancun, Mexico (CBD/COP/DEC/XIII/27). Therefore, this provision made mandatory for the preparation of 6th NR and summary of the report be presented for the 14 COP, Egypt in November 2018.

1.2 NBSAP adoption and its overview

The Nepal National Biodiversity Strategy and Action Plan 2014-2020 (NBSAP) was developed in 2014 following the Strategic Plan for Biodiversity 2011-2020, and the Aichi Targets (GoN-MoFSC 2014). It is the key instrument for translating the Aichi targets into national action through defining national indicators, integration of the conservation and sustainable use of biodiversity into sectoral and cross-sectoral activities and policies, legal, and institutional preparedness.

The vision of NBSAP for 2020 is "Conservation of biodiversity for sound and resilient ecosystems and national prosperity". The overall goal of the NBSAP is to significantly enhance the integrity of Nepal's ecological systems by 2020, thereby contributing to human well-being and sustainable development of the country. The objectives of the NBSAP are to promote the coherence and contribute to the achievement of the three objectives of the CBD, and Strategic Plan for Biodiversity 2011-2020 and the ABTs. The objectives of NBSAP are consistent with the provisions of the "Constitution of Nepal 2015", such as clause regarding the conservation, management, and use of natural resources (Part 4, Article 51.g). The NBSAP contributes to the vision, goal, and purpose of the 14th TYP (2016/17-2018/19) of GoN (GoN-NPC 2016). It contributes towards achieving goals and objectives of biodiversity conservation and sustainable use of National Forest Policy 2015 (MoFSC 2015); Agriculture Development Strategy 2015-2035 (MoAD 2016); and the Sustainable Development Goals (SDGs) 2016-2030 (NPC 2017).

The NBSAP has grouped strategies into six biodiversity themes, namely protected areas biodiversity, forest biodiversity outside protected areas, rangeland biodiversity, wetlands biodiversity, agrobiodiversity, and mountain biodiversity. They are accompanied by 14 cross-cutting themes and sectors that relate to: (i) policy and legislative gaps; (ii) institutional strengthening; (iii) mainstreaming biodiversity across the government, society and economy; (iv) harmonization of biodiversity related international conventions; (v) enhancement of national capacity for improved management of biodiversity; (vi) landscape management; (vii) management of invasive alien species; (viii) adaptation to and mitigation of the effects of climate change; (ix) integrating gender and social inclusion perspectives; (x) conservation of and respect to traditional knowledge, innovations, and practices of indigenous people and local communities; (xi) knowledge generation and management; (xii) technology development,

acquisition, and use; (xiii) communication, extension and outreach; and (xiv) fund generation and mobilization (GoN/MoFSC 2014). There are 51 strategies developed with 226 priority actions for an effective implementation of the NBSAP.

Similarly, 81 national targets and it's indicators have been developed through participatory and consultative process for monitoring and evaluation of the NBSAP (GoN-MoFSC 2014a) as well as implementation of the Aichi Biodiversity Targets (ABT) (for details see GoN-MoFSC 2014b).

1.3 Ways for effective implementation

Biodiversity mainstreaming is largely a political matter; hence biodiversity mainstreaming can and should be included in development plans, poverty reduction strategies, and similar planning activities. It implies shifting responsibility that biodiversity conservation is no longer the sole responsibility of the MoFE, rather it is now a shared and common responsibility of relevant stakeholders.

Nepal has entered into new federal structure. The government has been restructuring entire administrative apparatus after the new constitution was promulgated in 2015. The new units of governance have been created at the state and the local levels. National level institutions are also being revised to fit the changed context. Further, Nepal is committed to pursuing and achieving the Sustainable Development Goals (SDGs) and has set targets to be achieved by 2030 (NPC 2015). The periodic plans and annual budgets have been already begun to reorient policy and budget priorities to reflect these commitments (NPC-GoN 2017). In this context, NBSAP will have limited impact on the ground as per the new federal structure if they are not translated into action at the local level. NBSAP are consistent with the international obligations, to which Nepal is a party; Constitution of Nepal 2015; and other national development policies, programmes, and priorities and development goals of the country. National targets are yet to be localized and mainstreamed into state and local level policy, program and budget. Efforts are needed to increase coherence between three tiers of government.

1.4 Process of 6th NR preparation

The 6th NR is largely based on consultative and participatory process. The preparation of 6th NR is based on the following principles that was used as a guiding tool. A brief description of each of the guiding principles is stated below.

1.4.1 Key achievements after 5th NR

Among few, the review of 5th NR to summarize on the key achievements to update the progress only made after 2014 to be included in the 6th NR was done. There has been a reduction in forest loss between 2005 and 2010 by 31%. Likewise, the status of some of the PAs has been changed

and PAs coverage now accounts to 23.39%. Similarly, conservation action plan for 10 animal species and 2 plant species have been updated/prepared and implemented. One wetland has been added to the Ramsar list of international importance. Likewise, grassland management has been effectively undertaken in Suklaphanta NP and mapping of grassland in CNP was conducted. GLORIA project to assess long-term environmental and socio-ecological monitoring (LTESM) of mountain biodiversity in the face of climate change is being implemented in Nepal Himalaya including Humla (ICIMOD 2017). With regard to agriculture biodiversity, 11,389 accessions of 52 crops from 62 districts are deposited in the National Gene Bank. Of 790 plant species that are useful for food, 577 of them are cultivated. Number of floral and faunal species updated include a total of 2,467 species of Fungi, 792 species of Lichens, 1,213 species of Bryophytes, 10,204 species of other Insects, 238 species of Molluscs, 232 species of Fishes, 886 species of Birds and 212 species of Mammals from Nepal till date.

It was also summarized that coherence between forests and agriculture biodiversity has been felt necessary. It was analyzed that each intervention either in agriculture or forests need to link to Aichi national indicators. Despite these, at the institutional level within MoFE, a separate Environment and Biodiversity Division has been established. Gender equality and social inclusion (GESI) is well mainstreamed at the user committee of different forest management regime; however, it is still difficult at the Buffer Zone Management Committee (BZMC) level.

Finally, there is inadequate mainstreaming of different aspects of biodiversity including gender and social inclusion and limited coordination among stakeholders both horizontally and vertically. Biodiversity conservation requires huge resources both human and financial and these have always been a constraint.

1.4.2 NBSAP monitoring and evaluation

The monitoring and evaluation of NBSAP (2014-2020) was also done by MoFE to assess the national target versus achievement as of the proposed action plan. The evaluation reveled that of 77 targets, 2 (3%) targets were achieved before deadline 2020, 22 (28%) targets were on track to achieve by 2020, 39 (51%) targets were towards progress but at an insufficient rate and there was no overall progress for 14 (18%) targets (MoFE 2018). Therefore, this evaluation has helped to value add information on the Aichi national indicators and enrich the 6th NR.

1.4.3 Sustainable Development Goals (SDGs) and its linkages with Aichi Biodiversity Targets (ABTs)

Nepal, as a signatory to the UN, has endorsed the United States 2030 Agenda and Sustainable Development Goals (SDGs) as a part of the global initiative to be achieved its goals by 2030 (NPC 2017). The foundation for the SDGs has been set by the Millennium Development Goals (MGDs). The SDGs contain goal-wise quantitative indicators; some explicitly deal with conservation and sustainable use of various ecosystems and biodiversity including access to genetic resources and benefit sharing.

The SDGs and its linkages with Aichi targets based on the relevancy, biodiversity status, gaps and projections have also been analyzed as part of the guiding principles to the 6th NR preparation. The detail of the analysis is reflected and will be highlighted in Section Four.

1.4.4 Progress towards national targets and indicators for meeting ABT

This task is the main basis for 6th NR preparation. During this task, the status, trends and progress towards each of the national targets and indicators abide by Aichi biodiversity targets were analyzed. It included a wide range of methods to meet the guidance principle.

Steering Committee formation: A Steering Committee under the Chair of National Focal Point for CBD (Chief- EBD, MoFE) was formed prior to undertaking the preparation of the national report. The members in the committee included representative from stakeholders' institutions including the UNDP Nepal, WWF Nepal, IUCN Nepal, ZSL Nepal, BCN, TU, KU, DNPWC, DoFSC, FRTC, DPR, NTNC, and the Member Secretary of Biodiversity Section, and were engaged from the inception workshop till the final nation dissemination workshop in providing technical inputs and other support such as field consultations. These members were also the focal points of their respective organizations. A set of questionnaire designed to obtain data/information to track the progress against each of the national target abide by the ABTs were sent to stakeholder institutions through their focal points that were also the member of the steering committee.

Desk review: A wide array of qualitative and quantitative sources in the form of desk review, including analysis of case studies, academic and applied research, and grey literatures were reviewed. Project documents, books, and publications required for the desk review was sourced from various facilities (mainly from Government ministries and its departments, ICIMOD, IUCN, WWF Nepal, NTNC, NARC, LI-BIRD, academic institutions & expert consultaion, etc.). Different cross-sectoral strategies were critically reviewed to contribute to the ABT targets. In addition to the documents and literatures available in national repository, following set of relevant reports (4 years, July 2014- June 2015, July 2015- June 2016, July 2016-June 2017, July 2017-June 2018) were collected, reviewed, catalogued and documented. It includes the annual progress reports of MoFE, MoALD, DNPWC, DoFSC, FRTC, DPR, and REDD Implementing Cell.

National consultation: Consultations are also crucial part of the methods that were carried out after detail desk study of the secondary documents. A wide range of actors from decision makers to practitioner who have been dealing with NBSAP implementation, conserving biodiversity including agrobiodiversity, indigenous peoples and their knowledge for conservation were consulted. These process were important for making sure that voices and experiences of relevant stakeholders are recorded, as well as management gaps and challenges faced for overall biodiversity conservation were properly documented. At the central level, civil society, academic institutions, CBOs, funding agency-UNDP, also Ministry and its Departments, Kathmandu based INGOs including WWF Nepal, IUCN, ZSL, ICIMOD and national NGOs including BCN, NTNC, LI-BIRD that are working in the field of biodiversity conservation were also consulted during the process.

State consultation: Since the country had undergone the restructuring and is divided into States. State level consultation was held in all of seven state headquarters. The workshop/consultation was expected to capture information, data, facts and figures based on the following:

- ✓ NBSAP mainstreaming into sub-national systems (planning, budgeting, and monitoring & evaluation), threat assessment, and implementation and actions
- ✓ State level projects/programs contributing to Aichi national indicators
- ✓ Integration and implementation towards achieving Global Strategy for Plant Conservation 2020
- ✓ Indigenous Peoples' and Local Communities (IPLCs) knowledge on sustainable use of biodiversity components and fair and equitable sharing of benefits arising from genetic resources
- ✓ Gender Equality and Social Inclusion in meeting all three objectives of CBD and to cohere with the national Aichi targets.

Specific questions recommended for 6th national reporting guidelines in 2016 (CDB/COP/DEC/XIII/27) and Global Biodiversity Outlook-4, 2014 are followed to understand the achievements and trends of the Aichi Biodiversity Targets and national indicators. Then, each national indicator was assessed against the global target following "Dash board (GBO 4, 2014). The detail of national target assessment is dealt in the following sections.

The participants include the representatives from State's Ministry of Industry, Tourism, Forests and Environment; Ministry of Land Management, Agriculture and Cooperatives; Protected Areas manager; local conservation leaders; indigenous community association, agri-business farmer's association, Conservation based women association, community seed banks, NTFPs based enterprise association, NTFPs traders, leading CBOs, Federation of Community Forests User Nepal district chapters.

Community consultation and field verification: Apart from the workshop, visit was done to the field sites based on the various thematic focus including PAs management, community conservation initiative sites, agrobiodiversity initiatives sites. The visit was done to document best practices, lessons learned and interact with the community. These cases are highlighted in the later part of the report to showcase Nepal's effort towards biodiversity conservation, involvement of GESI in conservation and sustainable use of resources, and conservation benefits to local livelihoods.

1.4.5 Reporting guidance of CBD to prepare 6th NR

Apart from CBD guidance for the preparation of 6th NR, the following guidance to suite in the present context of the country has been followed.

- ▶ National Constitution of Nepal and new governance
- ▶ Flexibility and adaptive management
- ▶ Lessons learned and synergy
- ▶ Equitability and inclusiveness
- ▶ Transboundary cooperation and user friendly monitoring

SECTION TWO: IMPLEMENTATION MEASURES TAKEN, ASSESSMENT of their EFFECTIVENESS, ASSOCIATED OBSTABLES, AND SCIENTIFIC AND TECHNICAL NEEDS TO ACHIEVE NATIONAL TARGETS

This section briefly highlights on the linkages of NBSAP thematic areas with ABTs, implementation measures for NBSAP, assessment of their effectiveness; associated obstacles and needs to achieve national targets.

2.1 Linkages of NBSAP thematic areas and ABTs

This chapter of the section highlights the linkages between each of NBSAP thematic areas and ABTs and stakeholders' involved for implementation for each of the thematic areas (Table 1)

Table 1: Linkages of NBSAP thematic areas and ABTs

Thematic Area	**Relevant ABTs**	**Implementing Agency**	
		Main	**Support**
1. Protected Areas and species	1: Biodiversity Awareness 2: Biodiversity Mainstreaming 11: Protected Areas 12: Species and Extinction 18: Traditional Knowledge 19: Science and Research 20: Resource Mobilization	MoFE, DNPWC, DoF	I/NGOs, BZUCs, IPLCs, Research Institutions
2. Forest biodiversity outside PAs	1: Biodiversity Awareness 2: Biodiversity Mainstreaming 3: Perverse Incentives 4: Sustainable Production and Consumption 5: Habitat Fragmentation and Degradation 7: Sustainable Resource Management 9: Invasive Alien Species 10: Vulnerable Ecosystems 12: Species and Extinction 14: Ecosystem Services 19: Science and Research 20: Resource Mobilization	MoFE, DoFSC, FRTC	CFs, FECOFUN, Federation and Networks, Research Institutions, I/NGOs, CBOs
3. Rangeland Biodiversity	1: Biodiversity Awareness 2: Biodiversity Mainstreaming 4: Sustainable Production and Consumption 14: Ecosystem Services 18: Traditional Knowledge 19: Science and Research 20: Resource Mobilization	MoALD, NARC, DNPWC,	I/NGOs, Research Institutions
4. Wetland Biodiversity	1: Biodiversity Awareness 2: Biodiversity Mainstreaming 4: Sustainable Production and Consumption	MoFE, MoALD, DNPWC, DoFSC	CBOs, Private Sectors, I/NGOs, Academic Institutions

	6: Sustainable Fisheries 7: Sustainable Resource Management 8: Pollution 18: Traditional Knowledge 19: Science and Research 20:Resource Mobilization		
5. Agrobiodiversity	1: Biodiversity Awareness 2: Biodiversity Mainstreaming 3: Perverse Incentives 4: Sustainable Resource Management 13: Genetic Diversity 18: Traditional Knowledge 19: Science and Research 20: Resource Mobilization	MoALD, NARC	I/NGOs, Local Communities, Private Sectors, Universities
6. Mountain Biodiversity	1: Biodiversity Awareness 2: Biodiversity mainstreaming 5: Habitat Fragmentation and Degradation 10: Vulnerable Ecosystem 19: Science and Research 20: Resource Mobilization	MoFE	I/NGOs, Academic Institutions, IPLCs
7. Cross-cutting (policy and legislative gaps; institutional strengthening; mainstreaming biodiversity across the government, society and economy; harmonization of biodiversity related international conventions; enhancement of national capacity for improved management of biodiversity; landscape management; management of invasive alien species; adaptation to and mitigation of the effects of climate change; integrating gender and social inclusion perspectives; conservation of and respect to traditional knowledge, innovations, and practices of indigenous people and local communities; knowledge generation and	1. Biodiversity Awareness 2. Biodiversity Mainstreaming 3. Inventive and Subsides 4. Habitat fragmentation and degradation 7. Sustainable Resource Management 9. Invasive alien species 10. Vulnerable ecosystem 15. Climate Resilience 16. Access and Benefit Sharing 17. NBSAP 18. Traditional Knowledge 19. Science and Research 20. Resource Mobilization	All cross cutting Ministries	I/NGOs, Academic Institutions, IPLCs

management; technology development, acquisition, and use; communication, extension and outreach; and fund generation and mobilization			

2.2 Implementation measures

Implementation measures have been undertaken by Nepal to effectively implement the NBSAP and place it at the highest political level so that the NBSAP implementation on the ground take place in full phase as planned with respect to new federal structure of the country. A brief review of measures taken to implementation of the NBSAP and effectiveness following CBD (2018) are given in Table 2.

Table 2: Measures taken to implement NBSAP

Measures taken	Status and trends	Effectiveness
1. Legal preparedness	**Policy/Acts/Strategy/Plans (contemporary and major)** • Forest Policy 2015 • Forestry Sector Strategy (2016-2025) • CHAL Strategy and Action Plan (2016-2025) • TAL Strategy and Action Plan (2015-2025) • NPWC Act 2017 (fifth amended) • Forest Act (second amended) • Agriculture Development Strategy (2015-2035) • National Ramsar Strategy and Action Plan, Nepal (2018-2024) • CITES Act 2017 • 10 conservation action plan (faunal species) • 2 conservation action plan (floral species)	Measure taken has been partially effective
2. Institutional arrangements	**Federal level** • Ministry of Forests and Environment • Ministry of Agriculture and Livestock Development **State and Local level** • Ministry of Industry, Tourism, Forests and Environment • Ministry of Land Management, Agriculture and Cooperatives • Village/Municipality level Institutions	Measures taken has been partially effective
3, Stakeholders engagement	• Stakeholder role for biodiversity conservation especially for landscape level conservation, ecosystem and species conservation is commendable, however stakeholder often miss or ignore implementation of targets set at the national level for ABT	Measures taken has been partially effective
4. Capacity enhancement	• **Institutional**: Strengthening institutional capacity is needed for implementation of NBSAP by allocating adequate human resources with an emphasis at the sub-national level.	Measures taken has been partially effective

	• **Financial**: More meaningful cooperation between public, donors, INGOs, CBOs and private sectors are needed for generating additional resources for implementation of NBSAP • **Scientific & Technical**: Limited scientific and technical capacity at both national and sub-national levels exist to effectively implement the NBSAP.	
5. Communication	• Limited awareness on NBSAP and its implementation (Source: State workshops for 6th NR preparation)	Measures taken has been partially effective
6. Monitoring & Evaluation	• NBSAP-midterm evaluation conducted	Measure taken has been effective
7. International & Regional Cooperation	• International and regional cooperation have been extended contributing to global initiatives as well as regional transboundary landscapes with Bhutan, China, and India (See Section 4.21 for details)	Measure taken has been effective

2.3 Assessment of effectiveness of NBSAP

The recent assessment of effectiveness of NBSAP showed that the implementation of the strategy has generally progressed well in different agencies working under MoFE and MoALD. The positive results indicate that many of the Government level decisions and implementation processes such as those concerning protected areas, forest policy, ITPGRFA, *ex-situ* conservation of agrobiodiversity, CITES implementation, landscape level management, promotion of category of protected areas, and the reformed legislation - all promote and support to the achievement of national targets of the NBSAP. However, at the same time several national targets either have not been met or are unlikely to be met by 2020. It requires significant additional efforts to achieve these targets (MoFE 2018). A mid-term analysis of progress toward international biodiversity targets result suggests that despite accelerating policy and management responses to the biodiversity crisis, the impact of these efforts are unlikely to be reflected in improved trend in the state of biodiversity by 2020 at global scale (Tittensor et al. 2014); and similar projection exist for Nepal too.

2.4 Associated obstacles during implementation and time frame

Several obstacles were observed for effective implementation of the NBSAP that either hindered or distracted implementation of the NBSAP at the national level; they are listed as follows:

- 2014-2015 – The new constitution was promulgated in 2015 that provide also an opportunity to strictly pay an attention to the conservation and sustainable use of biodiversity; and provisions of the Constitution of Nepal, 2015 are consistent with NBSAP implementation, such as to: i) conserving the natural resources available in the country, its sustainable use in an environmental friendly way, and ensuring the fair distribution of the benefits generated by it by giving local people the priority and preferential rights (Article 51.g); ii) making a sustainable use of biodiversity through the conservation and management of forests, fauna and flora, and by minimizing the negative impacts of industrialization and physical development by promoting public awareness on environmental cleanliness and protection, and formulate

policies and enact laws on the basis of the principle of sustainable environment development (article 51.5); iii) and making special arrangements to ensure the rights of *Adivasi Janajatis* (indigenous ethnic groups) to lead a dignified life with their respective identities, and making them participate in decision making processes that concern them, and preserving and maintaining the traditional knowledge, skill, experience, culture and social practices of *Adivasi Janajatis* and local communities (article 51.10).

- Earthquake that took place in 2015 brought also damage and loss of lives, settlements and agricultural land, the devastated earthquake has destroyed large areas of forests compromising the capacity of natural forests ecosystems to deliver important services and benefits to the people (NPC 2015a). FAO, Rome has estimated forest loss rate of 2.2% for only six earthquake districts (NPC 2015b). Damage and loss of forest and biodiversity have also been observed in 7 PAs (out of total 20 PAs) that have received hard earthquake hit covering 15,988 km^2, i.e., 46.8% of total PAs coverage in Nepal. Losses of ecosystem services due to earthquake have been estimated NPR 34,021.3 million (NPC 2015a, b).
- 2016 – After the restructuring of the country, the government has been restructuring entire administrative apparatus after the new constitution was promulgated in 2015. The new units of governance have been created at states and local levels.
- 2017 – The NBSAP implementation year was largely affected by the local elections held in 2017. As the whole political/administrative set up of the country focused on conducting the election, the activities under NBSAP implementation was not effectively implemented in the field.
- 2018 – National level institutions are also being revised to fit into the changing context. The Ministry of Forests and Soil Conservation and the Ministry of Environment were merged and restructured as Ministry of Forests and Environment.
- 2018 – Institutional setup together with infrastructure settings at the state and local levels, bringing in human resources at the institutions at the sub-national levels delayed the NBSAP implementation.

These obstacles may also be an opportunity to place biodiversity issues and concern for conservation and mainstream biodiversity conservation agenda at the state and local system.

2.3 Revisions recommendation

The NBSAP monitoring and evaluation has made recommendation to make revision in the implementation measures (MoFE 2018).

Revision of the organizational structure of the Ministry: The then MoFSC, now MoFE's departments has been revised as per the changed context. One of the changes at the sub-national level is that the district level offices have been reorganized as Division Forest Office.

Revision of the local level organization: The then DDC (District Development Committee) has been restructured as District Coordination Committee (DCC) to plan, coordinate, monitor and execute environment related programs. However, NBSAP has mentioned DDC and VDCs as the local entity to develop local level plans incorporating biodiversity. At the present context, this needs to be revised and the municipality and rural municipality plan to incorporate biodiversity and environment aspects.

Revision of the targets: As there has been a major shift in the governance structure of the country since the time of formulating NBSAP in 2014, relevancy and appropriateness of some targets, primary roles and responsibilities of different agencies have changed. As a result, some of the targets is recommended for revision. The targets that are recommended for revision for different reasons are listed below.

(i) *Change in administrative context*: The restructuring of the country has entrusted several authorities and designated responsibilities to the Local Government Units. With regard to this situation, the targets which was previously handled by inter-departmental coordination, such as the management of grasslands (ABT 4) and wetlands (ABT 4) except for Ramsar sites, need to be revised as now managed under local government structure. Similarly, the target that included Environment Friendly Governance and LBSAP or even the translated NBSAP into Nepali version and local level dissemination (ABT 18) is recommended and a comprehensive LBSAP including plan for disaster risk management, climate change need to be prepared for/by all the Local Government Units.

(ii) *Further elaboration needed*: Some targets are ambiguous and is recommended to be more specific and clear, such as "Production forest under sustainable management (ABT 4) can be specified as the 'Production forest'; the preparation of conservation action plans of faunal species (ABT 11) is done by DNPWC whereas that of floral species is done by DoFSC and thus also extends to outside the Protected Areas.

(iii) *Making the targets more realistic*: It was found that some of the targets are not achievable in the given time period. They are recommended to be revised to make them attainable. These include enlisting five additional wetlands into Ramsar Site (ABT 7); and collection and conservation of genetic materials of 75% of commonly cultivated species (ABT 13).

(iv) *Making the targets more comprehensive*: Some of the targets are recommended for revision to make them more comprehensive, in particular those dealing with different bills and legislation can be made comprehensive to come under umbrella legislation.

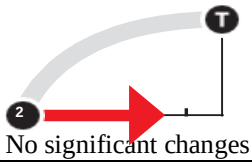
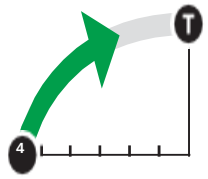
(v) *Addition of targets*: Some targets are recommended to incorporate the emerging and relevant issues. These include incorporation of targets on human wildlife conflict and management; wildlife health, forest fire, and creation of Biodiversity Code in national accounting system. Since, the current NBSAP is terminating in 2020, it is impracticable to add them in the current NBSAP, and these issues should be given due priority in the next NBSAP, however the preparatory actions should be initiated now (MoFE 2018).

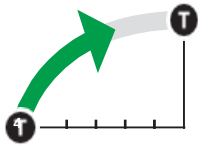
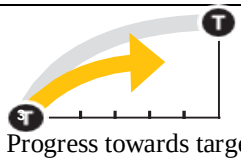
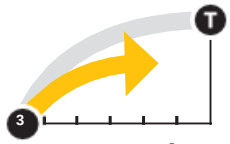
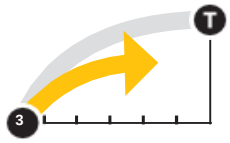
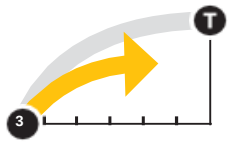
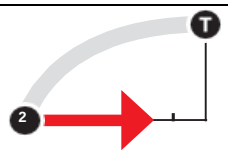
SECTION THREE: ASSESSMENT OF PROGRESS TOWARDS EACH NATIONAL TARGET

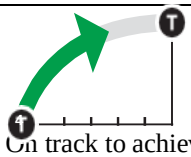
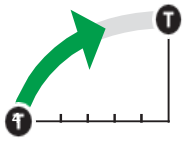
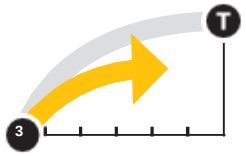
For the implementation of the ABT, Nepal's NBSAP has developed 81 national targets and its corresponding indicators. There are set of indicators for meeting the ABT under the five Strategic Goals A, B, C, D and E. Some of these national targets and indicators overlap with each other and some are repeated under different ABT. Thinking of this, building on a common understanding, it was brought to 58 targets for the process of the 6th NR. An intensive desk review, followed by state level and stakeholder consultations, these targets were assessed based on the Global Biodiversity Outlook-4, 2014 (GBO 2014). Each national target based on their assessment was rated as categories: 1 represents purple line (moving away from target), 2 represents red line (no significant changes), 3 represents yellow line (progress towards target but at an insufficient rate, 4 represents green line (on track to achieve target), and 5 represents blue line (on track to exceed target) (CBD 2014). In addition, the confidence level was assessed and represented with asterisks (*, **, ***) to indicate low (based on limited evidences), medium (based on partial evidence) and high (based on comprehensive evidence) (CBD 2018).

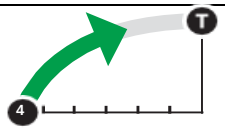
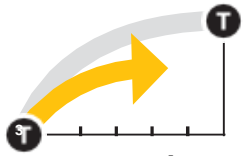
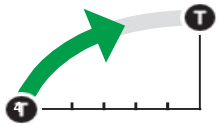
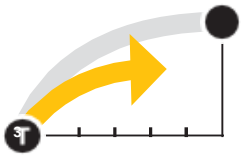
A summary of progress towards the national targets, its indicators abide by ABT, as per the GBO, 2014 is summarized as follows (Table 3). The assessment of targets shows that out of 58 targets, 3 (5.2%) were achieved before the deadline of 2020; 12 (20.7%) were on track to achieve the targets by 2020; 38 (65.5%) indicators were on progress but at an insufficient rate; 5 (8.6%) indicators had no significant progress; and none of the indicators showed moving away from the target.

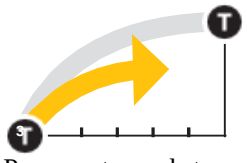
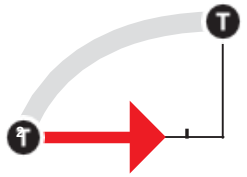
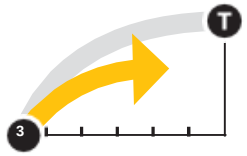
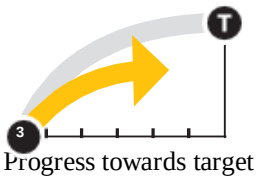
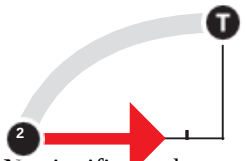
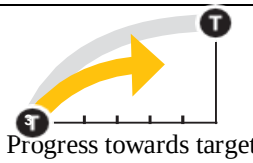
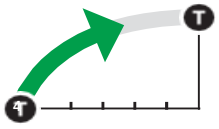
Table 3: Summary of overall assessment of progress in each national target and indicator

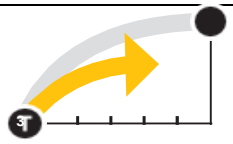
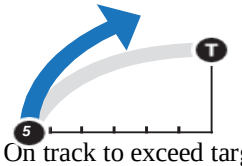
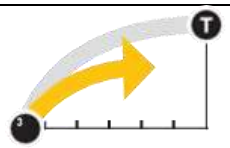
ABT/Selected National Targets	National Indicators	Progress	Category of Progress and Level of Confidence
	ABT 1: Biodiversity Awareness		
1. Establish a functional National Clearing House Mechanism by 2015, and operate National Biodiversity Information Management System (NBIMS) by 2016.	Status of National Clearing House and NBIMS	A national biodiversity clearing house mechanism not established and NBIMS not operated.	 No significant changes (**)
2. By 2020, at least 100 new audiovisual packages on different aspects of biodiversity will be prepared and disseminated.	Number of audio visual packages developed and distributed	At least 70 new audiovisual package developed on different aspects of biodiversity both at center and local level. More than 200 episodes' radio program aired by DoFSC.	 On track to achieve target (***)

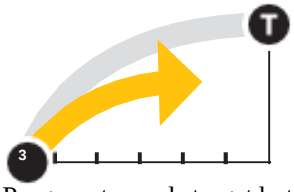
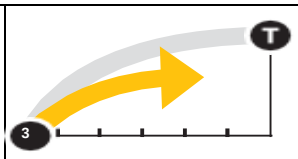
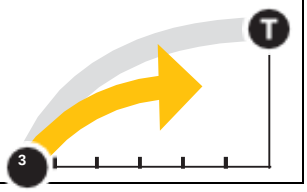
3. By 2020, enhance all the relevant programs and annual plans of the MoFE and MoALD which will have training, awareness raising, and on-site lecturing and demonstration in at least five selected protected areas and Ramsar sites	Number of trainings and awareness raising events, on-site lecturing, information center established	All annual plans of MoFE and MoALD have trainings and awareness raising in all districts. Information center functional in five Ramsar sites	 Progress on track to achieve target (***)
4. Establishment and management of a modern zoo, multipurpose nurseries, freshwater aquarium and botanical gardens to educate people about indigenous flora and fauna and their relation to human being	Status of new zoos, multi-purpose nurseries and botanical gardens	Zoological and botanical garden proposed and planned in all 7 states by 2020.	 Progress towards target but at an insufficient rate (***)
	ABT 2: Biodiversity Mainstreaming		
1. Amending, by 2016, the Government of Nepal (Allocation of Business) Regulations (2012) for giving biodiversity mainstreaming due importance by the National Planning Commission and relevant ministries.	Change in scope of the work of NPC to incorporate biodiversity	MoFE & MoALD have mainstreamed biodiversity conservation issues into their planning, other sectoral Ministries still need to be mainstreamed.	 Progress towards target but at an insufficient rate (**)
2. The Economics of Ecosystem and Biodiversity (TEEB) study will be carried out for protected area, forest, mountains and agriculture sector.	Number of TEEB studies carried out	Methods/processes are available for economic valuation for ecosystem services (Rasul et al. 2011), such as for Kailash Sacred Landscape (Nepal et al. 2017) and Koshi Tappu Wildlife Reserve (ICIMOD 2014). Standard national format has not been developed for various ecosystems.	 Progress towards target but at an insufficient rate (**)
3. Incorporation, by 2019, biodiversity considerations will be mainstreamed in local policies, plans and programs of relevant line ministries and other relevant government and non-government agencies.	Biodiversity integration at local level development plans and programs	Institution setup at Federal, State and Local level established. Envisioned for mainstreaming in local polices, plans and programs but not implemented.	 Progress towards target but at an insufficient rate (**)
	ABT 3: Perverse Incentives		
1. By 2020, perverse incentives in agriculture and forestry sector will be identified and their phase out plan prepared and implemented.	Number of perverse incentive in agriculture and forestry eliminated	Perverse incentives' phase out plan not envisioned.	 No significant change (***)

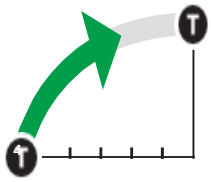
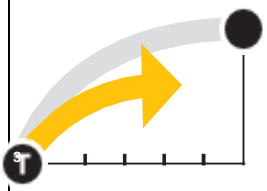
2. Incentive measures introduced for the genetic resource conservation of traditional agriculture crop, livestock, tree, shrub, herb and important wild animal.	Incentive measures introduced for genetic resource conservation	GoN providing support services including vaccination, drenching, shed improvement are being provided to farmers involved in *in-situ* conservation of indigenous breeds of cattle, buffalo, and sheep.	 Progress towards target but at an insufficient rate (**)
	ABT 4: Sustainable Production and Consumption		
1. By 2015, a National Strategic Framework for Conservation will be developed and implemented.	National Strategic Framework for conservation approved	National Strategic Framework for Sustainable Development (2015-2030) developed, partially implemented.	 On track to achieve target (***)
2. Inventory of all wetlands be completed by 2017; and 5 major degraded wetlands be restored by 2020.	Wetlands inventory and restoration conducted	Inventory of few major wetlands (Beeshhari, Ghodaghodi, Pokhara lake cluster, Jagadishpur, Maipokhari, KTWR) and 5 degraded wetlands partially restored.	 Progress towards target but at an insufficient rate (***)
3. By 2020, Low Carbon development strategy will be developed and implemented; SFM criteria developed and implemented; and climate-smart biodiversity management plan will be prepared.	Low Carbon Developmenent Strategy approved	Low Carbon Economic Development Strategy of Nepal 2015 developed. SFM criteria developed to suite into the country's context. Climate-smart management plan of few PAs (Manaslu, Dhorpatan, Krishnasar, Parsa, KTWR, Annapurna) prepared and implemented.	 On track to achieve target (***)
4. By 2020, all the district forest offices and forest user groups will develop and implement NTFPs management plan, especially targeting conservation of over-harvested species.	NTFPs management plan prepared	Government has identified 10 important NTFPs, but separate management plan has been prepared only for Jatamashi (*Nardostachys grandiflora*) for Humla district and EIA carried out for the first time, Yar-tsa-gunboo (*Ophiocordyceps sinensis*) harvesting regulation prepared by ANCA and Shey-Phoksundo NP, some PAs (GCA, ACA) have NTFP harvesting and regeneration plan. KCA	 Progress towards target but at an insufficient rate (***)

