Forest Carbon Partnership Facility (FCPF)
Carbon Fund

Emission Reductions Program Document (ER-PD)

ER Program Name and Country:

People and Forests-
A Sustainable Forest Management-Based Emission Reduction Program in the Terai Arc Landscape, Nepal

Date of Submission or Revision: September 2017

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EXECUTIVE SUMMARY

In 2001, Nepal embarked on an ambitious approach to integrate national and community development with conservation. This initiative, the Terai Arc Landscape (TAL) Program, was designed to scale up community conservation as a platform for both economic development and sustainable natural resources management. The vision was to maximize complementarities between the needs of the local people and the needs of the species and ecosystems that comprised the landscape. The ensuing decade and a half was extremely productive following this approach. As a result, nearly 62,000 hectares of degraded forests have been restored; wildlife populations have increased, with tiger populations increasing by 63% and rhinos increasing by 23%; more than 50,000 households increased incomes through nature-based enterprises and improved access to alternative energy; and community-based conservation organizations grew their capacity to manage natural resources.

While the TAL has experienced significant progress in supporting livelihoods and protecting forests and wildlife through improved forest management, forest loss and degradation continue to strain ecosystems and the natural resource base across the landscape. Recent trends in forest loss, particularly related to unsustainable harvesting, overgrazing, forest fires, lack of land use planning and the projected reliance on and demand for forest products in the years ahead, indicate the importance of strengthening and scaling up successful forest conservation approaches. Nepal's Emission Reduction (ER) Program will build on the foundation of the conservation successes realized in the TAL, utilizing tested approaches and management regimes and established partnerships between the government, civil society, and local communities. The ER Program will constitute the next chapter in the story of forest conservation in Nepal by leveraging performance-based payments to deliver forest conservation achievements at scale.

The ER Program includes 12 contiguous districts of the TAL, an area covering approximately 2.2 million hectares of Nepal's lowlands. Uniquely rich in culture and natural resources, the TAL represents approximately 15% of Nepal's total land area, 20% of Nepal's forests, 25% of Nepal's total population, and is the country's most productive agricultural region. The ER program is the central pillar of Nepal's TAL Strategy and Action Plan (2015-2025). It is a subnational effort to protect and restore forests through REDD+ and will be a model for implementation of the national REDD+ Strategy and for replicating performance-based activities to address drivers of deforestation and degradation at the national level.

The TAL is globally significant for its biodiversity, including iconic species such as tigers, rhinos, and elephants, and its forests provide vital ecosystem services across the landscape including aquifer protection, flood mitigation and carbon sequestration. Covering 52% of the area, forests play a central role in peoples' lives in the TAL, and forest management drives economic opportunity in this region. Forests are critical for food, fuel, timber, fodder, medicinal plants, and generating ecotourism revenues. The forests of the TAL are also the most carbon-rich forests in the country, elevating their significance as part of the national REDD+ strategy.

The 12 districts of the TAL have experienced some of the highest rates of deforestation in Nepal. Recent analyses of drivers suggest an overall supply-demand gap for fuelwood and timber that is exacerbated by illegal harvest, uncontrolled grazing and insufficient resources and capacity to implement improved land and forest management planning. These challenges have been magnified by poverty and insufficient livelihood opportunities. The TAL is therefore a high priority for Nepal to pilot an ER program to address drivers responsible for deforestation, forest degradation, and the loss of biodiversity and sustainable livelihoods.

Despite the dynamic political changes of recent decades, Nepal has successfully advanced a legacy of community-based natural resource management that focuses land stewardship and decision-making at the local level. Nepal will implement the ER Program building on this foundation, by combining community-based forest governance with increased knowledge and technical resources to improve forest management. This will involve increasing and broadening community engagement and leadership in transparent governance of local institutions – in particular community forest user groups and collaborative forest management groups. The ER Program will deepen the engagement with communities to foster sustainable, responsive and inclusive economic development and conservation. This work is critical for the people and wildlife of Nepal, for realizing Nepal's global conservation goals and commitments under the Paris Agreement and to make strides toward achieving the Sustainable Development Goals.

The ER Program will create additional opportunities for private sector forestry and support its role in engaging in the REDD+ process. Under this intervention area, 10% of forests in the Program Area will be developed as private forests, and long-term, low-cost capital will be provided to small-scale landholders to incentivize plantation production and maintenance of forests on their private lands.

The ER Program Area also is home to many globally significant Protected Areas that collectively represent 28% (0.3 million ha) of the TAL. Though these PAs have been protected from historical deforestation and degradation, maintaining them is critical to the preservation of Nepal's native and critically endangered flora and fauna, to economic opportunities associated with both domestic and international tourism, and to continued delivery of several other non-carbon benefits. The ER program will support continued PA stewardship activities including anti-poaching interventions and human-wildlife conflict mitigation.

The ER Program will generate results over a ten-year period through the implementation of seven areas of intervention. These interventions were designed based on extensive district, regional and national-level consultations with the participation of women, local communities, Indigenous Peoples, Dalits, and other marginalized communities, and are summarized here with their estimated contributions to program results:

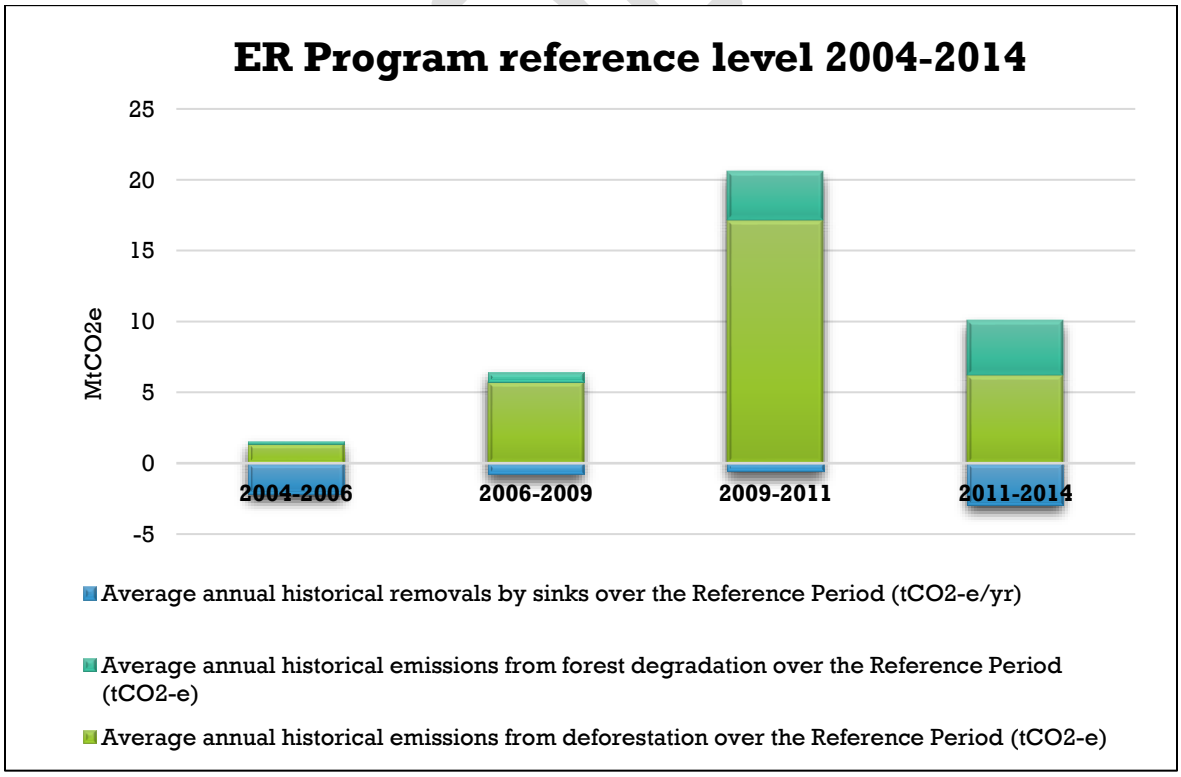
Intervention	Target	ER (MtCO2e)
1. Improve management practices on existing community and collaborative forests building on traditional and customary practices	336,069 ha	**19.0**
2. Localize forest governance through transfer of National Forests to Community and Collaborative Forest User Groups	200,937 ha	**9.3**
3. Expand private sector forestry operations through improved access to extension services and finance	30,141 ha	**0.9**
4a. Expand access to alternative energy with biogas	88,629 units	**2.5**
4b. Expand access to alternative energy with improved cookstoves	16,962 stoves	**0.1**
5. Scale up pro-poor leasehold forestry	12,056 ha	**0.7**
6. Improve integrated land use planning to reduce forest conversion associated with infrastructure development	11,736 ha	**3.2**
7. Strengthen capacity for management of Protected Areas (PA)*	6 PAs	
Total		35.6

*This activity will not directly contribute towards ER but enhance NCBs and environmental safeguards.

The Government of Nepal will improve the management of community forests and hand over government forests to community based management regimes (Collaborative and Community Forests) over a ten-year period. The ER Program will expand private and leasehold forests. Enhanced access to renewable energy technologies like biogas and energy-efficient cookstoves will significantly reduce fuelwood demand for domestic cooking and heating purposes. These interventions will contribute to approximately 35.6 million $MtCO_2e$ of emission reductions over a period of 10 years.

The estimated cost of Nepal's ER Program is USD 177.1 million, and Nepal will leverage significant domestic investments from the federal government, private sector and local communities to co-finance the implementation of the seven program interventions. The federal government is expected to contribute USD 70 million over ten years. An additional USD 51 million will be co-financed from community forest user groups (USD 25 million) and household rural energy users (USD 26 million), through existing cost sharing arrangements. Nepal is seeking results-based payments of USD 70 million from the Carbon Fund, and will leverage USD 35 million in concessional finance from the Forest Investment Program and International Development Association (IDA) 18 replenishment.

Given the complex pattern of deforestation and forest degradation in the TAL, the ER Program uses an innovative LiDAR assisted multisource program (LAMP) to estimate emissions reductions in the baseline. The LAMP uses activity data based on the five REDD+ activities defined by the IPCC and generated through analysis of land cover change from Landsat 5 and 7, and derives emission factors from LiDAR and field plots for each of the strata in the Program Area. Using this methodology, emissions during the reference period 2004-2014 are estimated at 3.23 $MtCO_2e$ /yr as depicted in the figure below.



The Government of Nepal proposes to sell 14 $MtCO_{2e}$ to the Carbon Fund over the first five years of the program. Additional ERs generated by the program would contribute to Nepal's Nationally Determined Contribution (NDC).

Based on priorities identified during consultations, the ER Program will produce significant non-carbon benefits, including improved forest governance, improved health outcomes from expanded use of biogas and cookstoves, sustainable livelihood opportunities for local communities, and maintained and enhanced biodiversity inside and outside the PAs. Metrics of success will include indicators of increased empowerment, level of participation and access to benefits under improved forest management regimes, in particular for women and marginalized communities. Seedling nurseries and private forestry will provide additional employment opportunities and improve ecosystem services including watershed regulation. Climate change adaptation considerations will be mainstreamed across all seven interventions to improve their resilience in the face of anticipated changes in environmental gradients and extreme weather events.

Benefits in the ER Program will be shared based on existing and developing national policies and revenue sharing arrangements. Approximately eighty per cent of benefits will be directed to community-level, field-based activities with the remaining funds supporting government-level policies and measures. Benefits for grass-roots activities will be allocated based on costs incurred in line with existing national policies. Implicitly, therefore, benefits will be decoupled from the volume of ERs achieved. This will ensure that activities that indirectly support REDD+ outcomes are also supported, as well as ensuring that activities or activities that support NCBs are also prioritized under the ER Program.

The ER Program will allocate 19% of generated emissions reductions to a buffer that will be managed by the Carbon Fund, based on estimated uncertainty of ERs of 30-60% (8% conservativeness factor) and risk of reversal of 11%. During initial stages of the ER Program, Nepal will rely on the registry system of the World Bank for tracking ERs generated under the Program. Upon successful establishment of the national registry, transactions will also be captured in the national registry and will be subsequently tracked through the national registry system.

In summary, the ER Program will deliver forest conservation results and emissions reductions at scale by addressing the multitude of pressures and threats to forests across the TAL, particularly by mitigating the supply-demand gap in forest resources and strengthening Nepal's foundation of community forest management. The program's interventions will sustain conservation outcomes and rural economic development through the commitment and engagement of communities, technical support for institutional strengthening and growing inclusive, transparent governance of community forest user groups. Finally, Nepal will use the experience of scaling effective forest governance and management in the ER Program as a model for advancing results-based conservation in the rest of the country to meet national forest and climate goals.

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

Association of Collaborative Forest Users Nepal	ACOFUN
Alternative Energy Promotion Centre	AEPC
Association of Family Forest Owners Nepal	AFFON
Aboveground biomass	AGB
Below-ground biomass	BGB
Business Literacy Classes	BLC
Benefit Sharing Mechanism	BSM
Benefit Sharing Plan	BSP
Buffer zone	BZ
Convention on Biological Diversity	CBD
community-based forest management	CBFM
World Bank Community Development Carbon Fund	CDCF
Clean Development Mechanism	CDM
Community forest	CF
Collaborative Forest Management Users Group	CFMUG
Community forest user groups	CFUGs
Confidence Interval	CI
Commission on Investigation of Abuse of Authority	CIAA
Convention on International Trade in Endangered Species	CITES
Collaborative forest	CoF
Community-based Forestry Supporters' Network	COFSUN
Collaborative forest user groups	CoFUGS
Civil society organization	CSO
District Agriculture Development Office	DADO
Danish International Development Agency	DANIDA
Diameter at breast-height	DBH
District Coordination Committee	DCC
District development committee	DDC
UK Department for International Development	DFID
District Forest Management Plans	DFMPs
District Forest Offices	DFOs
Nepal, Department of Forest Research and Survey	DFRS
Dedicated Grant Mechanism	DGM
District Livestock Office	DLO
Designated National Authority	DNA
Dalit NGO Federation	DNF
Department of National Parks and Wildlife Conservation	DNPWC
Department of Forests	DoF
Department of Land Information and Archive	DoLIA

Department of Land Reform and Management	DoLRM
District REDD+ Program Management Unit	DRPMU
District Soil Conservation Offices	DSCO
Department of Soil and Watershed Conservation	DSCWM
Digital Terrain Model	DTM
Environmental Friendly Local Governance	EFLG
Environmental Impact Assessment	EIA
Emission Reductions	ER
Emission Reduction Payment Agreement	ERPA
Emission Reductions Program Document	ERPD
Emission Reductions Program Idea Note	ER-PIN
Environmental and Social Assessment and Monitoring Unit	ESAMU
environmental and social impact assessments	ESIA
Environmental and Social Management Framework	ESMF
Food and Agriculture Organization of the United Nations	FAO
Forest Carbon Partnership Facility	FCPF
Federation of Community Forestry Users Nepal	FECOFUN
Federation of Forest Based Industry and Trade	FenFIT
Focus group discussions	FGD
Feedback and Grievance Redress Mechanism	FGRM
Forest Investment Program	FIP
Forest Investment Program Investment Plan	FIP-IP
forest law enforcement governance and trade	FLEGT
Facility Management Team	FMT
Forest Operational Plan?	FOP
free, prior and informed consent	FPIC
Forest Resource Assessment	FRA
Forest Reference Emission Level	FREL
Forest Reference Level	FRL
Forest user groups	FUGs
Green Climate Fund	GCF
Global Environment Facility	GEF
Gender Equality and Social Inclusion	GESI
Greenhouse gas	GHG
Gross national income	GNI
Government of Nepal	GoN
Green vegetation	GV
Height Above Ground	HAG
Human Development Index	HDI
Himalayan Grassroots Women's Natural Resource Management Association	HIMWANTI