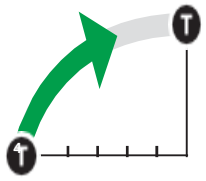
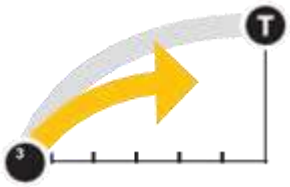
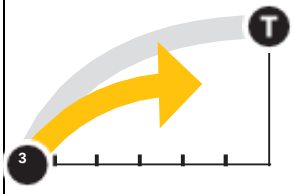
		has prepared business plan for Kutki (*Neopicrorhiza scrophulariiflora)*, Juniperus spp., *Swertia chirayita*. District Forest (5 yr.) Plan also include a separate NTFPs management chapter.	
5. Carrying out inventories to assess status and trends of rangeland resources and regulating the use of rangelands as per their carrying capacities.	Rangeland resources and their carrying capacities conducted	Grassland habitat mapping for CNP (2016), PAs management plan include rangeland management chapter. Carrying capacity assessment initiated in CNP for tiger habitat by DNPWC in collaboration with conservation partners.	 Progress towards target but at an insufficient rate (***)
6. By 2020, management plan for all forest regime will be prepared and implemented.	Management plan for all forest regimes prepared	All forest regime (CF, CMF, LHF) has guidelines for their OP preparation. In all districts, management plan of different forest regime preparation, its renew and implementation is a continuous process.	 On track to achieve target (**)
	ABT 5:Habitat Fragmentation and Degradation		
1. By 2015, a comprehensive and practical strategy and action plan will be developed and implemented for effective conservation of the Siwalik forests.	Strategy and Action Plan for conservation of Siwalik developed	President Chure-Tarai Madhesh Conservation and Management Master Plan developed (2017).	 Progress towards target but at an insufficient rate (**)
2. The landscape management strategy will be revised and implemented by 2016.	Landscape management strategy revised	Individual management strategy for TAL, CHAL, SHL, KSL, KL prepared and implemented.	 On track to achieve target (**)
3. By 2020, at least 10,000 ha of the encroached forestland will be reclaimed and degradation will be reduced by at least 75% of the current rate.	Rate of deforestation and forest degradation reduced	Reclaimed of encroached forestland was 16.1% (DoF, 2017) and 3226 ha forest land will be reclaimed with the current rate of progress.	 Progress towards target but at an insufficient rate (**)

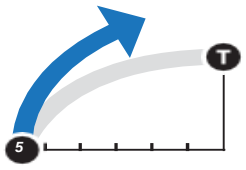
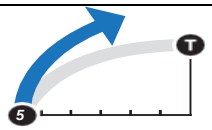
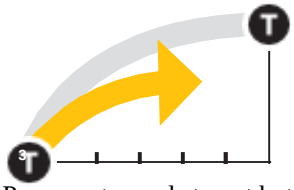
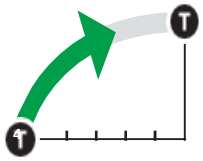
4. By 2020, effective conservation measures are implemented in at least five critical north-south corridors.	Landscape management strategy implemented	CHAL, KSL, KL, SHL, WML maintain N-S connectivity, inadequate studies to substantiate the critical N-S linkages.	 Progress towards target but at an insufficient rate (**)
	ABT 6: Sustainable Fisheries		
1. By 2017, at least three suitable wetlands will be declared and managed as fish sanctuaries; and by 2020, N-S biological connectivity will be developed in three major rivers.	Fish sanctuaries established, N-S biological connectivity established	Wetlands were found not declared as fish sanctuaries but restriction of fishing made in certain stretch of Koshi, Kaligandaki and certain area in Phewa lake. No rivers declared as unhindered N-S biological connectivity.	 No significant change (***)
2. By 2018, spread of invasive fish species will be controlled; and by 2020, pilot projects will be developed and implemented for conservation (*in-situ* and *ex-situ*) of 10 economically important native fish species.	The spread of invasive fish species, conservation measures implemented for native fish species controlled	No control over the spread of invasive fish species Mahasheer in Phewa, Buhari in Banke & Bara, Asala in Syangja Districts piloted.	 Progress towards target but at an insufficient rate (**)
3. By 2020, encroachment and eutrophication of 10 major wetlands will be controlled.	Encroachment and eutrophication of major wetlands controlled	Efforts are underway to control eutrophication in most of the wetlands across Nepal.	 Progress towards target but at an insufficient rate (**)
4. Initiation of commercial fish farming in at least three hydropower reservoirs, by 2020.	Commercial fish farming in hydropower reservoirs established	During the reporting period, no commercial fish farming initiated.	 No significant change (**)
	ABT 7: Sustainable Resource Management		
1. By 2020, 50 percent of the production forests will come under scientific management to improve forest productivity, biodiversity conservation and climate resilience.	Area of production forests under scientific forest management	Target for 2020 is 96,689 ha under scientific management, as of now- 84.3% comes under scientific forest management	 Progress towards target but at an insufficient rate (**)
2. By 2020, 10 percent additional national forest area will come under community based management; and by 2020, biodiversity chapter included in all forest management regime	Increase in the area of community managed forest, biodiversity chapter incorporated in	During the reporting period (July 2014-June 2018), 535,808 ha govt. managed forest under community based management.	

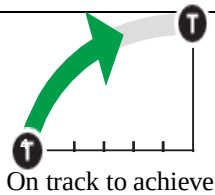
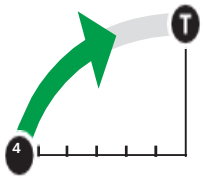
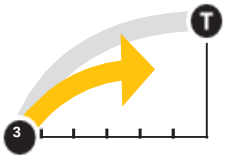
(Collaborative, Community, Leasehold).	forest management plan	All forest management regime include biodiversity chapter.	On track to achieve target (**)
3. By 2020, additional five wetlands of international importance will be identified and enlisted as Ramsar sites.	Enlisting of Ramsar sites	Only 1 wetland enlisted as Ramsar sites (Lake Clusters of Pokhara Valley).	 Progress towards target but at an insufficient rate (***)
4. By 2020, community based management of agrobiodiversity will be expanded to at least five additional districts.	Expansion of community based management of agro-biodiversity	Community based management of agrobiodiversity has already been expanded in 33 districts.	 On track to exceed target (***)
	ABT 8: Pollution		
1. By 2020, plans will be developed and implemented to: (i) monitor the level of use of pesticides, insecticides and chemical fertilizers, and (ii) control industrial pollution in five major rivers and other five major wetlands will be developed and implemented.	Assess the current status and monitor the use of insecticides, pesticides and chemical fertilizer, develop plan to contril industrial pollution in rivers	National Pollution Control Strategy and Action Plan prepared and waiting for approval to this date; remaining targets not initiated. River Ecosystem Management Plan for Rapti and Narayani is under formulation.	 Progress towards target but at an insufficient rate (**)
	ABT 9: Invasive Alien Species		
1. By 2020, detail survey of the coverage and research on modes and pathways of propagation, ecological and economic damage and loss, control measures, and biological control agents to control IAS will be conducted, and possible uses of at least five most problematic IAPs will be completed.	Survey of coverage of IAS, measures taken to control problematic IAS	International Conference on IAS management held from 25-27 March, 2014. Its resolution led to the formulation of draft IAS. Management. Strategy, ready for endorsement to this date. Identification of major IAS at national and local level done. "Impact Assessment of Invasive Alien Plant Species of Nepal" held on May 17-18, 2018 in Kathmandu has proposed four problematic IAPs and assess their threat category using Environmental Impact Classification of Alien Taxa (EICAT) adopted by IUCN. 26 species assessed, four species qualify for massive category, nine species fall in major, ten in moderate,	 Progress towards target but at an insufficient rate (***)

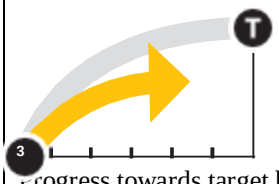
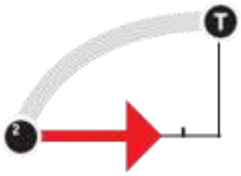
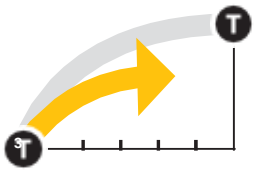
		and three in minor categories. The massive species identified are *Chromolaena odorata, Eichhornia crassipes, Parthenium hysterophorus* and *Lantana camara*. Except for *Eichhornia* spp, possible use of other four most problematic IAPs not completed.	
2. By 2020, program to raise awareness of local people focusing especially on marginalized communities on identification of IAS, their impacts and control techniques including biological control agents will be developed and implemented to control and manage IAS.	Awareness raising program on IAS focusing on local people	This target has been implemented in wetlands including Beeshhazari (Chitwan), Jokhad (Kailali), Betana (Morang) to name a few to raise awareness; however, developing biological control agent needs scientific knowledge and expertise in a country like ours.	 Progress towards target but at an insufficient rate (***)
	ABT 10: Vulnerable Ecosystems		
1. By 2020, at least 10,000 ha degraded mountain ecosystems will be restored through ecosystem based adaptation approach and 3,000 community forest user groups adopt climate change adaptation planning.	Restoration of degraded mountain ecosystems and user group adopting climate change adaptation planning	EbA project (2011-2016) has been piloted in mountain ecosystem in Panchase area, 120 ha (1.8%) of 72 vulnerable and degraded land was intervened with land rehabilitation measures (GoN/DoF/UNDP 2016). Recently IUCN & TMI has expanded EbA project to Rasuwa district but progress is yet to be reported and more than 3,000 CFUG adopt climate change planning. Effect of climate change on alpine plants and people are in progress under GLORIA research in the Himalayas by govt. and conservation institutions, focusing on mountain ecosystem.	 Progress towards target but at an insufficient rate (***)
	ABT 11: Protected Areas		
1. By 2020, at least 25% area of the country will be sustainably managed under protected area system.	Area under protected area system	Currently, Nepal's 23.39% (i.e. 34,419.75 sq. km) land area is under PAs that comprises 12 National Parks, 1 Wildlife Reserve, 1 Hunting	

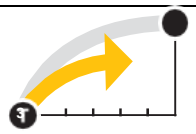
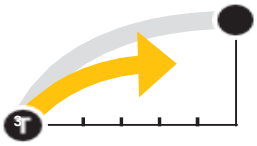
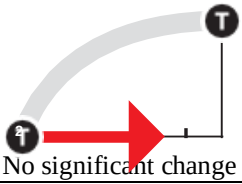
		Reserve, 6 Conservation Areas, and 13 Buffer Zones (DNPWC 2017).	Progress towards target but at an insufficient rate (***)
2. By 2020, local forest user groups will be capacitated for conservation friendly management of forests in five important corridors and climate refugia identified and mapped.	Enhance connectivity in corridors	Community forests in particular have conservation-friendly management as a focus to conserve biodiversity and support local livelihoods in major corridors. Western Mountain Landscape was identified and declared as conservation landscape (DoF 2018) having north-south linkages but inadequate data on conservation-friendly management. Most of the CFs support conservation friendly management but not all. Very limited knowledge on climate refugia identification and mapping exist and demands research and validation.	 Progress towards target but at an insufficient rate (***)
3. By 2020, at least 20 Protection forest will be declared for biodiversity conservation outside PAs.	Additional protection forest declared	Currently, Nepal has declared 10 Protection Forest (comprising an area of 190809.43 sq km); and additional 9 are in the process of declaration under Protection Forest (DoF FY 2073/2074).	 On track to achieve target (***)
4. By 2020, the concept of Smart Green Infrastructure will be applied while constructing new infrastructure (roads, railway) and "Overpass and underpass" at three key locations built to allow free movement of wildlife species.	Implement Smart Green Infrastructure	Three underpasses built in Barandabhar corridor, result shows suitable for small mammals only. Others are planned in Chitwan and Nawalparasi.	 Progress towards target but at an insufficient rate (***)
5. By 2020, the National Zoo Policy will be developed and implemented.	Develop National Zoo Policy	National Zoo Policy has been drafted.	 Progress towards target but at an insufficient rate (**)

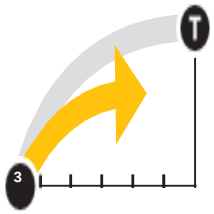
	ABT 12: Species and Extinction		
1. By 2020, conservation plans for 20 additional priority species (10 animals and 10 plants) will be developed and implemented.	Implement conservation plans for priority species	To date, Conservation Action Plans of ten faunal species (Bengal Florican, Blackbuck, Gharial, Pangolin, Rhino, Tiger, Snow leopard, Vulture, Elephant and Red Panda) and Pheasants are under development. 100% achievement in faunal component. Moreover, the formulation of action plan of species such as Wild water buffalo, Bear and Musk Deer is ongoing. For floral species, Conservation Action plan prepared for *Pterocarpus marsupium* (Kino tree), and *Rhododendron* spp. Action plan for Satisal, Rudraksha, Okhar are under development. 20 % progress in floral part.	 On track to achieve target(***)
2. By 2020, *ex-situ* conservation of threatened species will be strengthened by establishing additional 2 zoos and botanical gardens.	Strengthening ex-situ conservation of threatened species	Master plan for a zoo at Suryabinayak has been approved, MoFE has plans to establish at least one zoological garden in each state (MoFE 2018). MoFE has initiated to establish Bhanubhakta Zoological Garden in Tanahu District.	 Progress towards target but at an insufficient rate (**)
3. By 2020, awareness of local people on behaviors of different wild animals will be enhanced, and locally suitable low cost measures to deal with them will be established.	Awareness level of local people on wild animals	The most problematic species include Elephant, Rhino, Common Leopard, Tiger, Monkey, Wild boar, Snow Leopard causing HWC at higher scale in all state across the country. In PAs of Tarai, different adaptive measures for elephant, rhino and common leopard implemented. Awareness training on different PAs given, predator proof corral (low	

		cost) distributed to vulnerable communities in Tarai's PAs such as SuNP, BNP, BaNP, CNP. Conflict Management Strategy and Action Plan for Human-Elephant and Human-Common Leopard has been drafted.	Progress towards target but at an insufficient rate (**)
	ABT 13: Genetic Diversity		
1. By 2020, the Gene Bank will collect and conserve genetic resources of at least 75 percent of the commonly cultivated crops and horticulture species; and community based conservation of agro-genetic resources program expanded in five more districts covering all physiographic zones.	Local varieties of crops, their wild relatives and animal breeds conserved in the National Gene Bank	Out of 30,000 existing estimated accessions, the National Gene Bank has deposition of 11,389 accessions. Out of 74 crops and 145 horticultural crops' genetic material have been conserved for 40 crop/horticultural species (458 samples). Annually about 1,000 accessions are collected, community based conservation expanded in 33 districts.	 On track to exceed target (***)
2. By 2020, at least 10 wild relatives of domesticated crops are conserved *in-situ* and/or *ex-situ.*	In-situ and Ex-situ conservation of wild relatives of domesticated crops	65 accessions of 16 wild relatives of crops have been conserved (MoAD 2017).	 On track to exceed target (***)
	ABT 14: Ecosystem services		
1. By 2020, participatory and integrated soil and water conservation initiatives will be implemented in at least 30 critical sub-watersheds; and loss and degradation of Siwaliks will be reversed.	Number and coverage of participatory and integrated soil and water conservation	A total of 64 critical watershed/river system identified by Master Plan of PCTMCDC, former DSCWM, and DSCO have been implementing integrated soil and water conservation initiatives. CARE Nepal prepared 10 ISWMPs in CHAL and are under implementation.	 Progress towards target but at an insufficient rate (**)
2. By 2020, additional 5,000 ha. degraded forest will be rehabilitated through pro-poor leasehold forestry.	Number and coverage of propoor leasehold forestry	As of June 2018, total area under leasehold forestry programme is 43,957 ha covering 71,753 households (DoF FY 2074/75).	 On track to achieve target (***)

	ABT 15: Climate Resilience		
1. By 2016, The National REDD Strategy will be finalized and approved.	National REDD Strategy approved	Nepal National REDD+ Strategy finalized and approved in 2018 (MoFE/RIC,2018). Biodiversity Monitoring Protocol for REDD+ also prepared.	 On track to achieve target (***)
2. By 2020, at least 15 percent of the forested ecosystems will be restored through implementation of REDD+ and ecosystem based adaptation programs.	Restoration of forest ecosystem through forest ecosystem	The NBSAP target for restoration through REDD+ program is 298,000 hectares. Currently, Environmental and Social Management Framework program of REDD+ will restore forest in 13 TAL Tarai and Chure districts through Emission Reduction Program.	 Progress towards target but at an insufficient rate (**)
	ABT 16: Access and Benefit Sharing		
1. By 2015, the Nagoya Protocol on ABS will be ratified, and by 2016, ABS Bill will be finalized and enacted.	Nepal's position in the Nagoya Protocol	Accession of the Nagoya Protocol done on August 29, 2018 by the House of Representative, and September 11, 2018 by National Assembly of Nepal (Nepal Gazette). ABS Bill has been formulated and is in the process for endorsement.	 Progress towards target but at an insufficient rate (***)
	ABT 17: NBSAP		
1. The NBSAP will be endorsed by Government and come into implementation by the end of 2014.	Implementation of NBSAP	The NBSAP, 2014-2020 has been endorsed and implemented by the Government of Nepal since 2014. The Mid-term monitoring and evaluation of NBSAP has been completed in the mid of 2018.	 On track to achieve target (***)
	ABT 18: Traditional Knowledge		
1. By 2017, a community biodiversity protocol will be developed.	Status of community biodiversity protocol	Before 2010, protocol developed but practiced at pilot scale only in few districts. Training Manual for documentation of biodiversity and TK under preparation under strengthening capacity for implementation of	 Progress towards target but at an insufficient rate (*)

		Nagoya Protocol in Nepal (Project).	
2. By 2017, a *sui generis IPRs legislation* for the protection of plant varieties will be formulated and enacted and by 2018. Intellectual property rights legislation will be formulated and enacted.	Status of the sui generis legislation for protection of plant varieties	A draft for the amendment of 'Plant Variety Protection and Farmers' Right Bill 2008' is on progress and has obtained the approval from the cabinet. Intellectual Property Rights legislation has been drafted.	 Progress towards target but at an insufficient rate (***)
3. By 2015, the NBSAP will be translated into Nepali language and distributed.	Translation in Nepali language and distribution	Only the Abstract of NBSAP was translated to Nepali version, printed and disseminated.	 No significant change (**)
4. Representation of indigenous and local communities in the NBCC as well as district and VDC level institutional mechanisms will be promoted.	Representation of indigenous and local communities	The GoN, 2015 has provision of the participation of women and "Dalits" (at least female) in the local governments and national and provincial assemblies to meet the target. Resource governance community organizations such as CFUGs ensured at least 33% meaningful participation of women, "dalits", and disadvantaged groups in their executive bodies. However, in the case of government policy and decision making levels including NBCC such participation has been inadequate.	 Progress towards target but at an insufficient rate (***)
5. Capacity building programs targeting, women, "Dalits", "janajatis" and local communities will be designed and implemented.	Capacity building programs implemented targeting indigenous and local communities	In all CFUGs, BZUC and in conservation projects, capacity building program (skill development, literacy, livelihood support) designed and implemented but not sufficiently addressed.	 Progress towards target but at an insufficient rate (**)
	ABT 19: Science and Research		
1. By 2020, the Flora of Nepal project will be successfully completed.	Change in status of Flora of Nepal project	Preparation of checklist of flowering plants of Nepal have been initiated	

		(Rajbhandari and Rai 2017; Shrestha et al. 2018).	 Progress towards target but at an insufficient rate (***)
2. By 2017, conducting a comprehensive inventory of ecosystems and species; and existing information on Nepalese ecosystems will be updated.	Status of information on the country's ecosystem and species	Inventory of species in localized area done, comprehensive inventory of wetlands, grasslands, forests partially done. Updating of existing information on species has been partially done. FRTC has prepared concept paper to update ecosystems of Nepal.	 Progress towards target but at an insufficient rate (**)
3. . By 2017, a national Red List of flora and fauna will be prepared following IUCN guidelines and by 2020, status of nationally threatened, rare and endangered species of flora and fauna will be updated.	Red list of flora and fauna updated. Update of nationally threatened, rare and endangered species flora and fauna	The Status of Nepal's Mammals: The National Red List Series (2011) prepared following IUCN guidelines. Similarly, the Status of Nepal's Birds: The National Red List Series (2016) prepared. Red list of flora following IUCN guidelines has not been updated. Status of threatened, rare, endangered species of fauna and flora has not been worked out well. Status of mammals and birds has been updated (Amin et al. 2018; Inskipp et al. 2016, 2017) presently 886 bird species and 212 mammal species have been documented. Status of herpetofauna, fishes, and invertebrates is under way.	 Progress towards target but at an insufficient rate (***)
. By 2020, baseline survey of NTFPs and animal genetic resources will be completed.	Baseline survey of NTFP ans animal genetic resources	Baseline survey of NTFPs and animal genetic resources is not on track.	 No significant change (**)
	ABT 20: Resource mobilization		
1. Establishment and operationalization of a National Biodiversity Trust Fund by 2016.	Establishment of National Biodiversity Trust Fund	National level trust fund not established, however different stakeholders pull resources for a common biodiversity goal but	

		economic mainstreaming has been insufficient. The government does not yet have biodiversity budget code for budget allocation for implementation of NBSAP and related activities and is not reflected in the reporting system. Progress is observed involving private/corporate sector in PES and exploring new sources.	Progress towards target but at an insufficient rate (**)
2. Resource generation and mobilization plan will be prepared and implemented to generate an estimated USD 1,019 million required for implementation of the NBSAP. Of the total, the government, ODA, INGO, private sector and community based users' groups will bear 65.7%, 20.6%, 6.9%, 0.8% and 6% of the cost respectively.	Resource generation for biodiversity conservation	The Government budget allocation in forestry sector was 35.82 billion NPR. Other partner organizations supported programmes such as MSFP, Hariyo Ban, REDD+, NCCSP contributing to biodiversity funding. Other ministries such as agriculture, livestock, environment, tourism also allocated budget to implement NBSAP related activities.	 Progress towards target but at an insufficient rate (**)

SECTION FOUR: NATIONAL CONTRIBUTION TO ABT ACHIEVEMENTS

This section describes the ABT, overview of the ABT at the national context, then describes national targets that were set at the national context, also highlights on the status and tends of the national targets under each ABT. The progress achieved during the reporting period has been carefully collated, and presented. Finally, linkages between UN SDGs and ABT has been highlighted and overall monitoring progress has been assessed on each ABT.

4.1 Biodiversity Awareness

Aichi Target 1: By 2020, at the latest, people are aware of the value of biodiversity and the steps they can take to conserve and use it sustainably.

(1) Background

People's awareness on the values of biodiversity largely depends on communication, education, outreach programs, and development and implementation of demonstration programs. All these help people understand and learn to sustainably use and conserve biodiversity for future generation. It is important to raise awareness for promoting active participation of all concerned stakeholders and the general public. The level of public awareness on biodiversity is slowly increasing among Nepalese society; however, poaching, illegal collection and trafficking of wildlife parts are still occurring these days.

(2) Current status and trends

Target 1: A functional National Clearing House Mechanism by 2015 established, and National Biodiversity Information Management System (NBIMS) operated by 2016

A national biodiversity clearing house mechanism (NCHM) has not been established. Such a knowledge center once established, would also solve the purpose of both NCHM and National Biodiversity Information Management System. Clearing house mechanism is a web-based framework designed to provide information on national regulatory requirements related to biodiversity, on relevant authorities such as national focal point and competent national authority, as well as on permits issued at the time of access. In general, there is a lack of information on updating knowledge of biodiversity. However, knowledge on few selected groups/taxa has been upgraded.

Target 2: By 2020, at least 100 new audiovisual packages on different aspects of biodiversity will be prepared and disseminated

Government Ministries including Ministry of Forests and Environment and its departments such as DNPWC, DoFSC, DPR and other conservation stakeholders have been implementing different awareness raising programs at different levels and tiers for biodiversity conservation. At least 70 new audiovisual packages on different aspects of biodiversity has been prepared by

government - DNPWC, DoFSC, DPR and NARC and other non-government agencies ICIMOD, BCN, NTNC and WWF. All plans of DNPWC include capacity building program, school based eco-clubs/green force clubs, conservation campaigns, formal education, radio/TV programs, conservation education programs that are implemented in all PAs (Shrestha 2018). DoFSC airs its weekly radio program since many years as embedded in its annual program. Video documentaries on forest fire, uncontrolled grazing and afforestation have been produced by the department and disseminated at field sites.

Target 3: By 2020, enhance all the relevant programs and annual plans of the MoFSC and MOAD which will have training, awareness raising, and on-site lecturing and demonstration in at least five selected protected areas and Ramsar sites

Information centers at different Ramsar sites including Ghodaghodi Lake site, Jagadishpur Reservior site, Beeshhazari Lake site, KTWR and Rupa Lake site (one of Lake Cluster of Pokhara Valley) are fully functional. A lot of efforts have been put by various partner organizations to develop audiovisual packages on different aspects of biodiversity and also the concerned Ministries have regular program on capacity building training for different level of officials.

Target 4: Establishment and management of a modern zoo, multipurpose nurseries, freshwater aquarium and botanical gardens to educate people about indigenous flora and fauna and their relation to human being

The Central Zoo was established basically as the private zoo by then Prime Minister Juddha Sumsher JB Rana in 1932 AD. In 1995, GoN handed over the Central Zoo to NTNC for its management. One of its objective is to raise public awareness on the importance of nature conservation and provide conservation education on wild animals. It now hosts 125 different species of birds, mammals, reptiles and fishes both native and exotic species. Of these species, 14 of them are Protected Species of Nepal as of NPWC Act, 1973. It's open to both national as well as international visitors and their number has been very encouraging since years (Figure 1).

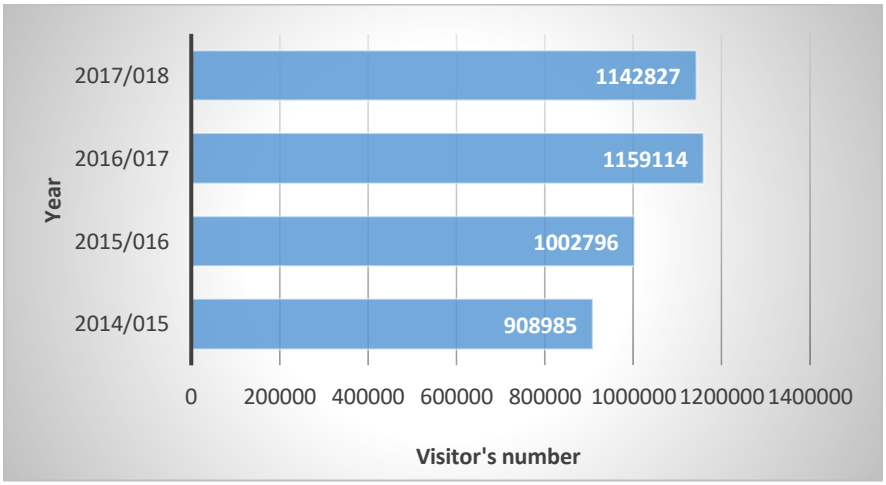


Figure 1: Number of visitors at Central Zoo, Kathmandu

GoN is in the process of establishing National Zoological Garden at Bhaktapur (30 kms east of Kathmandu) and is also planning to establish state level zoo in all 7 states in future. Similarly, DPR, the legal entity to initiate the botanical garden in Nepal, is also planning to establish at least a botanical garden at each state (Dhakal 2018). DNPWC has initiated Bhanubhakta Zoological Garden at Tanahu District to conserve local available species and create awareness amongst public.

Biodiversity Barometer: Awareness rates are growing globally, but differ strongly among countries. A study conducted by UEBT (Union for Ethical Biotrade) by using Biodiversity Barometer has assessed the level of awareness in 16 different countries including China and India, both neighbors. Among which in China 94% people have heard of biodiversity, 64% understand the correct definition of biodiversity and 22 % have knowledge of partial definition of biodiversity. The status for India is 40% people have heard of biodiversity, 1% understand the correct definition of biodiversity and 26 % have knowledge of partial definition of biodiversity (UEBT 2018).

No such study has been conducted in Nepal; however, during 4th National Report to the CBD preparation (MoFSC 2009) in the stakeholders' consultation at district level, it was observed that the terminology such as 'biodiversity', 'climate change', 'access to genetic resources and benefit sharing' are generally unfamiliar to the local communities. However, they are well abreast with the inter-relationship between biodiversity, ecosystem, livelihoods and global warming; increasing phenomenon of diseases and pests in the mountains; access to genetic resources and benefit sharing, etc. Scenario of biodiversity awareness observed during the consultation of the 6th national report preparation is slowly increasing but a lot remains yet to be done to meet the ABT 1 globally in general and in Nepal in specific.

(3) Progress assessment

There is need to continue to raise public awareness on the importance of biodiversity conservation through broadcasting and social network service as well as to enhance the participation of stakeholders supporting the activities of the private sectors also. Sharing and disseminating information through the network of metropolitan cities and states would enhance to raise the level of awareness. The progress of the target is "on track to be achieved". *Monitoring related to this target is partial.* Information sources used for assessment of progress of the target in given in Table 4.

Table 4: Information sources used for assessment of progress in implementing Aichi Target 1

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Websites of MoFE, MoALD and relevant ministries; Partner organizations annual reports;
Indicators used	Awareness packages developed; communication media; information obtained from public biodiversity education centers
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. Improvement is needed to establish National Clearing House Mechanism, National Biodiversity Information Management System

4.2 Biodiversity Mainstreaming

Aichi Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

(1) Background

Biodiversity conservation is crucial in preserving the environment, society and general health of Nepal's economy. It is imperative to pursue mainstreaming biodiversity when policy making and planning. The Nepal NBSAP is the most significant legal plan so far which is expected to help integrate and harmonize existing biodiversity plans. Government of Nepal has prepared implementing systems by setting up National Biodiversity Coordination Committee (NBCC), but it has not been fully functional to provide input and services at the state and local levels.

In 2017, the restructuring of the country brought several changes in the government institutions from federal to state level that are responsible and accountable for forest biodiversity and agriculture biodiversity in Nepal. As per the provisions in the Constitution of Nepal (CoN 2015), Ministry of Forests and Environment is formed at the federal level with its Environment and Biodiversity Division designated to take stewardship to all environment and biodiversity issues. Similarly, Ministry of Agriculture and Livestock Development at the federal level is responsible for overall agriculture development, agrobiodiversity conservation in the country. It's a focal ministry of the International Treaty on Plant Genetic Resources for Food and Agriculture, adopted in 2001. At the state level, Ministry of Industry, Tourism, Forests and Environment is the governing body for biodiversity. Whereas for agriculture, it is Ministry of Land Management, Agriculture and Cooperatives at the state level. Similarly, at the local level i.e., at the Municipality level, an environment section looks into the issues. Therefore, institutional setup has been established at different levels in the country. However, mainstreaming biodiversity into their policies and plan is expected in the upcoming years.

(2) Current status and trends

Target 1: Amending, by 2016, the Government of Nepal (Allocation of Business) Regulations (2012) for giving biodiversity mainstreaming due importance by the National Planning Commission and relevant ministries

One of the priority actions identified by NBSAP for integration of biodiversity values into national and local development, sustainable use of its components and prevention and control the loss of biodiversity and ecosystems in the mandate of National Planning Commission (NPC). The NPC coordinates planning, implementation and monitoring process of biodiversity conservation. The Government of Nepal has amended Allocation of Business Regulations (2012) in 2018 in which incorporation of biodiversity has been well spelled out in the forestry and agricultural sectors but not in other sectors (GC and Acharya 2018); however, biodiversity mainstreaming into other sectors such as tourism, physical infrastructure and road, hydropower, etc. have yet to be considered and mainstreamed into their respective mandates.

Target 2: The Economics of Ecosystem and Biodiversity (TEEB) study will be carried out for protected area, forest, mountains and agriculture sector

Biodiversity values into national accounting and reporting system including poverty reduction demands for the understanding of The Economics of Ecosystem and Biodiversity (TEEB). Methods/processes are available for economic valuation for ecosystem services (Rasul et al. 2011), such as for Kailash Sacred Landscape (Nepal et al. 2017), and Koshi Tappu Wildlife Reserve (ICIMOD 2014). Similarly, cost benefit analysis model of EbA was prepared. Since available methods/processes for economic valuation of ecosystem services are applicable in Nepalese context, however standard method cannot be applied for different categories of PAs. Further, studies/research are needed to substantiate to be approved as a standard national framework for better decision making of biodiversity resources.

Target 3: Incorporation, by 2019, biodiversity considerations will be mainstreamed in local policies, plans and programs of relevant line ministries and other relevant government and non-government agencies

The NBSAP implementation has provided an opportunity for responsible ministries like MoFE and MoALD, as well as other relevant government and non-government agencies to raise awareness on biodiversity values within their respective portfolios; such as tourism, physical infrastructure and road, hydropower, etc. This opportunity has not been fully realized. With the establishment of federal structure, biodiversity consideration is expected to be mainstreamed in local policies, plans and programs in the coming years. State government has approved their policy and programs, and has prioritized and allocated budget for biodiversity conservation.

Progress assessment

There is need to prepare the foundation for promoting local biodiversity strategy by: (i) harmonizing NBSAP for both central and local governments; (ii) providing guidelines for planning local biodiversity strategy to local governments; and (iii) establishing a legal basis for metropolitan cities/states to set up biodiversity strategy in Act on the conservation and use of biodiversity. The indicators for this target is in improving trend, indicating that "progress is towards target but at an insufficient rate". *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 5.

Table 5: Information sources used for assessment of progress in implementing Aichi Target 2

Items	Content
Time of assessment	December 2018
Information sources for assessing this target	Websites of MoFE, MoALD at Federal level, information obtained from State Ministries including MoITFE, MoLMAC, and relevant ministries; and Municipality level; websites of partner organizations; field level consultation (August-December, 2018)
Indicators used	Amendment of rules and regulations in policy and planning; inventory of ecosystems and species
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. Need to prepare enabling environment for promoting biodiversity mainstreaming at state and local level

4.3 Incentives and Subsidies

Aichi Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.

(1) Background

An enabling policy environment – especially the incentives it generates through price, credit, subsidies, technology, institutions and regulatory framework – plays a pivotal role in sustainable harnessing, value addition and conservation of PGRFA (Gauchan et al. 1999).

The basic aim of setting in place economic incentives for biodiversity conservation is to influence people's behavior by making it more desirable for them to conserve, rather than to degrade or deplete biodiversity in the course of their economic activities. Incentives relevant to Agricultural Plant Genetic Resources (APGRs) are mainly subsidies and compensation for cultivation and commercialization of high-yielding modern seed varieties that negatively affect the conservation, use, and inclusion of indigenous APGRs. Incentives modify the structure and effects of household utility function and give people the opportunity to choose the best option for them. Incentives such as payment for ecosystem services or certification schemes aim to correct market failures by 'rewarding' farmers for the adoption of environmental/ biodiversity or socially friendly practices (Hunter et al. 2017).

(2) Current status and trends

Target 1: By 2020, perverse incentives in agriculture and forestry sector will be identified and their phase out plan prepared and implemented

Present agricultural policies of Government of Nepal are guided by the Agriculture Development Strategy (ADS) (2015-2035), and in the past by the Agricultural Perspective Plan (APP) and the Periodic Economic Development. However, there are no mechanisms developed to regulate perverse incentive in agriculture and forestry sector, and to provide incentives or benefits for the conservation of crop biodiversity. Payments for conservation of crop biodiversity, provision of subsidies or inputs to cultivation and use of traditional crops and varieties and other forms of direct incentives/benefits do not exist from the formal sector agencies (Joshi et al. 2017).

Perverse incentive has been in practice from long time in Nepal in different forms. The 'pocket package' approach of APP in the past, and presently Prime Minister Agriculture Modernization Project (PMAMP) in pockets, blocks, zones and super zones approach have given no attention on analyzing their consequences on *on-farm* crop genetic diversity and conservation of APGRs (Joshi et al. 2017).

Target 2: Incentive measures introduced for the genetic resource conservation of traditional agriculture crop, livestock, tree, shrub, herb and important wild animal

In relation to the next target, in traditional agriculture crop, some of the activities undertaken to strengthen the contribution of crop biodiversity are diversity fair and mini kit distribution; incentives to progressive farmers by providing training, inputs, seeds, etc; value addition through non-breeding approaches as well as breeding approaches; free distribution of planting materials to farmers; creating favorable policy environment for exchange of genetic resources inside and outside the country; creating market for diverse agriculture produces; training and workshop. More than 100 different organizations including both governmental and non-governmental are involved in promotion of crop diversity for the improvement of farmers' livelihood.

For incentives in Animal Genetic Resources (AnGR) direct payment of incentives or subsidies is not a common system in Nepal for promotion of conservation of farm animal genetic resources. However**,** support services including vaccination, drenching, shed improvement are being provided to the farmers involved in *in-situ* conservation of *Achhami* and *Lulu* cattle, *Gaddi*, *Lime* and *Parkote* buffalo, *Lampuchhre* sheep under Department of Livestock Services/Directorate of Livestock Production. Similar supports are provided to the farmers in the occasional projects that are implemented by various NGOs/Development agencies (Joshi et al. 2017). Some *ex-situ* programs, such as collection of semen from indigenous cattle, eg, *Lulu* and *Achhami*, from indigenous buffalo like *Lime, Parkote* and *Gaddhi* have been started in ABD, NARC, Khumaltar.

In fisheries sector there has been no incentives, in general, to support the conservation and sustainable use of biodiversity for food and agriculture or associated biodiversity. However, a hatchery is established to produce fingerlings of native species (*Asala*) and release in the up and down stream of the dam constructed over the Kaligandaki river for conservation, in order to prevent the depletion of captured fish and affect livelihood of local fisherman, as well as other higher organisms depending in fish in food chain. In this case nearly 1 million fingerlings are released annually in the river. Similar activities are conducted in lakes of Pokhara Valley; however, the scale of fry release is less. In some rivers as well the native fish fries are released as a part of the river fish conservation sparsely (Joshi et al. 2017).

In forestry sector, the revenue from protected area based tourism has been continuously increasing since 2003 (DNPWC 2012). The PAs also play an important role for revenue generation apart from ecosystem services. The trend of revenue generated over years in PAs shows an increasing trend (Figure 2). This mechanism also ploughs back 30-50% revenue to buffer-zone for conservation and development initiatives. This has provided incentives to conserve biodiversity for the government, conservation agencies and local communities. Income from protected areas is directly contributing to management of buffer zones and conservation areas. Ploughing back part

of the revenue generated by respective protected areas remained an important source of funding for implementing conservation programmes in buffer zones and conservation areas.

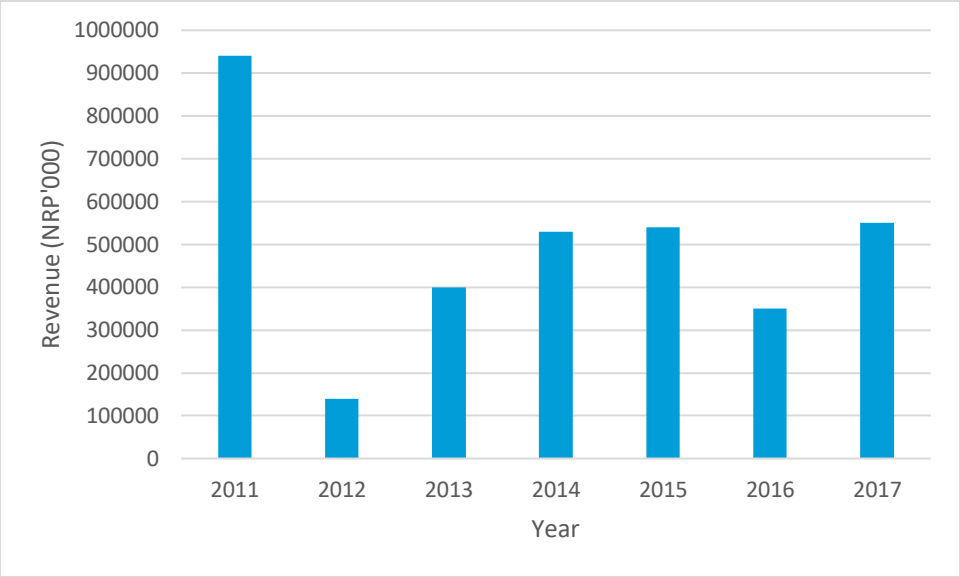


Figure 2: Revenue generated from PAs over years

Source: DNPWC 2018

Some *in-situ* conservation programs have been launched for different livestock species with local people participation in different parts of Nepal. However, the packages of practices and incentive measures for the conservation programs are not enough.

(3) Progress assessment

The plan for monitoring the level and nature of use of insecticides, pesticides, and chemical fertilizers is already being implemented. Rapid Bioassay of Pesticide Residue Guideline 2071 has been already implemented and revised (MoAD 2017). However, the gaps and priorities in ABT 3 include inadequate resources incentives, financial and skill human resources, laboratory and other infrastructure facilities. Therefore, providing incentives/economic benefits to farming communities for their roles in conservation and sustainable use of PGRFA would enhance conservation of biodiversity. There is "progress towards target but at an insufficient rate". *Monitoring to this target is partial*. Information sources used for assessment of progress of the target in given in Table 6.

Table 6: Information sources used for assessment of progress in implementing Aichi Target 3

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Agriculture Development Strategy (2015-2035); reports of relevant ministries including MoALD, MoFE; field level consultation (August-October, 2018); Joshi et al (2017)
Indicators used	Incentive measures for access to genetic resource conservation of traditional crops and livestock; revenue generated in forestry sector
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. Need to strengthen financial resources, technical skills, and technological facilities

4.4 Sustainable Production and Consumption

Aichi Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of uses of natural resources well within safe ecological limits.

(1) Background

Different sectors including wetlands, grasslands and forests are being recognized as important production sectors, however their production capacity and carrying capacity is being assessed in very limited aspects. Some of these ecosystems are over exploited without having kept the impact of the uses of natural reserve well without safe ecological limits.

(2) Current status and trends

Target 1: By 2015, a National Strategic Framework for Conservation will be developed and implemented

The National Strategic Framework for Sustainable Development (2015-2030) has been developed and implemented which comprises conservation and sustainable use of biodiversity (NPC-GoN 2015); however, our analysis shows that more efforts and commitments among stakeholders are needed to effectively implement the framework.

Target 2: Inventory of all wetlands be completed by 2017, and 5 major degraded wetlands be restored by 2020

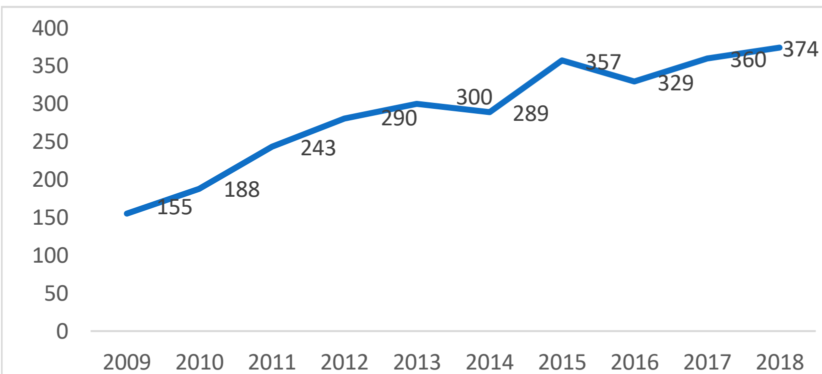
Assessment of status of biodiversity in Beeshazari Tal, Ghodaghodi Tal, Lake Cluster of Pokhara valley has been done. Plan is underway for Rara Lake. An institute working in the field of wetlands have undertaken the detailed mapping and wetlands inventory (western, mid-western and far-western Nepal) in 2016. Similarly, integrated lake basin management plan of Gaidahawa Lake has also been completed (CODEFUND 2015). Evidences show that people are now becoming aware on the values of wetlands, its goods and services provided at the local level and management linking to ecotourism promotion and revenue generation. Most of the degraded wetlands in Tarai are now being restored to maintain ecological integrity and promote ecotourism.

Wetlands including Jokhad Tal, Kailali; Gaidahawa Tal, Kapilvastu; Gajedi Tal, Kapilvastu; Beeshhazari Tal, Chitwan; Betna Tal wetland, Morang and many more to name. The GoN/ National Lake Conservation Development Committee is also working for the inventory, management and conservation of lakes in Nepal.

Sustainable habitat management and restoration within safe ecological limits has been observed in Ghodagodi Lake, a Ramsar site (Box 1).

Box 1: Ramsar Sites Restoration

D southwestern Tarai. It harbors an estimated 1% of South Asian biogeographic population of Cotton Pygmy Goose *Nettapus coromandelianus* and was set as an indicator species for the wetland in 2009 (CSUWN 2009). Since then the species is monitored during mid-winter every year by local CBOs and bird enthusiasts. Since, then the count shows an increment of its population in the lake. The increase may be attributed to effective habitat management and restoration, increased awareness and community based anti-poaching efforts (Modified BCN, 2018).



Target 3: By 2020, Low Carbon Economic Development Strategy, criteria and indicator for Sustainable Forest Management will be developed and implemented and climate-smart biodiversity management plan will be prepared

Low Carbon Economic Development Strategy for Nepal 2015 has been developed and implemented. The main objective of this strategy is to identify the key approaches and interventions that will allow Nepal to maximize its resilience and low carbon growth potential without compromising the overall growth potential of all development sectors. Sustainable Forest Management Criteria and Indicator has been developed by Nepal according to the country situation. It has not been developed as the commercially harvested timber to be sold into national market rather, it has been developed focusing on the principles of conservation forestry (MSFP 2016). Climate Smarting of PAs management plan include those of Manaslu CA, Krishnasar CA, KTWR, Parsa NP and Annapurna CA that have been endorsed while for Dhorpatan Hunting Reserve, approval is yet to be given for implementation.

Target 4: By 2020, all the district forest offices and forest user groups will develop and implement NTFPs management plan, especially targeting conservation of over-harvested species

The government has identified 10 important NTFPs, but separate management plan has been prepared only for Jatamashi (*Nardostachys grandiflora*), and yar-tsa-gunboo (*Ophiocordyceps sinensis*). Harvesting plan for Jatamashi of Humla district has been prepared and EIA was conducted for the first time. Management plans for remaining NTFPs are under development. The KCA has prepared business plan for Kutki (*Neopicrorhiza scrophulariiflora*), *Juniperus* spp, *Swertia chirayata* but implementation is very limited. Nonetheless, status, distribution and resource inventory of some NTFPs are mainstreamed in District Sector Plans and CFOPs. In addition, studies on status, use and knowledge gaps in NTFPs were carried out in Kailash Sacred Landscape and Kangchenjunga Landscape (Aryal et al. 2018; Uprety et al. 2016). Enterprise development based on management of NTFPs in Karnali State of Nepal has been practiced (Case 1).

Case 1. Management of Non-timber Forest Products and Enterprise Development, Karnali State, Nepal

SUNDAR Nepal, a leading NGO was established in 2053 BS in Surkhet district. With a capacity of more than 180 technical staffs ranging from agriculture technicians, social mobilizers, foresters, and entrepreneurship development staffs, the organization focuses on NTFPs production, marketing and technology transfer to local farmers in the district. The NGO has been running programs of different projects including USAID's PAHAL, GIZ's MAPs project, SDC's WASH, UKAID's Adaptation, and Heifer International's Improved Cattle Program.

The main NTFPs of the district include Timur *(Zanthoxulum armatum),* Tejpat (*Cinnamomum tamala*) and Chuiri *(Diploknema butyracea)*. These species are grown on the farmland edge without hampering the farmer's cash crop. In FY 2074/075, 1500 tons of Tejpat was exported from the district. The species has been collected from adjoining districts also, however more contributed from Surkhet district. The NGO supports community nursery which has a capacity of producing 22,000 seedlings per year including 12,000 seedlings of Tejpat that was distributed to farmers in last FY. The NGO has collaborated with Dabur Nepal for buyback guarantee of Tejpat only.

The NGO is now running MAPs program since 2014 focusing on three species including Chamomile, Lemon grass, Calamintha and Citronella. A harvesting guidelines for these species has also been produced. The program is more focused on cultivation and production via technology transfer and engagement with multi-national companies. About 200 farmers are involved in MAPs farming and organic certification has been provided. The program has supported for solar dryer and a distillation unit located at Chinchu. Apart from cash crop, the farmers plant these species during their cropping gap for three months. This is an additional income to farmers with a cost of oil of Chamomile maximizes up to NRs. 55,000/liter. However, the question lies that even after the program terminates, will this be sustainable in terms of seedling production, healthy harvest and buyback guarantee from companies.

Source: Field observation and interaction, 28th September 2018

Target 5: Carrying out inventories to assess status and trends of rangeland resources and regulating the use of rangelands as per their carrying capacities

The DNPWC has been implementing PAs specific programs and activities of grasslands and wetlands. Site specific grassland management guidelines for Banke, Bardia, Chitwan, Parsa, and Shuklaphanta National Parks have been prepared. Grassland habitat mapping was done for

Chitwan National Park in 2016 (CNP 2016). Studies on carrying capacities of habitats for tigers in CNP is ongoing by DNPWC in collaboration with partner organization. However, study on carrying capacity assessment for other species including Rhinos in rhino bearing PAs is very scattered.

Target 6: By 2020, management plan for all forest regime will be prepared and implemented

Regarding preparation of biodiversity chapter, District and FUGs have prepared/mainstreamed biodiversity chapter in their plans. The progress is also attributed to the Community Forests Development Programme Directives, which require that FUGs have a biodiversity chapter in the operation plans.

(3) Progress assessment

The overall trend for Nepal in sustainable production and consumption indicates that this target is "on track to achieve the target", however habitat degradation problems remain. *Monitoring to this target is inadequate*. Information sources used for assessment of progress of the target in given in Table 7.

Table 7: Information sources used for assessment of progress in implementing Aichi Target 4

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Website of NPC, DNPWC, DoFSC; Annual plans of Division Forest Office
Indicators used	Implementation of National Strategic Framework for Conservation and related strategies, ecosystem inventory including wetland, grassland, District level forest plans
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Inadequate. Monitoring mechanism need to be strengthened both at the federal and state/local levels

4.5 Habitat Fragmentation and Degradation

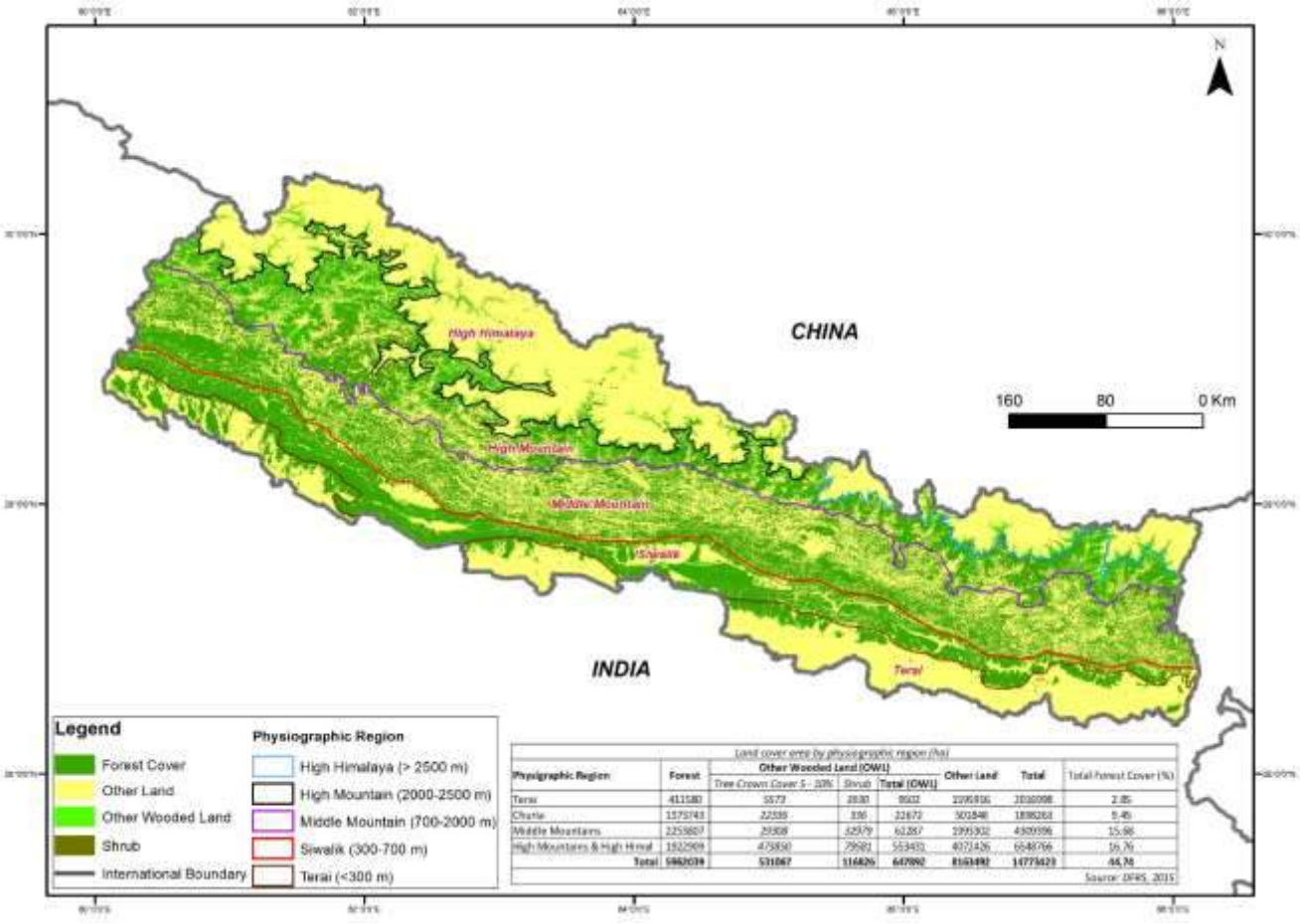
Aichi Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible bought close to zero, and degradation and fragmentation is significantly reduced.

(1) Background

Habitat destruction caused by development and urbanization is the primary threat resulting in biodiversity loss. Given the high population density, and urbanization/industrialization in the Tarai and Siwaliks as well as outmigration from the hills in Nepal, the need for sustainable development by reducing the rates of loss of all natural habitats is extremely crucial.

The latest data shows that forest area in Nepal represents 44.74% of the total area of the country including forest area covering 40.36% and other Wooded Land 4.38% (DFRS 2015; Map

1). However, a latest assessment by Reddy et al. (2017) shows that the total number of forest patches increased from 1930 to 2014. At the national level total forest patches are 16,925 (in 1930), 41,649 (in 1975) and 42,961 (in 2014). The mean patch size is declining gradually too, showing an area of 467.4 ha (in 1930), 104.5 ha (in 1975) and 93.8 ha (in 2014). Increasing number of patches could be attributed to outmigration of people from hills and mountains leaving the barren lands to develop into forest/shrub patches. There is need to promote restoration of fragmented and damaged areas in core ecological belts.



Map 1: Forest area coverage of Nepal

(2) Current status and trends

Target 1: By 2015, a comprehensive and practical strategy and action plan will be developed and implemented for effective conservation of the *Siwalik* forests

Regarding the national target; the President Chure–Tarai Madhesh Conservation and Management Master Plan has been developed in 2017 (PCTMCDC 2017). The Chure-Tarai Madhesh Landscape is considered a hotspot of biological diversity and home for many wildlife; covers a total area of 3,925,205 ha which comprises about 26.66 % of the total area of the country and covers full or part of 36 districts (PCTMCDC 2017). There are seven protected areas such as

five national parks, one conservation area and one wildlife reserves situated in Chure-Tarai Madhesh regions. Those protected areas play an important role for conservation of fauna and flora. The landscape also serves to recharge the ground water for the lower plains in the Tarai (FRA/DFRS, 2014). However, effective implementation of the master plan requires efforts on sectors including appropriate law, human resources, strong coordination and high level of ownership (based on consultation and observation, August-October, 2018).

Target 2: The landscape management strategy will be revised and implemented by 2016

With respect to the landscape management strategy; the landscapes approach has been initiated and implemented to fulfill the dual objectives of conserving biodiversity and enhancing livelihoods of poor peoples. The approach to "landscapes that work for biodiversity and people" requires managing farmlands, forests, rangelands to respond to the triples challenge of the Anthropocene - biodiversity loss, climate change and unsustainable land use (Kremen and Merenlender 2018). As such, the landscape management strategy has not been revised and implemented by 2016 but Integrated Landscape Planning Directives, 2012 (2069 BS) were already in place. Strategic plans for five individual landscape (CHAL, TAL, SHL, KSL, KL) have also been developed; whereas strategic plan for Western Mountain Landscape (WML) is under approval process. The conservation of biodiversity at the landscape level in Nepal was initiated during the 2000s and all six landscapes including three transboundary landscapes have been designated and their strategic plans are being implemented.. Coverage of landscape during 2000-2005 was 17% (24,710 sq. km.) of the total area of the country which increased by 49% to reach to 48,045 sq. km. during 2006-2010; further increased by 51% reaching to 98,573 sq km. during 2011-2015; and finally increased by 24% reaching 130,358 sq. km during 2016-2018. Now, more than 88% of the country's area has come under the landscape level conservation (Figure 3).

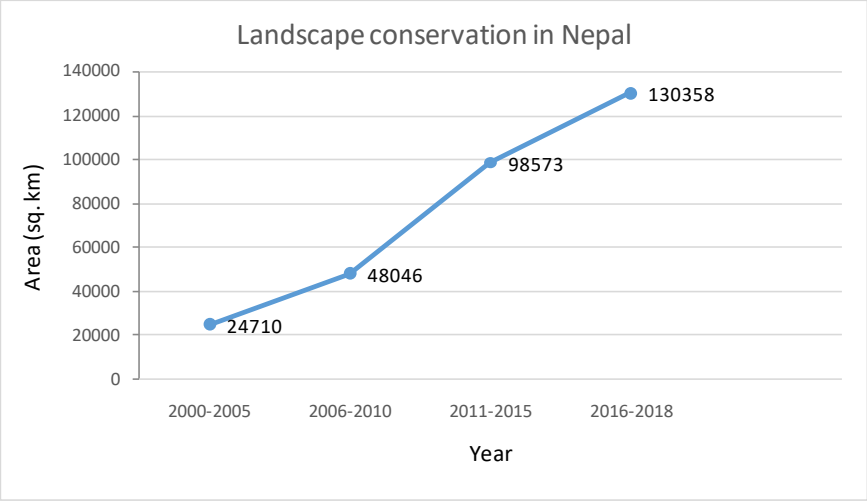
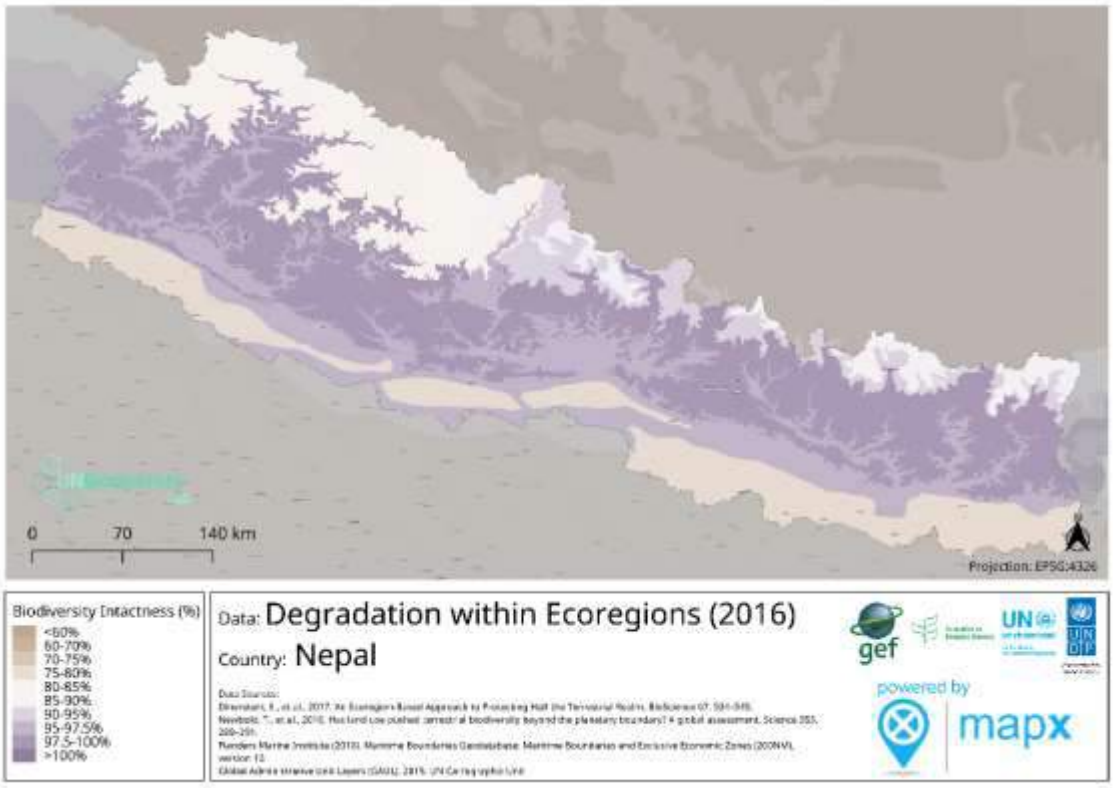


Figure 3: Area (sq.km) under landscape conservation

In Nepal, ecoregion conservation strategies that involve local communities complement the country's strictly protected areas and has reduces environmental degradation within ecoregions

(Dinerstein 2017) (Map 2). Community forests, linked together to form corridors, play a pivotal role in landscape conservation. In the Himalayan and trans-Himalayan ecoregions overlapping Nepal, conservation areas managed by local communities exceed in area the land. Nepal, ranks among the nations with the lowest per capita GDP but protects enough habitat to conserve biodiversity (Dinerstein 2013).



Map 2: Degradation within Ecoregions (2016)

Target 3: By 2020, at least 10,000 ha of the encroached forestland will be reclaimed, and degradation will be reduced by at least 75% of the current rate

Regarding reclamation of encroached forest land, Government of Nepal has enacted Forest Encroachment Control Strategy (2012). There were growing realization and efforts to tackle encroachment issue but the progress is not appreciable. Only 1,613 ha (16.1%) encroached forested land was reclaimed (DoF 2017). The latest data available on forest loss rate (0.44% mainly in Tarai) is for the period 2001-2010 (DFRS 2015). Rate of forest loss appears to be declining if we compare with earlier period, such as 2.1% (1990-2000) and 1.4% (2000-2005) (FAO 2010). Rehabilitation of degraded forest is also under the pro-poor leasehold forestry program. As of May 2018, total area under leasehold forestry program is 43,317 hectares covering 71,753 poor households (DoF 2018). In July 2013, a total of 7,413 poor households were engaged in management of 42,773 hectares of LH forests (GoN/MoFSC 2014). Only 544 ha degraded forest was rehabilitated by leasehold forestry. The area of degraded forest that is handed over to needy poor households is typically small. The forest loss issue is rather complex and therefore concerted

efforts of Government and non-government agencies are of utmost important to achieve the target by 2020. The concerted efforts of Department of Forests and Soil Conservation and institutions at sub-national and local levels are required to meet the target by deadline (MoFE 2018). A case of initiative to managing biodiversity undertaken by Chaite Lali Gurans Community Forest, Terahthum is presented as a Case 2.

Case 2. Chaite Lali Gurans Community Forest, Terahthum – Initiative to managing biodiversity (State 1, Nepal)

The Chaite Lali Gurans Community Forest, situated in the Tijure-Milke-Jaljale (TMJ) area which is a rhododendron hotspot, was established in 2050 B.S. It covers an area of 2,500 ha. Major ethnic communities include the Gurungs, Limbus, Chettris and Tamangs. The forests are being managed by the communities as 'block' forest. Four out of total 11 blocks have been allocated for afforestation. Population of wildlife fauna such as barking deer, leopard, pheasants, etc. have been increasing. Champ (*Michelia champaca*), Rudraksha (*Elaeocarpus spahericus*), pines (*Pinus* species), improved grasses have been planted. Collection of NTFPs including Chirayito (*Swertia chirayita*) – medicinal herb, Paper plants such as Lokta (*Daphne* species), Argeli (*Edgeworthia gardnerii*) etc. have been regulated for sustainability. Some forest areas have been allocated to the communities for cultivation of cash crops like large cardamom and tea. Seasonal wild fruits such as Chutro (*Berberis* species), Aiselu (*Rubus ellipticus*), Kaphal (*Myrica esculenta*) provide raw materials to the winery for production of alcoholic drinks.

Biodiversity conservation supporting work has been undertaken, for example, the Community Forest User Group (CFUG) provide loans to the marginalized communities for income generating activities. Collaborative effort has led to stop forest fire, rampant tree cutting for fuel-wood, and illegal poaching of wild fauna. However, incidence of human-wildlife conflict has been increased.

Source: Field observation and interaction, 30 August 2018

Target 4: By 2020, effective conservation measures are implemented in at least five critical north-south corridors

There are a number of forests with landscapes that maintain north-south corridors which have conservation friendly management. These include: (i) Sacred Himalayan Landscape; (ii) Chitwan-Annapurna Landscape (CHAL); (iii) Kailash Sacred Landscape; (iv) Kangchenjunga Landscape; and (v) Western Mountain Landscape, etc. (GoN/MoFSC 2014; MOFSC 2016).

Community managed forests in these landscapes have a conservation-friendly management as the focus is to conserve biodiversity and natural environment, not on extraction of timber and its exports. It is known that at least Barandabhar corridor (CHAL), Singhalila corridor (Kangchenjunga Landscape), Jaljala corridor (WML) and Panchase corridor (CHAL) have conservation-friendly management. Despite designation of landscapes and corridors, efforts need to be undertaken to effectively manage the landscapes and corridors.

(3) Progress assessment

Considering the context, this target is "on track to be achieved". *Monitoring related to this target is adequate*. Information sources used for assessment of progress of the target in given in Table 8.

Table 8: Information sources used for assessment of progress in implementing Aichi Target 5

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Website of DoFSC, CTMCDB, ICIMOD, WWF-Nepal; Annual reports of conservation partners; UN Biodiversity Lab
Indicators used	Chure conservation, landscape management along N-S corridor,
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Adequate

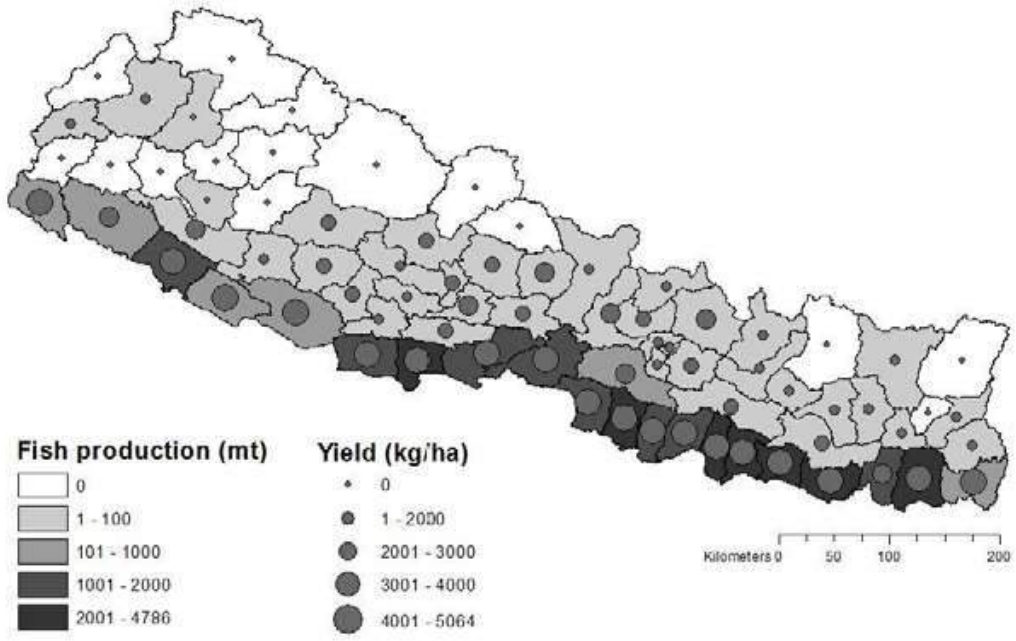
4.6 Sustainable Fisheries

Aichi Target 6: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts n threatened species and vulnerable ecosystems and the impacts of fisheries on stocks species and ecosystems are within safe ecological limits.