High Value Agriculture Project	HVAP
harvested wood products	HWP
International Center for Integrated Mountain Development	ICIMOD
improved cook-stoves	ICS
International Development Association	IDA
Initial Environmental Examinations	IEE
initial environmental and social examinations	IESE
International Fund for Agricultural Development	IFAD
International Forest Fire News	IFFN
Indigenous Peoples	IP
Intergovernmental Panel on Climate Change	IPCC
Intergovernmental Panel on Climate Change Good Practice Guidelines	IPCC GPG
Indigenous Peoples' Organizations	IPO
IPs and Vulnerable Community Planning Framework	IPVCPF
LiDAR assisted multisource program	LAMP
Local Adaptation Plans for Action	LAPA
Least Developed Countries	LDCs
leasehold forests	LF
Leasehold Forestry Program	LFP
Leasehold Forest User Group	LFUG
leasehold forest user groups	LHFUG
Light Detection and Ranging	LiDAR
Land Resource Mapping Project	LRMP
Local Self-Governance Act	LSGA
Local Self-Governance Regulation	LSGR
Land use and land cover	LULC
Land Use, Land Use Change and Forestry	LULUCF
Medicinal and aromatic plants	MAPs
Mean Error	ME
Multilateral environmental agreements	MEAs
Ministry of Agriculture Development	MoAD
Moderate Resolution Imaging Spectroradiometer	MODIS
Ministry of Energy	MoE
Ministry of Finance	MoF
Ministry of Forests and Soil Conservation	MoFSC
Ministry of Population and Environment	MoPE
Ministry of Science Technology and Environment	MoSTE
Measurement, Reporting, Verification	MRV
Multi Stakeholder Forestry Programme	MSFP
Mid-Term Review	MTR

National Adaptation Plan	NAP
National Adaptation Programmes of Action	NAPA
National Aeronautics and Space Administration	NASA
National Biodiversity Strategy and Action Plan	NBSAP
Natural Capital Accounting	NCA
Non-carbon benefits	NCBs
National Designated Authority	NDA
Nationally Determined Contribution	NDC
Normalized Difference Factional Index	NDFI
Nepal Federation of Indigenous Nationalities	NEFIN
Nepal Foresters Association	NFA
national forest inventory	NFI
National Forest/REDD+ Information System	NFIS
National Forest Monitoring System	NFMS
National Low Carbon Development Strategy	NLCDS
National Planning Commission	NPC
Non-photosynthetic vegetation	NPV
National REDD+ Centre	NRC
National Rural Renewable Energy Programme	NRREP
non-timber forest products	NTFPs
National Trust for Nature Conservation	NTNC
Protection Area	PA
Persistent Change Monitoring	PCM
President Chure Terai Madhesh Conservation Development Program	PCTMCDP
Pilot Program for Climate Resilience	PPCR
Quality Assurance/Quality Control	QA/QC
Rastriya Dalit Network	RDN
REDD Implementation Centre	REDD IC
Reducing emissions from deforestation and forest degradation and sustainable forest management of forests and enhancement of forest carbon stocks	REDD+
REDD+ social and environmental standards	REDD+ SES
REDD+ Focal Officer	RFO
REDD Implementation Centre	RIC
Reference level	RL
Relative Root Mean Square Error	RMSE
Resettlement Policy Framework	RPF
Readiness Preparation Proposal	R-PP
Regional REDD+ Focal Office	RRFO
Regional REDD+ MRV Unit	RRMU
REDD Working Group	RWG

Shifting Cultivation	SC
Standard deviation	SD
Swiss Agency for Development and Cooperation	SDC
Standard Error	SE
Strategic Environmental and Social Assessment	SESA
Safeguard Information System	SIS
Spectral Mixture Analysis	SMA
Sustainable management of forests	SMF
Terai Arc Landscape	TAL
Technical Advisory Panel, FCPF	TAP
Trees outside forests	TOF
Terms of Reference	TOR
Unsustainable forest management	UFM
UN Convention to Combat Desertification	UNCCD
UN Framework Convention on Climate Change	UNFCCC
United Nations REDD Programme	UN-REDD
US Agency for International Development	USAID
United States Geological Survey	USGS
Value Added Tax	VAT
Village development committees	VDC
Wealth Accounting and Valuing Environmental Services	WAVES
World Bank	WB
World Wildlife Fund	WWF

1. ENTITIES RESPONSIBLE FOR THE MANAGEMENT AND IMPLEMENTATION OF THE PROPOSED ER PROGRAM

1.1 ER PROGRAM ENTITY THAT IS EXPECTED TO SIGN THE EMISSION REDUCTION PAYMENT AGREEMENT (ERPA) WITH THE FCPF CARBON FUND

Name of entity	Ministry of Finance (MoF)
Type and description of organization	The Ministry of Finance (MoF) is the central authority of the Government of Nepal (GoN) charged with maintaining economic stability and managing financial resources in the country. There are six departments and nine divisions under the MoF and the International Economic Cooperation Co-ordination Division is authorized to sign agreements with multilateral and bilateral development partners and financing institutions. The Chief of this Division will sign in the ERPA on behalf of the Ministry of Finance. Draft National REDD+ Strategy provisions a National REDD+ Center (NRC) as the entity which will be responsible for ER program management. NRC will be developed as a semi-autonomous federal entity for REDD+ by promulgating a formation order or other legal instrument. The institutional capability of NRC will be enhanced over time to meet the fiduciary principles and standards, environmental and social safeguards (ESS) and gender policy of international climate or REDD+ financing institutions such as Green Climate Fund (GCF), Climate Investment Fund or FCPF Carbon Fund. The NRC will have authority to submit funding proposals through the National Designated Authority (NDA) to access GCF finance and it will have the authority and capability for direct access in other REDD+ related funds (draft REDD+ strategy 5.5.1.).
Main contact person	Mr. Baikuntha Aryal
Title	Joint Secretary
Address	Ministry of Finance, International Economic Cooperation Coordination Division, Singha Durbar, Kathmandu, Nepal
Telephone	+977 01 4211837
Email	baryal@mof.gov.np
Website	http://www.mof.gov.np

1.2 ORGANIZATION(S) RESPONSIBLE FOR MANAGING THE PROPOSED ER PROGRAM

Same entity as ER Program Entity identified in 1.1 above?	No
If no, please provide details of the organizations(s) that will be managing the proposed ER Program	

Name of organization	REDD Implementation Centre (REDD IC), on behalf of the Ministry of Forests and Soil Conservation (MoFSC) of Nepal.
Type and description of organization	MoFSC is the highest-level authority mandated with the sustainable management of Nepal's forests, protected areas and watersheds including biodiversity conservation and non-timber forest products (NTFPs). MoFSC strives to promote community-based and participatory approaches in forest management and to reduce poverty through promotion of forest based enterprises and employment generation. The ministry also serves as the focal point for the implementation ofobligations under international conventions such as the Convention on Biological Diversity (CBD), UN Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC). The REDD+ Apex body is an inter-ministerial institution that will harmonize REDD-related activities with national plans and policies, and promote cooperation at the highest level. It includes members from the Ministry of Finance; Ministry of Population and Environment; MoFSC; Ministry of Culture, Tourism and Civil Aviation; Ministry of Energy; Ministry of Agriculture and Cooperatives; Ministry of Land Reform and Management; Ministry of Industries; Ministry of Federal Affairs and Local Development; Ministry of Physical Planning and Transport; Ministry of Science and Technology; and representatives from the private sector, civil society and government organizations totaling 49 members. Draft National REDD+ Strategy and 14th Periodic Plan (2017-2019) has committed to establishing the National REDD+ Centre (NRC) as an entity. NRC will be established after approval of the National REDD+ Strategy. However, as per the legal provision of GoN (Business Allocation) Regulation 2015 the Ministry of Finance has the authority to sign the ERPA. NRC will coordinate the ER Program implementation. However, ER program interventions will be undertaken by institutions including the Department of Forests (DOF), Department of National Parks and Wildlife Conservation (DNPWC) and their subsidiaries and CBFM Groups. MRV and carbon registry will be implemented by the Department of Forest Research and Survey (DFRS). REDD IC will take lead responsibility until NRC is operational. REDD IC, a specialized body of MoFSC, is dedicated to the implementation of the National REDD+ strategy and program. Its main function is to coordinate with all stakeholders, including government agencies, civil society, academia and practitioners for the development and implementation of REDD+ in Nepal. It also serves as the operating entity for the Forest Carbon Partnership Facility (FCPF), the Forest Investment Program (FIP) and the UN-REDD Program.
Organizational or contractual relation between the organization and the ER Program	Both MoF and REDD IC / MoFSC are government agencies and work closely on the implementation of government policies, plans and programs, including climate mitigation actions. MoF allocates financial

Entity identified in 1.1 above	resources to REDD IC for the implementation of its annual plans and programs on REDD+ in Nepal. The funding available from the FCPF Readiness Fund is channeled to REDD IC through MoF. According to the GoN (Business Allocation) Regulation 2015, all climate finance for government agencies will be received by the MoF and will be channeled to appropriate implementing agencies including REDD IC. There is representation from MoF in the REDD Working Group which also helps to maintain close coordination between MoF and REDD IC. The REDD IC also reports regularly to MoF about expenditures and the financial status of REDD IC.
Main contact person	Dr. Sindhu Prasad Dhungana
Title	Joint Secretary and Chief of the REDD Implementation Centre (REDD IC)
Address	Babar Mahal, Kathmandu
Telephone	+977-1-4239126, +977-1-4215261
Email	info@mofsc-redd-gov.np
Website	www.mofsc-redd-gov.np

1.3 PARTNER AGENCIES AND ORGANIZATIONS INVOLVED IN THE ER PROGRAM

Name of partner	Contact name, telephone and email	Core capacity and role in the ER Program
Government agencies (Ministries)		
Ministry of Forest and Soil Conservation	**Contact name**: Mr. Prakash Mathema, **Telephone**: +977-1- 4211567 **Email**: info@mfsc.gov.np	MoFSC is responsible for the development of laws, policies and programs for the sustainable management of forests in Nepal. MoFSC will provide regular guidance to REDD IC for the implementation of the ER Program and other REDD+ activities.
Ministry of Finance	**Contact name**: Mr. Baikuntha Aryal (International Economic Cooperation Coordination Division) **Telephone**: +977-1- 4211837 **Email**: baryal@mof.gov.np	Ministry of Finance will direct financial resources for implementation of the ER Program through MoFSC and REDD IC.
Ministry of Livestock Development	**Contact name**: Dr. Yubak Dhoj G.C **Telephone**: info@mold.gov.np **Email**: +977-1- 1-4211706	Ministry of Livestock Development, through its local agencies, will support ER Program activities related to grazing pressure on forests.
Ministry of Agricultural Development	**Contact name:** Dr. Suroj Pokhrel, Secretary **Telephone**: +977 -1=4211905 **Email**: info@moad.gov.np	Ministry of Agricultural Development, through its local agencies, will support ER Program activities such as providing seedlings to landowners for tree plantations in farm lands.
Ministry of Energy	**Contact name:** Mr. Anup Kumar Upadhyay, Secretary	Ministry of Energy will develop and implement guidance to reduce forest-

	Telephone: +977-1-4211516 **Email**: info@moen.gov.np	related impacts from the establishment of transmission lines as feasible.
Ministry of Federal Affairs and Local Development	**Contact name:** Secretary, Mr. Dinesh Kumar Thapaliya **Telephone**: +977-1-4200309 **Email**: info@mofald.gov.np	Ministry of Federal Affairs and Local Development will administer and support Environmental Friendly Local Governance (EFLG) Framework.
Government agencies (Departments)		
Department of Forests (DoF)	**Contact name**: Mr. Krishna Prasad Acharya, Director General **Telephone**: +977-1-4220303 **Email**: dgdof@dof.gov.np	DoF is the main administrative authority in the Government of Nepal for the sustainable management of forests. It has 74 District Forest Offices (DFOs) across the country. DoF has more than 10,000 experienced and trained staff who provide services to local communities for the sustainable management of forests. It is one of the few institutions with reach to individual households at the community level.
Department of Forest Research and Survey (DFRS)	**Contact name**: Dr. Deepak Kumar Kharal, Director General, **Telephone**: +977-14220482 **Email**: info@dfrs.gov.np	DFRS is the central authority for developing and operating the national forest monitoring system. It has three divisions: Forest Research, Forest Survey and Remote Sensing and Planning. The National REDD+ Strategy also recognizes the role of DFRS in monitoring non-carbon benefits, liaising with DoF and the Department of National Parks and Wildlife Conservation (DNPWC).
Department of National Parks and Wildlife Conservation (DNPWC)	**Contact name**: Mr. Man Bahadur Khadka Director General, **Telephone**: +977-1-4227926 **Email**: info@dnpwc.gov.np	DNPWC was established in 1980 to conserve rare and endangered wildlife, including floral and faunal diversity. DNPWC will support monitoring for non-carbon benefits.
National Planning Commission	**Contact name**: Dr. Prabhu Budhathoki **Telephone**: +977 - 1- 4211970 **Email**: npcs@npc.gov.np	Forest related tasks are allocated to member of commission with responsibilities for the forestry sector. Commission monitors climate mitigation actions including REDD+ achievements based on periodic development plans.
Presidential Chure-Terai-Madesh Conservation Development Board	**Contact name**: Mr. Hem Lal Aryal **Telephone**: +977 -1-5531311 **Email**: mail@chureboard.gov.np	The Conservation Development Board formulates and implements policy, strategy and management plans necessary for the protection and management of the Chure area, which is highly significant for the protection of forests and biodiversity.
Alternative Energy Promotion Center	**Contact name**: Mr. Ram Prasad, Executive Director **Telephone**: +9771-5539390 **Email**: info@aepc.gov.np	The Alternative Energy Promotion Center will play a central role in promotion of alternative energy programs in the ER Program Area.
District Agencies		
District Forest Offices (DFO)	12 District Forest Officers	The DFOs and Sector Forest Offices (SFOs) will be the main local executing entities for

		the implementation of the ER Program through close coordination with Community Forest Users Groups (CFUGs), Collaborative Forest Users Groups (CoFUGs), small land holders, commercial private forest owners and other community-based forest management (CBFM) groups.
Technical and financial partners		
FAO Nepal	**Contact name**: Mr. Somsak Pipoppinyo **Telephone**: +977-1-5523200 **Email**: FAO-NP@fao.org	FAO supports government agencies and local communities in strengthening forest tenure rights of local communities and forest-based small enterprises.
World Bank	**Contact name**: Mr. Drona Raj Ghimire **Telephone**: +977 1 4236000 **Email**: dghimire@worldbank.org	The World Bank country office supports REDD+ readiness activities, ER-PD development and preparation, and harmonization between FIP, FCPF and other WB finance.
US Agency for International Development (USAID)	**Contact name:** Mr. Peter Malnak, Mission Director **Telephone:** +977-1-400-7200 **Email:** usaidnepal@usaid.gov	USAID supports the Hariyo Ban Program with a focus on biodiversity conservation and adaptation activities in ER Program Area.
Swiss Agency for Development and Cooperation (SDC)	**Contact name:** Country representative **Telephone:** +977 1 552 49 27 **Email:** kathmandu@eda.admin.ch	SDC supports climate change related programs such as adaptation and renewable energy development in ER Program Area
UK Department for International Development (DFID)	**Contact name:** Country Director **Telephone:** +977 1 5542980 **Email:** nepal-enquiries@dfid.gov.uk	DFID supports climate change related programs such as adaptation and renewable energy development in ER Program Area
Ministry of Foreign Affairs, Finnish Embassy	**Contact name:** Hon. Ambassador **Telephone:** +977 1 4417221 **Email:** sanomat.kat@formin.fi	Finland provides support for Nepal's National Forest Inventory, climate adaptation and forestry programs

A list of all agencies and organizations that will participate in the implementation of ER Program is provided in Annex 2: Agencies and organizations participating in the ER Program.