(1) Background

Nepal's fish diversity accounts to 232 species fin fish and all these are consumable. Of these, 12 species are commercially cultivated. Nepal has 16 endemic fish species. Fisheries account for about 1.22% of the Gross Domestic Production and 4.32% of agricultural GDP in the country (Gurung 2016). Agriculture Development Strategy (2015-2035) has emphasized fisheries and aquaculture for food and nutrition security. Fish farming is now moving from subsistence to neo-commercialization type (Gurung 2016). The aqua culture of fin fish comprises of Carp varieties, Tilapia, catfish and Trout. Besides these, the demand of shell fish (Gastropod, Shrimp, Crab and Mussel) is increasing and also for other aquatic plants such as fox nut and water chestnut but these hardly come into per capita consumption. Fishery and rural livelihood has always been associated to each other either in Tarai or Hilly areas.

In the last 15 years, there has been a steady growth in the fish production, with more than 37000 mt fish produced in 2013/14. Fish yield increased by more than 2000 kilograms per hectare during the same time period. However, the increase at the current level is not sufficient to cater the growing demand of fish in Nepal, and also to fulfill the target of making Nepal a self-sufficient country in fish production Karki (2016) (Map 3). The major problem faced by the community involved in fish farming in the reservoir is the lack of sustainable fingerlings supply (Gurung et al., 2010), loss of habitat and their degradation (Gurung 2013). To achieve this target, promotion of public-private partnership for improved fish farming is necessary for Nepal.



Map 3: District-wise fish production (metric ton) and yield (kg/ha) in Nepal

Source: Karki 2016

(2) Current status and trends

Target 1: By 2017, at least three suitable wetlands will be declared and managed as fish sanctuaries; and by 2020, N-S biological connectivity will be developed in three major rivers

Nepal's Himalayas are well known for their running and standing waters supporting the variation of fish diversity from cold running water to shallow ponds/lakes. Kulekhani river was ones best known for Asla (Snow trout), after dam construction, it was displaced by capture fishery, as Snow trout could not flourish in stored water (Pradhan and Swar 1987). Similarly, study of fish diversity collected from 34 sites in Kaligandaki-Narayani River over decades show the trend in decreasing order of fish species (David et al. 2016) (Table 9).

Table 9: Time series fish diversity in kaligandaki-Narayani river

Time	Collection	Species
1984-1986	60	77
1996	47	69
2015-2016	47	67

Source: David et al. 2016.

Some advanced scientific methods including eDNA for identifying different fish species was used for the first time in South Asia in Karnali river in 2017. Of the total 629 fish captured in

all three seasons, 51 species were identified through genetic analysis of which 33 unique species were found. The eDNA study also found some fish non-native to the region (NFBP/CMDN 2018).

Similarly, fish diversity of Sapta Koshi River, exactly at Koshi Barrage was studied in 2016 (winter and summer sampling) and a total of 59 species were recorded (Shah 2016), while species diversity was found to be maximum in winter than in rainy season.

However, natural and human made disasters have significant impact on biodiversity in the past 10 years including Kaligandaki River in May 2015, flood in Arun River and landslide in Taplejung districts, Phewa Lake degradation due to vegetation reduction and sedimentation (Gurung 2016) and industrial effluent in Narayani.

Rampant illegal and crude fishing (fish poisoning, improper gear used) have decreased the fish population and diversity in many of the river systems of Nepal. In order to overcome this, one of the option is the establishment of fish sanctuary. Fish sanctuary is considered as an important tool for protection and conservation of fisheries resources together with communities' participation. This can be done by setting aside a larger area of wetlands for protection, conservation and management of fisheries resources for sustainable production. NBSAP has also envisioned the establishment and management of fish sanctuaries, however in the context of limited legislation and intense fishing pressure and use rights of communities; no wetlands have been declared and managed as fish sanctuaries until the reporting period. Certain stretch of river in Koshi inside KTWR, designated area of Phewa Lake and stretch near dam side of Kulekhani River are restricted for fishing.

North-South biological connectivity is crucial for fish assemblage and to maintain the ecological integrity of the river system. In a country like ours having very potential of hydropower development, the hydropower companies ignore the concept of environmental flows. And the concept of fish ladder is often ignored during dam construction. At this condition, it seems no possibility for developing and implementing plan for maintaining unhindered N-S biological connectivity at thee major rivers. In the Kaligandaki Hydropower, a fish hatchery has been established to mitigate the biodiversity loss due to the construction of dam in the river. Now, the hatchery produces fry of the native fishes to release into the downstream and upstream of the river (Gurung and Baidya 2012).

Target 2: By 2018, spread of invasive fish species will be controlled, and by 2020, pilot projects will be developed and implemented for conservation (in-situ and ex-situ) of 10 economically important native fish species

Altogether 19 introduced (introduced, invasive, introduced invasive status not known) fish species have been reported in Nepal (Budha 2015). They are two catfish species, seven carp species, two barbs, one mosquito fish, one iridescent shark, two species of tilapia, one species of cichlid and three species of salmon. *Clarias batrachus*, an air breathing catfish, native to SE Asia

(Indonesia), is one of the world's worst invasive species and has been introduced to Nepal also. *C. garipenis*, native to Africa is commercially farmed in Nepal. It has been reported in river system in eastern Nepal, tributaries of Tamor River (Sharma 1999). Similarly, the native fish have reduced to 40% in Begnas Lake, Pokhara by the introduction of Carp varieties (Swar & Gurung 1988). Rainbow and brown trouts have negative impacts on local biodiversity in established areas (Kitano 2004). In Nepal, these species are highly prioritized for commercial purposes (Gurung 2008). Budha (2013) reported the unintentionally released rainbow trout in the natural old streams than in the fish farm in Rasuwa, Nepal. Henceforth, no measures have been taken for the spread of invasive fish species.

Aqua Pond Gene Bank under the aegis of National Gene Bank (NGB) has been established in two districts of Tarai, Banke and Bara in 2015 with a view to promote the IUCN Red List *Buhari* fish (*Wallago attu*). Similarly, the NGB has initiated establishing five other such banks in the mid-hills region of Nepal to promote artificial breeding of economically important native fish species. Some of the native fish species that can be artificially bred include Snow Trout (East-West diversity, cold running water), Tor spp. (can be successful bred), and Labeo spp (native, warm water, high potential for aquaculture) (comm. with Dr. Bibhuti Jha).

Target 3: By 2020, encroachment and eutrophication of 10 major wetlands will be controlled

Natural wetlands in Nepal are under threat due to degradation and loss by eutrophication and encroachment of invasive species. Efforts are underway to control eutrophication in major wetlands including Beeshazari Lake, Phewa Lake, and Mai Pokhari by using water mower and/or other means. Public discourse on Phewa lake encroachment picked the momentum following the special order of the Supreme Court. Encroachment in Barjulake (Sunsari district) was successfully controlled by a local institution. Jokhad tal (Kailali) and Betana tal (Morang) are examples of wetlands that have been restored and successful ecotourism initiatives are ongoing by the local management committee.

Target 4: Initiation of commercial fish farming in at least three hydropower reservoirs, by 2020

Fish farming had been initiated in Kulekhani and Kaligandaki before 2014. During the reporting period, no commercial fish farming was initiated in hydropower reservoirs. However, no hydropower reservoirs were constructed during this period.

(3) Progress assessment

With regard to this target, there is "progress towards target but at an insufficient rate". *Monitoring measures with regard to this ABT is inadequate*. Information sources used for assessment of progress of the target in given in Table 10.

Table 10: Information sources used for assessment of progress in implementing Aichi Target 6

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Website of MoALD, NARC, Budha (2015), Academic publications
Indicators used	Fish diversity, fish sanctuaries, wetlands encroachment,
Confidence level	Based on partial evidence
Adequacy of monitoring information to support assessments	Inadequate. Monitoring mechanism need to be strengthened both at the federal and state/local levels

4.7 Sustainable Resource Management

Aichi Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

(1) Background

Agriculture and fishery in Nepal have high level of dependence on the ecosystem and require special measures to protect biological diversity. Due to degradation of traditional agriculture, the destruction of habitats, and excessive fishing, biological essential for human livelihoods have been threatened.

(2) Current status and trends

Target 1: By 2020, 50 percent of the production forests will come under scientific management to improve forest productivity, biodiversity conservation and climate resilience

Government of Nepal developed and enacted Scientific Forest Management Guidelines in 2014 to advance the sustainable management in production forests. The objectives are to derive economic benefits from forests, to reduce reliance on timber imports from foreign countries, and to increase revenues from forestry sector. As of March, 2018, 81,500 ha of the production forest has been brought under the SFM by 285 CF, 30 CFM and 6 DFO (Poudel et al. 2018).

Target 2: By 2020, 10 percent additional national forest area will come under community based management; and by 2020, biodiversity chapter included in all forest management regime (Collaborative, Community, Leasehold)

Community forestry is considered as one of the most successful forestry models where over 2.9 million households are affiliated and benefited from 22,266 community forests user groups (DoF 2018). In this reporting period, 535,808 ha government managed forest was brought under community management in the form of community forest, collaborative forest, leasehold forest, and religious forest (GoN/MoFSC2014; MoFE 2018; DoF 2018) (Table 11). However, it is reported that there are not much potential forests left to be handed over to community (Consultation with DoF 2018). And people are now aware of the benefits of private forests and there have been an increase in the registration of private forests in Tarai and hills (Table 12). Regarding preparation of biodiversity chapter, District and FUGs have prepared/mainstreamed biodiversity chapter in their plans but not adequately addressed. The progress is also attributed to

the Community Forests Development Programme Directives, which require that FUGs have a biodiversity chapter in the operation plans.

Table 11: Status of forest management category (up to June 2018)

Description	CF	LHF	CFM	RF	PF
Number	22,266	7,506	30	36	10
HHs	29,07,871	71,753	8,64,015		
Forest area (ha)	22,37,671	43,957	43,317	2,056	1,90,809.4

CF: Community Forest, LHF: Leasehold Forest, CFM: Collaborative Forest Management, RF: Religious Forest, PF: Protection Forest

Table 12: Registered private forests in Tarai and hill districts

Tarai districts	Number	Hill districts	Number
Morang	503	Solukhumbu	133
Jhapa	380	Tanahu	74
Sunsari	362	Dhankuta	56
Chitwan	212	Khotang	56
Dhanusa	201	Surkhet	51

Source: Amatya and Lamsal 2017

Target 3: By 2020, additional five wetlands of international importance will be identified and enlisted as Ramsar sites

Lake Cluster of the Pokhara Valley has been enlisted as Ramsar site during the reporting period. The Lake Cluster of Pokhara comprises 10 wetlands *viz*. Phewa, Begnas, Rupa, Khaste, Deepang, Maidi, Gunde, Neurani, Kamalpokhari, and Pokhara Seti catchment. An integrated lake basin management plan of Lake Cluster of Pokhara Valley, Nepal (2018-2023) has been developed and being implemented (MoFE 2018). A case of urban biodiversity conservation in Gandaki State, Nepal is presented (Case 3).

Case 3. Urban Biodiversity Conservation in the "City of the Lakes" in Gandaki State, Nepal

Pokhara Valley, also known as the 'City of the Lake' is of international importance from biodiversity, as it supports vulnerable, endangered, and critically endangered species as well as threatened ecological communities. The Lake Cluster of the Pokhara Valley (LCPV) is the 10th Ramsar site of Nepal, declared on 2 February 2016. The LCPV Ramsar Site is comprised of nine lakes and one catchment, and located in Pokhara Metropolitan in Kaski District. The total catchment comprises of an area of 261 sq. km of which water bodies consists of 3.5%; whereas the rest of the catchment area is dominated by agricultural land, forests, settlement and built-up area. The lake provides home to over 360 species of plants, 32 species of mammals, 140 species of birds, 24 species of reptiles, 27 species of fish, and 11 species of amphibians; many are globally threatened. The LCPV possess high socio-economic significance. There are a lot of temples and shrines which are used for celebration of festivals, holy baths and worship God and Goddess. Thousands of people are dependent on these lakes for the tourism business, wetland resources, irrigation and fishery, and hydropower generation. Threats have been observed from: (i) mass tourism pressure; (ii) commercial fishing; and (iii) land use changes, especially settlement and built-up area extension leading to eutrophication, sedimentation/siltation, pollution (solid waste), etc. Integrated Lake Basin Management Plan of the Lake Cluster of Pokhara Valley, Nepal (2018-2023) has been prepared and implemented for sustainable

management of the LCPV (MoFE 2018). In the New Federal Structure, biodiversity conservation initiatives have been undertaken by the Gandaki State through development of biodiversity conservation policies. Biodiversity conservation has been mainstreamed by the Pokhara Metropolitan by allocation of NRs. 197,000 in the sub heading of Forests and Environment for FY 2075/076. This is only 0.318% allocation in forests and environment sector. However, the municipality has been involved in maintaining greenery in the parks, providing tree guard for road side plantation, and also implemented 1 house 2 trees concept that was quite successful in the past.
Sources: DNPWC (2016); MoFE (2018); and Field Consultation, 04 October 2018

Target 4: By 2020, community based management of agrobiodiversity will be expanded to at least five additional districts

Community based management of agrobiodiversity has five components: Seed bank, Field Gene bank, Tissue Bank, DNA Bank, and On-farm Conservation (Genebank 2017). Community based management of agrobiodiversity has been extended to 33 districts by the time of review. An effective functional linkage has been established between the National Gene Bank and community Seed Banks. Community Seed Bank Directives and Procedures are in place (GC and Acharya 2018). There is a clear guideline for establishment and management of community seed bank (Shrestha 2018). There is also a system of repatriation of accessions to strengthen the functional linkages. Community Seed Banks were supported for on-farm conservation of agrobiodiversity. Similarly, technical and financial assistance was provided to Community Seed Banks for collection of local landraces, conservation and improvement and field gene bank.

To successfully meeting the target, there is need to harmonize the protection of forest biological diversity; develop ecofriendly agriculture practice, and monitor conservation of fishery stock.

(3) Progress assessment

There is need to harmonize the protection of forest biological diversity; develop ecofriendly agriculture practice, and monitor conservation of fishery stock. The overall progress is the target is "on track to be achieved". *Monitoring related to this target is adequate*. Information sources used for assessment of progress of the target in given in Table 13.

Table 13: Information sources used for assessment of progress in implementing Aichi Target 7

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Websites and annual reports of MoFE, MoALD, DoFSC, DNPWC, NARC
Indicators used	Forest area under different management regimes, wetlands of international importance, community based agrobiodiversity management
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Adequate

4.8 Pollution

Aichi Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

(1) Background

Intensive farming in some pocket areas; imbalanced and or indiscriminate use of agrochemicals are leading to water pollution. The pollution is one of the most critical challenges for self-recruiting fisheries, aquatic genetic resources, micro-organisms, invertebrates' genetic resources, and associated biodiversity (MoAD 2017). National Pollution Control Strategy and Action Plan (2017-2032) has been prepared but not endorsed to this date. Similarly, the formulation of River Ecosystem Management Plan for Rapti and Narayani is ongoing.

(2) Current status and trends

Target 1: By 2020, plans will be developed and implemented to: (i) monitor the level of use of pesticides, insecticides and chemical fertilizers, and (ii) control industrial pollution in five major rivers and other five major wetlands

Trend of river pollution trend if any

Very limited updated information exists regarding the country's pollution and its impact detrimental to ecosystem function and biodiversity. Study conducted by MoAC (2017) found that one of the important drivers affecting the extent and distribution of associated biodiversity in last 10 years in Nepal is pollution and external inputs. In irrigated production systems, because of higher use of external inputs especially agrochemicals and higher cropping intensity, associated biodiversity is more affected as compared to rain fed production system. There has been lack of information on systematic study to monitor the level of use of pesticides, insecticides and fertilizers; however, use of agricultural pesticides have impact negatively on freshwater fish and aquatic organisms. Frogs and fish might also be in decreasing trend due to environmental pollution and several other factors. The aquatic mammals such as Dolphin (*Platanista gangetica*) are also known to be declining; however, some initiatives on conservation have been taken in Mohana River, Kailali to monitor the species (Pers. Comm. Bijay Shrestha). The aquatic plants such as Singhada (*Trapa bispinosa*), Makhana (*Eurayle ferox*) and Lotus (*Nelumbo nucifera*) might also be rated in declining trends because of over exploitation, drying up and encroachment of the wetlands due to over population, rapid urbanization, use of wetlands and lakes for traditional agriculture and town planning activities. Occasionally, assessment of surface water quality of wetlands, such as Chimdi Lake, Sunsari District (Das 2017); Betna wetland, Morang District (Das et al. 2018) have been conducted.

Similarly, pollution management measures are incorporated in Lake Cluster of Pokhara Valley. The trend in the state of associated biodiversity is likely to be declining due to pollution, drying up of wetlands; and flood plains encroachment. Fishes are not free from risks associated

with extinction. Well-known local fish species such as Sahar, Asala, Masheer, Bam, Hile machha, shrimp, crab, etc. are highly threatened; one of the major threats is aquatic pollution (MoAC 2017).

Restoration of degraded lake due to pollution and other anthropogenic and natural disasters has been undertaken in Pokhara Valley Lake Cluster, as lessons learnt (Box 2).

Box 2: Rupa lake restoration

Rupa Lake Restoration Cooperative, which is the largest cooperative in agricultural sector in the country, became successful to restore the degraded Lake Rupa around late nineties with 'bio-manipulation' of lake with fish stocking (Gurung 2007). The lake now has been restored, cleaned up and has been the source of livelihood of about 740 families living nearby catchment areas. The annual fish harvest of the lake is nearly 60-70 mt per year. The Lake Rupa case is one of the examples to show case the management of pollution and natural/ human made disasters. The conservation effort has become successful for improving livelihoods, food security and nutrition of local communities (MoAC 2017).

(3) Progress assessment

There is progress towards the target but at an insufficient rate to meet it by 2020. *Monitoring of this target is poor*. Information sources used for assessment of progress of the target in given in Table 14.

Table 14: Information sources used for assessment of progress in implementing Aichi Target 8

Items	Content
Time of assessment	July 2018
Information sources for assessing this target	Websites of MoALD, field consultation, academic publications
Indicators used	Biophysical and chemical properties of wetland degradation
Confidence level	Based on partial evidence
Adequacy of monitoring information to support assessments	Based on limited evidence. Monitoring mechanism need to be strengthened both at the federal and state/local levels

4.9 Invasive Alien Species

Aichi Target 9: By 2020, invasive alien species (IAs) and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

(1) Background

Biological invasion has become one of the major causes of environmental and socio-economic damages as well as major driver of biodiversity decline (CBD 1992). Many alien taxa are known to cause socio-economic impacts by affecting the different constituents of human wellbeing, including food security, material and non-material assets, health, social, spiritual, and cultural relations (Bacher et al. 2017). Anthropogenic pressure, land use change, and climate change have accelerated invasion by invasive species in the Himalayas (Thapa et al. 2018).

(2) Current status and trends

Target 1: By 2020, detail survey of the coverage and research on modes and pathways of propagation, ecological and economic damage and loss, control measures, and biological control agents to control IAS will be conducted, and possible uses of at least five most problematic IAPs will be completed

Regarding detail survey of the coverage and research in IAs, Nepal has initiated to develop distribution maps, conduct inventories, develop policies, improve awareness and monitor results. A Darwin supported workshop "Impact Assessment of Invasive Alien Plant Species of Nepal" held on May 17-18, 2018, Kathmandu was participated by national and international experts, and has identified four problematic IAPs in Nepal; and assessed their threat category using Environmental Impact Classification of Alien Taxa (EICAT) adopted by IUCN. There are altogether 26 species assessed, four species can qualify for massive, nine species fall in major, ten in moderate, and three in minor categories. The massive species identified are *Chromolaena odorata, Eichhornia crassipes, Parthenium hysterophorus* and *Lantana camara*; whereas *Mikania micrantha* is one among nine major species

Potential impact of climate change on the distribution of six invasive alien plants in Nepal has been studied by Shrestha et al. (2018); and Shabbir et al. (2019). Using occurrence data of six of the most problematic invasive alien plants (IAPs) of Nepal, such as *Ageratum houstonianum, Chromolaena odorata, Hyptis suaveolens, Lantana camara, Mikania micrantha,* and *Parthenium hysterophorus*, the authors have predicted their climatically suitable areas across the country under the current and two future climate change scenarios (RCP 4.5 scenarios for 2050 and 2070). Under the current climatic condition, *P. hysterophorus* had the highest suitable area (18% of the total country's area) while it was the lowest for *M. micrantha* (12%). A predicted increase in the currently suitable areas ranges from 3% (*M. micrantha*) to 70% (*A. houstonianum*) with the mean value for all six species being 29% under the future climate change scenario for 2050. For four species such as *A. houstonianum, C. odorata, H. suaveolens* and *L. camara*), additional areas at elevations higher than the current distribution will provide suitable habitat under the projected future climate. Thus, all six IAPs assessed are likely to invade additional areas in future due to climate change and these scenarios need to be considered while planning for IAPs management as well as climate change adaptation (Figure 4).

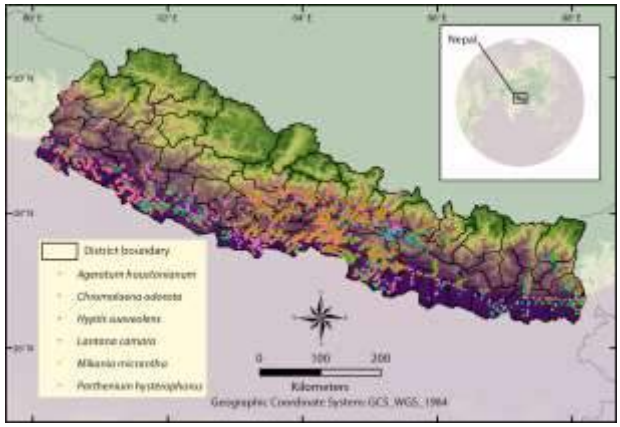


Figure 4: Distribution of most problematic invasive alien species in Nepal

Source: Shrestha et al. 2018

Lamsal et al. (2018a) made a study to assess impact of and the dynamics of IAPs under climate change scenario in the Himalayas, and forecasted that two invasive species, *Ageratum conyzoides* and *Parthenium hysterophorus*, will lose overall suitable area by 2070, while *Ageratina adenophora*, *Chromolaena odorata* and *Lantana camara* will gain suitable areas and all of them will retain most of the current habitat as stable.

Target 2: By 2020, program to raise awareness of local people focusing especially on marginalized communities on identification of IAs, their impacts and control techniques including biological control agents will be developed and implemented to control and manage IAs

Regarding target to raise awareness of local people focusing especially on marginalized communities on identification of IAs, their impacts and control techniques including biological control agents, study of IAPs has also been conducted at regional and landscape levels. This includes an illustrated manual of 16 invasive alien plant species like *Ageratina adenophora, Lantana camara, Parthenium hysterophorus, Ageratum haustonianum,* and *Erigeron karvinskianus, etc.* identified in the Kailash Sacred Landscape – Nepal (Bisht et al. 2016, ICIMOD 2017). The Department of Plant Resources (DPR) has made study of exotic plant species planted along East-West Highway; and 91 exotic species were collected including 25 IAPs. About 20-22 community forests have established control plots under National Science Foundation (NSF) funding (BB Shrestha, CDBTU, personal communication, May 2018). Similarly, NARC has conducted research on management of *Eichhornia crassipes*; Weevil/beetle has been introduced from India for biological control. Manual control of *Eichhornia crassipes* in Phewa lake, Pokhara and Beeshazari lake, Chitwan and the species is being utilized for making organic manure and adding to the methane digester (Field consultation, June 2018). Commonly found IAPs in the Tarai region include *Chromolaena odorata, Spermacoce alata, Ageratum haustonianum*; whereas in Siwaliks *Chromolaena odorata, Bidens pilosa, Ageratum haustonianum, Lantana camara*; and *Chromolaena odorata* are the most dominant species in terms of both frequency and coverage from Tarai and Siwalik regions (Dhakal et al. 2018).

(3) Progress assessment

Overall, sporadic work on IAPs has been done. The Forests Research and Training Centre (FRTC) is the focal point of IAPs in Nepal. There is need to: (i) expand nationwide survey and conduct detailed investigation to designate alien species; (ii) monitor the IAPs that are disturbing the ecosystems, and (iii) implement the Cartagena Protocol on Biosafety. An IAS Management Strategy (after International Symposium of IAS in 2014) has been drafted and approval awaited. There is "progress towards this target but at an insufficient rate". *Monitoring related of this target is partial*. Information sources used for assessment of progress of the target in given in Table 15.

Table 15: Information sources used for assessment of progress in implementing Aichi Target 9

Items	Content
Time of assessment	October 2018
Information sources for assessing this target	Website of FRTC, DPR, NARC, field observation, workshop outcome,
Indicators used	Spatial distribution of IAPs,
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. There is need to develop management strategy

4.10 Vulnerable Ecosystems

Aichi target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

(1) Background

Anthropogenic pressure, land use change, and climate change have accelerated in Nepal Himalaya impacting all ecosystems, disproportionately more in the High Himalayas and the Trans-Himalayas (Shrestha et al. 1999).

(2) Current status and trends

Target 1: By 2020, at least 10,000 ha. degraded mountain ecosystems will be restored through ecosystem based adaptation approach and 3,000 community forest user groups adopt climate change adaptation planning

To maintain the integrity and functioning of the ecosystems, the government and conservation institutions have been carrying out assessments in Global Observation Research Initiative in Alpine Environments (GLORIA) to document the effects of climate change on alpine plants and peoples. GLORIA study has been established in a 1500 km trans-Himalayan transect across Nepal, Bhutan, and the Tibetan Autonomous Prefecture (TAP), China (Salick et al. 2014); for biodiversity monitoring in Humla, Kailash Sacred Landscape, and in Kangchenjunga Landscape (ICIMOD 2017); Himalayan treelines responding to climate change in Gaurishankar Conservation Area (Schickhoff 2015); and Nepal Himalaya (Bhatta et al. 2018). In addition, an assessment on land use land cover change and ecosystem service in the Temperate forest ecosystem of Taplejung was completed (Thapa et al. 2018). The studies have reflected that biotic responses to current climate change include elevational range shifts of species, intense recruitment of tree species in treeline ecotones and shifts in phenology, resulting in modified structure, composition and functioning of Himalayan ecosystems (Salick et al. 2014; Schickhoff et al. 2016a & b; Schwab et al. 2018).

(3) Progress assessment

Despite some progresses, the “progress towards target is at an insufficient rate”. Particular attention need to be given to address key challenges of loss of biodiversity; the degradation and fragmentation of natural habitats; negative impact of climate change in habitat and species; the

eutrophication/encroachment of water bodies, etc. *Monitoring related of this target is partial.* Information sources used for assessment of progress of the target in given in Table 16.

Table 16: Information sources used for assessment of progress in implementing Aichi Target 10

Items	Content
Time of assessment	June 2018
Information sources for assessing this target	Website of ICIMOD, report of KSLCDI, KL
Indicators used	GLORIA study
Confidence level	Based on partial evidence
Adequacy of monitoring information to support assessments	Partial. Long-term environmental and socio-economic monitoring need to be expanded to cover (spatial and temporal) the country

4.11 Protected Areas

Aichi target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular important for biodiversity and ecosystem services, are conserved through effective and equitably managed, ecologically representative and well connected systems of protected areas and other effective area based conservation measures, and integrated into the wider landscape and seascapes.

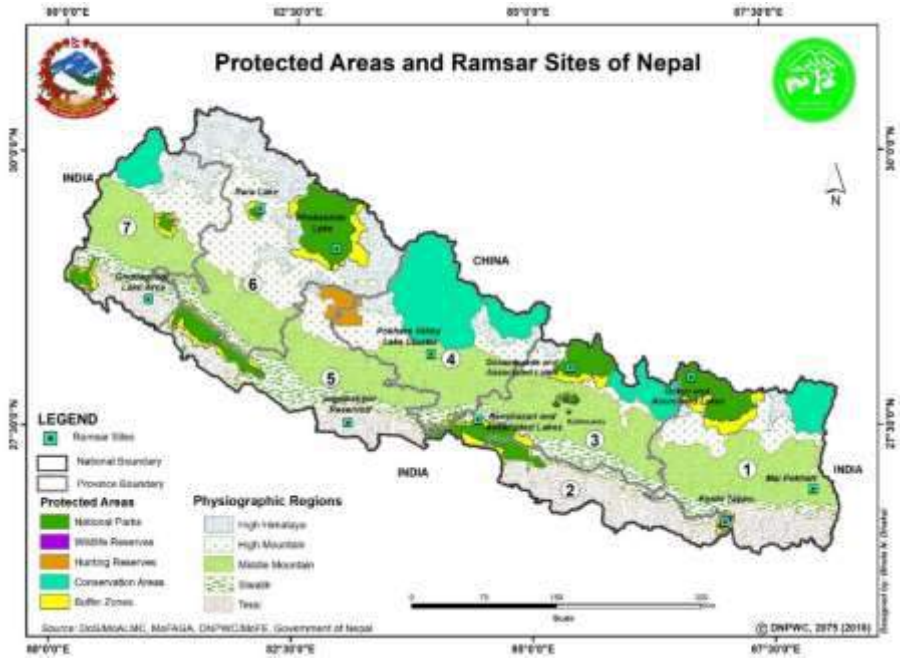
(1) Background

Strategic Plan for Biodiversity 2011-2020 suggests that 17% of the world terrestrial and inland water areas and 10% of coastal and marine areas be conserved through designation of protected areas. The ABT 11 deals with protected area management and other effective area-based conservation measures which is a major approach of biodiversity conservation in Nepal.

(2) Current status and trends

Target 1: By 2020, at least 25% area of the country will be sustainably managed under protected area system

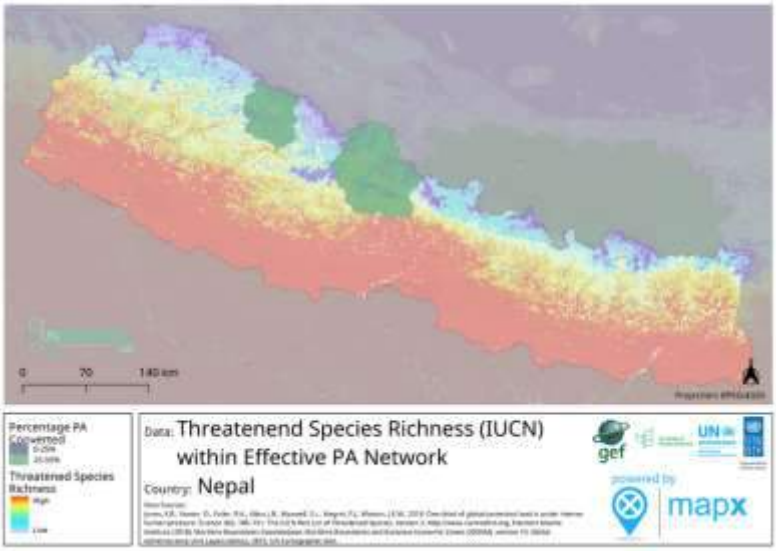
Regarding the target "By 2020, at least 25% area of the country will be sustainably managed under protected area system"; Nepal currently holds 23.39% (i.e. 34,419.75 sq km) land area under PAs that comprises 12 National Parks, 1 Wildlife Reserve, 1 Hunting Reserve, 6 Conservation Areas, and 13 Buffer Zones (DNPWC 2017); and this proportion is above the suggestion (Map 2). However, it is necessary to improve effectiveness in evaluation and monitoring of the management of protected areas, in particular those PAs that are designated as the "World Heritage Sites". There has been also increase in the area coverage of the national parks from 32% to 34%.



Map 4: Protected Area System and Ramsar sites of Nepal

(Source: DNPWC 2018)

In response to massive worldwide biodiversity loss, strict protected areas in some nations show that they are potentially effective in conserving biodiversity (Jones et al. 2018). Nepal shows an example of protection of threatened species richness (IUCN) within well-managed effective PA network (based on map produced by UN Biodiversity Lab 2018) (Map 5).

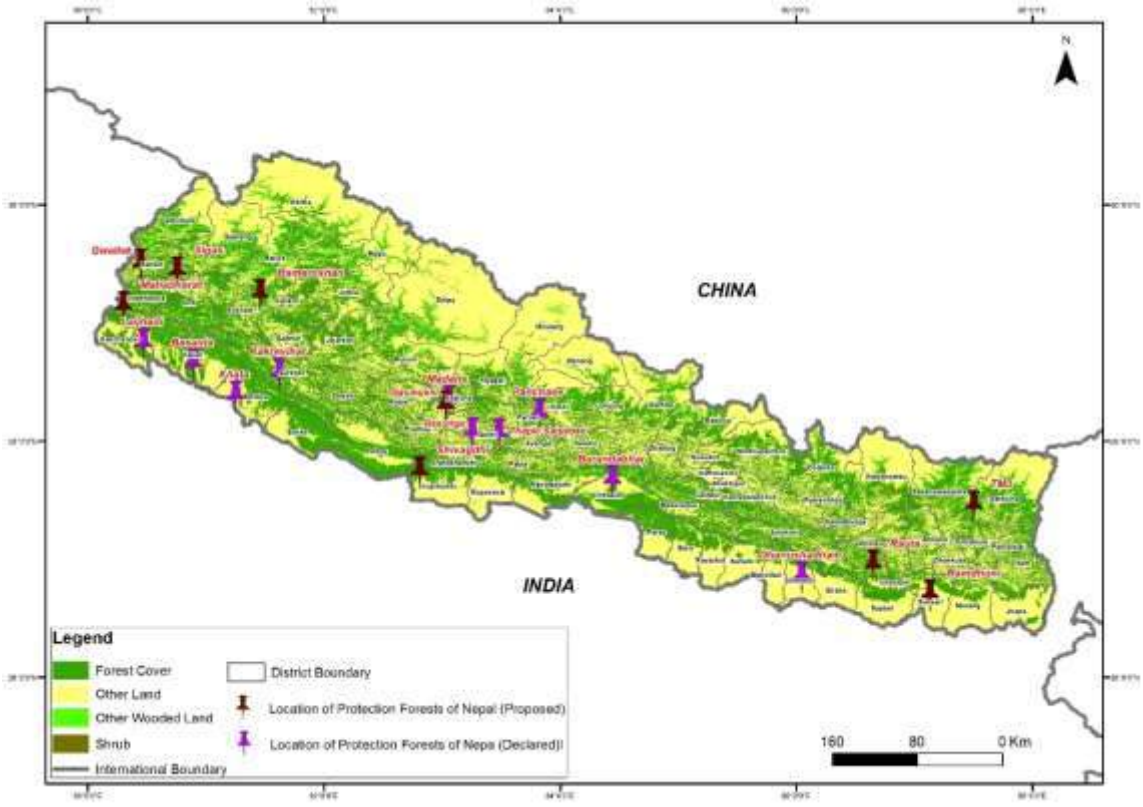


Map 5: Threatened species richness within effective PA network

Target 2: By 2020, local forest user groups will be capacitated for conservation friendly management of forests in five important corridors and climate refugia identified and mapped

The GoN has so far identified and mapped important corridors; these include ten forest corridors identified and declared as protection forest (DoF FY 2073/2074). These forests best serve as biological corridor and connectivity, important habitat for mega fauna, important areas of religious, cultural and natural sites, ecotourism, water reservoir and watershed conservation, and rich in ecosystem services (Map 6).

Community forests in particular have conservation-friendly management as a focus to conserve biodiversity and support local livelihoods in major corridors. Western Mountain Landscape was identified and declared as conservation landscape (DoF 2018) having a north-south linkage but limited studies validate the linkages and conservation-friendly management. Most of the CFs support conservation friendly management but not all. Very limited knowledge on climate refugia identification and mapping exist and this further demands research and validation.



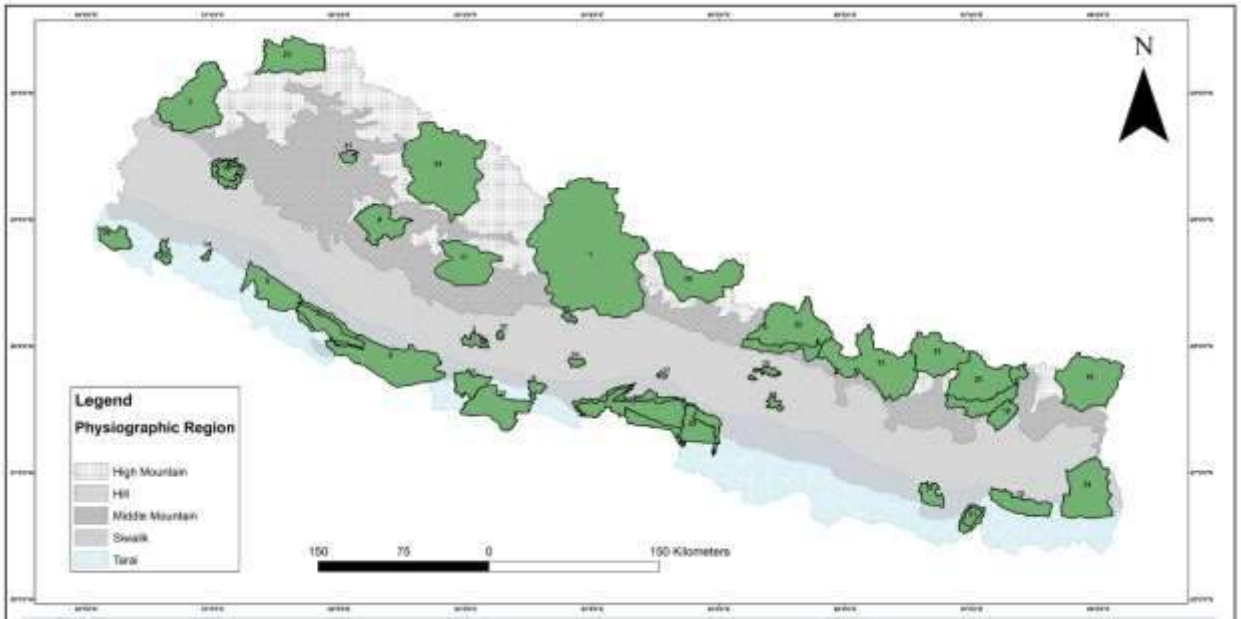
Map 6: Declared and proposed Protection Forests of Nepal

Source: 6NR 2018

Target 3: By 2020, at least 20 Protection forest will be declared for biodiversity conservation outside PAs

In addition to 20 PAs as mentioned above, currently, Nepal has declared 10 Protection Forests (comprising an area of 190809.43 ha); and additional 9 forests are in the process of declaration under Protection Forest (DoF FY 2073/74) (Map 6). These protection forests acts as forest corridors linking protected areas, and protected areas 'connectivity into landscapes.

Despite the richness and diversity, threats to avifauna and their habitats are still continuing. To combat with the threats, Nepal in collaboration with BCN, a Bird Life International UK partner aims to identify, document and work towards the conservation and sustainable development of a network of critical sites for the world's birds and other biodiversity. A total of 37 Important Bird Areas (IBAs) (Map 7) (10 additions to already identified 27 IBAs in the past years) now cover nearly 28% of Nepal's land area. IBAs meet the obligation of CBD; however, continuous conservation actions at all levels is essential to sustain these IBAs in Nepal.



1	Annapurna Conservation Area	14	Ghodaghodi Lake Area	27	Panchase Protected Forests
2	Api Nampa Conservation Area	15	Jagdishpur Reservoir / Lumbini Farmlands	28	Parsa National Park and Buffer Zone
3	Argha	16	Kanchanjunga Conservation Area	29	Phulchoki Mountain Forests
4	Banke National Park and Buffer Zone	17	Kapilvastu	30	Rampur Valley
5	Bardiya National Park and Buffer Zone	18	Khandbari	31	Rara National Park and Buffer Zone
6	Barekot	19	Khaptad National Park and Buffer Zone	32	Reshunga Forests
7	Chitwan National Park and Buffer Zone	20	Khutiya	33	Sagarmatha National Park and Buffer Zone
8	Dang Deukhuri foothill forest and West Rapti Wetlands	21	Koshi Tappu Wildlife Reserve and Koshi Barrage	34	Shey-Phoksundo National Park
9	Devdaha	22	Langtang National Park and Buffer Zone	35	Shivapuri Nagarjun National Park and Buffer Zone
10	Dharan Forests	23	Limi Valley	36	Shukla Phanta National Park and Buffer Zone
11	Dhorpatan Hunting Reserve	24	Mai Valley Forests	37	Triyuga Watershed
12	Gadhi Siraichuli	25	Makalu Barun National Park and Buffer Zone		
13	Gaurishankar Conservation Area	26	Manaslu Conservation Area		

Map 7: Important Bird and Biodiversity Areas of Nepal

Source: BCN 2018

Protection forest at the local level is being managed by local forest office has been contributing to protection of biodiversity and cultural diversity; a case from State 2, Nepal is presented below (Case 4).

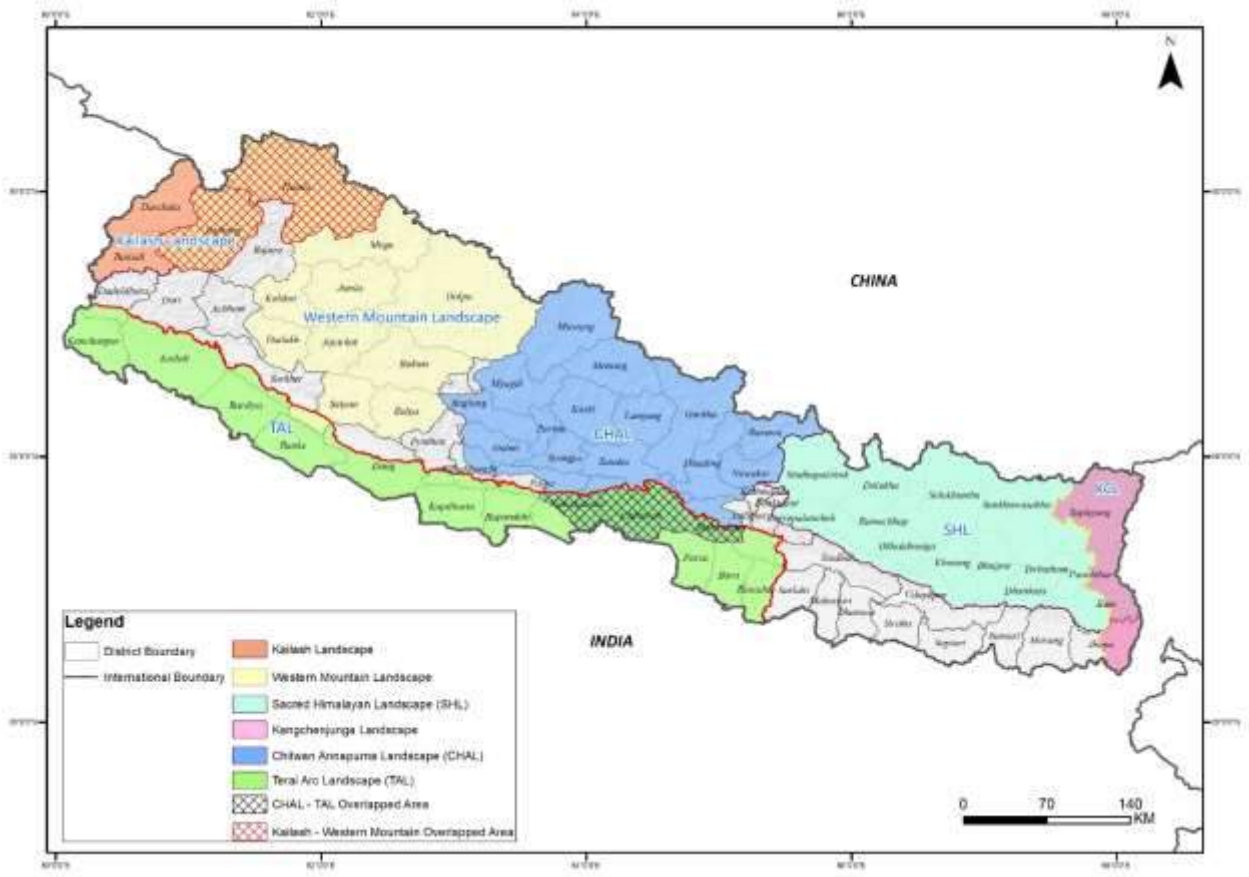
Case 4. *Dhanusha Dham Protection Forest – Contributing to Conservation* (State 2, Nepal)

The Dhanusha Dham Protection Forest is situated in Dhanusha District and covers an area of 360 ha. The historical forest once over-exploited for a long time was declared as protection forest in 2069 B.S. The forest is being managed by local forest office in collaboration with Mithila Wildlife Trust (which is supported by Zoological Society of London), and has developed as: (i) a center of *in-situ* and *ex-situ* conservation of local biodiversity; (ii) suitable habitat and corridor for wildlife; (iii) rescue centre for wildlife; and (iv) tourist visiting centre. In addition, 250 children of the Mushar community from 267 households have been supported to get enrolled in the government school; whereas "Jhijhiya" Committee has been established to protect the culture of Mithila.

For the management purpose, the forest area is divided into core area and fringe area. Natural forest occupies an area of 340 ha comprising mainly mixed forest of Sal (*Shorea robusta*), Khayar (*Acacia catechu*), Sissoo (*Dalbergia sisso*), and species of *Adina, Terminalia, Lagerstroemia,* etc. Seven threatened and protected species of fauna including python, king cobra, turtles have been conserved in *ex-situ* condition. The forest serves as a wildlife corridor for elephants. Local communities inform the authorities of the protection forest when wild animals are seen outside the forest area, and wild fauna are being rescued as routine activities by the authorities. The forest area comprises 18 ha wetlands called "Dhanusha Daha" comprising an area of 7.2 ha. With the help of local fishermen, rare and new fishing's are added to the pond which serves as *ex-situ* conservation of fish diversity of the area. About 50 % of the tourists (average 117 tourists per day out of 224) who visit Dhanusha Dham also visit the park area of the forest.

Source: Field observation and interviewing, 01 September 2018

It is suggested that landscape approaches should complement and not replace more conventional biodiversity conservation measures (Sayer 2009). Now, more than 88% of the country's area has come under the landscape level conservation (Map 8; see ABT 4.5 for details).



Map 8: Major conservation landscapes of Nepal

Source: 6NR 2018

Target 4: By 2020, the concept of Smart Green Infrastructure will be applied while constructing new infrastructure including "Overpass and underpass" at three key locations to allow free movement of wildlife species

Regarding this target, three underpasses have been constructed in Barandabhar corridor. The construction of underpass has raised a doubt whether those structures would meet the standards of underpass for free movement of wildlife particularly large mammals. Remaining structures are planned in Chitwan and Nawalparasi.

Cutting edge technology for wildlife conservation has also been implemented in most of the PAs located in the Tarai to improve security and support local communities to address HWC for conservation (Box 3).

Box 3: Cutting edge technology for wildlife conservation

Despite Nepal's endeavor in the establishment of National Parks and Wildlife Reserve and species conservation, challenges still lie when security forces find difficult to the pertaining threats. Nepal has set an example by embarking into the use of appropriate cutting edge technologies for wildlife conservation. Examples include Smart Patrolling System in various PAs that allows visualizing real-time information about patrolling. Patrols team with their smart phones, record their positions in regular interval which is then sent to the command post application. Then the command post application monitors the activity and ease the commander to take an immediate decision in severe cases. Beside this, sometimes the use of Unmanned Aerial Vehicles (UAVs) are flown to monitor the wildlife movement and track its habitats. It thus helps for surveillance of unauthorized entry including persons or vehicles and thus help in conservation. In addition to these, Toll Free hotline telephone number has been implemented in CNP to establish a communication platform to share information on any illegal activities to park authorities and security forces. Another example include vehicle tracking system implemented in CNP for vehicles that are taken to jungle drive. Joint operation room displays live movement of vehicle inside the Park. These jungle drive vehicles are controlled to move only in their permitted route and so is with their speed too. Control are thus done so that the vehicles cannot halt for a longer period of time in one location. This system is expected to control illegal activities and disturbances to wildlife inside the park. All these conservation technologies help park administration for effective conservation, improve security and support local communities to address HWC for sustainable conservation.

Source: Modified from Sipahi Barshik 2074, Janasamparka tatha Suchana Nirdeshnalaya, Jangi Adda, Kathmandu, Anka-51, Barsa-50.

There is still need and scope to promote effective management of PAs. The recently conducted Management Effectiveness Evaluation (DNPWC 2016) of 10 PAs namely SuNP, BNP, CNP, PNP, KTWR, MBNP, SNP, ShNP, LNP and KNP, only Chitwan NP stood 'very good' from MEE perspective. Two PAs namely Makalu Barun NP and Khaptad NP were categorized under 'satisfactory' and rest were 'good'. The MEE reflected that the performance of accessible PAs is better than remote one. Also, the management performance of the PAs which are producing good resources show better performance. Another key point to note is that the PAs receiving conservation partner's support are also in a good management portfolio. This will enhance the health of habitat. It is also to establish a plan to build basic information system of national protected areas, and expand the designation of special protection zones in national parks.

Target 5: By 2020, the National Zoo Policy will be developed and implemented

National Zoo Policy has been drafted by DNPWC.

(3) Progress assessment

Overall the target is "being achieved". *Monitoring related to this target is adequate*. Information sources used for assessment of progress of the target in given in Table 17.

Table 17: Information sources used for assessment of progress in implementing Aichi Target 11

Items	Content
Time of assessment	July, 2018
Information sources for assessing this target	Websites and Annual reports of DNPWC, DoFSC, NTNC, BCN, ZSL, UN Biodiversity Lab; Field consultation; UN Biodiversity Lab
Indicators used	Area of PAs, protection forest,
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Adequate

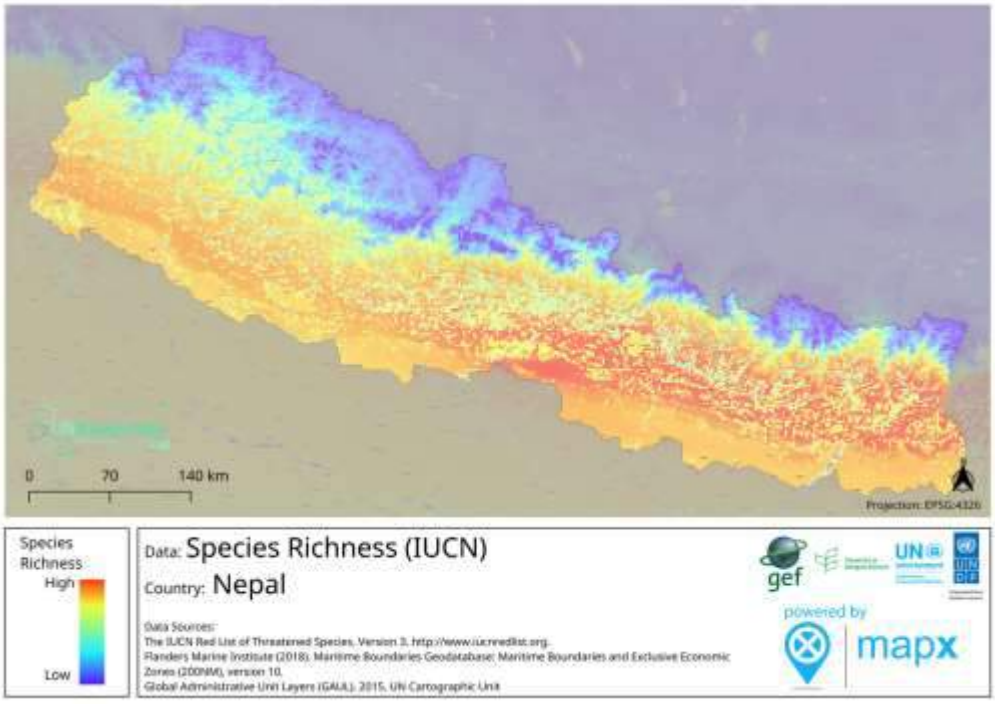
4.12 Species and Extinctions

Aichi Target 12: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

(1) Background

Species richness of vascular plant species in Nepal Himalaya exhibit a unimodal response to elevationwith peaks in total species richness between 1500m and 2500m (Vetaas and Grytnes 2002). Species richness (following IUCN category) in Nepal including vulnerable species has been assessed by the IUCN Red List of Threatened species, version 3. The Map 9 produced by UN Biodiversity Lab 2018) shows high species richness in the mid-hills physiographic zone.

Vulnerability of endangered species in Nepal is becoming an alarming issue. Institutionalized protection and management are necessary for protection of threatened, and endemic species of Nepal.



Map 9: Species richness across Nepal

(2) Current status and trends

Target 1: By 2020, conservation plans for 20 additional priority species (10 animals and 10 plants) will be developed and implemented

Conservation Action Plan of threatened species has been formulated for their conservation and management and are under implementation in different PAs of Nepal by government and conservation partners. These conservation action plan include the following:

- Elephant Conservation Action Plan (2009-2018)
- Vulture Conservation Action Plan (2015-2019)
- Bengal Florican Conservation Action Plan (2016-2020)
- Black Buck Site Specific Conservation Action Plan for SuNP (2016-2020)
- Tiger Conservation Action Plan (2016-2020)
- Rhino Conservation Action Plan (2017-2021)
- Snow Leopard Conservation Action Plan (2017-2021)
- Gharial Conservation Action Plan (2018-2022)
- Pangolin Conservation Action Plan (2018-2022)
- Red Panda Conservation Action Plan draft (2019-2023)
- Pheasants Conservation Action plan is under formulation.

The preparation of conservation action plan of species including Wild water buffalo, Bear and Musk Deer is ongoing.

In the case of plant species, Conservation Action plan prepared has been prepared for *Pterocarpus marsupium* and *Rhododendron* spp. (2018-2022). Conservation Action Plan preparation is ongoing for species including *Satisal*, Rudraksha, *Okhar*, etc.

Target 2: By 2020, *ex-situ* conservation of threatened species will be strengthened by establishing additional 2 zoo and botanical gardens

Until now, Nepal has only one Zoo. Such zoos are proposed and master plan has been prepared and approved for Surya Binayak (Bhaktapur). GoN has envisioned for establishing zoo and botanical garden in each of the 7 states of Nepal. Bhanubhakta Zoo in Tanahu District under the aegis of DNPWC is being initiated.

Target 3: By 2020, awareness of local people on behaviors of different wild animals will be enhanced, and locally suitable low cost measures to deal with them will be established

With the increase in the number of wild fauna, there has also been an increase in the human and wildlife conflict in most of PAs in particular and outside PAs in general. The most problematic animals in Tarai include the wild elephants and rhinos in the buffer zone of PAs where crop depredation is very high. Whereas in mid hills it's the Common Leopard, Porcupine and most notably the Rhesus monkeys responsible for crop damage the most. While in mountains it's the Snow Leopard for livestock depredation. In mountain area, community corrals are supported where large herds are kept for ranging and also deterrent lights to keep away wild predators. In mid hills, efforts have not been successful for monkeys, porcupine and wild boar. In Tarai, along the fringe area of the forests, predator proof corrals have been supported to vulnerable communities

as a low cost measure and awareness programs on behavior of different wild animals are supported. However, these measures are not sufficient in number and scale to address the recent problem of HWC in the localized area. Human-Elephant Conflict Management Strategy and Action Plan and also Human-Common Leopard Conflict Management Strategy and Action Plan has already been draft and is waiting for approval. Nepal has put substantial effort to protect the species there by managing its habitat and reducing poaching of the species, such as tiger (Figure 7), and vulture (Box 4).

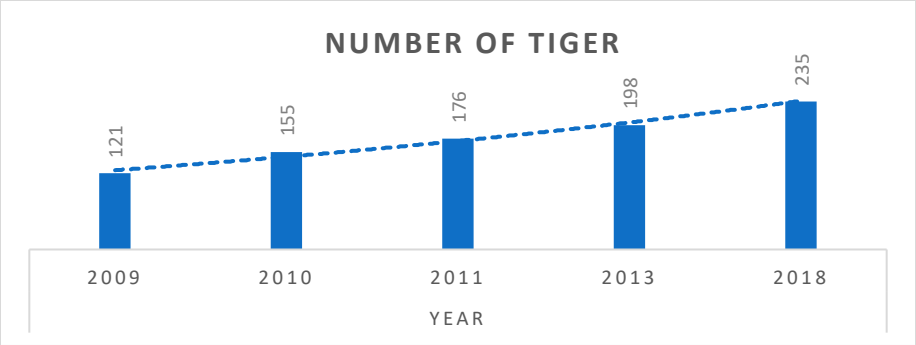


Figure 5: Population of wild tigers in Nepal

The census came with 235 wild tigers in the country, nearly doubling by 2022, the baseline of around 121 tigers in 2009.

Box 4: Vultures conservation in Nepal

Of the nine species of Vulture recorded in Nepal, White rumped Vulture (WRV) is listed as Critically Endangered. The decline in its population is due to diclofenac (NSAID), treated to livestock during 1990 and 2000s and the species feeding on the carcasses containing its residue. In order to halt the decline, the GoN in collaboration with BCN for both in-situ and ex-situ conservation of the species. The in-situ conservation is the creation of a Vulture Safe Zone (VSZ), an area greater than 30,000 sq km, that includes one vulture nesting colony, suitable foraging habitat and food sources free of diclofenac. Following this lead, provisional VSZs are now being implemented in Bangladesh, India and Pakisthan. Till the date 66 districts declared as Diclofenac Free Zone (vulture toxic drug free) on veterinary use which occupies more than 85% land of country. Seven Vulture Safe Feeding Sites popularly called *Jatayu Restaurant* are now operated in Nepal to provide safe food for vulture. *Ex-situ* conservation started with establishing Vulture Conservation and Breeding Center in 2008 against the continuing decline of WRV. A total of 60 chicks of WRV collected from Western Nepal in different years were kept and reared. Egg lying started from 2012 and 15 chicks hatched since then. Nepal became the first country in the world to release the captive vultures into the wild in 2016 and until now released 18 captive birds including 8 captive bred with satellite tag. Similarly, 20 wild White-rumped Vultures also fitted with satellite tags now shows promising sign of survival and success and several breeding locally and up to 100km from trapping site. One adult wanderer visited to Jammu and Kashmir and even close to the Pakistan boarder which is 1,100 km far from the release site, Pithauli, Nepal. The population of White-rumped Vulture declined by 91% between 1995 to 2011 but its population is partially recovering in the latest year.

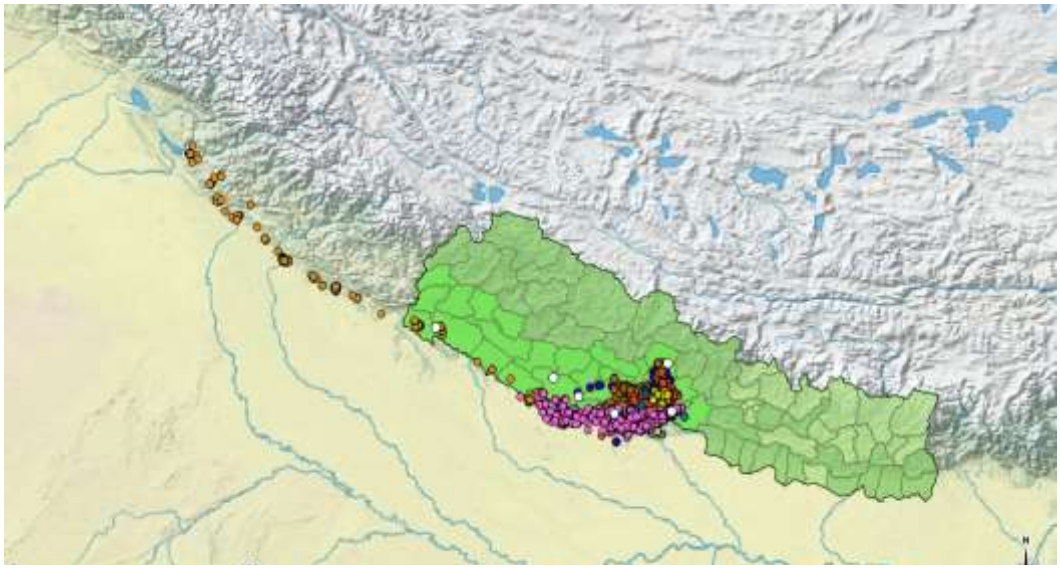


Figure 6: Movement of satellite tagged Vultures (Adopted and modified: BCN, 2018)

(3) Progress assessment

Though the GoN has taken numerous measures to protect species and restore habitats, a number of animal and plant species are facing risks of extinction, indicating that this target is "progressing but an insufficient rate". There is need to monitor and restore endangered species, and strict enforcement of CITES Act 2017. *Monitoring to this target is partial*. Information sources used for assessment of progress of the target in given in Table 18.

Table 18: Information sources used for assessment of progress in implementing Aichi Target 12

Items	Content
Time of assessment	July 2018
Information sources for assessing this target	Websites and Annual reports of DNPWC, DoFSC, NTNC, BCN, ZSL, UN Biodiversity Lab; Field consultation
Indicators used	Nationally threatened species, conservation plan, ex-situ conservation,
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. There is need to strengthen monitoring and enforce strictly CITES Act 2017

4.13 Genetic Diversity

Aichi Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

(1) Background

Genetic resources such as seeds of traditional crop land races and livestock' breeds possess great potential values and play a vital role to the human survival. In Nepal, collection of genetic resources of specific crops and the protection of native genetic breeds of livestock has been poor. It is also urgent to analyze economically valuable characters even for the collected genetic resources.

Nepal is rich in agrobiodiversity. Diverse agro-climatic environments with complex and varied farming systems, a broad mixture of ethnicity and races, varied socio-economic settings, high differences in altitude and complex topography are the factors to support the rich agriculture diversity in the country. There are 790 food value plant species and 577 cultivated plant species including forage species. Among 577 cultivated plant species, 484 species are indigenous and 93 are introduced species including forage species. Among 484, about 224 are called crop wild relatives (Joshi 2017c). Some of the unique crop landraces include as shown in Table 19.

Table 19: Some of the important and unique crop landraces in Nepal

Crop	Genotype	Uniqueness
Buckwheat	Bhate Phaper	Loose husk
	Kagpani Phaper	Highest rutin content
Cauliflower	Gavre Cauli	Very large head, perennially gene, vegetative propagation
Chilly	Akbare Khursani	Medicinal value, extreme hot, no burning sensation on stomach
	Jire Khursani	All year round fruiting
Finger millet	Dailekh Local	High yielder and adapted to low fertility land
Maize	Pani Makkai	Tolerant to water logged condition
Rice	Amaghauj	Multiple spikelet per node
	Bhati	Deep water rice
	Gamadi Dhan	Matured panicle remained within flag leaf
	Jumli Marshi	Cold tolerance rice
	Mansara	Adopted to very marginalized land
	Samundhaphinj	Swampy land rice
Sarsoo	Gorlikhorka	Highest oil content
Wheat	Dabde Local	For low fertility and moisture deficient land
	Mudule Gahun	Very sweet taste, awn less
	Pauder Local	Cold induced sterility tolerance

Source: Joshi 2017b; Upadhyay and Joshi 2003; Joshi 2008; Joshi 2015

Despite high economic, social and ecological significance, these wild relatives are threatened. In Nepal, 95% of all the agriculture commodities are imported. All five components of crop biodiversity (cereals, vegetables and fruits, oil seeds and pulses, spices, fodder and pasture) are most affected and many local landraces of this component, has been lost due to commercialization of agriculture, weak policy and regulatory framework, social factor, land use changes and climate change and natural disaster (MoAD 2017).

Livestock sub-sector plays a significant role by contributing about 11.5% of the total country's GDP and 26.8% to the agricultural sector (MoLD 2017). Nepal is rich in animal genetic resources both in terms of diversity and numbers but these resources are utilized only to a very limited scale till now. Roughly, 70% of households keep some type of livestock. Several economically and ecologically important livestock are reported but are rare. *Lime, Parkote, gaddi* and *Tarai buffaloes* are the breeds of native buffalo which along with *Murrah* contribute to 70% of the total milk production in Nepal. Among these, *Lime* is in declining state. Among cattles, Siri, Yak, Nak and Chauris are high mountain breeds. However, Yak and Nak population is decreasing because of cross breeding and herders switching to other occupations like tourism and migration. The state of local livestock species is depicted in Table 20.

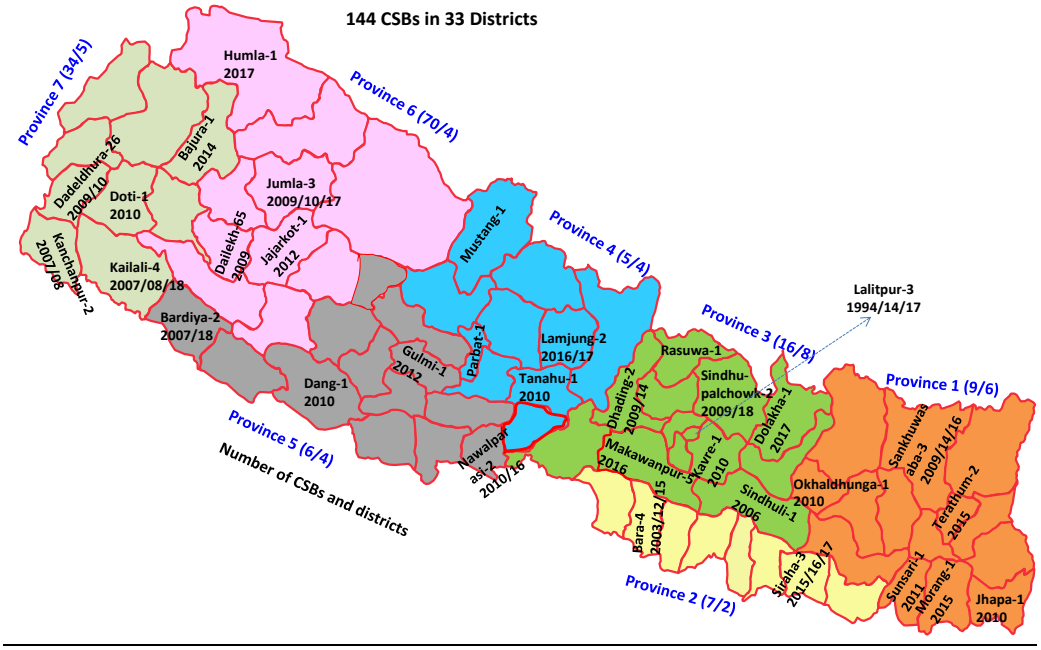
Table 20: Breeds of livestocks found in Nepal

Species	Indigenous breeds	Exotic breeds	Remarks
Cattle	*Pahadi Black, Tarai White, Lulu, Achhami, Siri, Khaila, Chauri, Yak and Naks*	Brown Swiss, Jersey and Holstein crosses	Siri cow is nearly extinct. Lulu and Achchhami number decreasing
Buffalo	*Lime, Parkote, Gaddi, Tarai*	Murrah and Murrah crosses	Lime number decreasing
Goat	*Khari, Chyangra, Sinhal and Tarai goat*	Jamunapuri, Barbari, Saanen, Boer and their crosses	Boer is getting popular these days
Sheep	*Lampuchhare*		Population declining and at risk
Pig	*Hurrah, Chwanche, Bampudke*	Landrace, Hampshire, Yorkshire, Duroc, Nagpuri and Pakhribas black	Bampudke is nearlyt to extinct
Chicken	Sakhini, Ghanti Khuile, Pwankh ulte	Various commercial breeds	
Horse	Jumli horse		
Source: Poudel et al. (2017); DoLP (2015)			

Current status and trends

Target 1: By 2020, the Gene Bank will collect and conserve genetic resources of at least 75 percent of the commonly cultivated crop and horticulture species and community based conservation of agro-genetic resources program expanded in five more districts covering all physiographic zones

Nepal Agriculture Genetic Resources Center (National Gene Bank) was established to effectively conserve, manage and utilize maximum agrobiodiversity. It has five banks namely: Seed bank, Field Gene bank, Tissue bank, DNA bank, Community seed bank and Community field bank. Out of 30,000 existing estimated accessions, the national gene bank has access to 11,389; Out of 74 crops and 145 horticultural crops, genetic material have been conserved for 40 crop/horticultural species (458 samples). Annually about 1,000 accessions are collected. Altogether, 65 accession of 16 wild relatives of crops have been conserved in *in-situ* and *ex-situ*. The *in-situ* conservation of wild relatives of crop is done via the establishment of community seed bank. Community seed bank (CSB) is a community based mechanism to enhancing local seed security, responding to meet local seed demands, enhancing farmer's access and availability to quality seeds suitable for the locality, and promoting on-farm conservation of local crop diversity. The CSB empowers farmer's and their institutions, help conserve local plant genetic resources for food and agriculture (PGRFA) and their associated knowledge and practices that are being lost, and promotes farmer's rights and sovereignty. There are a total of 144 such community seed bank all over Nepal, district wise number illustrated in Map 10.