2. STRATEGIC CONTEXT AND RATIONALE FOR THE ER PROGRAM

2.1 CURRENT STATUS OF THE READINESS PACKAGE AND SUMMARY OF ADDITIONAL ACHIEVEMENTS OF READINESS ACTIVITIES IN THE COUNTRY

Nepal initiated REDD+ Readiness activities in 2011. In December 2013, Nepal became the third REDD Country to present a Mid-Term Report (MTR) to the FCPF Participants Committee. In March 2014, the Government of Nepal submitted an Emission Reductions Program Idea Note (ER-PIN) to the ninth FCPF Carbon Fund meeting for 12 contiguous districts in the Terai Arc Landscape (TAL). At the meeting, Carbon Fund Participants accepted Nepal's ER-PIN into the Carbon Fund pipeline and allocated up to US$ 650,000 to support the development of Nepal's ER Program Document (ER-PD).

Nepal successfully completed its 1st phase of REDD+ readiness in August 2015 and then requested mid-term readiness funds in September 2015. This request was approved by the 20th meeting of the Participant Committee of the FCPF in November 2015 (Resolution PC/20/2015/3), but funds were not yet disbursed. Nepal submitted its R-Package to the PC in July 2016 and it was endorsed by the 22nd meeting of the PC in September 2016 (Resolution PC/22/2016/1). The Findings of the R-Package assessment as compared to the mid-term report are summarized in Table 1 and demonstrate forward progress in all components. In January 2017, Nepal secured mid-term Readiness funding for US$ 5.2 million. The use of these funds will focus largely on the issues prioritized in the self-assessment to ensure a robust foundation of REDD+ readiness behind the ER program in the Terai as well as to scale this readiness nationally.

Table 1 Readiness progress comparison between the Mid-Term Review (MTR) and the R-Package assessment

Components and subcomponents	Progress at MTR	Progress at R-Package
1. Readiness Organization and Consultation		
1a. National REDD+ Management Arrangement		
1b. Consultation, Participation and Outreach		
2. Prepare the REDD Strategy		
2a. Assessment of Drivers, Forest Law, Policy and Governance		
2b. REDD Strategy Options		
2c. REDD Implementation Framework		
2d. Social and Environmental Impacts		
3. Reference Emissions Level/Reference Levels		
4. Monitoring System for Forests, and Safeguards		
4a. National Forest Monitoring System		

4b. Information System for Multiple Benefits, 

Significant progress

Further development required

Progressing well, further development required

Not yet demonstrating progress

The R-Package self-assessment concluded that Nepal achieved significant progress for 16 criteria, good progress for 12 criteria, and required further development for 12 criteria (6 of these overlapping with good progress category). No elements were assessed as not yet demonstrating progress. The TAP review of the R-Package[1] found the participatory self-assessment process in Nepal was in general well conducted and provided an accurate picture of REDD+ readiness progress in Nepal. The review suggested that under sub-component 2c, the R-package did not sufficiently reflect the progress that had been made on proposed legal reforms for REDD+ implementation, including detailed recommendations with regard to carbon rights. In sub-components 2a and 2b, on the other hand, the reviewers felt that yellow scores might have been more appropriate, given that the R-package report signaled potential challenges in these areas. Those criteria assessed in the orange (further development required) and follow-up actions and achievements are summarized in Table 2 below.

[1] https://www.forestcarbonpartnership.org/sites/fcp/files/2016/Sep/Nepal%20R-Package-TAP%20Review-September%202016.pdf

Table 2: Criteria assessed during the Readiness Package as requiring further development and Nepal's progress in these areas

Criteria	R-Package Further Development Suggested	Additional Achievements of Readiness
Feedback and grievance redress mechanism (FGRM)	• Strengthen the FGRM; • Monitor, respond and account for grievances.	• Local consultations on FGRM were chaired by District Forest Officers and will inform on-going development.
Public disclosure of consultation outcomes	• Expand dissemination of REDD+ documents in Nepali language and lengthen the time periods available for submitting public comments; • Include the outcomes of consultations on the REDD IC website.	• The REDD IC translated the REDD+ Strategy into Nepali. The REDD IC also uploaded documents to the REDD IC website for comments including the REDD+ Strategy through a notice *http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Notice1.pdf* • REDD+ Training of Trainers (ToT) manual developed in 2014 was updated with recent information and knowledge associated with REDD+ and Climate Change. A five day carbon assessment training was held in Dolkha district for Local Resource Persons (LRPs). A total of 22 LRPs from government and non-government organizations participated in the training in; 38% of the participants were female.
National Forest Reference Level	• Further check and update information and data sets to improve national FRL based on lessons learned from sub-national experience.	• The GoN developed and submitted a national Reference Level to the UNFCCC in January 2017. The submitted FRL was built on the draft FRL developed during the initial phase of REDD+ readiness (2011-2015) using more recently available national forest inventory data (DFRS 2015). The FRL is under technical assessment. • Due to methodological differences between the National RL and the sub-national RL for the ERP area, a workshop will be held in October 2017 to assess methodological and numeric differences (see Section 8.6).
MRV and Forest Monitoring	• Set up functional MRV system at appropriate government levels in response to new federal structure of Nepal; • Strengthen the forest monitoring systems to expand potential carbon pools and to measure non-carbon benefits, and continue to strengthen the technical capacity and awareness of relevant stakeholders including but not limited to GoN technical staff,	• The Department of Forest Research and Survey (DFRS) was designated lead organization for MRV for ER Program. DFRS also supported the development of the national RL with REDD IC. At least one technical workshop will be held in 2017 to improve DFRS capacity to implement MRV (see Section 8.6). • A Biodiversity Monitoring Protocol for REDD+ was prepared and field-tested. The document is pending endorsement by the Ministry of Forests and Soil Conservation and will be helpful in addressing the issues of environmental safeguards in ER Program Area. In coordination with REDD IC, DNPWC took a lead in preparing the Protocol with the financial and technical support of National Trust for Nature Conservation (NTNC) and International Center for Integrated Mountain Development (ICIMOD).

	Indigenous Peoples, civil society members and local communities.	
Policies and measures	• Review existing Policy and Measures (PAMs) to develop recommendations for the amendments required for the effective implementation of REDD+ in response to the new federal structure.	• Forest Policy 2015 and Forestry Sector Strategy 2016-2025 were approved. Similarly, Forest Act 1993 was amended in 2016. This amendment incorporated 'carbon service' as one of the environment services (sec.2). Addressing deforestation and degradation, the amended Forest Act includes provisions suggesting that forest land conversion for purposes such as resettlement is discouraged (sec 6). Environment Protection Act 1997 was amended in 2016 to enforce the environmental standards and added provisions for the preparation of supplemental EIA report if there is any negative impact in forest areas from development projects. The Land Act 1964 was amended in 2016 (6th amendment 2016) to include a provision on classification of land. Based on this amended provision, the land will be classified into 11 categories including forest land and the forest land will not convert into other categories. The amended act also incorporated a provision for the institutional mechanisms for the enforcement of this provision. The new constitution of Nepal also recognizes 'carbon service' as one of the items under the right of the Federal Government enlisted in Annex 5 of the Constitution. Unbundling of the power enshrined in various schedules of the Constitution was endorsed by the Council of Ministers. The Constitution also ensures the proportional representation of gender and social inclusion in state structure, e.g., provisioning a mandatory quota for women and Dalits in Local Government. Similarly, the CITES Act was promulgated in 2017, customizing the provisions in CITES to a Nepalese context. This will be instrumental to control illegal trade of CITES-listed species. The Nagoya Protocol was ratified by the parliament of Nepal in September 2017, paving the way for promulgating the bill on access to benefit sharing. The GoN prepared a draft bill on access and benefit sharing of genetic resources and this Act will also guide benefit sharing in the ER Program.
Benefit sharing mechanism	• Further define the modalities of the REDD+ Benefit Sharing Mechanism (BSM). The existing legal provisions for sharing the benefits of forest products from community-managed forests are well-established and form a solid basis for the REDD+ BSM	• A Benefit Sharing Mechanism will be further developed under mid-term REDD+ Readiness grant funding and in preparation for ERPA negotiations, in consultation with all relevant stakeholders

National REDD+ registry	• Continue to advance REDD+ registry with mid-term readiness finance, building from National Forest Database and National Forest/REDD+ Information System (NFIS)	• The National REDD Registry will be further developed or outsourced based on the forthcoming recommendations of a study under the management of the Department of Forest Research and Survey supported by the mid-term REDD+ Readiness Grant
Institutional arrangements and capacities	• Strengthen institutional capacities and coordination mechanisms across all key REDD+ actors, including sector ministries, Indigenous Peoples and civil society groups; • Further refine analytical reports such as the draft REDD+ Strategy, the drivers of deforestation and degradation, the Strategic Environmental and Social Assessment (SESA) and the Implementation Framework in order to address identified gaps and adjust to the changed national context.	• REDD Working Group was made more inclusive by adding representatives from related civil society organizations (i.e. Association of Collaborative Forest Users Nepal (ACOFUN), Himalayan Grassroots Women's Natural Resource Management Association (HIMWANTI), Federation of Forest Based Industry and Trade (FenFIT), and Rastriya Dalit Network (RDN). ACOFUN represents the users and leaders of collaborative forest management groups from the southern Terai region. ACOFUN organizes it's members at grass-root, district and national levels. HIMAWANTI is a national network of women users, activists and leaders working in the natural resources sector, particularly in forests. FenFIT is a national federation of forest-based enterprises with networks at district and national levels. Dalits are highly stigmatized social castes in Nepalese culture. Some of the Dalits are directly dependent on forest products for their traditional livelihoods, such as charcoal for blacksmithing. Rastriya Dalit Network is a national level federation of Dalit NGOs and communities. • Four REDD+ awareness trainings were delivered through the Central Forest Training and Extension Centre and its regional branches of the Ministry of Forests and Soil Conservation Nepal. Altogether 18 media representatives from different national newspapers, radios and televisions took part in the training held in Kathmandu. A total of 85 participants including media, forest officials, extension workers and social workers participated in the trainings provided at eastern, western and mid-western regional training centers as a part of the annual programs of the REDD Implementation Centre. These events were conducted in July 2017. • A study on gender integration in REDD+ was carried out from January to June, 2017, focusing on ER Program Area, and made recommendations for how each intervention in ERPD can be more inclusive of women and marginalized communities. Many of these findings are reflected in the ERPD.

		• REDD IC also further developed the SESA and ESMF with a focus on proposed activities of ER Program, using targeted support of the UNREDD program. Similarly, an analytical report interpreting UNFCCC REDD+ safeguards in the Nepalese context was prepared with the support of REDD Himalayan project of the ICIMOD. The interpretation will serve as the foundation for Nepal's country safeguard approach and development of GoN's Safeguard Information System. • Development of Forest Investment Program Investment Plan (FIP-IP) and Dedicated Grant Mechanism (DGM) has progressed. REDD IC is coordinating the process in close collaboration with the World Bank. It is expected that the investment plan will help bridge the funding gap for ER-PD implementation. Similarly, it is expected that through the DGM, capacity of Indigenous Peoples and local communities will be enhanced to effectively participate in the REDD+ process in coming years. The FIP-IP will be submitted to FIP sub-committee in November 2017.
Consultations	• Strengthen outreach activities to improve level of participation and engagement, particularly of marginalized, vulnerable and forest dependent communities.	• There is an established mechanism for the engagement of relevant stakeholders, particularly Indigenous Peoples and local and marginalized communities including women in the REDD+ process. The Apex Body, REDD Working Group and Multi-Stakeholder Forum, REDD+ CSO and IPO alliance have been set up as platforms to discuss REDD+ related issues. Multiple stakeholders have been engaged actively throughout the REDD+ readiness process through these and other platforms. Six REDD+ Trainings of Trainers (ToTs) were conducted with midlevel REDD+ facilitators in 12 ER Program districts from June to July 2017. A total of 114 participants from 12 districts participated in the trainings. Out of the total participants, about 65% were from civil society organizations like Nepal Federation of Indigenous Nationalities (NEFIN), Federation of Community Forestry Users Groups (FECOFUN), Association of Collaborative Forest Management Nepal (ACOFUN) and HIMAWANTI, while 35% of the participants were from government agencies like District Forest Offices (DFOs), National Parks and Soil Conservation Offices. 32% of the training participants were female. The main objective of these trainings was to capacitate district level REDD+ facilitators and trainers to deliver basic knowledge and skills of REDD+ and its policy approaches to local level stakeholders.

The steps in the REDD+ readiness process also informed the design of regulations and institutional arrangements necessary for the implementation of the ER Program, including the following examples:

Meeting of REDD Working Group and REDD Apex Body. A REDD Working Group meeting, chaired by the Secretary of MoFSC, was held in December 2016 to endorse the National Forest Reference Level for submission to UNFCCC. Also, the first meeting of the REDD Apex Body, chaired by MoFSC, officially endorsed the ERPD to be submitted on behalf of the Government of Nepal to the FCPF.

Biodiversity Monitoring Protocol for REDD+: A Biodiversity Monitoring Protocol for REDD+ was prepared and field-tested. The document will be endorsed by the Ministry of Forests and Soil Conservation and will inform environmental safeguards monitoring in the ER Program area. DNPWC took the lead in preparing the protocol, with financial and technical support from National Trust for Nature Conservation (NTNC) and International Center for Integrated Mountain Development (ICIMOD).

Integration of the REDD+ strategy into the National Low Carbon Development Strategy (NLCDS): The NLCDS integrates REDD+ activities and includes forestry as one of six leading sectors for promoting low carbon growth in Nepal. The strategy stresses improving forest management practices, community-based forest management and livelihoods through sustainable forest management. The strategy further highlights the need to include women, Indigenous Peoples, *dalits* and marginalized communities in all processes. Some key activities currently underway and relevant to the ER Program include: preparation of allometric equations for ten forest tree species; establishment of a national carbon registry; improvements and updated database management at the Department of Forest Research and Survey; and an improved and updated national forest information system and national forest database.

GoN is committed to further integrating REDD+ into forest and climate change policies. The draft REDD+ Implementation Framework recommends a combination of legal reforms and related systems to facilitate implementation, with a strategic focus on the following areas:

1. Forest-based mitigation actions at local and district/sub-national levels, and further strengthening of existing multi-level, cross-sectoral and multi-stakeholder governance mechanisms that emerged in successful CBFM initiatives;
2. Reforming and harmonizing policies, and implementing policy and measures to address the drivers of deforestation and forest degradation rooted in policy and market failures, complimenting on-the-ground REDD+ actions; and
3. Enabling simultaneous financing of local/sub-national REDD+ actions and the institutional, technical and capacity strengthening of national REDD+ architecture, including a fully operational MRV system.

2.2 AMBITION AND STRATEGIC RATIONALE FOR THE ER PROGRAM

Nepal's national greenhouse gas (GHG) emissions, excluding the Land Use, Land Use Change and Forestry (LULUCF) sector, were estimated at 24.5 million tonnes (Mt) carbon dioxide equivalent (CO2e) for the base year of 2000. Nearly 70% of this total comes from the agricultural sector.[2] Emissions and removals in the LULUCF sector for the same base year were estimated nationally to be

[2] Nepal 2nd National Communication to UNFCCC 2014. http://unfccc.int/resource/docs/natc/nplnc2.pdf

a net sink of 12.8 MtCO2e. Nepal also recently submitted an initial national forest reference level (RL) to the UNFCCC for the reference period 2000-2010 that estimated annual national emissions from deforestation and degradation at 3.0 MtCO2e and only partially estimates GHG removals from sinks.[3] Given differing reference intervals, pools and methodologies, these figures are not directly comparable without detailed elaboration (see Section 8.6); however, the Terai ER program sets an ambitious but achievable agenda to achieve 35.6 Mt CO2e in emission reductions from reduced deforestation and degradation over a ten year period ("bottom-up" estimates and assumptions detailed in Section 13).

Nepal's Nationally Determined Contribution includes REDD+ and forest sector strategies and policies as important focus areas both for climate mitigation and adaptation.[4] The national Forest Sector Strategy (2016-2025) aims to enhance national carbon stocks by 5% from the current forest carbon stock estimate of 177.6 tC/Ha and decrease deforestation rates by 0.05% - from current figures of about 0.44% and 0.18% in the Terai and Chure respectively - through activities including community-based forest management (CBFM), sustainable management of forests (SMF), leasehold forests (LF) and forest enterprise development. All of these activities are represented in the proposed ER program.

The Program Area in the Terai Arc Landscape represents approximately 15% of Nepal's total land area, 20% of Nepal's national forest area, 25% of Nepal's population, and is historically the area of greatest agricultural productivity and consequently deforestation. It is therefore core to Nepal's national strategy for climate change mitigation and adaptation. As a central component of the TAL Strategy and Action Plan (2015-2025), the ER program will be the leading subnational effort for REDD+ readiness and performance-based activities and will serve as a model to replicate REDD+ readiness and priorities identified in the national REDD+ Strategy in other parts of the country. In addition, the central element of Nepal's core development priorities is to reduce poverty, share economic prosperity and promote good governance to transition out of Least Developed Country status by 2022 and transform Nepal into a middle-income country by 2030. In this regard, Nepal's ER Program is fully aligned with Nepal's development strategy.

The ER Program will build on the foundational successes of the first phase of the TAL Program, initiated in 2001 to scale up community conservation as a platform for both economic development and sustainable natural resources management. This landscape level program has been critical in protecting forests, species and ecosystems across the TAL. Over the past 15 years, nearly 62,000 hectares of degraded forests have been restored; wildlife populations have increased, with tiger populations increasing by 63% and rhinos increasing by 23%; more than 50,000 households increased incomes through nature-based enterprises and improved access to alternative energy; and community-based conservation organizations have strengthened their capacities to manage natural resources.

While there has been significant progress in protecting forests through improved management, forest loss and degradation continue to strain ecosystems and the natural resource base across the TAL. Recent trends in forest loss, particularly related to unsustainable harvesting, overgrazing, and forest fires, and the projected reliance on and demand for forest products in the years ahead, indicate the importance of scaling up successful forest conservation approaches in the ER Program Area. The ER Program will replicate successful approaches and management regimes, and build upon established partnerships between the government, civil society, and local communities. The ER Program will be a

[3] National Forest Reference Level of Nepal 2016. redd.unfccc.int/files/nepal_frl_jan_8__2017.pdf
[4] Nepal's Nationally Determined Contribution, 2016.
http://www4.unfccc.int/ndcregistry/PublishedDocuments/Nepal%20First/Nepal%20First%20NDC.pdf

critical part of the story of forest and landscape conservation in Nepal by leveraging performance-based payments to deliver forest conservation achievements at scale.

2.3 POLITICAL COMMITMENT

The Government of Nepal has demonstrated consistent commitment to conserve and manage Nepal's natural heritage and, more recently, to the opportunities presented by REDD+ by imbedding relevant practices and strategies in national planning frameworks. For example, the national Forest Sector Strategy (2016-2025) aims to enhance carbon stocks and decrease deforestation across the Terai and Chure through activities outlined in the ER Program. Similarly, Nepal's Forest Policy 2015 prioritizes SFM as a strategy to increase productivity of forests and meet increasing demand for forest products. The 13th Periodic Plan of the National Planning Commission (NPC) emphasizes that the conservation and sustainable management of forestry resources including forests, plants, wildlife and biodiversity should be optimized through participatory and decentralized systems, as are proposed for the ER Program. In addition, the upcoming 14th Periodic Plan (2017-2019) aims to promote diversified forest management practices and improved livelihood and employment opportunities through SMF.

Nepal's commitment to REDD+ was initially demonstrated through establishment of a three-tiered institutional structure to manage and coordinate REDD+ activities (see Section 6.1 for further details of the Institutional arrangements in Nepal). The GoN continues to actively participate in international negotiations and trainings, including the UNFCCC, where Nepal has played an important coordinating role for all 49 Least Developed Countries (LDCs) on climate change issues. Nepal is also an active participant at the FCPF, including as a technical resource to its neighboring countries Bhutan and Pakistan.

The Government of Nepal considers REDD+ as one of its highest-priority programs, and its progress is monitored by several sectors beyond MoFSC up to the level of Minister, and by the National Planning Commission (NPC), and the Office of Prime Minister and the Council of Ministers. During the Inception Workshop for the ER Program held in August 2015, officials from five key ministries including the Secretary of Ministry of Forest and Soil Conservation (MoFSC), and Joint Secretaries of the Ministry of Finance (MoF), Ministry of Federal Affairs and Local Development (MoFALD), Ministry of Law, Justice and Parliamentary Affairs (MoLJPA), and the National Planning Commission (NPC) indicated their support for the ER Program and multiple links between the activities proposed with ongoing efforts in their respective ministries. By linking carbon finance with specific programs and initiatives that deliver concrete results, the GoN expects that development and implementation of the ER Program will further build the political support and advance Nepal's national readiness efforts, laying the foundation for additional results-based programs.

3. ER PROGRAM LOCATION

3.1 ACCOUNTING AREA OF THE ER PROGRAM

The ER Program Area lies in the Terai Arc Landscape (TAL)[5], covering an area of approximately 2.2 million hectares along the foothills of the Himalayas in the southernmost part of Nepal known as the Terai region Figure 1. The TAL ranges from the lowlands of the Terai up to the southern slopes of the Himalayas in the Churia hills with altitudes from 100 - 2,200 meters. The fertile Terai region is described as the rice bowl of Nepal and is home to over 7 million people from numerous ethnic groups and Indigenous Peoples. The 12 districts of the Program Area, from east to west, are Rautahat, Bara, Parsa, Chitwan, Nawalparasi, Rupandehi, Kapilbastu, Dang, Banke, Bardiya, Kailali and Kanchanpur (see Table 3). The Program Area covers 15% of Nepal's overall land area and is also the region with the highest historical rates of deforestation (see Section 8).

According to Forest Act 1993, forests in Nepal are classified into two broad management regimes: National and Private Forest. National Forest is further classified into six sub-categories: Government-Managed Forest, Collaborative Forest, Protected Forest, Community Forest, Leasehold Forest, and Religious Forest (further described in Table 24 in Section 4.4 below). In 2013 about a half of the TAL (1.17 million ha) was forested. Of this, 29% (0.33 million ha) was within protected areas, and 24% (0.28 million ha) was under community forest (CF). An additional 5% (0.06 million ha) was collaborative forest; and the remaining 54% (0.5 million ha) was government managed forest (see Table 4).[6]

The following map of the ER Program Area portrays the political boundaries established under the new constitution (Section 4.2 further describes constitutional transition). The district boundaries are now divided among seven recently delineated states, and the ER program partially overlaps with five of these. Under recent constitutional changes, municipalities will play a greater role in local planning, likely reducing the significance of district-level government planning and operations. The NRC will be in place at the federal level and will oversee REDD+ related roles and responsibilities in forestry sector organizations during the restructuring the forestry sector. The implementation of ER program will mainly take place at local and community levels, at which roles are already relatively established. According to the Constitution, local governments need to follow federal forest laws during the implementation of forest related activities.

[5] See Terai Arc Landscape (TAL), Nepal for more information, available at: http://wwf.panda.org/what_we_do/how_we_work/our_global_goals/species_programme/species_people/our_solutions/tal_nepal/

[6] REDD, Forestry and Climate Change Cell, Ministry of Forest and Soil Conservation, Government of Nepal. Emission Reductions Project Idea Note. Kathmandu, Nepal, 2014.

Figure 1 Map of Nepal showing ER Program Area (Terai Arc Landscape in light green) and Protected Areas in Nepal's Federal state

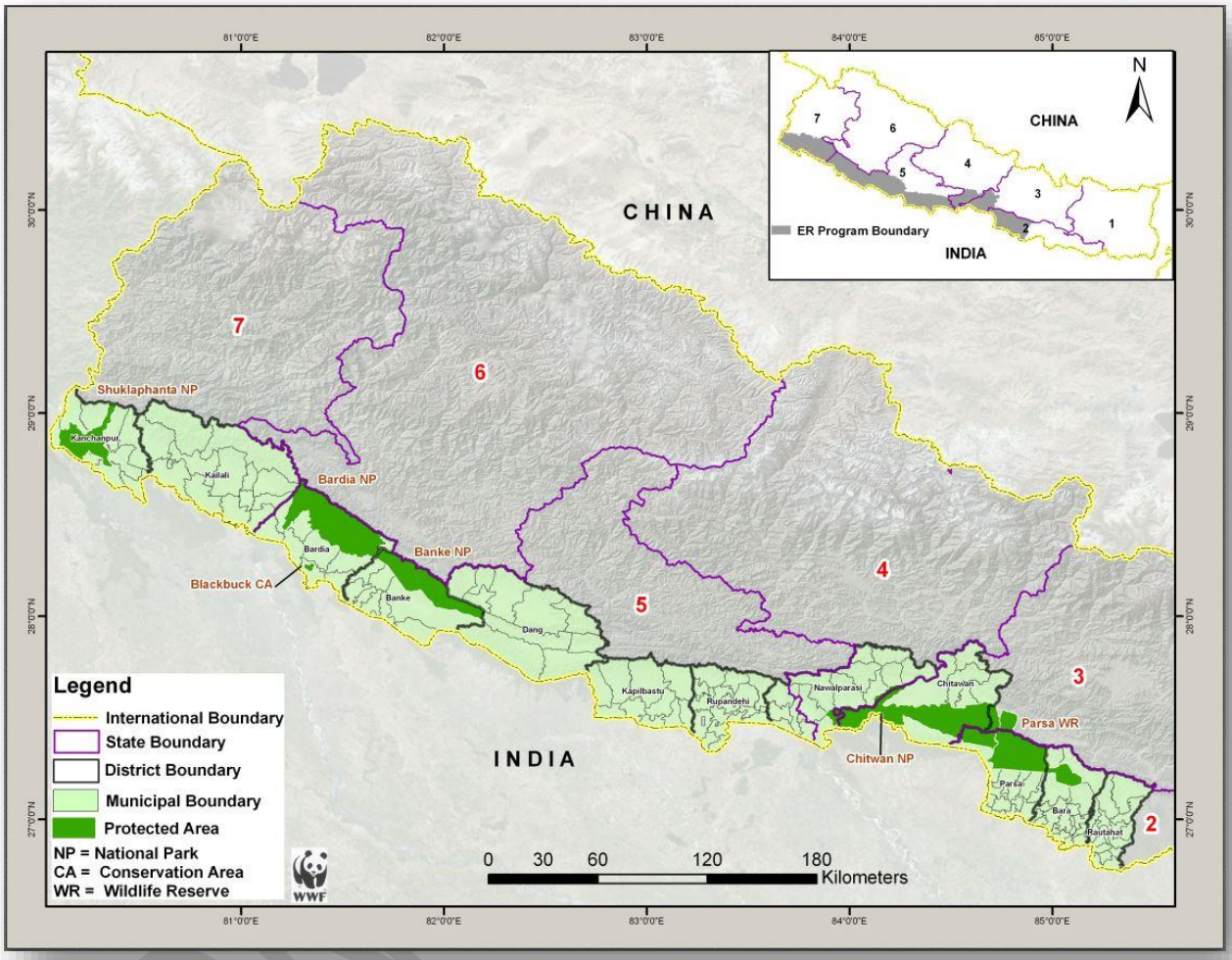


Table 3 Overview of the 12 districts in the ER Program Area (Nepal Human Development Report 2014)

District	Area (ha)	Forest Area (%)[7]	Population	Population growth rate	GNI (PPP$)	Agriculture / Forestry GNI (%)	Life expectancy	Adult Literacy Rate
Nepal	14,718,100	40%	26,494,504	1.2%	1,160	37%	68.8	60%
ER Program districts								
Rautahat	112,600	23%	686,722	2.3%	757	45%	71.0	34%
Bara	119,000	39%	687,708	2.1%	1,480	34%	70.5	43%
Parsa	135,300	56%	601,017	1.9%	1,223	29%	70.3	49%
Chitwan	221,800	64%	579,984	2.1%	1,537	31%	69.8	72%
Nawalparasi	216,200	48%	643,508	1.3%	1,157	39%	67.8	64%
Rupandehi	136,000	18%	880,196	2.2%	1,123	34%	68.3	64%
Kapilbastu	161,000	34%	571,936	1.7%	990	53%	67.6	47%
Dang	150,200	65%	552,583	1.8%	1,127	50%	67.3	62%
Banke	233,700	50%	491,313	2.4%	1133	40%	68.4	56%
Bardiya	202,500	55%	426,576	1.1%	1,086	59%	67.3	57%
Kailali	323,500	61%	775,709	2.3%	942	50%	66.5	59%
Kanchanpur	161,000	48%	451,248	1.8%	938	52%	67.1	63%
Total	2,172,800	50%	7,348,500	2.0%	757	41%	68.5	56%

[7] Taken from DFRS, 2015. State of Nepal's Forests. Forest Resource Assessment (FRA) Nepal, Department of Forest Research and Survey (DFRS). Kathmandu, Nepal.