Map 10: Community seed banks in Nepal

(*Source: Joshi 2017b, Updahayay and Joshi 2003, Joshi 2015, Joshi 2008).*

Community seed banks has been contributing to conservation of agrobiodiversity in Nepal, a case from State 7, Nepal has been given (Case 6).

Case 6. Community Seed Bank and Conservation of Agrobiodiversity in Sudur Paschim state, Nepal

Community seed bank (CSB) is a community based mechanism to enhancing local seed security, responding to meet local seed demands, enhancing farmer's access and availability to quality seeds suitable for the locality, and promoting on-farm conservation of local crop diversity. The CSB empowers farmer's and their institutions, help conserve local plant genetic resources for food and agriculture (PGRFA) and their associated knowledge and practices that are being lost, and promotes farmer's rights and sovereignty. In Nepal, USC Canada initiated CSB in 1990s, later NARC, LIBIRD and DoA have established CSBs across the country to enhance on-farm conservation. The linkage between CSBs and national genebank has been established as a unique example for sustainably managing APGRs and institutions.

The CSB established at Jurel (Doti District) was established in 2065 BS with the technical and financial support from Li-BIRD. This seed bank is a wing of Agriculture Biodiversity Cooperative Corporation and is registered in division cooperative office of the district. The seed bank stores about 73 varieties of seeds including lentils, crops, vegetables and species. At the initial stage it was started with only 10 types of seeds. It is based on the concept that the seed bank provides a single variety of seed to three farmers. About 250 gm of seed is taken on a loan basis, after harvest the same amount is given back to the seed bank. While the rest of the crop are purchased by the seed bank on the market value.

Recently, there are 700 farmers registered in the cooperative, while only 20-22 farmers are associated in the seed bank. Li-BIRD has also provided NRs. 600,000 as seed money for sustainability of the program. Now, the cooperative is able to make NRs. 3,500,000 from the selling of seeds only. The seed bank runs vegetable nursery with a capacity of producing 100,000 seedlings of vegetables each year.

It was observed that there are challenges to this local level seed bank including the technical support from government offices, also from the commercial seed production companies located in Chitwan at a very large scale. Similarly, most farmers are adopting hybrid crops for more production which is often a threat to these traditional varieties.

Source: Joshi et al. (eds.) 2017; field observation and interaction, 25th September 2018

The Ministry of Agriculture and Livestock Development (MoALD) envisions to formulate various action plans for an effective conservation of agrobiodiversity in Nepal; these include: (i) Development of landraces catalog; (ii) Identification of rare and unique landraces; (iii) Diversity mapping; (iv) Diversity fairs of local crops; (v) Diversity blocks; (vi) Diversity kits; (vii) On-farm conservation village; (viii) Diversity field school; (ix) Collection and conservation; (x) Rescue mission (rare); (xi) Field genebank; (xii) Crop specific parks; (xiii) Community seed bank and seed network; (xiv) Household genebank; (xv) Characterization and naming; (xvi) Landraces enhancement and conservation (LEC); (xvii) Collaboration with relevant stakeholders for crop wild relatives and wild edible plants; (xviii) Herbarium and photo album; (xix) Geographical indicators; and (xx) Development of ownership documents for important landraces (pers. Comm. December 2018).

Target 2: By 2020, at least 10 wild relatives of domesticated crops are conserved *in-situ* and/or *ex-situ*

In case of plant species, 65 accessions of 16 wild relatives of crops have been conserved (MoAD 2017). In case of animals, *in-situ* conservation of certain identified breeds of local livestocks and poultry (population of which are declining), community participatory programs for conservation and utilization of indigenous animal genetic resources in Nepal. Various centers including Yak Genetic Resource Center, Solukhumbu; Sheep Genetic Resource Center, Nuwakot; Goat Genetic Resource Center, Kailali and Cow Genetic Resource Center, Dolakha support to conserve, promote and sustain local breeds. The support is mainly provided to the farmers and *ex-situ* conservation is also done for endangered and local breeds in the country (MoAD 2017). *Ex-situ* conservation includes collection of semen, practice of artificial insemination, embryo transfer and selection and performance recording system in cattle, buffalo and goat

(2) Progress assessment

The progress is "on track to exceed target by 2020". However, there is need to enhance: (i) promotion of protection measures for special habitats of abundant genetic biodiversity, (ii) *Ex situ* conservation and development of management system of genetic resources, (iii) promotion of native plant seed collection and expanding the examination of seed characteristics, (iv) establishing identification system by constructing DNA barcode system, and (v) examination, research and conservation of genetic diversity. *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 21.

Table 21: Information sources used for assessment of progress in implementing Aichi Target 13

Items	Content
Time of assessment	July 2018
Information sources for assessing this target	Websites of MoALD, NARC, field consultation
Indicators used	National gene bank data, community seed bank, in-situ and ex-situ conservation of genetic resources
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. There is need to expand research and conservation on

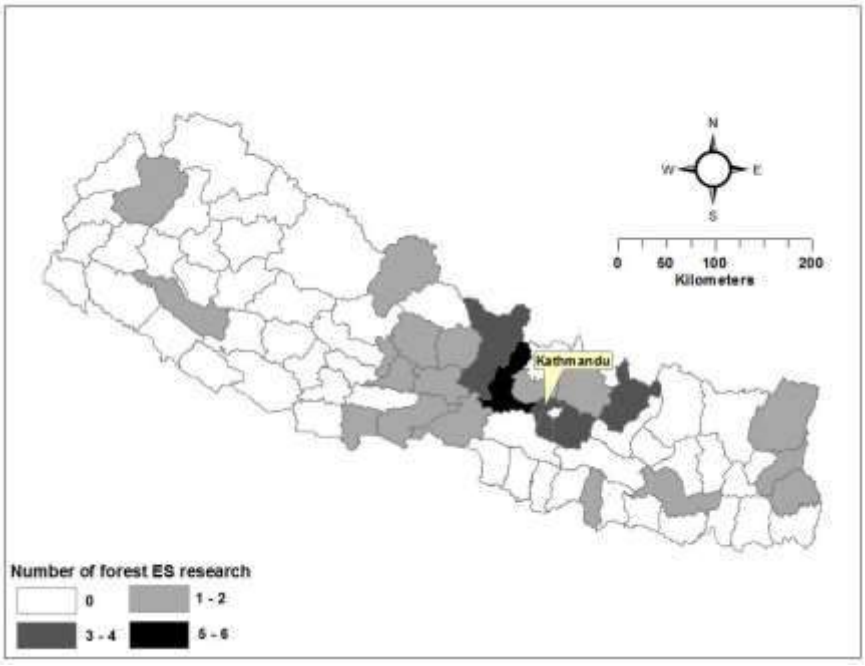
4.14 Ecosystem Services

Aichi Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

(1) Background

Ecosystem services (ES), the benefits that humans obtain from ecosystems, are vital for rural livelihoods as well as national economy. Ecosystems are increasingly being affected by global environmental changes including land use taking place at the global level (Costanza et al. 2014), and climate change at national level (K.C. et al. 2015, Parajuli et al. 2015). Nepal is highly dependent on forest ES; however, there is limited and scattered research on the available forest ES in the country and the possible future impact of anticipated global and regional climate change (Bhatta et al. 2015, Lamsal et al. 2018b).

A study by Lamsal et al (2018b) shows that only 24 of the total 75 districts (32%) of Nepal were covered by studies on forest ES. The majority of studies were carried out in the central and western regions of Nepal. Mid-western and far-western regions have the lowest number of studies. Sixty-two percent of articles out of 46 focused on regulating services of forests, followed by provisioning (47%), supporting (19%), and cultural (19%) services (Map 11).



Map 11: Spatial distribution of forest ES studies across Nepal

Source: Lamsal et al (2018b)

There has been no sincere effort made to evaluate and integrate the value of ecosystem services, despite that ecosystem services support livelihoods of majority of peoples, improve the function

of the environment regulating services in particular in the urban areas of high population, and executing ecotourism by making good use of biological and cultural heritages. Though, ecosystem services from community forest provide an opportunity of upstream-downstream linkage, a case from State 5, Nepal has been presented (Case 7).

Case 7. Ecosystem Services from Community Forest, Dovan, Palpa: Upstream-Downstream Linkage *(State 5, Nepal)*

Community Forest Coordination Committee (CFCC), Dovan, established in 2001, is an umbrella organization of 36 Community Forests User Groups (CFUGs). A total of 45,000 households (HH) are involved, and the Magars indigenous community is in majority. The area mainly comprises Chure area and a part of Tarai Arc Landscape. It is the main source of Tinau River watershed, and endowed with Satyabati Lake, Suketal Lake, and several waterfalls such as Chharchare, Rani.

Local communities were involved in the past in selling firewood collected from Chure region for their livelihoods; and almost 200 bundles (each bundle approx. 30-40 kg) of fuelwood were sold every day to the newly growing town in the south, Butwal which is the present capital of State 5 of Nepal. Seasonal outmigration was very high, up-to 95% of the people from some villages of the region visited India for earning money. Once the CFCC was established, the committee initiated formation of conservation clubs, undertook capacity building and awareness raising training to the local inhabitants, distributed improved cooking stoves, started home stay activities, established nurseries ; conducted afforestation of Non-timber Forest species that aided to the income generating to the local communities including 'Tejpat' (*Cinnamomum tamala)*, 'Broomgrass' (*Thysanolaena maxima*), 'Amala' (*Phyllanthus emblica*), 'Bel' (*Aegle marmelos*), etc.

The Dovan Forest provides different ecosystem services to the people downstream. Apart from income-generating opportunities from trade, the water of the Tinau River and waterfalls are important source of drinking water, and more than 100,000 Litres of water each day supplying to the Butwal Metropolitan City; 1 MW hydropower generation; and irrigation to 16,000 ha land. The Siddhababa temples provide religious, spiritual and inspirational values to the visitors and local inhabitants; as well as Ramapithecus Botanic Garden, an archaeological site provides recreational value to the visitors. The communities have been preparing for the Payment for Ecosystem Services (PES) mechanism. Local peoples' seasonal visit to India have almost stopped. Biodiversity status has been improved, such as sighting of leopards, population of 'Satisal' (*Dalbergia latifolia*), and "bijaysal' (*Pterocarpus marsupium*) – protected species of Nepal have increased; hunting of wild animals have drastically decreased or almost eliminated; and occasionally, economic incentives to upstream communities have been provided. Income generated by the CFCC, Dovan are being spent in conserving the ecosystems, supporting livelihoods to the economically disadvantaged peoples for income generation, capacity building and awareness raising.

Source: Field observation and Interaction with CFCC Chair, 06 October 2018

(2) Current status and trends

Target 1: By 2020, participatory and integrated soil and water conservation initiatives will be implemented in at least 30 critical sub-watersheds, and loss and degradation of Siwaliks will be reversed

The Chure range, extended as a contiguous landscape from east to west covers 33 districts. It is bordered by the Mahabharat range in the north and Tarai in the south. Covering about 13% of the country's area, the region is important from ecological, social, economic and political perspective. The range is vulnerable to degradation due to natural and human made disasters. Many of the streams and rivulets originates from Chure making it more important. With a view to conserve this important range and bringing changes to the lives of vulnerable people, the PCTMCC

has developed a Master Plan that is being implemented currently in 27 districts of Nepal. (PCTMCC 2017). The plan has identified 64 critical watershed/river system. The PCTMCC has been preparing 29 integrated river management plan for implementing integrated soil and water conservation initiatives. In addition to this, CARE Nepal through USAID funded Hariyo Ban Program has prepared 10 Integrated Sub-Watershed Management Plan (ISWMP) of critical sub-watershed of CHAL districts. To name a few are Bhat Khola, Syngja; Sardi khola, Kaski; Tallo Harpan khola, Kaski; Kerunge khola, Nawalparasi; and Khageri khola, Chitwan. These plan are under implementation by the government together with other stakeholders. These 10 ISWMP covers 617.01 sq.km, and benefit 45,614 households.

Target 2: By 2020, additional 5,000 ha. degraded forest will be rehabilitated through pro-poor leasehold forestry

Though, Nepal is pioneer in community forestry programs; equitable access and benefit sharing arising from community forests to disadvantaged community and pro-poor household still remains a question in community forestry. Leasehold forestry for poverty alleviation came into implementation in 1993. Between 1993 and 2000, 7,000ha of degraded forests has been leased to 1,600 LH groups (Ohler 2000). About 554 ha was rehabilitated from July 2017-June 2018. As of June 2018, a total of 7506 numbers of LH forestry (pro-poor and commercial) has been registered covering 71,753 poor households (DoFSC 2018).

(3) Progress assessment

The progress of this target is on track to achieve it by 2020. However, it is necessary to construct systematic evaluation system of the ecosystem service values in support of making decision on development policy and plans. It is recommended to exploring and evaluating the ecosystem service in different types of ecosystems - forest, agriculture, grassland, wetland, PAs, etc. and to foster ecotourism in collaboration with government agencies, I/NGOs and private sectors. *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 22.

Table 22: Information sources used for assessment of progress in implementing Aichi Target 14

Items	Content
Time of assessment	October 2018
Information sources for assessing this target	Website of CTMCDB, academic publications;
Indicators used	Ecosystem services in Siwaliks, national assessment of ES
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. It is recommended to evaluate ES in different ecosystems

4.15 Climate Resilience

Aichi Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

(1) Background

Climate change can have impact to the degradation and loss of critical ecosystems as well as huge impact in the environment. Some of the visible changes of climate change include changes in vegetation pattern, loss of biological resources, changes in rainfall pattern, sudden increase of IAPs, etc. Nepal's Himalaya is facing.

(2) Current status and trends

Target 1: By 2016, The National REDD Strategy will be finalized and approved

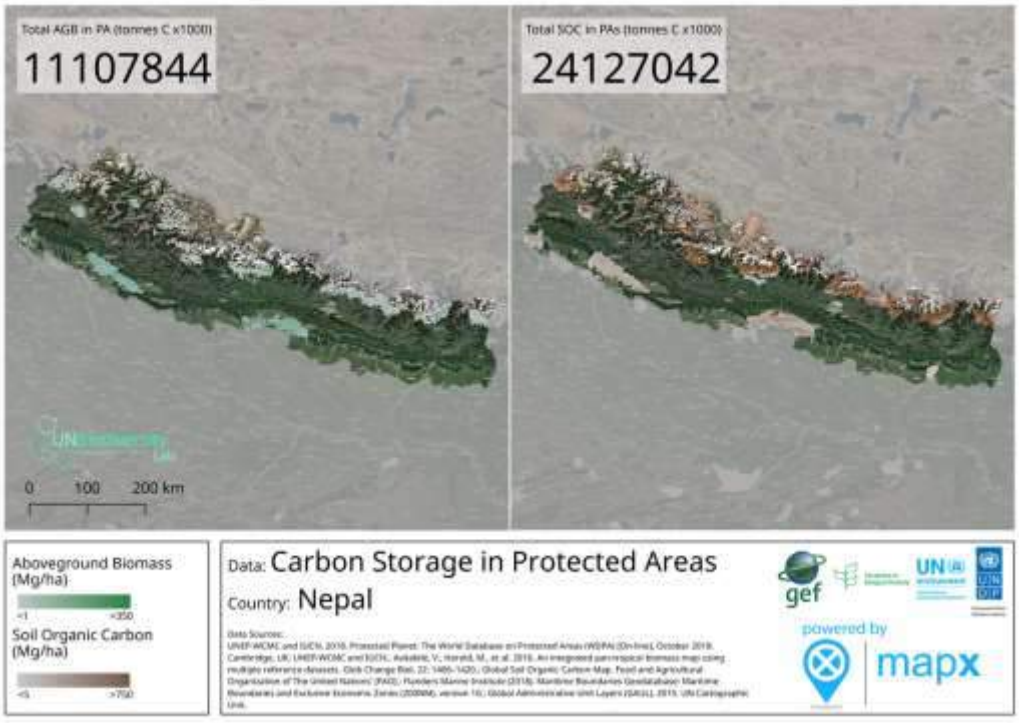
Nepal is a signatory member of UNFCCC. With respect and contributing to achieving goals of these agreement, Reducing Emission from Deforestation and Forest Degradation (REDD+) is one of the program Nepal has initiated since 2008. Nepal has also completed the readiness of the program moving towards the demonstration phase with a plan to implement a number of forest related activities. These include contribute to reducing GHGs, upscaling of sustainable management of forests, expanding community-based forest management, engaging private sector in forest plantation, increasing access of indigenous people, capacitating women to decision making position and ensuring fair and equitable benefit sharing mechanism. Implementing these would require REDD Strategy, the formulation started since 2014. Recently, Nepal National REDD+ Strategy was endorsed on 19th April 2018. The mission of the strategy is "to strengthen the resilience of forest ecosystems for emission reduction and increased environmental, social, and economic benefits through improved policies, measures and institutions with enhanced stakeholder capacity, capability and inclusiveness". The strategy is implemented under five different objectives (REDD+ Strategy 2018).

Target 2: By 2020, at least 15 percent of the forested ecosystems will be restored through implementation of REDD+ and ecosystem based adaptation programs

For the implementation of REDD+ Strategy, recently the Forest Carbon Partnership Facility (FCPF) under World Bank has approved the Emission Reduction Program for Nepal. The program will be implemented in 13 contiguous districts of the TAL covering 2.4 million ha. of lowlands and some of Chure hills. With this six years' project, by 2020 it is expected that 15% of the forests under REDD+ program will be restored. In 2017/018, REDD+ fund (grant from Forest Carbon Partnership Facility of World Bank) has been invested in preparation of Sustainable Forest Management plan of Community-based forest regime of 5 districts (Rautahat, Bara, Dang, Banke and Bardia). REDD+ Himalaya Project has been implemented in Dolakha, Gorkha and Chitwan to capacitate sub-national stakeholders (including the then district forest offices) in REDD+ process.

The total carbon stock in Nepal's Forest has been estimated as 1,054.97 million tonnes (176.95 t/ha). Out of this total, tree component (live, dead standing, dead wood and belowground biomass), forest soils, and litter and debris constitute 61.53%, 37.80 %, and 0.67% respectively (DFRS 2015). A study conducted by UNEP-WCMC and IUCN (2018) shows that carbon storage in PAs of Nepal has been estimated as above ground biomass (AGB) to be more than 11 million tonnes; and Soil Organic Carbon to be more than 24 million tonnes (based on map produced by UN Biodiversity Lab 2018) (Map 12).

Climate Change Policy 2011 and NAPA document aims to ensure that national adaptation planning processes are informed by, and supportive of local adaptation needs and planning processes. Hence, Local Adaptation Plans of Actions (LAPAs) are formulated as community based approaches that take a "vulnerability first" approach to climate change adaptation. The VDCs and the municipality have been identified as the most appropriate unit for integration of climate change resilience into local to national development planning processes and outcomes. These bodies are capable of consolidating and changing both development and climate adaptation budget. Different organizations are supporting the formulation and implementation of LAPA at this context. NCCSP supported more than 100 LAPAs in Karnali state, NTNC supported 6 LAPAs for Manaslu Conservation Areas, ASHA project is supporting the formulation of 70 enhanced LAPA for 7 districts and CARE Nepal for 14 LAPAs in CHAL area during this reporting period.



Map 12: Carbon storage in Protected Areas of Nepal

(3) Progress assessment

The above analysis shows that the progress is "on track to achieve target. However, It is necessary to establish a long-term monitoring in order to assess and monitor the effect of climate change has on biodiversity, and respond to minimize its impact on biodiversity and peoples' livelihoods. Measures for adaptation to climate change to conserve biodiversity should be urgently taken. *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 23.

Table 23: Information sources used for assessment of progress in implementing Aichi Target 15

Items	Content
Time of assessment	July 2018
Information sources for assessing this target	Website of MoFE, FRTC, REDD+Cell-Nepal,
Indicators used	Carbon stock, adaptation plan
Confidence level	Based on partial evidence
Adequacy of monitoring information to support assessments	Partial. Recommended to establish LTESM

4.16 Access and Benefit Sharing

Aichi Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

(1) Background

With respect to accession/ratification of the Nagoya Protocol, the GoN has done accession to the Nagoya Protocol on August 29, 2018 by the House of Representative, and on September 11, 2018 by National Assembly of Nepal (Nepal Gazette). This accession has made Nepal a party to the Nagoya Protocol and opens the door for the enactment of the Access to Genetic Resources and Benefit Sharing (ABS) Act and subsequent regulations and strategies.

(2) Current status and trends

Target 1: Formulation of rules and regulation that will allow the implementation of Nagoya Protocol once the ABS law is enacted

The formulation of a specific ABS Act has been started since 2000. The present proposed ABS Bill in 2016 has made an attempt to cover some relevant issues related to the protection of rights of the indigenous peoples and local communities (IPLCs) over biological/genetic resources; access to genetic resources and associated traditional knowledge (TK); benefit sharing process; mechanism of access to genetic resources for preliminary scientific study; and institutional mechanism to implement the ABS Bill; etc. The Ministry of Forests and Environment (MoFE) initiated a two-and-half-year-long project 'Strengthening capacities for implementation of the Nagoya Protocol in Nepal', also called ABS-GEF, in late 2016 with the technical support of IUCN Nepal and financial support from Global Environment Facility (GEF). The objective of the project is to build the capacity of key stakeholders at national, sub-national and local levels to implement ABS in Nepal. The mid-term review of the project report strongly concludes to discuss on further issues related to balancing rights of IPLCs, prior informed consent (PIC), benefit sharing, prior

approval from the authority for Intellectual Property Rights (IPRs), and relationship with other proposed laws including Farmers' Rights Bill, etc. Therefore, there is a need to urgently finalize the ABS Bill through a series of consultations, policy labs, and policy discussions among the stakeholders. However, despite continuous efforts, the ABS Bill has not yet been finalized and tabled for endorsement by the parliament.

(3) Progress assessment

The progress is "on track to achieve the target by 2020". Monitoring related to this target is adequate. Information sources used for assessment of progress of the target in given in Table 24.

Table 24: Information sources used for assessment of progress in implementing Aichi Target 16

Items	Content
Time of assessment	October 2018
Information sources for assessing this target	Website of MoFE, MoALD, IUCN
Indicators used	Implementation of Nagoya Protocol, Farmers Rights Bill, ABS Bill
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Adequate

4.17 NBSAP implementation

Aichi Target 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

(1) Background

Following Article 6 of the CBD, Nepal has approved, and implemented the Nepal Biodiversity Strategy (NBS 2002), the Nepal Biodiversity Strategy and Implementation Plan (NBSIP 2006), and a revised Nepal National Biodiversity Strategy and Action Plan (NBSAP) 2014-2020. The country's biodiversity conservation strategy has been grouped into six ecosystem based thematic areas, such as, forests, protected areas, wetlands, agrobiodiversity, rangelands and mountain biodiversity (MoFSC 2002, 2006, 2014).

(2) Status and trends

Target 1: NBSAP will be endorsed by Government and come into implementation by the end of 2014

The revised NBSAP (2014-2020) has been developed in 2014 following the CBD's Strategic Plan 2011-2020, and the Aichi Targets (MoFSC 2014). In 2011, the United Nations General Assembly (UNGA), at its 65th meeting, passed Resolution 65/161, which declared the period 2011 – 2020 to be "*the United Nations Decade on Biodiversity, with a view to contributing to the implementation of the Strategic Plan for Biodiversity for the period 2011-2020*".

The NBSAP has developed monitoring and evaluation system based on theory of change approach and entails among others setting targets, identification of performance indicators, and means of verification. The NBSAP had already come into implementation by the end of 2014 and recently

the mid-term review, monitoring and evaluation has been completed, as discussed detail in earlier Section 2 of the report.

(3) Progress assessment

The progress is "on track to achieve target". Monitoring related to this target is adequate. Information sources used for assessment of progress of the target in given in Table 25.

Table 25: Information sources used for assessment of progress in implementing Aichi Target 17

Items	Content
Time of assessment	July 2018
Information sources for assessing this target	Website of MoFE, MoALD, NBCC
Indicators used	Implementation of NBSAP
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Adequate

4.18 Traditional Knowledge

Aichi Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

(1) Background

Traditional beliefs about the diverse uses of plants are deeply rooted in Nepalese culture, and the country's various ethnic groups have developed their own indigenous knowledge systems relating to the role of plants in food, clothing, shelter, health care and their spiritual needs (Rajbhandari and Winkler 2015). Traditional knowledge has been carried out in several research institutes including academic institutions, GoN research institutes, International/National Non-government organizations. However, systematic management and streamlines research attempts have so far been insufficient. Nepal is moving towards developing a nationally unified approach on the protection and use of traditional knowledge that are fully in consistent with the Nagoya Protocol (see ABT 16).

(2) Current status and trends

Target 1: By 2017, a community biodiversity protocol will be developed

There has been development of preparation of training materials, community protocols, and process of documentation on TK (MoFE and IUCN 2018). The existing training materials developed are: (i) Training of the Trainers Manual on Access and Benefit Sharing from Genetic Resources and Associated Traditional Knowledge (Oli and Dhakal 2009); (ii) Biodiversity and traditional knowledge documentation training resource book (MoFSC 2010); (iii) Training manual

for documentation of biological resources and traditional knowledge for district resource persons (IUCN 2004); and (iv) Training manual for documentation of biological resources and traditional knowledge for local resource persons (IUCN 2004). However, the existing training materials should be updated and new materials should be addressed. The identified area to be addressed include provisions of national and international conventions/treaties; updating formats for biodiversity and TK documentation and community protocols; formats for PIC and MAT; and inclusion of terminologies in Nepali language, etc. The project on "Strengthening capacities for implementation of the Nagoya Protocol in Nepal" has recently initiated development of two training manuals: (i) TOT manual on ABS and (ii) Training manual for documentation of biodiversity and traditional knowledge and preparation of community protocol (MoFE & IUCN 2018). One of the means to strengthen the capacity of the stakeholders in the above project has been identified as development and training of 'Citizens' Scientist' that were piloted in Kaski and Dolakha Districts. The training aimed to build capacity of local resource persons on Nagoya implementation, and to sensitize them on the process and procedure of Community Protocol preparation, update the Community Biodiversity Registers format, and orient on the importance of access to genetic resources and benefit sharing (MoFE and IUCN 2018).

Target 2: By 2017, a *sui generis* legislation for the protection of plant varieties will be formulated and enacted and by 2018, intellectual property rights legislation will be formulated and enacted

To support the implementation of Nagoya Protocol, initiation has been undertaken to formulation and enactment of a *sui generis* legislation for the Plant Variety Protection and Farmers' Rights (PVP and FR) Bill (Li-BIRD and the Development Plan 2017) at different levels by addressing the relevant issues, among others (MoFE & IUCN-Nepal 2018). It is also necessary to provide information and improve awareness among stakeholders such as government agencies and private sectors for the implementation of the ABS.

Status of other related legislations is: (i) Convention on International Trade of Endangered Species of Fauna and Flora is in place in 2017; (ii) Finalization of the ABS Bill is on track; (iii); and (iv) Intellectual property rights legislation formulated and enacted by 2018 has been drafted.

In the case of the accession to and implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, by 2015, there was accession to the protocol on 29 August 2018 by the House of Representative, and on 11 September 2018 by the National Assembly of Nepal.

Target 3: By 2015, the NBSAP will be translated into Nepali language and distributed

Regarding translation of the NBSAP, only the summary of NBSAP was translated in Nepali language and disseminated.

Target 4: Representation of indigenous and local communities in the NBCC as well as district and VDC level institutional mechanisms will be promoted

The constitutional provision has ensured the participation of women and "Dalits" (at least female) in the local governments and national and provincial assemblies to meet the target. Resource governance community organizations such as CFUGs also have ensured at least 33% meaningful participation of women, "Dalits", and disadvantaged groups in their executive bodies. However, in the case of government policy and decision making level including NBCC such participation has not been achieved.

Target 5: Capacity building programs targeting, women, "dalit", "janajatis" and local communities will be designed and implemented

Major government policy documents related to biodiversity conservation have incorporated gender and social inclusion perspective. Some of these policies are Forest Policy, 2015; Sustainable Development Goals (2016-2030); Nature Conservation Strategic Framework for Sustainable Development (2015-2030); REDD+. Strategy, 2018; Agriculture Development Strategy, 2015; Chure-Tarai Madhesh Conservation and Development Plan, 2017; Agrobiodiversity Policy (first amendment), 2014; Agrobiodiversity Conservation and Utilization Bill (in progress), ABS Bill (in progress). The government has also passed 'Gender Responsive Budget Localization Strategy in 2016 (MoFALD 2016). The MoFE has engaged, to some extent, NEFIN/NFDIN in consultation process of developing biodiversity/forest policies including in celebrating special events. However, efforts for supporting in protection of traditional knowledge, innovation is limited.

(3) Progress assessment

The progress is "towards the target but at an insufficient rate". There is need to develop database service of traditional knowledge on herbal medicine in Nepal. It is also important to expand studies and exploration of TK on endemic species, agriculture and fisheries, and Nepalese traditional medicine as well as to conduct in-depth research on Nepalese traditional medicine. *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 26.

Table 26: Information sources used for assessment of progress in implementing Aichi Target 18

Items	Content
Time of assessment	October 2018
Information sources for assessing this target	Websites of NPC, MoFE, MoALD, NBCC, IUCN, LI-BIRD, NEFIN/NEFDIN, Field consultation
Indicators used	TK documentation, ABS Bill, CITES Act
Partial	Partial
Adequacy of monitoring information to support assessments	Recommended to develop systematic database on uses and values of biodiversity

4.19 Science and Research

Aichi Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

(1) Background

Knowledge generation on biodiversity plays an important role in updating existing data as well as in improving science-policy interface. Academic institutions, research organizations, I/NGOs, private research institutions, and individuals have been contributing to strengthen science and technology based knowledge relating to biodiversity. The ABT 19 has set four national indicators, these are: (i) By 2020, the Flora of Nepal project will be successfully completed; (ii) By 2017, existing information on Nepalese ecosystems will be updated; (iii) A national Red List of flora, fauna, and ecosystems will be prepared by 2017, following IUCN guidelines; and (iv) By 2020, baseline survey of NTFPs and animal genetic resources will be completed. It is also considered that clearing house mechanism, a web-based framework designed to provide information on national regulatory requirements related to biodiversity, on relevant authorities such as national focal point and competent national authority, as well as on permits issued at the time of access.

(2) Current status and trends

Target 1: By 2020, the Flora of Nepal Project will be successfully completed

It is believed that 7,000 species of vascular plant species occur in Nepal: the largest family being Orchidaceae (450 species) followed by Compositae (395 species), Gramineae (366 species), Leguminosae (304 species), and Cyperaceae (191 species) (Miehe et al. 2015). Similarly, a total of 312 endemic species of flowering plants belonging to 126 genera and 46 families in 2017 has been updated by DPR (Rajbhandari et al. 2017). Fragmentary information exists for fungi (five monotypic genera and 142 species considered to be endemic to Nepal) (Kost and Adhikari 2015); other groups are yet to be fully worked out. The status of individual national indicators are as follows.

Regarding the national target "By 2020, the Flora of Nepal project will be successfully completed"; one volume (vol. 3), out of 10 volumes of "Flora of Nepal-vol.3" was published in 2011. Other volumes 4, 7, and 10 are under progress. However, preparation of checklist of flowering plants of Nepal has been initiated. The Volume-1 'Handbook of flowering plants of Nepal' comprises 91 families of gymnosperms and angiosperms (Cycadaceae – Betulaceae), 696 genera and 3,004 taxa, encompassing nearly 40 percent of Nepal's Flora (Shrestha et al. 2018). Comparing with the previous version of checklist (Press et al. 2000), there has been nearly 12% increase in species

number. Similarly, the volume 1 of the three books, checklist of flowering plants of Nepal has been published. Out of total 3 volumes, Vol. 1 comprises 58 families, 421 genera and 1,715 species including color photographs of 304 species (Rajbhandari and Rai 2017).

Biodiversity assessment has been undertaken at the local level; a few examples conducted during the reporting period include Flora of Makwanpur District which comprises a total of 1068 species of flowering plants (23 species of gymnosperms and 1045 species of angiosperms) along wide elevational range from 166 m to 2584 m (Chapagain et al. 2016); Flora of Bankey District comprising 452 plant species comprising 190 Herbs, 111 Shrubs, 102 trees, and 48 climbers (Acharya and Thakur 2016); Flora of Kailali District comprising 57 species of ferns in 16 families, 812 species of flowering plants in 118 families including 32 rare and threatened species, 191 species of medicinal plants, and a new record of ferns (*Thelypteris hirtisora*) (Rajbhandari et al. 2016); Flora of Salhesh Phulbari (Siraha District) comprising 82 taxa of dicots, monocots and ferns belonging to 71 genera representing 45 families of plant species (Bhatt and Khatri 2016); Flora of central Chure region comprising a total 666 species of flora including 240 trees, 144 shrubs, 187 herbs, 70 climbers, 22 ferns and 3 epiphytes in which 305 species are medicinally important (Chapagain et al. 2017); status of 33 species of Rhododendron in and around Kangchenjunga Conservation Area with challenges opportunities and potentialities in rhododendron conservation (Poudel et al. 2018).

Target 2: Conduct a comprehensive inventory of ecosystems and species; and update on the existing information on species and Nepalese ecosystem 2017

Inventory of species in localized area has been done in most of PAs, grasslands, wetlands across Nepal. However, comprehensive inventory of wetlands, grasslands, forests have been partially done. There has been no systematic updated information on Nepalese ecosystems. However, there are 55 types of forest/vegetation described based on altitudinal belts, climatic zones, humidity types (perhumid/semi-arid, etc.), description of plant life forms and related formations, and human impact in Nepal (Miehe et al. 2015). Recently, FRTC has prepared a concept note to systematically conduct assessment of ecosystems in Nepal.

Target 3: Preparation of national red list of flora and fauna, and ecosystems by 2017; and update status of nationally threatened, rare and endangered species of flora and faina by 2020

Nepal is highly diverse country with an extraordinary landscapes and wildlife. However, their detail baseline information is still lacking for many of the wildlife including plants and animals.

The IUCN Regional Red List on The Status of Nepal's Mammals was done in 2011. Amin et. al 2018 (Status of Nepal's mammals) includes the following: 212 mammalian species, 49 listed as Nationally Threatened, 9 are considered Critically Endangered, 26 as Endangered, 14 Vulnerable,

1 is considered Regionally Extinct, and 7 Near Threatened. The most threatened group includes the Ungulates including Barasingha, Hog Deer and Himalayan Musk Deer and so do the Gangetic Dolphin, Greater One-horned Rhine and Hispid Hare. This update is considered recent and helps GoN to monitor its progress towards meeting national and international targets such as those set by the CBD.

The National Red List Series (2016) provides a comprehensive account of all the bird species found in Nepal, assess their status applying the IUCN Guidelines at Regional Levels, identify threats to bird species and recommend the most practical measures for their conservation. The recently published an Official Checklist of Birds of Nepal (DNPWC & BCN 2018) includes 886 bird species recorded, which is roughly to about 9.5% of global share; 43 species are globally threatened and 167 nationally threatened bird species in Nepal. Out of these, globally threatened species, 9 are Critical Endangered, 26 Vulnerable, and 8 endangered; whereas Nationally threatened species comprises of 67 (40%) as Critical Endangered, 38 (23%) as Endangered and 62 (37%) as Vulnerable. Similarly, 12 species listed in CITES Appendix I, 95 species listed in CITES Appendix II and 5 species listed in CITES Appendix III are found here. Spiny Babbler (*Acanthoptila nipalensis)* is only the endemic species found in Nepal. Status of herpetofauna, fishes, and invertebrates is currently under way.

An improved and managed habitat for wildlife in Parsa National Park (State 2), Nepal support habitat for threatened, rare and endangered species (Case 5).

Case 5. Parsa National Park – An Improved and Managed Habitat for Wildlife (State 2, Nepal)

Established as Wildlife Reserve in 2040 B.S., Parsa National Park was declared in 2074 B.S. (July 2017) by extending the area to 627 sq. km. The park adjoins the Chitwan National Park and covers parts of Chitwan, Makwanpur, Bara and Parsa districts. Almost 90% of the park is covered by Sal (*Shorea robusta*) forest in association with Sissoo (*Dalbergia sisso*), Khayar (*Acacia catechu*), *Pinus roxburghii, Adina cordifolia*, *Terminalia* species, etc. The park serves as prime habitat for Asian elephants, Royal Bengal tiger, Leopard, Wild Boar, Sloth bear, Bison, Asiatic Rock Python, Hispid Hare, horn bill (*Buceros bicornis)*, etc.

The park is characterized by Bhabar and Chure and the rivers are dry in nature. Water scarcity is one of the major challenges of the park. Recently, the park initiated establishment of water ponds, numbering a total of 36, including bigger ponds such as Kali Daha, and Rato Mate Daha. View towers have been established in the side of major ponds for wildlife viewing. Sighting of wild animals have increased contributing to tourism promotion. Human-Wildlife conflict has been observed although solar fencing has minimized such conflict to an extent.

Source: Field observation and Interaction with Warden, PNP; 03 September 2018

Effective management of the wildlife stockpiles is important to reduce the risk of leakage of contraband to illegal markets. The majority of stockpiles in Nepal was derived from two major sources: (i) confiscation, and (ii) natural causes. The wildlife stockpiles are comprised of skins, elephant ivory, rhino horns and hooves, skulls and bones, antlers and horns, Tibetan antelope fur, Pangolin scales, bear's gall bladders, musk pods, elephant tail hairs, and other items. According to the provision of 5th amendment to the National Parks and Wildlife Conservation Act 1973, MoFSC developed *Aakhetopahar Byasthapan Karyabidhi 2074* (Wildlife stockpiles Management Working Procedure 2017), the destruction, in consistent with international standard for counter-

wildlife trafficking (CWT) including the standard set forth by in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), took place on May 22, 2017 amid a special event in Kasara, Chitwan. The act consolidates experience-based knowledge and covers the process of the wildlife stockpiles management including scientific field identification and its follow up process (Dhakal et al. 2017).

. Exploratory survey of areas with possible existence of endangered species of flora by DPR done.

Target 4: Baseline survey of NTFPs and animal genetic resources by 2020

Study on baseline survey of NTFPs and animal genetic resources is not on track. However, there has been prioritization of 34 NTFPs species for promotion. A manual of sustainable development and conservation of NTFPs has been published that comprises a list of 134 NTFP species (Uprety et al. 2016). Good agricultural and collection practices of important medicinal and aromatic plant species have been published by the Department of Plant Resources (DPR) including *Cinnamomum tamala* (DPR 2015a); *Swertia chirayi*ta (DPR 2016a); *Valeriana jatamansii* (DPR 2016b); *Xanthoxyllum armatum* (DPR 2016c), etc. Nepal is a hub of trade of NTFPs, a case from State 7, Nepal is given below (Case 8).

Case 8. Non-timber Forest Products from Dadeldhura District, Sudur Paschim state – NTFPs trade hub in Nepal

Non-timber Forest Products is an important commodity for socio-economic development of the country. It supports to the livelihoods of the communities. Dadeldhura District, located in the Far-western Nepal is a hub of trade of the medicinal and aromatic plants including Ganoderma species. NTFPs extracted from the district include Rittha (*Sapindus mukorossi*), Tejpat (*Cinnamomum tamala*) and Resin (*Pinus roxburghii*). The survey including hotspots identification and regeneration status of NTFPs has not been carried out in the district. In FY 2073/074, the collection of Rittha and Tejpat was 1.5 times higher than the allowed permits (as of communication with DFO). Apart from other NTFPs, the district gets a good revenue from Resin and is regarded as one of the highest Resin extraction districts of Nepal. Resin is extracted both from National forests as well as community managed forest. The revenue from Resin extraction during the last five years (FY 2069/070 – FY 2073/074) is about NRs. 980,981.

The division forest office Dadeldhura also permits the collection of Ganoderma from both national and community forests by paying NRs 5/Kg. It was observed that a local trader manages the collection of this particular species in the district. During the monsoon season, the local trader involves 5-7 people to collect the species from high mountain region of the area. The local trader then buys at NRs. 1000/kg from the collectors. The processing including drying, segregation and packing is done by the local trader. The local trader then sells it to the trader in Kathmandu in NRs. 4000/kg. While it is then sold to Chinese trader at NRs. 10,000/kg. The local trader has been involved in the business since 5 years and has sold around 1.5 tons of species from Dadeldhura district. *Ganoderma lucidum* (Family Ganodermataceae), a polypore basidiomycetous fungi, has a long history of use for promoting health and longevity in China, Japan and other Asian countries. In Dadeldhura District, it is collected by the local communities from the trunks of living or dead trees, mainly from oak forest.

Source: Field observation and interaction, 24 – 25 September 2018

(3) Progress assessment

In general, there is limited information on updating knowledge on biodiversity. However, knowledge on few selected groups/taxa have been upgraded (Miehe et al. 2015). It is necessary to complete the national list of biodiversity as well as enhance public participation in biodiversity

survey. The target is "progressing but at an insufficient rate". *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 27.

Table 27: Information sources used for assessment of progress in implementing Aichi Target 19

Items	Content
Time of assessment	October 2018
Information sources for assessing this target	Websites of MoFE and its departments, MoALD, its departments and collaborating institutions, Academic institutions, Conservation partners, Field consultation
Indicators used	Flora of Nepal, red list of Flora and Fauna, NTFPs
Confidence level	Based on comprehensive evidence
Adequacy of monitoring information to support assessments	Partial. Updating knowledge on biodiversity is needed.

4.20 Resource Mobilization

Aichi Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs

(1) Background

The NBSAP put forth a number of strategies in order to ensure the adequate and dedicated fund generation for biodiversity and other associated themes, such as: (i) significant increment in public funding for management of biodiversity; (ii) exploring and promoting new sources of funding for management of biodiversity; (iii) effective mobilization of local funds; (iv) increasing external source of funding; and (v) efficient financial management and reporting.

(2) Current status and trends

Target 1: Establishment and operationalization of a National Biodiversity Trust Fund by 2016

A National Biodiversity Trust Fund has not been established till date however, different stakeholders pull resources for a common biodiversity goal and economic mainstreaming has not been sufficient. Biodiversity budget code for budget allocation for implementation of NBSAP and related activities has not been formed.

Target 2: Ensure the adequate and dedicated fund generation for biodiversity and other associated themes

The mid-term monitoring and evaluation of NBSAP has made an assessment of achievement of mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 (MoFE 2018). The fund from different sources (GO, I/NGO, Private sector) could not be adequately generated as envisioned in NBSAP, and the priority actions proposed in relation to

fund generation strategies were not effectively considered during NBSAP implementation. The total national budget in forestry sector under MoFSC in the reporting period was approximately NPR 35.82 billion. Out of total national budget, 18.35 % was government channeled donor contribution for the following programmes: MSFP, REDD, and BCRWME. Several ministries such as agriculture, livestock, environment, tourism, local development have designated funds which are used to undertake actions identified in the NBSAP.

However, the government has not yet introduced biodiversity budget code and integrating it in national plans and programmes of relevant ministries, and the share of total budget allocation to implement NBSAP related activities is not yet introduced in the reporting system. Funding and investments in biodiversity sectors of institutions such as NTNC, WWF Nepal, IUCN, UNDP, and ZSL are also not clearly reflected in the current reporting system.

Hence, the total budget allocated and expenditure incurred in the respective priority actions under different thematic areas is unaccounted in the present financial management and reporting system. In the allocated budget, the contributions of other GoN/sectoral ministries, I/NGOs CBOs, and private sector is limited. Involvement of private/corporate sector in PES is very poor. Even some of the NBSAP identified priority actions are partially or fully missing in the annual programmes of the respective implementing agencies.

(3) Progress assessment

Considering the context of fund generation and limited sources of fund, the progress is "towards the target but at an insufficient rate". *Monitoring related to this target is partial*. Information sources used for assessment of progress of the target in given in Table 28.

Table 28: Information sources used for assessment of progress in implementing Aichi Target 20

Items	Content
Time of assessment	July 2018
Information sources for assessing this target	Websites of NPC, MoFSC, MoALD
Indicators used	Budget
Confidence level	Based on partial evidence
Adequacy of monitoring information to support assessments	Partial. Besides GoN budget, budget allocation of conservation partners, business and private sectors need to be integrated.

4.21 Activities contributing to the achievement of the ABTs at the global level

Implementation of NBSAP has been effective in Nepal due to implementation of international agreements on biodiversity, and strengthening of regional collaboration for the restoration of biodiversity across the transboundary scale. Success in biodiversity conservation is one of the areas that Nepal can showcase to the international communities (Oli and Dhakal 2018). The section briefly deals with multilateral agreements to which Nepal is a party; Nepal's regional collaboration with China and India; and ongoing collaborative projects/programmes with regional countries.

***Enhancing international collaboration for biological diversity conservation*:** Nepal has signed several multilateral agreements such as UNCBD, UNCCD, UNFCCC, Ramsar Convention, etc. The country is actively participating in international activities for the conservation of biodiversity by: (i) maintaining activities for the conservation of biological diversity; and (ii) maintaining close relationship with relevant organizations for implementation of multilateral agreements including UNCBD, UNF CCC, Ramsar Convention, CITES, ITPGRFA, etc. to further enhance effective international partnership. In addition, Nepal is committed to take part in CBD COP and implement its decision into national planning process. Nepal has also been participating to the discussion on international scientific platform such as Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). There is need to enhance participation in multilateral collaboration programmes such as GTI, GSPC, etc.

Enhancing regional collaboration for biodiversity conservation: Nepal has been involved in a number of global as well as regional networks and forums for biodiversity conservation including South Asia Wildlife Enforcement Network (SAWEN); Global Snow Leopard and Ecosystem Protection Programme (GSLEP) and Global Tiger Forum (GTF), etc. Regional collaboration with neighboring countries, in particular with China and India, has been an important factor to strengthening partnership through bilateral discussion and agreements for biodiversity conservation. The mountain ecosystems of the Himalayas need an integrated and transboundary ecosystem approach at the landscape scale for conservation and sustainable development. It should be managed as a mosaic of integrated socio-ecological systems across political boundaries. Efforts are needed to build on existing traditional practices, promote regional cooperation, and increase national and global investments.

Bilateral agreements for biodiversity conservation: Nepal has signed two important bilateral agreements with China and India. Nepal and India have regularly held the high-level meeting and filed level meetings since 1990s in fostering wildlife and biodiversity conservation and curbing wildlife trade in the border regions; the recent one was held during 14-25 September 2017 in Kathmandu. Similarly, Nepal-China have been collaborating in biodiversity conservation since 2010; the last bilateral transboundary meeting was held in October 2017 in Kathmandu which worked on, among others, preparing the Cooperative Conservation Service Agreement on Greater One-horned Rhinoceros for promoting the cooperative conservation on Rhinos between Nepal and

China (Lamichhane 2018). This has provided an opportunity for sharing information and technology transfer between and among countries.

- The Ministry of Forests and Environment (then MoFSC) and the State Environment Forestry Administration, People's Republic of China (PRC) signed a MoU on 3 June 2010. The MoU expresses the commitment to implement the obligations of multilateral agreements and conventions to protect the environment and conserve biodiversity. Major areas of cooperation include: formulating forestry policies and strategies, forest management, addressing adverse effects on forests, wildlife conservation (by stopping the illegal hunting of animals and the illegal trade of their body parts), scientific research, and public awareness.

- A resolution was signed between Nepal's Department of National Parks and Wildlife Conservation, India's National Tiger Conservation Authority, and India's Ministry of Environment and Forests on 29 July 2010. This resolution on transboundary conservation is an outcome of the Fourth Nepal-India Consultative Meeting. The resolution focused on, *inter alia*, the conservation of endangered species (including tiger, rhino, and elephant), capacity building, joint monitoring arrangements, and cooperation on recognized priority landscapes.

***Regulation of transboundary movement of animals/diseases*:** The Livestock Health and Livestock Services Act (1998) obliges the GoN to establish temporary or permanent quarantine check posts, to prohibit the import of animals suffering from disease, and to return livestock, animal/livestock products, and livestock production equipment/inputs that are prohibited back to their country of origin. If there is any likelihood of these spreading contagious diseases, the GoN can order their destruction. The Act requires that any party willing to engage in the export or import of biologics, fingerlings, chicks, and animal feed has first to obtain approval from the GoN.

Collaborative transboundary initiatives: Three landscape level transboundary initiatives projects/programmes have been active; these include Tarai-Arc Landscape (TAL); Kailash Sacred Landscape (KSL); and Kangchenjunga Landscape (KL).

(i) TAL: The Terai Arc Landscape (TAL) encompasses the important protected areas of Nepal and India along the border. The landscape has created important transboundary habitat for wildlife connectivity, linking Nepal's Churia forests with India's Dudhwa NP. The corridors such as, Khata corridor, Kamdi corridor; Basanta corridor; Karnali corridor; Laljhadi-Mohana corridor; Brahmadev corridor, etc. links with protected areas in India, and provide important habitat for movement of endangered megafauna (MoFSC 2015).

(ii) Kailash Sacred Landscape (KSL): This landscape covers remote south-western portions of the Tibet Autonomous Region (TAR) of China, and contiguous areas of north-western Nepal and India. It is the source of four of Asia's most important rivers, the Brahmaputra, Indus, Karnali, and

Sutlej. At the heart of this landscape lies the sacred Mount Kailash, revered by hundreds of millions of people in Asia and throughout the world. The KSL is situated in the Hindu Kush-Himalayas - a recognized global 'Biodiversity Hotspot' and 'cultural hotspot', as it has a deep and rich cultural tradition and diversity. Many significant cultural heritage sites are now threatened by poverty, socio-economic and environmental change, and unregulated development. The KSL with its diverse manifestations of culture and nature, offers immense opportunities for tourism from adventure tourism, to religious tourism, heritage tourism, cultural tourism, and nature or wilderness tourism (Zomer and Oli 2011).

(iii) Kangchenjunga Landscape (KL): The landscape comprises parts of Nepal and India and Bhutan. It comprises Jhapa, Ilam, Panchthar and Taplejung districts in Nepal and maintains connectivity between the KCA and Makalu Barun National Park in Nepal. North-east border between Nepal and India is represented by the Singhalila mountain range. Limited research and data, inadequate environmental awareness of local communities, ineffective implementation of programmes and initiatives are other important issues of KL Nepal. One of the recent successful activities include collaring Snow leopard with GPS tracker for wildlife monitoring (WWF 2013). Data transmitted by the collar will allow researchers to track the Snow leopard's movement, habitat use and preferences, home range and other important parameters needed for effective management of the species. Similarly, RPN has been conducting baseline survey/research on Red panda and community-based monitoring of the species in Panchthar, Ilam and Taplejung districts. Human-wildlife conflict is a serious problem in KL Nepal. Crop depredation by wildlife is reported from all over KL Nepal districts (Chaudhary et al. 2015).

Regional threat to biodiversity: Major threats to biodiversity in the transboundary landscape include crop depredation by Asian elephant, Barking deer, Himalayan bear and livestock predators that include Snow leopard and Common leopards. Emerging problem due to seasonal migratory herd of elephants in Jhapa district in KL has become even more serious, which needs to be addressed with short and long-term strategies and effective implementation plans. Other regional conservation threat to biodiversity includes decrease in population of caterpillar fungus in the Himalayas (Box 5).

Box 5: Threats of caterpillar fungus in the Himalayan region

Himalayan caterpillar fungus (*Ophiocordyceps sinensis*) has become one of the world's most valuable biological commodities, providing a crucial source of income for hundreds of thousands of collectors in Bhutan, China, India and Nepal. However, the resulting harvesting boom has generated widespread concern over the sustainability of its collection. According to collectors across four countries, caterpillar fungus production has decreased due to habitat degradation, climate change, and especially overexploitation. They indicate that caterpillar fungus is more productive under colder conditions, growing in close proximity to areas likely to have permafrost. With significant warming already underway throughout much of its range, it has been concluded that caterpillar fungus populations have been negatively affected by a combination of overexploitation and climate change. The results underscore that harvesting is not the sole threat to economically valuable species, and that a collapse of the caterpillar fungus system under ongoing warming and high collection pressure would have serious implications throughout the Himalayan region.

Source: Hopping et al. (2018).

Transboundary translocation and repatriation of Rhinoceros unicornis: The MoFE, GoN handed over two pairs (separately) of Greater One-horned Rhinoceros (*Rhinoceros unicornis)*, an endangered species, to Peoples Republic of China during July 2018 and August 2018. The Rhinos were translocated from the Chitwan National Park to Guangdong Chimelong Safari Park and Shanghai Wild Animal Park in China. Latest update is that after proper quarantine process in China both pairs of rhinos translocated from Nepal to China are healthy. This has strengthened Nepal's international and regional commitments towards conservation of biodiversity.

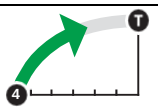
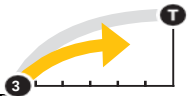
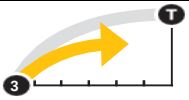
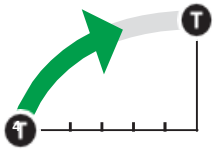
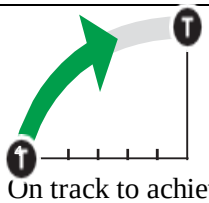
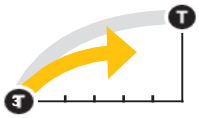
As an example of transboundary conservation, a rhino which was swept away by flood during July 2017 to India in an unsuitable habitat across the Nepal-India border was repatriated to its original habitat in Chitwan National Park.

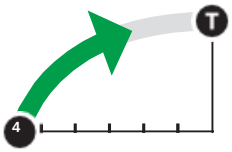
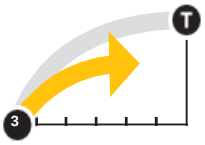
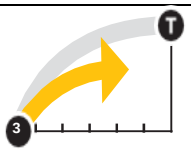
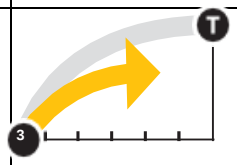
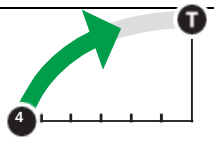
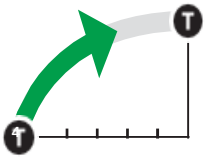
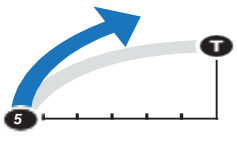
4.22 Summary of the ABT being persuaded at the national level

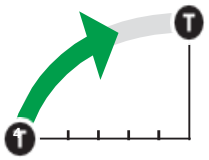
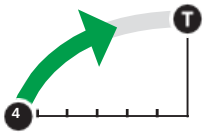
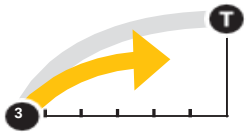
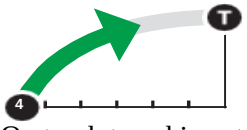
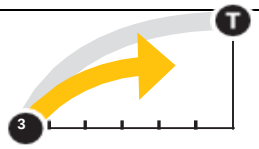
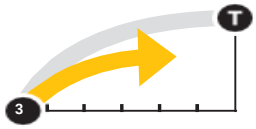
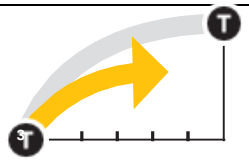
In order to summarize the overall progress of ABT that is being persuaded at the national level, the following measures were used. Information collected both at national and state level were assessed per targets. Aichi target dashboard was designed by assigning score on the scale of 1-5 (where 1 being the lowest, 5 being the highest). Each national indicator based on their assessment were scored. Then, the score was divided by their maximum range and the output of each ABT

were rated to their respective categories: (1)1-20%, (2) 21-40%, (3) 41-60%, (4) 61-80%, (5) 81-100%, which respectively represent purple (moving away from target), red (no significant changes), yellow (progress towards target but at an insufficient rate, green (on track to achieve target), and blue (on track to exceed target) (CBD 2014). If sum of all 4 national indicators under a single Aichi target is 13, it is then divided by its maximum score 20, then transferred to percent value. Here, its 65%, which means, the progress is on track to achieve the target. In addition, the confidence level was assessed and represented with asterisks (*, **, ***) to indicate low (based on limited evidences), medium (based on partial evidence) and high (based on comprehensive evidence) (CBD 2018). A summary of national level achievement of ABT has presented (Table 29).

Table 29: Overall national level achievement of Aichi Biodiversity Targets

Aichi Target	**Overall Target Status**
1. Biodiversity Awareness	 On track to achieve the target (***)
2. Biodiversity Mainstreaming	 Progress towards target but at an insufficient rate (**)
3. Incentives and Subsides	 Progress towards target but at an insufficient rate(**)
4. Sustainable Production and Consumption	 On track to achieve target (***)
5. Habitat Fragmentation and Degradation	 On track to achieve target (***)
6. Sustainable Fisheries	 Progress towards target but at an insufficient rate (**)

7. Sustainable Resource Management	 On track to achieve target (***)
Pollution	 Progress towards target but at an insufficient rate (***)
9. Invasive Alien Species	 Progress towards target but at an insufficient rate (***)
10. Vulnerable Ecosystems	 Progress towards target but at an insufficient rate (*)
11. Protected Areas	 On track to achieve target (***)
12. Species and Extinction	 On track to achieve target (***)
13. Genetic Diversity	 On track to exceed target (***)

14. Ecosystem Services	 On track to achieve target (***)
15. Climate Resilience	 On track to achieve target (***)
16. Access and Benefit Sharing	 Progress towards target but at an insufficient rate (*)
17. NBSAP	 On track to achieve target (***)
18. Traditional Knowledge	 Progress towards target but at an insufficient rate (**)
19. Science and Research	 Progress towards target but at an insufficient rate (***)
20. Resource Mobilization	 Progress towards target but at an insufficient rate (**)

4.23 Contribution of Aichi Biodiversity targets (ABT) to the Sustainable Development Goals (SDGs)

Nepal gives high importance to the 2030 Agenda for Sustainable Development. The GoN has developed Sustainable Development Goals – Status and Roadmap: 2016-2030 (NPC 2017). Nepal has also done tremendous work in the field of biodiversity conservation to achieve 2030 Sustainable Development Goals and made important contribution. This chapter assesses contribution of ABTs to achieve the SDGs (Table 30).

Majority of the ABT's contribute to the SDG targets in general, relevant among them include SDG national indicators 1.4 (equal rights to resources); 2.4 (sustainable food production); 2.5 (maintaining genetic diversity and fair and equitable benefit sharing); 4.7 (acquire knowledge and skills to promote sustainable development); 6.6 (protect ecosystems); 8.4 (sustainable consumption and production); 9.5 (enhance scientific research); 11.4 (protect cultural and natural heritage); 11.7 (universal access to green and public spaces); 12.2 (sustainable management and efficient use of natural resources); 12.8 (ensure relevant information and awareness for sustainable development); 13.2 (integration of climate change policy into national policies, strategies and plans); 13.3 (improve awareness-raising on climate change and mitigation); SDG 15 (promote, restore and promote sustainable use of terrestrial ecosystems); 17.6 (enhance regional and international cooperation), & 17.9 (enhance international support to implement all SDGs). The ABTs approach to conservation should, therefore, be considered as complementary to the SDGs.

Table 30: Linkages between SDGs and ABTs

SDGs	Relevant SDG Target	Relevant target set by Nepal	ABT Contribution
1. No poverty	1.4 … access and control over … natural resources	iv. Nationally defined poverty reduce to 5%	Poor and marginalized communities are most dependent on wild biological resources for food, medicine, timber, fuel, etc (ABT 4 & 18).
2. No hunger	2.4… sustainable food production systems … 2.5 … maintain genetic diversity of seeds, cultivated plants ….	v. Increase food grain production by at least 50% from current level	Biodiversity is the basis of sustainable agriculture & contribution to food security (ABT 6, 7, 13 & 16).
3. Good health		No relevant target	Plants are the basis of many traditional and modern medicines (ABT 18).
4. Quality of education	4.7 … all learners have the knowledge and skills needed to promote sustainable development	iii. …….vocational education	Learning about values of biodiversity is a part of education and awareness for sustainable development (ABT 1).
5. Gender equality	5.a … equal rights to economic resources … control over … natural resources…	No relevant target	Community biodiversity conservation projects address gender issues (ABT 7).
6. Clean water & sanitation	6.6 Protect and restore water-related ecosystems …	No relevant target	Biodiversity, in particular forest, and grassland help provide clean water and strengthen upstream-downstream linkages (ABT 14).
7. Affordable energy for all	7.2 … increase share of energy	ii. Reduce to 10% of HHs who use firewood as their primary fuel for cooking	Biodiversity is an important source of energy (ABT 14).

8. Sustainable economic growth	8.4 … decouple economic growth from environmental degradation	No relevant target	Research is needed to identify sustainable harvesting levels for socioeconomic and culturally valuable important species (ABT 4).
9. Innovation & resilient infrastructure	9.5 Enhance scientific research. …	No relevant target	Scientific research on biodiversity help lead to innovation and development (ABT 19).
10. Reduced inequalities	10.3 Ensure equal opportunity … promoting appropriate legislation, policies and actions…	No relevant target	Nagoya Protocol on ABS in Nepal (ABT 16), and resource mobilization (ABT 20) help reduce inequality.
11. Sustainable cities and communities	11.4 … protect natural heritage 11.7 … universal access to green and public spaces	No relevant target	Important IBAS and IPAs including PAs are the important areas of natural heritage. Further, Botanic Gardens and Zoos enhance accessibility to green and public spaces (ABT 11).
12. Responsible consumption	12.2 … sustainable management of natural resources 12.8 … people have relevant information for sustainable development	iii. Improve soil organic matter fourfold	For responsible consumption, support is needed for sustainable use of biodiversity (ABT 4); and enhancing education for sustainable development (ABT 1).
13. Climate action	13.2 Integrate measures into national policies 13.3 Improve education and awareness …	i. Halve existing Co_2 emission level	Biodiversity contribute regulation of global climate, and are involved in both mitigation and adaptation (ABT 15). It is important to enhance education and awareness for sustainable development (ABT 1).
14. Life below marine water	This goal is not directly relevant for Nepal	Not relevant	
15. Life on land	All targets	i. Increase community managed forest to 42% by 2030 ii. Increase PA by 2.3% by 2030 iii. Increase number of conserved wetlands, lakes from 1727 (2015) to 5,000	Biodiversity support all life on land (ABT 2, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16 & 17).
16. Peace and justice	16.6 Develop effective , accountable and transparent institution at all levels	No relevant target	Good governance in natural resource management and institutional strengthening are fundamental requirements for sustainable resource management (ABT 7), ABS (ABT 16) and establish Biodiversity budget code (ABT 20).
17. Partnership for the goals	17.6 … enhance... international cooperation .. on science, technology … 17.9 … enhance international support for ... capacity building …		Networking and partnerships are needed among biodiversity conservation organizations, development, business, private organizations and communities at various levels (ABT 19 & 20) to achieve the goal.

4.24 The Post-2020 Global Biodiversity Framework

The Conference of the Parties at its fifteenth meeting, in 2020, is expected to consider adoption of the post-2020 global biodiversity framework and follow up progress to the Strategic Plan for Biodiversity 2011-2020 and related means of implementation, including resource mobilization (CBD/SBI/2/17, 30 May 2018). While developing the post-2020 global biodiversity strategy, Nepal will follow the guidelines provided by the Convention on Biological Diversity, the Conference of the Parties and the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA).

For the preparation of the Nepal's post-2020 strategy, the country will consider the 2050 Vision of "Living in Harmony with Nature" of the Strategic Plan for Biodiversity 2011-2020, the 2030 Agenda for Sustainable Development, other relevant international processes while taking into account global trends that have an impact on biodiversity and ecosystems. The post-2020 global biodiversity framework, including any supplementary tools for the implementation of the Protocols, should build upon the achievements of the Strategic Plan for Biodiversity 2011-2020.

As practiced in the preparation of previous (First in 2002, and second in 2014) biodiversity strategy of Nepal, the country will make meaningful engagement of Parties to the Convention and its Protocols, indigenous peoples and local communities, United Nations and other intergovernmental organizations (including the Rio Conventions, the biodiversity-related multilateral environmental agreements, IPBES, the United Nations Environment Programme, the United Nations Educational, Scientific and Cultural Organization, the United Nations Development Programme, the Global Environment Facility and the Food and Agriculture Organization of the United Nations, among others), non-governmental organizations, women organizations, academia, the business community, faith groups, youth and other stakeholders, including citizens.

In this regard, the framework will be built on: (i) the lessons learned from the implementation of the current Strategic Plan 2011-2020; (ii) mid-term review of the national biodiversity strategies and action plans (NBSAPs), national targets, information on the effectiveness of actions taken by Parties to implement the Strategic Plan; (iii) the updated available information and knowledge, including scientific evidence, and indigenous and traditional knowledge systems; (iv) the sixth national reports; (v) the fifth edition of the Global Biodiversity Outlook and its related reports; (vi) the deliverables of IPBES; (vii) the sixth edition of the Global Environment Outlook; (viii) other relevant scientific information related to natural and social sciences; and (ix) reports from biodiversity-related multilateral agreements and other governmental, intergovernmental and nongovernmental organizations.

Other considerations Nepal would make are to ensure the coherence and complementarity of the post-2020 global biodiversity framework with other existing or upcoming international processes, including (i) the 2030 Agenda for Sustainable Development; (ii) relevant international agreements, including, but not limited to the Sendai Framework for Disaster Risk Reduction 2015-2030, adopted under the United Nations Office for Disaster Risk Reduction, the Paris Climate Agreement, adopted under the United Nations Framework Convention on Climate Change, the Land Degradation Neutrality Goal, adopted under the United Nations Convention to Combat Desertification, the new Urban Agenda, adopted under United Nations Human Settlements

Programme, the International Treaty on Plant Genetic Resources for Food and Agriculture, the UNESCO World Heritage Convention, and the United Nations Convention on the Law of the Sea, as well as key strategies/agendas adopted by other biodiversity-related conventions, such as the Strategic Plan for Migratory Species 2015-2023, the United Nations Strategic Plan for Forests 2017-2030, the Fourth Ramsar Strategic Plan 2016-2024 and the CITES Strategic Vision: 2008-2020.

The process for developing the post-2020 global biodiversity framework should be guided by the principles of participatory, inclusive, comprehensive, transformative, catalytic, knowledge based, transparent, and iterative.

SECTION FIVE: NATIONAL CONTRIBUTION TO THE ACHIEVEMENTS OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION (GSPC) TARGETS

The Global Strategy for Plant Conservation (GSPC) with its 16 targets was adopted by the Parties to the CBD in 2002; and then updated and revised in 2010, with targets to be achieved by 2020. The GSPC seeks to assess the conservation status of the world vascular plants by 2020, and to guarantee that at least 75% threatened taxa are conserved *in situ* (Munoz-Rodriguez et al. 2016). Nepal incorporated GSPC into updated and revised Nepal National Biodiversity Strategy and Action Plan, 2014-2020. So, specific plant conservation activities continued to be inadequately integrated into national biodiversity policies as well as progress towards GSPC targets are often not fully captured in national biodiversity reports, like many Parties (Sharrock and Jackson 2016).

At global scale, government bodies often prefer to concentrate biodiversity (higher groups of fauna) conservation in the protected areas development and management system; similar situation has also been observed in Nepal where present efforts are more focused on higher taxa of fauna. Whereas much of plant conservation actions are mainly undertaken within the academic sectors such as universities, and non-government organizations. The GSPC has not been widely acknowledged and implemented at the national level, and plants are still neglected in broader biodiversity and sustainability debate (Sharrock and Jackson 2016). This section describes on how and to what extent Nepal is contributing to each GSPC target. Nevertheless, on the basis of preliminary assessment of 16 GSPC targets, the following results are observed at the national level (Table 31).