Table 4 Forest cover for different forest management regimes in the ER Program Area

Districts	Total Area	Forest Cover	National Park	Community Forest		Collaborative Forest	
unit	Ha	Ha	Ha	Ha	Forest units	Ha	Forest units
Rautahat	112,600	25,874	-	5,139	37	11,661	3
Bara	119,000	45,981	-	8,170	38	7,546	4
Parsa	135,300	75,843	63,700	102	25	11,545	3
Chitwan	221,800	141,668	93,200	18,055	64	-	-
Nawalparasi	216,200	103,593	-	15,707	123	1,778	1
Kapilbastu	136,000	59,025	-	13,296	105	17,187	4
Rupandehi	161,000	25,105	-	11,654	92	1,118	1
Dang	150,200	192,682	-	103,151	508	-	-
Banke	233,700	116,360	55,000	27,760	155	-	-
Bardia	202,500	111,550	96,800	18,812	278	-	-
Kailali	323,500	198,239	-	39,629	393	7,407	2
Kanchanpur	161,000	77,630	30,500	16,352	115	-	-
Total	2,172,800	1,173,550	339,200	277,827	1,933	58,242	18
Total (%)	100%	54%					

Table 5: Forest cover for different physiographic zones in the ER Program Area

District	Total Land Area	Forest Terai	Forest Churia	Forest_ Middle-Mountain	Total Forest Area
Kanchanpur	161740	56159	21471	0	77630
Kailali	328716	71154	126203	882	198239
Bardiya	200065	46626	64924	0	111550
Banke	188046	38992	77368	0	116360
Dang	305986	0	155181	37501	192682
Kapilbastu	165136	37475	21550	0	59025
Rupandehi	130522	6512	18593	0	25105
Nawalparasi	215255	3222	75877	24494	103593
Chitwan	223970	0	115386	26282	141668
Parsa	140628	24561	51282	0	75843
Bara	127266	30804	15177	0	45981
Rautahat	103816	18640	7234	0	25874
	2291146	334145	750246	89159	1173550

Source: FRA 2010-2014

3.2 ENVIRONMENTAL AND SOCIAL CONDITIONS IN THE ACCOUNTING AREA OF THE ER PROGRAM

3.2.1 EXISTING VEGETATION TYPES IN THE ACCOUNTING AREA

The ecosystems in Program Area range from early successional tall grasslands established in the alluvial floodplain to old growth Sal forests at lower elevations, and to broad-leaved forest in the Churia. Major forest ecosystems include Sal forest, riverine forest, and mixed forest and grasslands.[8]

Sal forest is dominated by *Shorea robusta* associated with *Terminalia* spp., *Dillenia pentagyna, Careya arborea, Lagerstroemia parvi ora* and *Buchanania latifolia.* Riverine forests grow along water bodies and are dominated by *Mallotus phillipinensis, Trewia nudi ora and Bombax ceiba.* Wooded grasslands have sparsely distributed trees, including *Mallotus phillipinensis, Bauhinia spp., Lagerstromia parvi ora* and *Adina cordifolia.* Tall grasslands are dominated by *Saccharum* spp*., emeda* spp*., Arundo donax, Phragmites karka* and *Narenga porphyrocoma*. The TAL also harbors dozens of trees and other plant species that yield non-timber forest products (NTFPs), as well as medicinal and aromatic plants (MAPs).

Most of the natural grasslands in Terai have been converted to either settlements or agricultural lands. Major crops in the Terai include rice, wheat, pulses, sugarcane, jute, tobacco, and maize, most of which source primarily to local and domestic markets.

The Churia range rises steeply from the Terai plains along their northern border. It extends as a contiguous landscape feature from east to west in 33 districts, including the 12 districts of the ER Program Area. It also makes up about 13% of the country The Churia has 26% of the natural forest of Nepal; 3% are conifers (all Chirpine), 83% are hardwoods (comprised of Sal and tropical mixed forest), and 14% are mixed Chirpine and hardwoods. Because of its social and ecological significance, GoN has prioritized conservation in the Churia since the 1970s, and declared the entire region as a priority environmental conservation area in 2014.

3.2.2 CLIMATIC CONDITIONS AND THE OCCURRENCE OF CATASTROPHIC EVENTS

The Program Area is influenced by both tropical and subtropical climates. From April to June, the maximum daily temperature is around 35°C. The rainy season lasts from June to September and is characterized by heavy downpours that often cause severe flooding. In winter the daily maximum temperature is around 25°C. During nights, the temperature may fall below 10°C.[9] Climate change is expected to increase monsoon precipitation 15-20% in the TAL but with greater variability and less predictability.

The Terai region seems to be experiencing more extreme weather events including more frequent, devastating floods. Figure 2 and Figure 3 show temperature and rainfall change over time from the Rampur Station in Chitwan district. More intense rainfall, coupled with denuded and deforested watersheds and rugged topography in the Churia and Siwaliks results in soil erosion and landslides. In addition, poorly managed extraction of sand, gravel, and boulders from streams and rivers in the Churia is changing river profiles and flow regimes. All of these factors result in increased sedimentation in the flat lands of the Terai, with subsequent shifts in river channels and flooding.

[8] MoFSC 2015. Strategy and Action Plan 2015-2025, Terai Arc Landscape, Nepal. MoFSC, Singha Durbar, Kathmandu, Nepal.
[9] WWF Nepal 2016. Terai Arc Landscape (TAL). http://www.wwfnepal.org/about_wwf/where_we_work/tal/

Downstream communities, ecosystems, and infrastructure are now more vulnerable to floods and other natural disasters.

Figure 2: Trend of mean annual rainfall of 35 years of Rampur Station

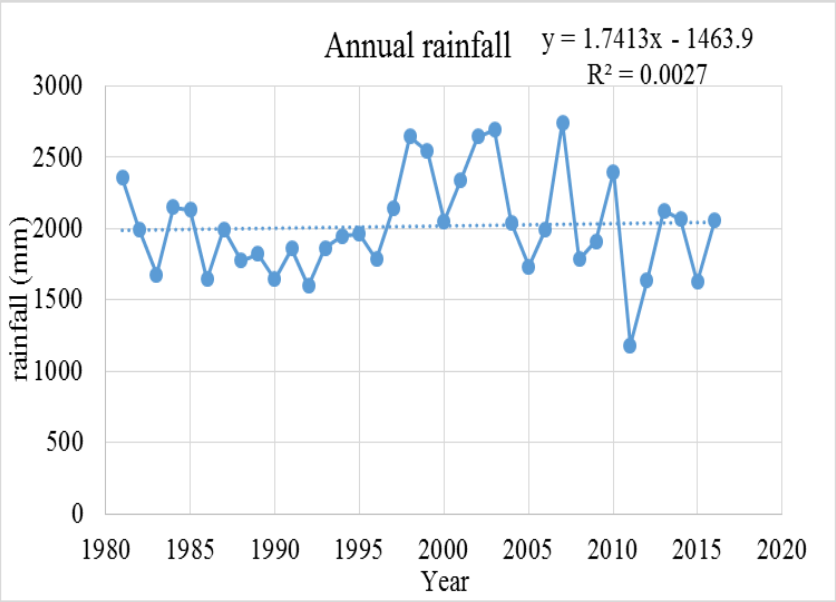
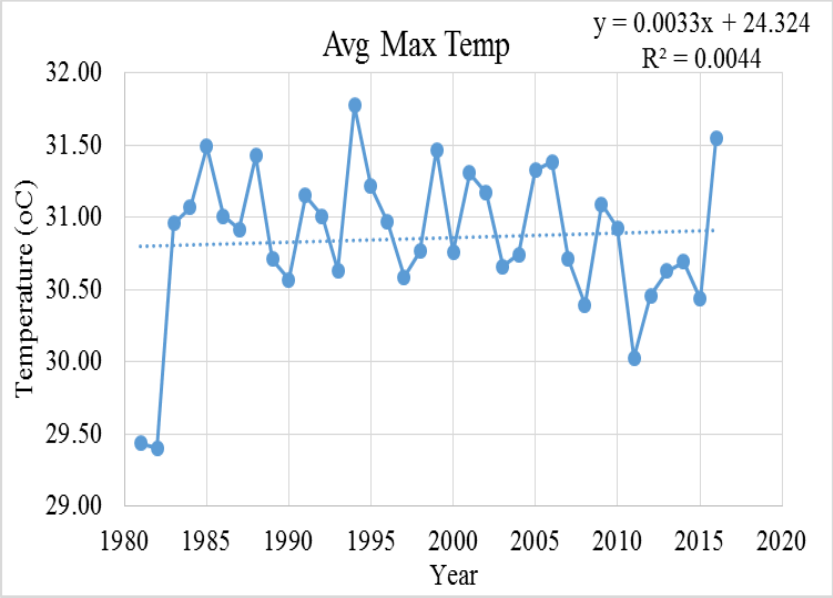


Figure 3: Trend of mean maximum temperature of 35 years of Rampur Station



Projections of climate impacts on Nepal's forests using global climate models reveal that parts of the Sal forests of the Terai are particularly vulnerable to climate change, and are likely to undergo major change in species composition by 2080.[10] Recent research indicates an overall trend for tree species

[10] Thapa et al. 2015. Climate-change Impacts on the Biodiversity of the Terai Arc Landscape and the Chitwan-Annapurna Landscape.

in the lower elevations to shift northwards or up slopes within their current ranges. *Shorea robusta* (Sal) showed a northward shift following the river valleys and up the surrounding slopes. Climate impacts may also include a loss of agricultural productivity which would increase pressure on forests as existing lands become less able to support domestic food needs. For example, increased or more severe droughts could decrease the productivity and yields of current agricultural areas leading to further pressures to deforest. In addition, as areas become overgrazed and water holes dry up, livestock may go further into forests for food and water. Prolonged droughts and degraded forests are also likely to lead to more frequent or intense fires, which would also adversely affect the availability of firewood and timber.

Although the ER Program Area is out of Nepal's primary earthquake impact zone, several indirect effects of the recent earthquakes have been felt inside the proposed Program Area. First, resettlement of communities impacted by the earthquakes has increased immigration into the Terai, leading to increased demands on forest resources. Secondly, since Sal is the preferred choice of timber for reconstruction and is available only in Terai, the demand for timber for post-earthquake reconstruction is expected to increase demands on the forests of these 12 districts.

3.2.3 SOIL CHARACTERISTICS

The soils of Nepal are highly variable and are derived mainly from young parent material and classified on the basis of soil texture, mode of deposition, and color. The soils are broadly divided into alluvial, sandy and alluvial, gravelly, residual, and glacial soil. The Terai valleys lie between the Siwaliks and Mahabharat hills which widen out in places to form flat fertile Dun valleys with alluvial soils. New alluvial soils - with more sand and silt than clay - are being deposited in the flood plain areas along the river courses. Alluvial soils are also found in the slightly higher areas above the flood plains covering a greater part of the Terai. The nutrient content of new alluvial soils is fair to medium depending on how long they have been cultivated. On the other hand, the nutrient content of old alluvial soils is very low.[11]

3.2.4 PRESENCE OF RARE AND ENDANGERED SPECIES AND THEIR HABITAT

The TAL is a globally significant area for biodiversity conservation and has been established as a model of landscape conservation by Government of Nepal with the support of WWF Nepal and other partners. Highly productive alluvial grasslands and subtropical forests support some of the highest densities in the world of the Royal Bengal Tiger (*Panthera tigris tigris*), the second largest population of the Greater One-horned Rhinoceros (*Rhinoceros unicornis*) and the largest herd of Swamp Deer (*Cervus duvaucelli*). The ER Program Area is also home to endangered and protected species like the Asian Elephant (*Elephas maximus*), Gangetic Dolphin (*Platanista gangetica*), Gharial Crocodile (*Gavialis gangeticus*) and Sarus Crane (*Grus antigone*). Bardia National Park has been designated as a Learning Site for the Protected Area Learning Network (PALnet) by IUCN. The ER Program Area also includes three Ramsar sites, a Bird Diversity Hotspot and two World Heritage sites – Chitwan National Park and Lumbini, the birthplace of Lord Buddha.

[11] Food and Agriculture Organization, 1998. Country Pasture/Forage Resource Profiles – Nepal http://www.fao.org/ag/agp/agpc/doc/counprof/nepal.htm

3.2.5 OVERVIEW OF STAKEHOLDERS AND RIGHTS-HOLDERS, INCLUDING LINGUISTIC AND SOCIO-CULTURAL DIVERSITY

The TAL is known for its rich cultural heritage. Indigenous Peoples (Tharu community) have been living in the TAL for generations, and their cultural and traditional values associated with natural resources and forests contribute to the conservation and protection of the Terai's forests. Numerous other ethnic communities also live in the area, which continues to draw migrants from the Mid Hills and Himalaya regions.

The ER Program Area represents a cultural mosaic that is currently inhabited by the following broad groups of people :

- People comprised of caste Hindus and Adhibasi/Janajatis (IPs) of hill origin who migrated to and settled in the area, particularly after 1950.
- People who have been living in the region for centuries and prefer to be recognized as Adhibasi/Janajatis of the Nepal Terai. These include the Tharus, Dhimals, Tajpuriya, Rajbanshis, Gangai, Majhis, Kumal, Darai & Danuwar.
- People of the Terai Hindu (also known as Madhesi) with a social structure including the Brahmins (Maithili) and untouchables (Dom, Halkhor).
- Muslims.
- Others (e.g., the merchant groups of Indian origin such as Marwaris, Bengalis and Sikhs).

Overall, IPs (in both the Hills and the Terai) represent the largest segment of the population (31%), followed by High Caste Hill Groups (24%) and Madhesis (23%). Dalits (12%) and Muslims (9%) are minority groups that form the remainder of the Terai population. See Annex 3: Socio-economic conditions in the Terai Arc Landscape for a more detailed assessment of socioeconomic conditions in the TAL to represent the socio-economic conditions in the Program Area.