Table 31: Achievements of GSPC targets

Objectives & Targets	**Achievements & Evaluation rank**	**Implementing/ supporting agency**
Objective I: Plant diversity is well understood, documented and recognized		
Target 1: An online flora of all known plants.	**Achievements** • Annotated Checklist of the Flowering Plants of Nepal - This is an updated online version of Press et al. (2000). The updates include the addition of species recently recorded from Nepal and the inclusion of vernacular names. For further information on Nepal and its plants see www.floraofnepal.org; http://www.efloras.org; http://www.tropicos.org. • Other updates on Flora of Nepal available in print include Flora of Nepal, vol. 3 (Magnoliaceae to Rosaceae) Watson et al. (2011); Fern and Fern Allies of Nepal Fraser-Jenkins et al. (2015) • Digitization of 21,000 herbarium specimens at Department of Plant Resources (DPR), National Herbarium and Plant Laboratories (KATH), Godavari, Lalitpur. (http://kath.gov.np/Digitization_Publicity_Section) **Evaluation rank**: *Progress towards target but at an insufficient rate*.	DPR, CDB-TU, NAST
Target 2: An assessment of the conservation status	**Achievements**	DPR, CDB-TU, IUCN

of all known plant species, as far as possible, to guide conservation action.	• Assessment of conservation status of plant species has been initiated. Fifteen officers of the DPR and other researchers from academic institutions participated on Three Days Training Workshop on IUCN Red listing from 20-22, May, 2018 (Plant Resources, Newsletter July 2018, Year 21, No.4). **Evaluation rank**: *No significant change at national level*.	
Target 3: Information, research and associated outputs, and methods necessary to implement the Strategy developed and shared	**Achievements** • Nepal National Biodiversity Strategy and Action Plan (NBSAP): 2014-2020 provides strategic framework to implement the plant conservation strategy (GoN-MoFSC 2014). **Evaluation rank**: *Progress towards target but at an insufficient rate*.	NBCC, DoFSC
Objective II: Plant diversity is urgently and effectively conserved		
Target 4: At least 15 per cent of each ecological region or vegetation type secured through effective management and/or restoration.	**Achievements** • 80 ecosystems (67.8% in average) out of 118 total are conserved in the PAs representing lowlands, midhills and highlands (BPP 1995). **Evaluation rank**: *On track to achieve target at national level.*	FRTC, DoFSC, Academic institutions
Target 5: At least 75 per cent of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity.	**Achievements** • About 75% of plant diversity is effectively conserved through: (i) PAs, 23.39% includes at least 40% flowering plants (Shrestha et al. 2010, DNPWC (2017); (ii) Protection forest (8 declared comprising 1336.85 sq km & 11 on pipeline to be declared comprising 1949.58 sq. km) (Map 6); (iii) Six landscapes covering about 88% of the country) (DoF (2017) (Map 8) **Evaluation rank**: *On track to achieve target at national level*.	DoFSC, DNPWC
Target 6: At least 75 per cent of production lands in each sector managed sustainably, consistent with the conservation of plant diversity.	**Achievements** • Production lands include: Forest area (44.74%); Agricultural lands 21%; Grasslands 12%; and wetlands 2.6%. Majority of the forest lands are expected to be managed sustainably; however, for other production lands, additional efforts are needed. **Evaluation rank**: *On track to achieve target at national level*.	MoFE, MoALD, DoFSC
Target 7: At least 75 per cent of known threatened plant species conserved *in situ*.	**Achievements** • A list of 49 threatened tree species in Nepal (MoFSC 2013); and 19 plant species protected in Nepal is given (GoN/MoFSC 2014). About 75% of plant diversity are subjected to an adequate *in situ* conserved through: (i) PAs, 23.39% that includes at least 40% flowering plant species within PAs (Shrestha et al. 2010); (ii) Protection forest (8 declared comprising 1336.85 sq km & 11 on pipeline to be declared comprising 1949.58 sq. km); (iii) Six landscapes covering about 88% of the country); although its effectiveness is yet to be studied. **Evaluation rank**: *On track to achieve target at national level*.	DoFSC, DPR
Target 8: At least 75 per cent of threatened plant species in *ex- situ* collections, preferably in the country of origin, and at least 20 per cent available for recovery and restoration programs.	**Achievements** • A systematic study on assessment of the threatened species in Nepal has not been carried out. Few studies have identified some species as threatened including valuable timber species, and Non-timber Forest Products (NTFPs) and aromatic plants (MAPs). The process includes protection of 49 threatened tree species; 92 species conserved in the farmland; 23 tissue culture	DPR, NARC

	forest tree species; and seeds available as reproductive material of 46 species (MoFSC 2013). • Majority of threatened plant species (36 Threatened plant species) has been conserved in *ex situ* collection in botanical gardens and Research Centres of DPR (DPR 2017, *Annual Progress Report of FY 2073/074*). • 50 Threatened plant species are conserved *in-vitro* in Biotechnology Section of DPR. **Evaluation rank**: *Progress towards target but at an insufficient rate*.	
Target 9: 70 per cent of the genetic diversity of crops including their wild relatives and other socio-economically valuable plant species conserved, while respecting, preserving and maintaining associated indigenous and local knowledge.	**Achievements** • Scientific and technical measures for preventing loss of plant genetic resources include both: (i) *In situ* conservation through establishment of protected area network complemented by landscape level conservation and management; established seed bank; and (ii) *Ex situ* conservation trough established botanical gardens, breeding seed orchards, applied tissue culture technology, and germplasm conservation (MoFSC 2013; Map 7). • An estimated number of crop landraces in Nepal are 30,000. Altogether, the National Gene Bank has 11,389 accessions (38%) (Genebank 2017). Generally, on an average about 1,000 accessions are collected annually and the target cannot be achieved before 2020. • Seeds and herbarium of 65 accessions of sixteen (29%) wild relatives of crops have been collected and conserved in the National Gene bank. • 55 socio-economically valuable plant species are conserved in National Botanical Garden, Godavari, Lalitpur. • Less priority given on documentation and reorganization and use of traditional knowledge and practices of local communities; some of the traditional practices eg churning milk, hay making in the high lands, use of herbal medicines in parasites control, traditional shelter to protect animals from the cold, etc are some of the traditional knowledge and practices that are associated with the biodiversity conservation in Nepal (Poudel 2017). **Evaluation rank**: *Progress towards target but at an insufficient rate.*	NARC, DPR, DoFSC
Target 10: Effective management plans in place to prevent new biological invasions and to manage important areas for plant diversity that are invaded.	**Achievements** • All management plans of PAs envision sustainable management of biodiversity including invasive species. • Management plans of aquatic invasive plant species are included in management plans for Beeshazari and associated lake, Ghodaghodi lake area, Jagdishpur reservoir, and Lake Cluster of Pokhara Valley; and Ramsar Strategy and Action Plan (2018-2024). • Collaboration of DPR with NAST in Darwin Initiative Project for IAS management by making biochar. • Mapping and documentation of Invasive Alien species conducted by the DPR in Salyan, Dang, Chitwan, Dhanusha, Makwanpur, Ramechhap, Dolkha, Kavre, Sankhuwasabha, Tehrathum, Dankuta districts. • Invasive species Policy formulation is on pipeline.	FRTC,DNPWC, DoFSC, DPR, CDB-TU, IOF

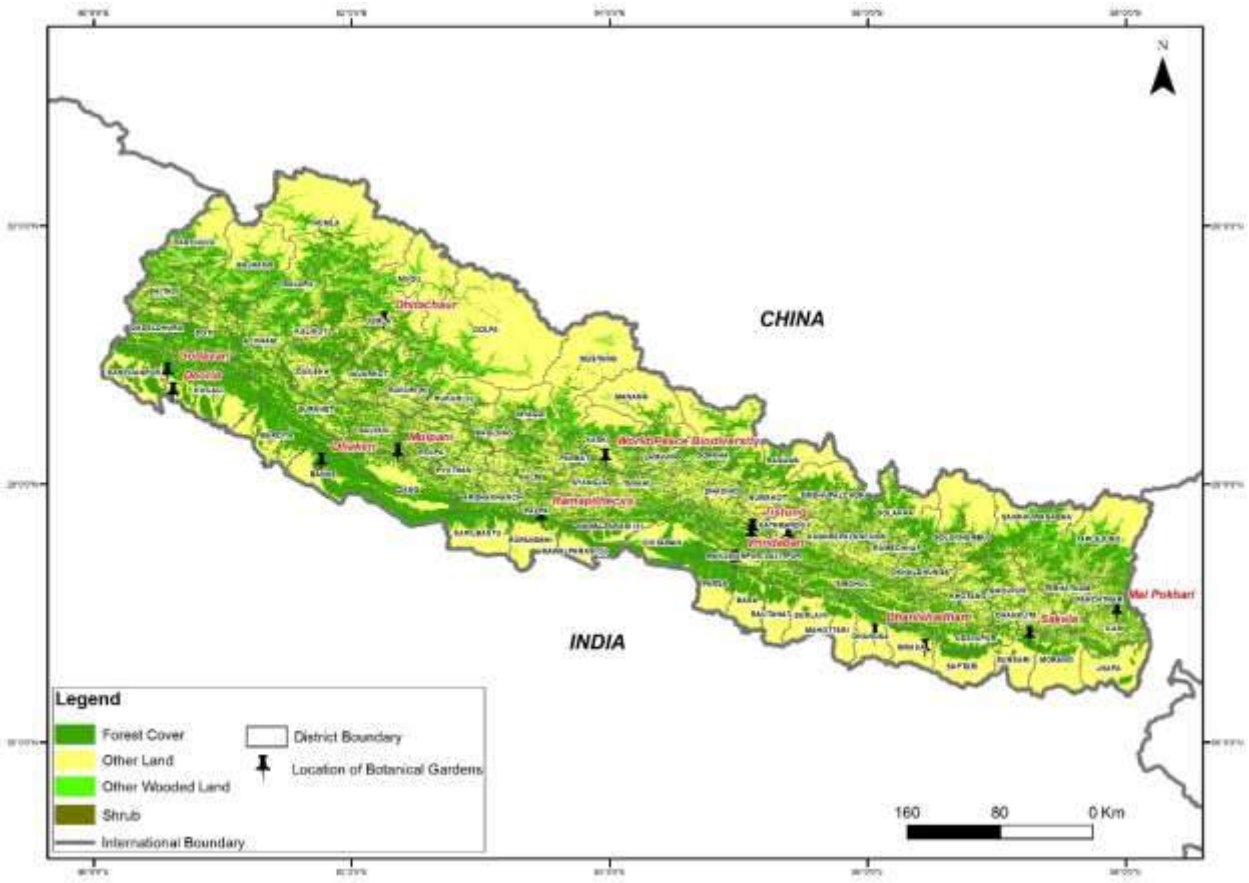
	Evaluation rank: *Progress towards target but at an insufficient rate.*	
Objective III: Plant diversity is used in a sustainable and equitable manner		
Target 11: No species of wild flora endangered by international trade.	**Achievements** • No such study seems to be undertaken; however, over exploitation of high value and rare species, such as yartsa-gun-boo (*Ophiocordyceps sinensis*), satisal (*Dalbergia latifolia*), champ *(Michelia champaca*), bijaysal (*Pterocarpus marsupium*), wild olive (*Olea cuspidata*) has threatened the survival of these species in their natural habitats. • Excessive commercial harvest of medicinal plants (legally and illegally) has caused direct threat to the high value species, including yartsa-gun-boo (*Ophiocordyceps sinensis*), jatamasi (*Valeriana jatamansi*), sarpagandha (*Rauvolfia serpentina*) and many species of orchids. • Trade is regulated by Convention on International Trade of Endangered Species of Fauna and Flora Act (2017) in specific & Forest Act 1993 in general. **Evaluation rank**: *Progress towards target but at an insufficient rate.*	DoFSC, DPR
Target 12: All wild harvested plant-based products sourced sustainably.	**Achievements** • No such study has been undertaken, however forest certification has been applied by some Forest User Groups in the Community Forest in Bajhang and Dolkha Districts (Kandel 2007). • A toolkit of "Certification of Community Managed Forests" has been developed (ANSAB 2010). **Evaluation rank**: *No significant change at national level.*	DoFSC
Target 13: Indigenous and local knowledge innovations and practices associated with plant resources maintained or increased, as appropriate, to support customary use, sustainable livelihoods, local food security and health care.	**Achievements** • Traditional Knowledge (TK) documentation on 14 ethnic group (Tamang, Gurung, Khas, Chamar, Chepang, Magar, Thami, Kathahariya, Jirel, Ghale, Tharu, Lepcha, Musahar, Raji) (Annual Reports, DPR, 2014 to 2017). In addition, some recent studies during the reporting period have been given in Section Five. However, systematic management and streamlines research attempts have so far been insufficient. (see ABT 18 for details). **Evaluation rank**: *Progress towards target but at an insufficient rate*.	DPR, TU, KU, FECOFUN, NEFIN, ILPCs
Objective IV: Education and awareness about plant diversity, its role in sustainable livelihoods and importance to all life on earth is promoted		
Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programs.	**Achievements** • The importance of plant diversity and need for its conservation is well taken by institutions and stakeholders. Some examples include Celebration of World Environment day (June 5), Biodiversity day (May 22), Wetland day (February 02), International Mountain Day (December 11), Plant Resources day (Chaitra 29-last week of the new year). Masters courses related to biodiversity and environmental management have been run in academic institutions – TU (CDB, CDZ, CDES, IAAS, IoF), KU, AFU, PU (https://edusanjal.com/course/m-sc-in-biodiversity-and-environmental-management-tribhuvan-university/; http://www.cdztu.edu.np/?option=academics&page=content&pg=academic-programs; http://www.cdes.edu.np/academic-	DOFSC, DNPWC, NTNC, IUCN, WWF-Nepal

	program/special-program.html http://www.ku.edu.np/env/; www.iof.edu.np). **Evaluation rank**: *Progress towards target but at an insufficient rate.*	
Objective V: The capacities and public engagement necessary to implement the Strategy have been developed		
Target 15: The number of trained people working with appropriate facilities sufficient according to national needs, to achieve the targets of this Strategy.	**Achievements** • Almost all sectors related to biodiversity conservation possess insufficient human resources. Considering the technological advancement, appropriate facilities in Nepal are weaker, hence demanding to enhance technological facilities as well as trained human resources. **Evaluation rank**: *Progress towards target but at an insufficient rate.*	GoN, Academic institutions
Target 16: Institutions, networks and partnerships for plant conservation established or strengthened at national, regional and international levels to achieve the targets of this Strategy	**Achievements** • Networks and partnerships for plant conservation has been enhanced, but at an insufficient level. • Collaboration has been established among partners, organization working in Plant resource sector i.e. NGO. INGO, WWF, ICIMOD, FAO, and academic institutions such as TU, KU, etc.). However, strengthening collaboration is needed at the central level as well as at the subnational levels in the current changed political restructuring of Nepal. • Regional networking and partnership have been developed for biodiversity conservation among China, India and Nepal under Kailash Sacred Landscape Initiative; among Bhutan, India and Nepal under Kangchenjunga Landscape Initiative; between India and Nepal under Tarai Arc Landscape Programme. • Nepal has been actively participating in international activities for the conservation of biodiversity with relevant organizations for multilateral organizations such as CBD, ITPGRFA, UNCCD, Ramsar Convention, etc. • Implementation of MOU with TU and Show a Pharmaceutical Univ. Japan, RBGE, UK and KNA, Korea • NBG has entered into networking Botanical Garden Conservation International (BGCI) as a member. • Global Taxonomic Initiative (GTI) established in 2013 at DPR as per Nepal government (Secretary level) decision dated 2070/8/18 also functions as the National focal point of GTI. (http://dpr.gov.np/about-us/Jun 26, 2018). **Evaluation rank**: *Progress towards target but at an insufficient rate.*	MoFE and its department, MoALD, conservation partners and stakeholders, academic institution

Preliminary assessment for GSPC targets shows that that out of 16 targets, four targets have been on track to achieve target at national level, 10 targets fall under the category of progress towards target but at an insufficient rate; and 2 targets are having no significant change at national level.

National Contribution to the achievement of GSPC: The Aichi Biodiversity Targets (ABT) contribute to the GSPC that mainly includes: ABT 1 (awareness increased); 2 (biodiversity mainstreaming); 4 (sustainable production & consumption); 5 (habitat fragmentation & degradation); 7 (sustainable resource management); 10 (vulnerable ecosystem); 11 (Protected Area System); 12 (species and extinctions); 14 (ecosystem services); 16 (Access and benefit sharing);

17 (NBSAPs development and implementation); 18 (traditional knowledge); & 19 (Science & Research).



Map 13: Location of botanical gardens

SECTION SIX: INDIGENOUS PEOPLES' AND LOCAL COMMUNITIES

Indigenous Peoples' and Local Communities (IPLCs) are ethnic groups and other communities who are the original inhabitants of a given region, in contrast to groups that have settled, occupied or colonized the area more recently. Groups are usually described as indigenous when they maintain traditions or other aspects of an early culture that is associated with a given region.

Indigenous and local knowledge holders are understood to be persons situated in the collective knowledge systems of indigenous peoples and local communities with knowledge from their own indigenous peoples and local communities. *Indigenous and local knowledge experts* are understood to be persons from indigenous peoples and local communities who have knowledge about indigenous and local knowledge and associated issues (they may also be indigenous and local knowledge holders). The *experts on indigenous and local knowledge* are understood to be persons who have knowledge about indigenous and local knowledge and associated issues, not necessarily from indigenous peoples and local communities. They all contribute to enhance the contribution of IPLCs to the ABT achievement.
During the process of 6th NR preparation, experts from local communities (key informants) ----, experts representing IPLCs present at state level consultation and ILK experts (professionals) were also consulted. Documents on sacred sites were also reviewed and analyzed.

The contribution of IPLCs has been stressed on the post-2015 United Nations development agenda and sustainable development goals to: (i) support the conservation and sustainable use of biodiversity; (ii) tackle causes of the loss of biodiversity and encourages all relevant stakeholders including indigenous peoples and local communities, (iii) engage in the discussions on the post-2015 United Nations development agenda and the sustainable development goals: and (iv) appropriately reflect the objectives of the Convention and its Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets and associated vision for 2050 in the sustainable development goals, targets and indicators, highlighting the crucial importance of biodiversity and ecosystems services and functions for sustainable development.

Indigenous peoples and local communities depend directly on biodiversity and its customary sustainable use and management for their livelihoods, resilience and cultures and are therefore well placed, through their collective actions, to efficiently and economically manage ecosystems using the ecosystem approach. The IPLCs are affected by global environmental change as well as changes taken place at the national level; because they directly rely on their immediate environment for meeting basic livelihood needs. Indigenous and local knowledge (ILK) systems provide the foundations for localized approaches based on historic practices of the protection and use of natural resources. There is a diversity of local and traditional practices that exemplify how working with IPLCs can benefit biodiversity and ecosystem services (BES) management.

The IPLCs in Nepal are mainly settled in and around high biodiversity wilderness areas including protected areas that have often been established in the traditional territories of indigenous peoples (Bajracharya et al. 2015). Indigenous peoples' rights in relation to Protected Areas have been promoted by various international agreements such as United Nations Declaration on the Rights of Indigenous Peoples which was adopted in 2007 and the 1989 International Labour Organization (ILO) Convention 169 which was ratified by the Government of Nepal (GoN) in 2007. The GoN legally recognizes 59 different indigenous peoples and is taking initiation to further recognize IPLCs. GoN has not still envisioned for the formulation of National Action Plan to protect, preserve and promote knowledge, innovations and practices of indigenous and local communities and encourage sustainable use of biodiversity. IPLCs are also contributing to the conservation of culture, religion and spiritual heritage of sacred natural sites (Rai 2018).

Nepal has made important progress in the implementation of CBD Article 8 (j); its related provisions; and various COP decisions that address key guidelines related to IPLCs such as The Plan of Action on Customary Sustainable Use of Biological Diversity, Tkarihwaié:ri Code of Ethical Conduct, the Akwe:Kon Guidelines, and Mo'otz Kuxtal Voluntary Guidelines (CBD/COP/DEC/XIII/18, 17 December 2016).

The GoN has made accession to the Nagoya Protocol on August 29, 2018 by the House of Representative, and on September 11, 2018 by National Assembly of Nepal (Nepal Gazette). This accession has made Nepal a party to the Nagoya Protocol and opens the door for the enactment of the Access to Genetic Resources and Benefit Sharing (ABS) Act and subsequent regulations and strategies.

ABS Bill Nepal (draft) 2016 has acknowledged that the traditional knowledge of the IPLCs on biological and genetic resources thus have rights over access, use and benefits. REDD Implementation center has genuinely involved indigenous people's organizations in policy formulation process and programs. This has been confirmed in meeting with NEFIN. Department of Plan Resources has conducted research on 16 ethnic groups concerning the ethnobotanical knowledge. A few example comprising the documentation of traditional knowledge include by Aryal et al. (2018), Atreya et al. (2017), Atreya et al. (2018) and Basnet and Chaudhary (2017), Bhattarai (2017), and Chapagain and Tamang (2017).

A few examples of IPLCs contribution to achievement of the ABT include in Sustainable production and consumption (ABT 4); Sustainable resource management (ABT 7); PAs management (ABT 11); Species and extinction (ABT 12); Genetic diversity (ABT 13); Ecosystem services (ABT 14); Traditional Knowledge (ABT 18); and Science and research (ABT 19) (See Section 4 for details).

An example of IPLCs collective contribution to biodiversity conservation and ecosystem services is brought here from the case study conducted in the transboundary Kailash Sacred Landscape of Nepal by Basnet and Chaudhary (2017); and Chaudhary et al. (2017).

(i) Institutionalization of social institutions: Religious institutions governed by IPLCs have played an important role in the management and conservation of resources. In many northern societies of Humla district, religious institutions like monasteries, monks, and shamans play a key role in the way resources are extracted and managed. In fact, even today, they play a major role in dispute settlement, maintenance of the social order and conservation of resources. The conservation ethos promoted by religious leaders like abbots of monasteries has been found to be very effective in reducing hunting activities. The religious institutions are key units in addressing the symbolic aspects of resource management like appeasing various deities of water, rain, good harvest, forest; officiating ceremonies of agricultural activities; and transferring the knowledge and tradition of resource management (Basnet and Chaudhary 2017).

(ii) Resource governance: The village authorities set the rules for access to the forest, agricultural operation, and pastureland management. They decide certain dates when dried firewood can be collected from the village forest. *Loiba* check each load of firewood collected just before people enter the village and if anyone is found picking fresh twigs, he/she is fined up to Rs. 5,000. People take oaths before religious idols that they will not collect any fresh twigs or fell any trees. Such oaths are respected by every individual. People are strictly prohibited from hunting animals. If anyone is found using a gun, he/she is fined Rs. 50,000. The community decides the calendar of operation of agricultural practices like the date of sowing seeds (usually allowing two days), weeding the crops, cutting grasses from the field, irrigation and harvest. All people strictly adhere to such decisions.

(iii) Pastureland management: The IPLCs here practice transhumance, moving their herds to pastures of different elevations called Soika, Yarka, Tonka, and Ghunka based on the seasons. They follow a seasonal calendar in grazing their animals. All the animals are taken to the high pasture called Soika in the summer after planting of crops. Generally, pack animals dzo and horses are not taken to the higher pasturelands and are grazed near the villages. However, sometimes they are also taken to the higher pasturelands and are brought back to the villages from the high pastures if there is a need to carry loads. The pastures for rainy season called Yarka are higher. Usually, around August, with the onset of Tonka, pastoralists start bringing their animals down to lower elevation pastures. The Tonka pastures are the same as Soika pasture. Around the end of the Tonka season, crops are also harvested and animals are brought back close to the village when the Ghunka or winter season begins. These rotational grazing systems are closely monitored and regulated by the community. If any individual is found grazing animals in Ghunka pasture in other seasons, he/she is severely punished.

Like in other countries that demonstrate good practices and can serve as examples, many IPLCs in Nepal face a series of obstacles to securing collective tenure in line with their legitimate rights under international law and human rights treaties. Actions on tenure would help ensure the recognition of contribution of IPLCs to fully participate in the governance and implementation of such land titling initiatives.

Therefore, traditional knowledge, practices and innovations possessed by IPLCs should be valued, respected and considered as useful and necessary for biodiversity conservation and sustainable use as other forms of knowledge taking into account free prior and inform consent, full and effective participation at all levels in accordance with the objective of the Convention article 8(j) and 10 (c).

SECTION SEVEN: NATIONAL BIODIVERSITY PROFILE

This section comprises an update on biodiversity status and trends in Nepal in three parts: (i) major drivers of change to biodiversity and ecosystems; (ii) major changes in threats to biodiversity with an emphasis at the sub-national levels; and (iii) profile of species richness.

(i) Major drivers of change: The major drivers of change include demographic and socio-economic changes; environmental and human induced changes such as climate and land-use changes, forest cover change; development activities; Forest policy; and political changes (Chaudhary et al. 2016).

Population growth (annual rate 1.40% in 2011 compared to 2.25% in 2001) appears to be the most important factor behind decreasing forest cover and biodiversity loss in Nepal. The annual growth rate of population is higher in the Tarai. Until the 1980s, the majority of this growing population had migrated from the hills to the Tarai which was mostly inhabited by clearing forest. The rapid pace of out-migration, especially of male youth has resulted in feminization of agriculture and natural resources management. While in some places conversion of forest into agricultural land is taking place, on the other hand abandonment of agricultural land is also on rise leading to unproductive lands.

Himlayan region ecosystems undergo rapid environmental changes due to climate change. This change poses a serious threat to the unique biodiversity of the region. In general, some of the observed features include alpine species shifting towards higher elevation, upward shifting of treeline leading to decrease of alpine meadows, etc (Schickhoff et al. 2016a & b; Schwab et al. 2018). However, in Nepal's Himalaya, downhill shift of alpine plant assemblages has also been observed due to contemporary climate and land use changes, especially due to reduced grazing in contrast to expected upslope shift of species due to climate warming (Bhatta et al. 2018).

Deforestation is one of the environmental issues in Nepal. In general, the drivers of deforestation and degradation are the mixture of direct and indirect causes such as high dependency on forest resources, unsustainable harvesting practices, illegal harvest of forest products, infrastructure development, forest fire, natural calamities, encroachment, overgrazing, lack of good governance, and ambiguous policy. Some main causes of deforestation in Nepal, however, can not be attributed simply to population pressure accompanied by migration and settlements, but a variety of economic, social, and governance factors that interact to cause deforestation (DFRS 2015, Chaudhary et al. 2016).

The recent trend shows that the rate of deforestation is slowing down from 2.1% (1990-2000) to 1.4% (2000-2005) (FAO 2010). The latest data shows that forest area in Nepal represents 44.74% of the total area of the country including forest area covering 40.36% and other Wooded Land

4.38% (DFRS 2015). However, a latest assessment by Reddy et al. (2017) shows that the total number of forest patches increased from 1930 to 2014. Similarly, assessment of tree cover area in Nepal between 2001 and 2016 shows that the country has lost areas covered by trees with substantial spatial and temporal variations (Shrestha et al. 2018). Further, over collection of fuel wood as a major source of energy, over grazing, illegal timber harvesting and trade including across the border with China and India, etc. On the other hand, some other groups in the past and in recent days were actively involved in deforestation in the name of *Sukumbasis* (landless peoples) in the Tarai. The landless people also endeavored to have access to a patch of land through forest clearance during this transitional phase (Chaudhary et al. 2016).

Deforestation has proliferated in recent years by the development activities related to road construction, schools, hospitals, graveyards, irrigation canals, dam building, and expansion of settlements. Unplanned and unregulated developmental activities, generally without environmental impact assessments, are causing forest loss and degradation in the country (Chaudhary et al. 2016). Recent initiatives of the government to build large-scale hydropower and transmission lines will certainly pose serious threats to the biodiversity in many parts of the country.

Increasing tourism and trekking is a widespread problem in all almost major trekking routes in Nepal. The hotels and lodges on the trekking routes need large amounts of timber for construction and firewood for cooking and heating.

Political instability in the country in the past (since 1950s) and recent (during 2000s) has adverse impact on environmental sustainability. Further the process of new constitution making (2015), followed by general election (2016) and restructuring of states in Nepal (2017) remained as one of the major challenges of effective implementation of NBSAP.

(ii) Major changes in threats to biodiversity: Threat Assessment at sub-national levels was conducted during the consultation workshop organized in all seven states in order to develop the 6th NR in a participatory and consultative way. During the workshop, major threats to different ecosystems were identified and imperative threat ranking was also conducted. Ranking was done as very high, high, moderate and low (Table 32).

The overall findings from all the state concluded that forest ecosystem is at high threat due to habitat loss and deforestation, human-wildlife conflict, invasion by invasive alien species, and forest fire. Protected areas are under pressure mainly due to high livestock's grazing intensity. Similarly, rangelands are under threat due to over-grazing and invasion by invasive alien plant species. Similarly, wetlands are under high threat due to over-fishing, widespread mining of gravels and sands, and pollution. Whereas agrobiodiversity is under high threat due to improper use of pesticides, urbanization and loss of traditional agrobiodiversity. Mountain biodiversity is

suffering from very high threat due to unplanned and unregulated rural roads; from high threat due to over-harvesting of selected NTFPs, climate change. Species are threatened in general by over-exploitation of timber and NTFPs, and Invasive Alien Plant species. Also to add on, genetic resources are getting extinct due to loss of local land races and wild relatives, as well as due to increased vulnerability to pest and diseases.

Table 32: Threat asssessment of biodivesity at different states of Nepal

Ecosystems	Threats	State 1	State 2	State 2	Gandaki	State 5	Karnali	Sudurpaschim
Forests	Habitat loss and deforestation	Moderate	High	High	Moderate	Moderate	Moderate	High
	Illegal hunting and trade	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Human Wildlife Conflict	Moderate	Moderate	High	High	High	Moderate	High
	Invasion by IAPs	Moderate	Moderate	High	Moderate	Moderate	High	Moderate
	Forest fire	Moderate	High	High	High	High	High	High
Protected Areas	Poaching	Moderate	Moderate	Moderate	Moderate	Moderate	High	Moderate
	Grazing	High	High	Moderate	Moderate	High	Very High	Very High
	Illegal timber harvesting	Low	Moderate	Moderate	Moderate	Moderate	High	Moderate
	Uncontrolled tourism	Low	Low	Moderate	Moderate	Moderate	High	Low
Rangelands	Overgrazing	Moderate	High	Moderate	Moderate	Very High	High	High
	Invasion by IAPs	Moderate	Moderate	High	Moderate	High	High	High
Wetlands	Human encroachment	Moderate	High	Moderate	High	Moderate	High	High
	Over-fishing	High	High	High	Moderate	Moderate	High	High
	Pollution	Moderate	High	High	High	Moderate	High	High
	Widespread mining of gravel	High	High	High	High	Moderate	High	High
	Illegal hunting and trapping of birds & other wildlife	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High
	Invasion by IAPs	Moderate	Moderate	High	Moderate	Moderate	Moderate	Moderate
Agriculture	Loss of agrobiodiversity	High	High	High	High	High	High	High
	Improper use of pesticides	High	High	Very High	High	High	High	Moderate
	Urbanization	High	High	High	High	Moderate	High	High
	Lack of incentives to conserve local landraces	Moderate	High	Moderate	High	High	High	High

Mountain	Poaching	Moderate	High	High	Moderate	Moderate	Moderate	High
	Overharvesting of plant species	Moderate	High	High	High	NA	Very High	Moderate
	Climate change	High	Moderate	High	High	Moderate	High	High
	Unplanned and unregulated rural roads	Very High	Very High	Very High	High	High	Very High	Very High
Species loss	Over exploitation of timber and NTFPs	High	High	Moderate	High	Low	High	High
	Alien Invasive Plant Species	Moderate	Moderate	Moderate	Moderate	High	High	High
Genetic resources loss	Loss of local landraces	Moderate	Moderate	High	High	Very High	Moderate	High
	Loss of wild relatives	Moderate	High	High	Moderate	Very High	Moderate	High
	Increased vulnerability to pest and diseases	Moderate	High	High	High	High	High	Moderate

Source: State Consultation 6NR 2018

(iii) Profile of species richness: Status of Nepal's species richness (Table 13); ecosystem/habitat diversity (Table 14); and threatened and endangered species of Nepal in the CITES list have been compiled from different sources and are listed below. The results of species diversity show that there has been emphasis to update profile of species focusing mainly on higher groups such as mammals and birds. Similarly, in the ecosystem/habitat diversity, there has been upgrading of protected areas; increase in forest area coverage, and important bird areas; and collection of accession of agrobiodiversity in the national gene bank in Nepal. A status of the threatened and endangered species of Nepal in the CITES Appendices is given as follows (Table 33).

Table 33: Status of Nepal's species diversity

Group	**No of known species**	
	2014[1]	**2018**
Flora		
Algae	1,001	1,001 (Prasad 2013)
Fungi	1,822	2,467 (Adhikari 2016))
Lichens	465	792 (Olley and Sharma 2013)
Bryophytes	1,150	1,213 (Pradhan 2016)
Pteridophytes	534	580 (Jenkins et al. 2015)
Gymnosperms	26	41* (Shrestha et al. 2018)
Angiosperms	6,973	6,973 (Groombridge and Jenkins 2002)
Flora total	***11,971***	***13,067***
Fauna		
Platyhelminthes	168	168 (Gupta 1997)
Other Insects	5,052	10,204 (Thapa 2015)
Crustaceans	59	59 (Tiwari and Chhetry 2009)

Rotifers	61	61 (Surana et al. 2005)
Spiders	175	175 (ICIMOD and MoEST 2007)
Butterflies	651	664 (cited in Thapa 2015)
Moth	3,958	3,958 (Haruta 2006)
Mollusks	192	238** (Budha, December 2018, pers. Comm.)
Fishes	230	232 (Gurung 2016)
Amphibians	117	117 (ICIMOD and MoEST 2007)
Reptiles	123	123 (Schleich and Kastle 2002)
Birds	867	886 (DNPWC and BCN 2018)
Mammals	208	212 (Amin et al. 2018)
Fauna total	***11,861***	***17,097***

[1] Adopted from GoN/MoFSC 2014; From various sources 2018. Thapa (2015) prepared a checklist of 12,136 species of Insects of Nepal among which 384 species have their specific epithet after Nepal (nepalica, nepalensis, etc.). * Number of species of Gymnosperms include wild, cultivated and exotic. ** Personal Communication (Compiled from various sources including Budha, 2016); Budha et al., 2015; Budha et al., 2017).

Table 34: Staus of ecosystem/habitat Biodiversity

Thematic area/Category	**2014**	**2018**
Protected Areas (number)	20 (10 NP, 3 WR, 1 HR, 6 CA, 13 BZ)	20 (12 NP, 1 WR, 1 HR, 6 CA, 13 BZ) (DNPWC 2017)
PA Coverage (%)	23.23	23.39 (DNPWC 2017)
Ramsar Site (number)	9	10
Forest /Vegetation	35	55 (Miehe et al. 2015)
Forest Area (%)	39.6	44.74 (DFRS 2015)
Important Bird Areas (No.)	**27**	**37 (DNPWC & BCN 2018)**
Agrobiodiversity (accession)		11,389 (Genebank 2017)

Table : Nepalese species of flora and fauna in the CITES list

Group	**Appendix I**		**Appendix II**		**Appendix III**		**Total**	
	2014[1]	2018[2]	2014[1]	2018[2]	2014[1]	2018[2]	**2014**	**2018**
Mammals	32	28	16	17	4	5	**52**	**50**
Birds	12	12	95	95	1	5[3]	**108**	**112**
Reptiles	2	8	15	21	2	0	**19**	**29**
Amphibians				2				**2**
Butterflies	0	0	3	2	0	0	**3**	**2**
Floras[4]	2	2	8	411	5	4	**15***	**417****
Total								

1-GoN-MoFSC (2014); 2-DNPWC (2014); 3-DNPWC & BCN (2018); 4 – Sharma-Dhakal and Saud (2018). * comprises all orchids as a single entity; whereas ** comprises individual orchid species.

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