3.2.6 POPULATION DEMOGRAPHICS AND GROWTH

Until the 1950s, the ER Program Area was covered by forests occupied by only a few ethnic groups. After the establishment of a democratic government in 1951, improved access to malaria treatment and land resettlement programs that reached many diverse groups, the Terai became a new agricultural frontier. This brought about a significant change in the population of the Terai; n 1950, the Terai accounted for only 35 per cent of the total population of Nepal, but today it accounts for more than half of the total population of the country. [12]

According to the 2011 census, the total population of the ER Program Area includes 1,345,706 households with total population of 7,348,500. The average annual population growth rate in the TAL is 2.1%, almost double the national annual growth of 1.2% per year. In general, the population growth rate is low in the Hill districts and high in the Terai districts due to migration and resettlement. The area continues to face immigration from the north and emigration of working age males to urban centers in Nepal, India and the Middle East. The increased flux due to emigration has dampened future projections of population growth in the Terai..

[12] Government of Nepal National Planning Commission Secretariat Central Bureau of Statistics National Population and Housing Census 2011. Accessed http://unstats.un.org/unsd/demographic/sources/census/wphc/Nepal/Nepal-Census-2011-Vol1.pdf

3.2.7 MODES OF LIVELIHOODS & DEPENDENCY ON FOREST RESOURCES

Agriculture is the main occupation in the Program Area and most people (57 %) are also own or manage livestock.[13] Livelihoods and forests are inextricably linked in the TAL. Forests are an important source of various products, particularly for forest-dependent peoples who have limited alternative sources of livelihoods. Forests are used by some households for timber production and by others for subsistence livelihoods like gathering fuelwood, fodder and non-timber forest products (NTFPs). Forests provide timber essential for housing, farm buildings, fences, irrigation canals, and agricultural tools. For these reasons, sustainable forest management and forest conservation are critical to improve livelihoods and reduce poverty.

Approximately two thirds of households in the ER Program Area use firewood for cooking purposes (see Annex 3: Socio-economic conditions in the Terai Arc Landscape). The remaining third cook primarily with dung (13%) and LPG (16%). Biogas now is used by 4% of households in the Terai as a result of the national biogas program and Gold Standard biogas project.

Forests in the ER Program Area include high value timber species that generate substantial revenue for the government, though much of this revenue has historically not been invested back into forest management. The forests in the watersheds in the Chure hills north of the Terai also play an important role in regulating ground water recharge and surface water supply to Terai inhabitants, as well as in mitigating flood risks. In addition, they support numerous indirect benefits including soil and water conservation, carbon sequestration, biodiversity conservation and nutrient cycling for downstream farmlands. The protected area system in the ER Program Area attracts approximately 200,000 tourists each year, generating USD $26.31 million in revenue for the area.[14]

[13] Livelihoods Outcomes: Study and Analysis of Changes in the Livelihoods of Bottleneck-level Community Forest Users", WWF Nepal 2008
[14] Annual Progress Report (2016), Department of National Parks and Wildlife Conservation (DNPWC), Babarmahal, Kathmandu, www.dnpwc.gov.np

4. DESCRIPTION OF ACTIONS AND INTERVENTIONS TO BE IMPLEMENTED UNDER THE PROPOSED ER PROGRAM.

4.1 ANALYSIS OF DRIVERS AND UNDERLYING CAUSES OF DEFORESTATION AND FOREST DEGRADATION, AND EXISTING ACTIVITIES THAT CAN LEAD TO CONSERVATION OR ENHANCEMENT OF FOREST CARBON STOCKS

The TAL has experienced steadily increasing emissions from deforestation and forest degradation over the last decade (See Section 8). Several analyses conducted in recent years reveal a complex mix of inter-related drivers and underlying conditions that are the basis for this section and the assessment of drivers in the TAL (see Table 6 below for summary of current analyses relevant to TAL and Annex 6 for a full compilation of national studies). Collectively, these analyses reveal a supply-demand gap for fuelwood and timber that is exacerbated by illegal and uncontrolled grazing and insufficient resources and capacity to implement improved land use planning and forest management regimes. These challenges have been magnified by frequent changes in government, and by poverty and insufficient livelihood opportunities. In addition, the TAL is experiencing a growing and heterogeneous population base, as many continue to emigrate from the Mid Hills for the more productive Terai soils and better infrastructure and basic public services. Despite the dynamic change of recent decades, Nepal has successfully advanced a legacy of community-based forest management (CBFM) that brings land stewardship and decision-making to the village level. It is upon the legacy of CBFM that Nepal will build the ER program by combining locally-based forest governance with increased knowledge and technical resources to improve forest management.

Table 6: Summary of drivers of deforestation and forest degradation identified in studies in ER Program Area

Strategy/Study/Report	Drivers identified	Summary of the underlying causes
Strategy and Action Plan 2015-2025, Terai Arc Landscape, Nepal (2015)	1. Unsustainable and illegal harvest of forest products 2. Overgrazing 3. Fuelwood collection 4. Forest fires 5. Conversion of forests to other land uses (encroachment, resettlement, infrastructure)	• Increasing demand for forest products exceeds sustainable supply • Population growth • Weak supply chain • Regional increase in livestock numbers in the Terai
Understanding drivers and causes of deforestation and forest degradation in Nepal: potential policies and measures for REDD+ (2014)	1. Illegal logging 2. Encroachment 3. Fuelwood consumption 4. Road construction 5. Forest fires 6. Mining 7. Grazing	• Poverty and high dependency on forests • Increased demand for forest products • Weak law enforcement • Weak land tenure • Weak governance • Population growth • Political instability • Poor technology in forest management
Essays on reducing emissions from deforestation and forest degradation in the Terai Arc Landscape of Nepal (Lincoln University, 2014	1. Fuelwood extraction 2. Logging/timber extraction 3. Agricultural land expansion 4. Cattle ranching	• Population growth • Agricultural yields • Property rights • Political instability • Road network

District, regional and national level multi-stakeholder ERPD consultations (2017)	1. Unsustainable and illegal harvest of timber and fuelwood 2. Overgrazing 3. Forest fires 4. Encroachment 5. Resettlement 6. Infrastructure development	• Disproportionate population distribution and migration patterns • Policy gaps, poor implementation, policy contradictions among different sectors or jurisdictions • Poverty and limited livelihood opportunities • High dependency on forest products and gap in demand-supply • Land use policy and insecure forest tenure • Poor governance and weak political support • Weak coordination and cooperation among stakeholders • Inadequate human resource development and management • Low priority for research and development • Limited strategies for responding to natural disasters and climate change

The ER-PD preparation process followed a two-step process to assess the drivers of deforestation and forest degradation in the Program Area. First, the National REDD+ strategy and other studies on the drivers in the TAL were synthesized to develop a prioritized list of drivers in the Terai. These drivers were then discussed in depth at 12 district- and five regional- and national-level consultations (see Section 5.1) and weighted by participants with local knowledge as high, medium or low significance (in each district) and their emission reduction potential. The full results of these consultations are given in Table 69. Based on the outcomes of the studies and weighted analysis of the consultations, the following six drivers were deemed to be the most important drivers of deforestation and forest degradation, and are discussed in more detail below:

1. Unsustainable and illegal harvest of timber and fuelwood
2. Overgrazing
3. Forest fires
4. Encroachment
5. Resettlement
6. Infrastructure development

Underlying causes were also identified during the consultation process and have been analyzed during the development of the national REDD+ process. The national REDD+ Strategy (2016) identifies the underlying causes of deforestation and forest degradation as follows:

1. Disproportionate population distribution and migration pattern
2. Policy gaps and poor implementation, as well as policy contradictions among different sectors or jurisdictions
3. Poverty and limited livelihood opportunities

4. High dependency on forest products and gap in demand-supply
5. Land use policy and insecure forest tenure
6. Poor governance and weak political support
7. Weak coordination and cooperation among stakeholders
8. Inadequate human resource development and management
9. Low priority for research and development
10. Limited strategies for responding to natural disasters and climate change

More detailed relationships between the proximate drivers and their underlying causes are identified below.

4.1.1 UNSUSTAINABLE AND ILLEGAL HARVEST OF TIMBER AND FUELWOOD

Unsustainable harvest of wood for fuel and timber is a major driver of forest degradation and contributes to deforestation in the TAL. Unsustainable harvest is driven by both increasing demand and diminishing and/or poorly-managed supply. Population growth is also a key contributor to the increasing demand for timber and fuelwood, growing more than 50% in the Terai between 1991 and 2011, from 8.6 million people to 13.3 million people.[15]

On the demand side, most TAL communities rely heavily on local forests to meet their basic needs, most importantly for fuelwood for energy and cooking and timber for basic construction. Approximately 84% of households in Nepal use fuelwood for cooking and other purposes, and the per capita annual consumption is estimated at 456 kilograms/person in the Terai. A 2012 Nepal Foresters Association (NFA) study estimated demand for fuelwood region-wide (20 districts, including the ER Program Area) at 5.3 million tons/year, more than twice the estimated 2.58 million tons of sustainable supply.[16] The same study estimated annual timber demand at 1.46 million m^3, approximately 30% above estimated supply (1.1 million m^3). Based on per capita estimates of demand from this analysis, total demand of fuelwood and timber is estimated to be 2.9 million tons (0.4 tons/person/year) and 0.8 million m^3 (0.11 m^3/person/year) per year respectively in the ER Program Area in 2011. Projections for demand and supply out to 2020 and 2030 for the harvest of timber and fuelwood show that demand will likely continue to outstrip supply for both (Tables 7 and 8).[17]

Table 7: Projections for timber demand and supply (million m^3) [18]

Year	2011		2020		2030	
Ecological region	Demand	Supply	Demand	Supply	Demand	Supply
Terai	1.46	1.15	1.67	1.53	2.23	2.13
Hills	1.72	1.81	1.87	2.32	2.33	3.2
Mountain	0.19	0.22	0.21	0.27	0.25	0.35
Total	**3.37**	**3.18**	**3.75**	**4.12**	**4.81**	**5.68**

[15] Nepal Central Bureau of Statistics (2011)
[16] NFA (2012) A Study on The Demand and Supply of Wood Products in Different Regions of Nepal
[17] Kanel et al 2012. A study on the demand and supply of wood products in different regions of Nepal
[18] Table extracted from Un-REDD Programme 2014. Understanding drivers and causes of deforestation and forest degradation in Nepal: potential policies and measures for REDD+

Table 8: Projected fuelwood demand (million tons/year) [19]

Year	2011		2020		2030	
Ecological region	Demand	Supply	Demand	Supply	Demand	Supply
Terai	5.3	2.58	5.48	3.72	5.62	5.07
Hills	4.4	5.44	4.27	6.96	4.05	9.6
Mountain	0.82	0.94	0.78	1.13	0.72	1.51
Total	**10.52**	**8.96**	**10.53**	**11.81**	**10.39**	**16.18**

High demand for timber and fuelwood also drives significant illegal harvest in the Program Area. Illegal harvest occurs when households cannot otherwise meet basic subsistence needs and are forced to gather fuelwood and fodder, e.g., on government-managed forests. A 2010 study estimated that over 100,000 cubic feet (2,800 cubic meters) of timber was illegally harvested nationally in 2009 alone.[20] This is only reported data based on the legal actions taken against perpetrators; unreported data is not estimated. In other cases, illegal harvest has been attributed to abuse of authority at the DFO level, opaque timber licensing modalities and/or inaccessibility (financial or proximity) of legal and sustainably sourced timber[21]. The high quality of TAL timber relative to surrounding regions draws high prices across the region and in nearby cities. When paired with limited livelihood opportunities, these conditions lead to illegal harvest, and there has been insufficient enforcement to counter these activities. While illegal cross-border trade in Sal timber with India has declined considerably in recent decades, it is still a problem leading to depletion and degradation of Terai forests.[22]

There are also a number of challenges on the supply side of forest production in the TAL. Despite several well-established forest management models currently in place (Section 4.3), few of these regimes are consistently implemented in a way to optimize sustainable yields. For example, CFUGs have little technical training on determining sustainable harvest volumes or optimizing productivity of forest units based on increased carbon sequestration, making cases of over- or under-harvest common. There are also backlogs to renew community forest operational plans and review and approve new ones, delaying the implementation of improved management practices or anticipated benefits of local governance. Community-managed forests can also be challenged with weak governance problems, sometimes perpetuating imbalances of local power and disproportionately benefitting the elite in the communities.[23,24,25]

In collaborative forests, issues arise with respect to the mandated sharing of 50% of forest product revenues with the government, insufficient contributions from the government in managing collaborative forests, and social inclusion and equity among the poor and Dalits.[26] In government-managed forests, the lack of oversight, management and enforcement of laws and regulations

[19] Table extracted from Un-REDD Programme 2014. Understanding drivers and causes of deforestation and forest degradation in Nepal: potential policies and measures for REDD+

[20] UN-REDD (2014) Understanding drivers and causes of deforestation and forest degradation in Nepal: potential policies and measures for REDD+

[21] Jhaveri, N.J. & Adhikari, J. (2015). *Nepal Land and Natural Resource Tenure Assessment for Proposed Emission Reductions Program in the Terai Arc Landscape*. Washington, DC: USAID Tenure and Global Climate Change Program

[22] Satyal, Poshendra. "Forestry Sector in Nepal: a Country Profile Report." (2004)

[23] Poudel et al (2014). REDD+ and community forestry: implications for local communities and forest management- a case study from Nepal

[24] Bushley (2010). Seeing the communities for the carbon: governance challenges of reducing emissions from deforestation and forest degradation in Nepal

[25] Gurung et al (2011). Community-based forest management in Nepal: opportunities and challenges

[26] Mandal et al (2014). Collaborative forest: issues, challenges and possible solutions

governing encroachment and harvesting of forest resources continues to diminish the health of the forests.

Several other issues contribute to the supply problem, including limited information management systems on production and consumption of forest products, unregulated (or unenforced) access to forests, and inefficient supply and delivery mechanisms to get sustainably harvested products to consumers. Most of these challenges stem from inadequate resources for forest management, training, knowledge sharing, enforcement, and accountability and can be addressed if incentives and/or forest-related revenues are channeled back to improving management practices.

4.1.2 OVERGRAZING

Overgrazing (e.g., overstocking of cattle) and unmanaged grazing in the ER Program Area contributes significantly to forest degradation, destroying understory seedlings, saplings and causing soil erosion. Millions of livestock, including cattle, buffaloes, goats, and sheep, graze in national forests across the Terai. [27] This negatively impacts the forest understory and prevents forest regeneration.[28] The most recent national forest inventory (NFI) estimates grazing as the most frequent biotic disturbance reported across forests.[29] The more recently developed national forest reference level estimates grazing to be the largest source of emissions in Nepal contributing to an estimated 1.8MtCO2e of emissions annually.[30] There is a significant deficit in terms of biomass needed (-1,915,546t DM) and supplied in the Terai for cattle. The most recent Forest Resource Assessment 2010-2014 found that nearly two-thirds of the total forest area in Nepal was affected by grazing.[31]

Table 9 presents official data on livestock numbers published by the Government of Nepal, summarizing increases in livestock numbers, year on year, in the 12 ER Program districts over the past five years. Cattle, buffalo, sheep, and goats are included as they are the most numerous livestock grazing in forests, and have the most potential impact on forest health and greenhouse gas emissions. The data show increases in every district but Chitwan during this period. Overall, there was approximately a 12% increase in these four types of livestock across the ER Program districts from 2011-2016.[32,33]

[27] MoAD (2017). Statistical Information on Nepalese Agriculture 2015/2016
[28] MoFSC (2015) Strategy and Action Plan 2015-2025, Terai Arc Landscape, Nepal
[29] DFRS, 2015. State of Nepal's Forests. Forest Resource Assessment (FRA) Nepal, Department of Forest Research and Survey (DFRS). Kathmandu, Nepal. http://www.dfrs.gov.np/downloadfile/State%20of%20Nepals%20Forests%20(DFRS)_1457599484.pdf
[30] MoFSC (2016) National Forest Reference Level of Nepal (2000 – 2010) http://redd.unfccc.int/files/nepal_frl_jan_8__2017.pdf
[31] DFRS (2015). State of Nepal's Forests
[32] MoAD (2012). Statistical Information on Nepalese Agriculture 2011/2012
[33] MoAD (2017). Statistical Information on Nepalese Agriculture 2015/2016

Table 9: Livestock numbers in ER Program districts

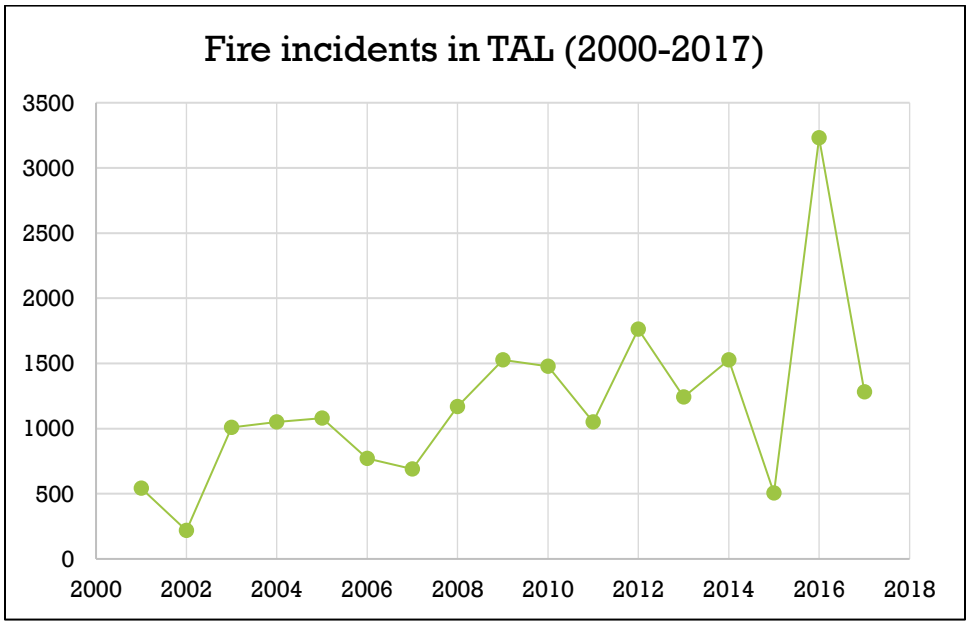
District	2011				2016				% Increase
	Cattle	Buffalo	Sheep	Goat	Cattle	Buffalo	Sheep	Goat	Cattle, Buffalo Sheep, Goat
Rautahat	119,166	72,209	200	135,663	116,431	80,132	917	154,145	7.5%
Bara	112,785	75,979	245	144,999	132,748	150,189	336	170,762	35.9%
Parsa	80,554	44,644	144	104,127	74,675	49,806	144	117,929	5.7%
Chitwan	90,773	115,609	2,674	188,101	91,469	68,809	3,900	213,968	-4.8%
Nawalparasi	182,020	117,230	5,242	216,311	172,441	107,815	11,128	244,996	3.0%
Rupandehi	107,503	113,968	3,802	214,078	104,372	145,463	4,525	232,133	10.7%
Kapilbastu	132,652	99,461	8,708	178,091	135,336	160,445	18,680	201,968	23.3%
Dang	128,970	103,356	28,424	215,508	130,177	120,767	34,091	237,444	9.7%
Banke	121,533	115,035	10,982	137,902	128,879	137,126	11,609	189,743	21.2%
Bardiya	119,300	110,800	13,227	175,883	112,817	109,668	13,025	199,438	3.8%
Kailali	170,243	128,155	18,404	130,187	196,305	155,695	21,267	158,293	18.9%
Kanchanpur	154,002	98,206	7,953	110,777	142,603	112,923	7,953	133,340	7.0%
Total Population	**1,519,501**	**1,194,652**	**100,005**	**1,951,627**	**1,538,253**	**1,398,838**	**127,575**	**2,254,159**	11.6%
TOTAL	**4,765,785**				**5,318,825**				**12%**

The underlying causes of unmanaged grazing include poor understanding of the ecological impacts, weak policy and enforcement (e.g., allowing unmanaged grazing in forests), unproductive livestock, and poor coordination in grazing management systems. In addition, the high rates of landlessness both within the TAL and also in the Churia Hills leads people to graze their cattle in government managed forests instead of in dedicated grazing areas. Finally, cultural and religious sensitivities, which prohibit the culling of cows and oxen, mean that even when some cattle become unproductive they are left to stray and graze in both managed and unmanaged forest areas.

4.1.3 FOREST FIRES

While some fire is needed for the health of several forest types in Nepal, including Sal forests in the Terai, frequent, uncontrolled forest fire degrades forests by preventing seedlings and saplings from regenerating, and sometimes by destroying entire stands. In most cases, people start fires, intentionally or accidentally. Intentional fires are often related to agriculture, i.e., to create grazing areas for livestock, to reduce human-wildlife conflict, or for other subsistence needs. However, fires can also start naturally via lightning strikes, particularly during droughts. MODIS forest fire data for the ER program district provided by ICIMOD estimated 2,148 forest fires in the ER Program Area in 2016; a more than 10-fold increase on previous years.[34] According to IFFN (2006), more than half of the forest fires in the Terai were deliberately lit by grazers, poachers, and hunters. Approximately 40% of fires were considered accidental by IFFN.

Figure 4: Fire incidents in TAL (2000 - 2017)



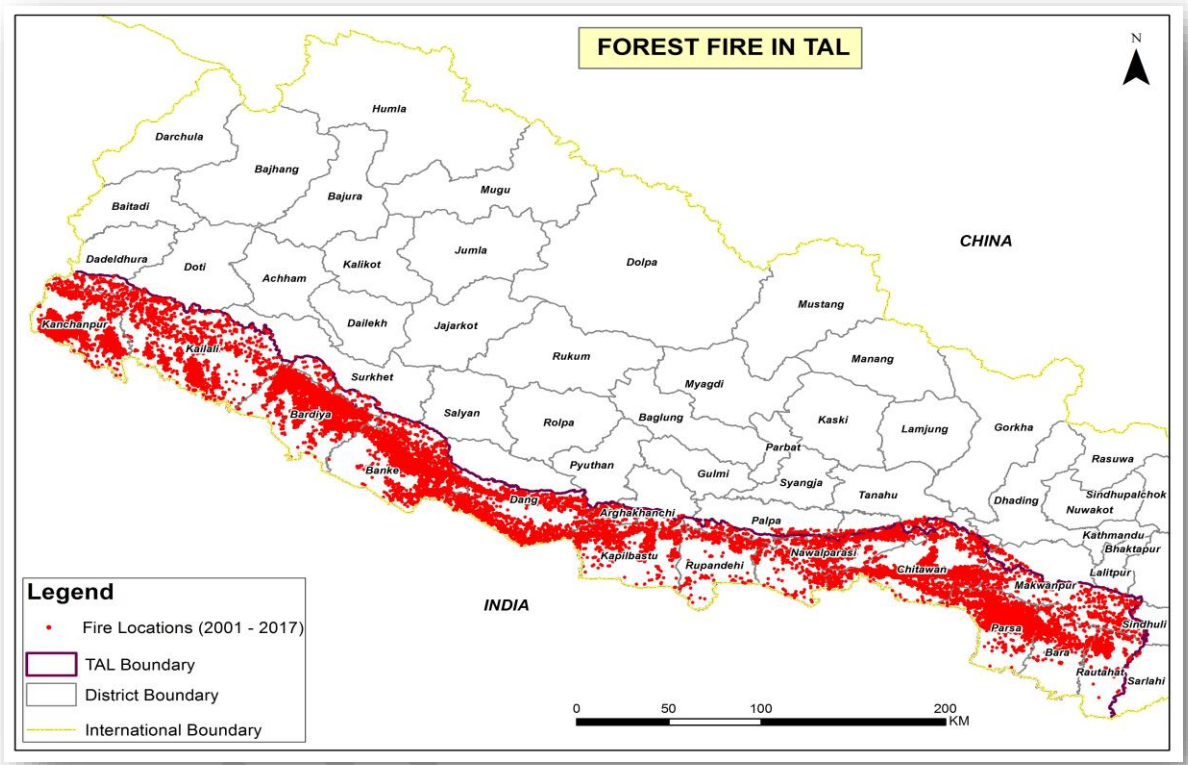
Data Source: NASA collected by MODIS instrument

A recent study provides evidence indicating that the number of forest fires is increasing in Nepal, which is adversely affecting forests and human settlements.[35] This study found that forests with a large distribution of *Shorea robusta* and *Pinus roxburghii* face high incidence of destruction due to forest fires each year compared to forests with different assemblages. Reasons for the high incidence of forest fires include hot, dry weather, as well as the proximity of forests to human

[34] http://apps.geoportal.icimod.org/NepalForestFire/#
[35] Parajuli et al 2015. Spatial and temporal distribution of forest fires in Nepal

settlements, roads and agriculture. Of the forest fire incidences evaluated, 58% were caused by deliberate burning by grazers, poachers and non-timber forest product collectors, 22% were caused by negligence and 20% occurred by accident. This study produced a risk zonation of Nepal identifying different fire sensitive zones. Nearly all of the spatially explicit high-risk values in the Terai, broken down by district, overlap with the ER Program districts, namely Kanchanpur, Bardia, Banke, Dang, and Kapilvastu.[36]

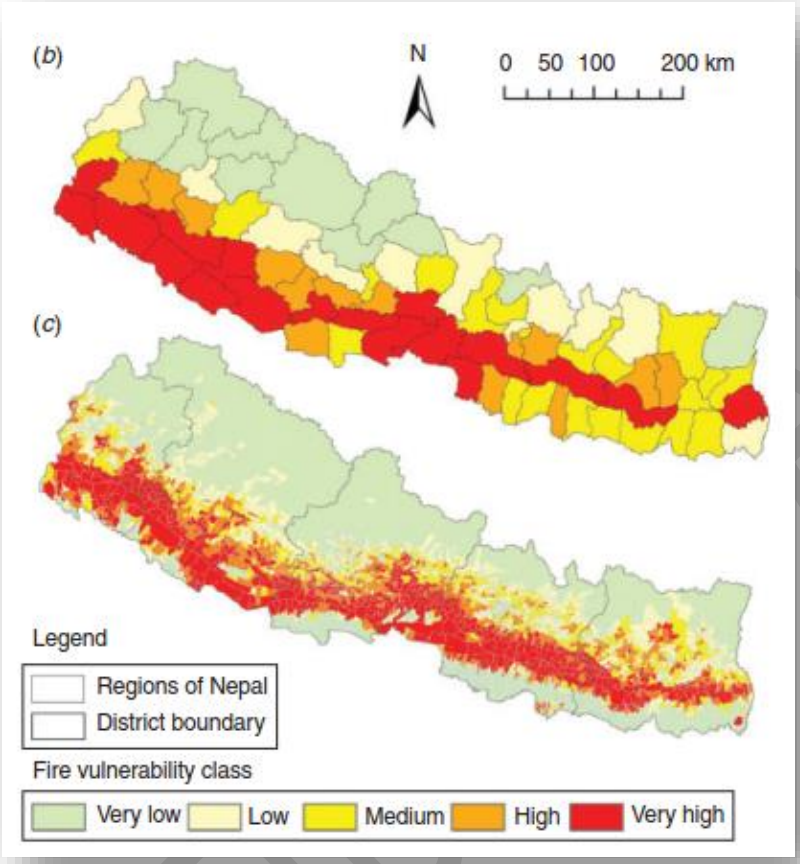
Figure 5: Forest Fire in TAL



Another study analyzed historical forest fire incidence data to explore spatial and temporal patterns. The study identified three factors driving the ignition and spread of forest fires, including fuel availability, temperature and ignition potential. A fire risk index was developed using these factors, and the assessment parameters included remote sensing based land cover, temperature and active fire data, and topographic data. The results included risk rankings for districts and village development committees (VDCs), with 18 of the 75 districts found to have high risk of forest fires.[37] Eight of these districts are located in the ER Program area. The two color coded maps below summarize these findings, with the top map breaking down the fire risk by district, and the lower map doing so by VDC.

[36] Parajuli et al 2015. Spatial and temporal distribution of forest fires in Nepal
[37] Matin et al 2017. Understanding forest fire patterns and risk in Nepal using remote sensing, geographic information system and historical fire data

Figure 6: Spatial Distribution of High Forest Fire Risk in Nepal



The 2016 fire season was particularly severe as a delay in the pre-monsoon rains resulted in very dry conditions, with high temperatures and low relative humidity. Fire frequency was much higher than normal, and fires burned hotter, sometimes reaching the canopy rather than burning low to the ground. Since climate change is likely to result in more extreme and variable precipitation patterns in the future, pre-monsoon drought events may become more frequent. While many forests can recover from one bad fire year, if uncontrolled hot fires become more frequent, potentially leading to dominance of more fire-resilient species.

A fire management strategy was developed by the MoFSC in 2010 emphasizing fire prevention through awareness and education, capacity development of DFOs, community based fire management and strengthened coordination and collaboration among multi-stakeholders. DFOs in the Terai have increased their capacity over recent years to handle forest fires. The USAID-funded Hariyo Ban Program, for example, trained DFOs and CFUGs in fire management techniques including fire-fighting, and establishing fire lines in community forests. At the national level, ICIMOD and MOFSC have been implementing a near-real-time forest fire detection system to track forest fires across Nepal. The fire information system uses data collected by MODIS 2 to send automated information on forest fires to the main forestry stakeholders, including the DoF, DFOs and district officials of FECOFUN. ICIMOD is also piloting a community-based fire detection system to complement this initiative.

4.1.4 CONVERSION OF FORESTS TO OTHER LAND USES DUE TO ENCROACHMENT, RESETTLEMENT, AND INFRASTRUCTURE

Encroaching and then illegal conversion of forests to agricultural land and legal, but poorly planned, conversion related to resettlement and infrastructure are additional drivers of deforestation in Nepal. The reasons driving conversion of forests to agricultural land are multi-layered. The high number of landless people in the Terai and lack of off-farm employment opportunities and alternative livelihood options drive the conversion of "common property" to agricultural land. Many families also lose their land due to flooding, riverbank erosion, changes in river courses, deposition of boulders and sediment by rivers, and landslides. This in turn leads to planned resettlement, often in forest areas. Policy initiatives for resettlement and/or compensation are limited to agricultural based livelihoods, putting more pressure on forests. In some cases, these initiatives have been ineffective due to weak management, insufficient allocation of resources, and/or abuse of authority

Infrastructure development, particularly road construction, continues to be an acute problem in the Terai, particularly in the far western region. Infrastructure was identified by MoFSC as a major obstacle to sustainable forest management. Annually, about USD $40 million is spent on road construction. As a result, the road network more than doubled between 1998 and 2010 (from 4,740 km in 1998 to 10,835 in 2010), and this growth continued in recent years.[38] Several national roads are planned, and many local roads are being opened up without adequate planning, leading to serious impacts on forests, particularly in the fragile Churia hills. An east-west railway is planned, many transmission line corridors are in various stages of development, and a new airport is planned, with a potential direct loss of 700 hectares of forest. Many of these developments require extraction of building materials (sand, gravel, rock) which is an additional threat in the Churia. Impacts on forests are both direct and indirect (e.g., increased access for illegal activities, forest fragmentation).

Insufficient coordination among different government line agencies is a major contributing factor to these environmental outcomes. Major infrastructure development projects, like the expansion of road networks and transmission lines, are implemented without considering the economic or ecological value of forests. The situation is exacerbated by weak enforcement of environmental impact assessments (EIAs) for these projects. In addition, Strategic Environmental Assessment legislation that would cover complex, large-scale and multi-sectoral developments has not yet been passed. DoF estimates that about 14,000 ha of forest have been officially permitted for development through ministerial-level decisions in the last 25 years. These recorded cases provide a conservative estimate of actual conversion.

Additional underlying factors include lack of transparency in forest sector governance and weak land tenure. Weak governance in the forestry sector may also undermine regulation and enforcement, e.g., of development plans, harvest and transport of forest products. As a result, diverse types of non-transparent and illegal financial transactions in the forestry sector lead to deforestation and degradation. Weak law enforcement primarily results from a lack of capacity. The Department of Forest (DoF) and its local offices do not have an adequate number of staff, transport equipment, and access to information to monitor, detect and stop overharvesting, illegal logging, or poaching. With respect to weak land tenure, the government continues to hold management responsibility of over two-thirds of forest lands. As the central government has full control over the management and benefits of most forests, local governments have not had a specific role to play. The tenure issues are sometimes unclear, even for community forests and other forest regimes. There are ongoing conflicts between the authorities and community leadership, specifically over the roles and regulations exercised by the government officials and local organizations.

[38] UN-REDD (2014) Understanding drivers and causes of deforestation and forest degradation in Nepal: potential policies and measures for REDD+

Climate change and Terai forests
Several of these drivers may be exacerbated in the future by climate change in Nepal, and climate change itself may become a direct driver of deforestation/forest degradation, or forest change, with profound implications for sustainable forest management. Climate change may exacerbate the impacts of infrastructure construction, encroachment and resettlement. As extreme weather events become more frequent and intense there will be increased flooding and prolonged droughts in the Terai, and infrastructure will have to be adapted (e.g. raised, better drained or rebuilt) and people resettled after these events. This could mean a major shift in settlement and encroachment patterns in coming years. The ER Program proposes several interventions to increase climate change resilience across the ER Program Area.

Existing activities and policies relevant to conservation and enhancement of carbon stocks
Extensive mapping of relevant laws and statutes is provided in Sections 4.4, 4.5 and Annex 7; however, those activities and policies of particular relevance to program implementation are briefly summarized here:

- **Strategy and Action Plan 2015-2025, Terai Arc Landscape.** The ER Program builds upon a strong national commitment to forest conservation and landscape planning led by the Ministry of Forests and Soil Conservation and delineated in the Terai Arc Landscape Strategy and Action Plan 2015-2025. This strategy will be the guiding document and key policy priority for development and conservation in TAL over the next ten years.

- **National Biodiversity Strategy and Action Plan.** This ER Program will support Nepal's National Biodiversity Strategy and Action Plan (NBSAP), revised in 2014, which is an important means of supporting the Convention on Biological Diversity. The NBSAP prioritizes the meaningful participation of local communities in the management of natural resources, implementation of landscape approaches to address multiple drivers of biodiversity loss, and cooperation among relevant agencies to achieve success in biodiversity conservation. The ER Program will support the implementation of priority actions linked to the NBSAP to meet the Aichi Targets. This includes contributions to Aichi Target 5, loss of natural habitat, including forests, and Aichi Target 7 concerning sustainable management of agriculture and forests to ensure conservation of biodiversity.

- **Forest Policy 2015.** The ER Program is consistent with the Government of Nepal's Forest Policy (2015), which identifies community, collaborative, leasehold, protection, buffer zone, religious and private forests as key tools for the provision of social, economic and ecosystems services. The Forest Policy identifies forests as critical to climate change adaptation and provision of forest ecosystem services. The Forest Policy recognizes forests as a renewable natural resource which contributes to subsistence livelihoods, and recognizes subsistence forest use as a stepping stone to increased application of good forest management practices.

- **Nationally Determined Contribution.** The Nationally Determined Contribution (NDC), submitted by Nepal to the UNFCCC in February 2016, outlines both mitigation and adaptation strategies to address climate change. The NDC goals prioritize resource conservation and management in forest areas; reducing dependency on biomass through the use of alternative energy; maintaining forest cover and enhancing carbon sequestration through sustainable management of forests, improved forest governance to control drivers of deforestation and forest degradation, and institutional strengthening.

4.2 ASSESSMENT OF THE MAJOR BARRIERS TO REDD+

Based on multiple consultations and prior assessments conducted in Nepal, the major barriers to addressing the key drivers of deforestation and forest degradation in the Program Area include the following: 1) limited financial resources and technologies to successfully implement programs; 2) limited information and awareness on best management practices; 3) Nepal's constitutional transition and governance; 4) insufficient alternative livelihood and poverty alleviation opportunities; and 5) conflicting views on sustainable management of forests. These are each briefly describe below.

Limited financial resources and technologies to successfully implement programs
Nepal has been a major recipient of donor support for many decades. External aid increased from USD 0.13 million per year in 1956 to over USD 1 billion in 2013.[39] Notwithstanding this, most finance in Nepal today is not directed to forests. Forest-related support from both bilateral and multilateral donors has declined significantly in recent years, with the closing of the Multi Stakeholder Forestry Programme (MSFP) and the Forest Resource Assessment (FRA). Current forest sector investments are focused in the Chure and Mid-Hills, with fewer investments concentrated in the Terai.

Past investments in the forestry sector have built capacity in best management practices; however, approaches for the sustainable management of forests have evolved in recent years, so it will be important to inform, sensitize and build capacity of communities and local institutions to adopt new approaches, technologies, and management models of SMF. Small-scale, localized awareness raising events and management trainings have been performed on a project by project basis throughout the REDD+ readiness process, but without a comprehensive push across government and civil society to widely disseminate best practices across entire districts for forest management at the landscape level.

Limited information and awareness on best management practices
The lack of institutional and technical capacities of district level government offices and community based organizations is a barrier to disseminating information effectively and providing training in best management practices. For example, there is often community interest and political will to transfer government-managed forests to CBFM models. However, communities and DFOs lack the resources to develop management plans and to implement new harvest and use regimes. In addition, CFUGs are generally open to and interested in new management techniques, but have not had access to training to understand the medium and long-term benefits of alternative management. Many five-year community forest operational plans are due for renewal, but the DoF lacks the resources to renew these, which limits progress at the central level and creates a backlog of applications.

In addition, the low level of capacity to actively manage forests for future scenarios under climate change is a barrier to addressing deforestation and forest degradation. This includes planning for more variable and unpredictable weather, shifting monsoon seasons, natural disturbances such as flooding and landslides, and species range shifts. The slow uptake of incorporating climate change implications into forest management, particularly in Forest Operational Plan development, is a barrier to addressing the drivers of deforestation and forest degradation.

Nepal's constitutional transition and governance
Nepal is undergoing a major political transition from a constitutional monarchy to a federal democratic republic system. The restructuring of state jurisdictions and establishment of state and local level bodies necessary to institutionalize the new political system is progressing, but slowly. The new constitution ensures devolution of power and rights of forests management to the local

[39] MoFSC, 2015. Project Bank in the Forestry Sector of Nepal.

government. This devolution to the local level is expected to significantly improve the management of forests in the future; however, there are still some ambiguities on the legal and institutional transition from the current centralized management structure to a devolved local management structure. In near term, although newly elected local bodies have the mandate to manage the forests resources, they will likely face capacity challenges. It will also take time to resolve outstanding ambiguities on management of forest resources and to establish necessary entities at local level. During this transition period, there are potential risks associated with lack of clear authority lines which could create room for increased illegal activities like timber harvesting and forest area encroachment, though mostly in the government managed forests.

The ER Program Districts will fall under five states in the new state structure. This will add an additional layer of coordination and undoubtedly will require better communication mechanisms and capacity building for successful implementation of ER Program. A forest agency will be created in each of the states which will be responsible for activities like planning, management plan preparation and transfer of forests to local communities for management. At local (municipality) level, there will be forestry units which will be responsible for protection, restoration and management of the forests. There is a plan to absorb the current forestry workforce to the new proposed entities at state and local levels based on their technical capacities and interests. Each state will have its own forest policy and implementation plan. The final mechanism for overall forestry sector planning and implementation is still under discussion.

Importantly, REDD IC; Department of Forests, Research and Survey; and Department of National Parks and Wildlife Conservation will remain in their current structure under the federal government. The REDD IC and ERPD development team are working to design working modalities for the program to collaborate with the state and local government structures. Notwithstanding these challenges, the new constitution provides several significant changes that also provide new opportunities for successful overall implementation of the ER program.

Insufficient alternative livelihood and poverty alleviation opportunities
Previous programs have targeted forest dependent communities focused on selected priority areas of different donors. The ER-PD focuses on expanding and scaling this work across a larger geography than these past investments, and in so doing working with many more communities in the EPRD Program Area. The work performed and interventions pursued under the ER-PD will be done in coordination with other projects in the ER Program Area that have strong livelihoods components.

Conflicting views on sustainable management of forests
There are conflicting views and ongoing debates about the practices of sustainable management of forests and scientific forest management. There is lack of consensus on the benefits with respect to biodiversity and carbon sequestration of rotation, thinning, and pruning regimes. This makes it difficult to proceed with a unified, coherent approach to forest management that has nationwide political support. CFUGs are reluctant to support scientific forest management because of transparency issues with DFOs, specifically with how and to whom the timber harvest is allocated. The DFOs control many of the parameters of harvest, and communities are not allowed to harvest timber under Forest Operational Plans. The justification by DFOs that decisions are made based on sound science remains a point of contention with communities, as there is a lack of shared understanding of the basis of that science. This leads to mistrust, as well as illegal harvesting because the legal and regulatory frameworks, specifically the Forest Operational Plans, do not allow for optimum harvest.

There also continues to be a perceived competition between both groups. The CFs and CoFs are interested in increasing the share of forest area under their management regimes, with all CF benefits concentrated locally, and CoFs benefitting distant users through a revenue sharing mechanism between the government and communities. The competition arises from perceived government preference for CoFs, given the revenue sharing structure.

The interventions proposed in the next section will address these barriers as directly as possible. Most importantly, the program seeks to expand models of local control, empowerment, and accountability in land management regimes, and combine this with improved knowledge sharing. Nepal's precedent for significant community involvement presents a framework from which to implement management changes broadly to improve the supply-demand deficit for forest products and the sustainability of ecosystem services that forests provide. The last few years have marked considerable progress in the national governance situation in Nepal with adoption of a new constitution, and this is well-timed with the ambitious interventions proposed.

4.3 DESCRIPTION AND JUSTIFICATION OF THE PLANNED ACTIONS AND INTERVENTIONS UNDER THE ER PROGRAM THAT WILL LEAD TO EMISSION REDUCTIONS AND/OR REMOVALS

The discussion in Section 4.1 on the major drivers in the TAL and the results of multiple recent stakeholder consultations depict a culturally and ecologically diverse landscape that is facing a tipping point. The TAL's rich soils support substantial agricultural output and forest growth, and the forests and grasslands continue to support globally important wildlife like the Royal Bengal tiger. However, the demands on the land increasingly exceed its production capacity and its ability to support the basic needs of local communities. The result is continued poverty, declining forest cover, and loss of ecosystem services, including associated increases in emissions from deforestation and degradation (Section 8).

On the other hand, there is much experience to build from in the region, including a legacy of conservation efforts from NGOs and critical multilateral and bilateral support from countries including the UK, US, Finland, and Switzerland. There are strong traditions and values from the local to national level that place a high priority on sustaining Nepal's natural resources, reflected in the protected area designation of almost one-third of the forest area in the Program Area. Most importantly, there is an existing forest governance infrastructure in the Terai that is supported by active participation of thousands of households organized as villages, wards and districts that provide a foundation for advancing sustainable land management practices (see Box 1: Nepal's community based forest management models).

The Government of Nepal and its partners will take the opportunity and visibility of the ER Program to leverage this unique community-driven infrastructure, bring improved planning, accountability, coordination and sustainable production to the Terai, and achieve a green growth trajectory that can be a model for other parts of Nepal as well as other forest countries.

BOX 1: Nepal's community based forest management models

Community forest (CF): After nationalization of all forest management rights in Nepal (Forest Nationalization Act 1957), significant deforestation continued. There were limited provisions to meet local demand for wood products and the government had limited capacity to manage vast forest areas actively. In 1991, the Government of Nepal instituted the community forestry model, whereby management rights and benefits were delegated to community forest user groups (CFUGs) upon approval of forest management plans by DFOs. This approach was highly successful, particularly in the Mid-Hills, because users had greater access to their forest resources and responsibility for their stewardship. On average, community forests began to show higher densities of tree cover and higher rates of regeneration, and these improvements increased with time. The CFUGs, which have a legal authority, demonstrated that they are able to move beyond simple delivery of forest benefits and have become institutions that can play a transformative role in redistributing the benefits from natural capital to bring about changes in the livelihoods of the poor and socially excluded. They have also been remarkably resilient to political change. Currently, there are approximately 2,184 community forests (321,115 ha) in the proposed ER program area.

Collaborative forest (CoF): The success of CF was not as extensive in the Terai region as it is elsewhere. In the Mid -Hills, forests are interspersed more evenly with villages, whereas in the Terai forests mostly line the northern length of the region and settlements are concentrated to the south. In addition, higher timber quality in the Terai makes sales, legal or illegal, more lucrative and increases pressure to harvest. The Revised Forest Policy (2000) established the CoF whereby management of larger blocks of forest in the Terai is jointly shared between communities, government, and the private sector. Collaborative forest involves joint management of forests by the District Forest Office, local government and Forest User Groups as per the approved operational plan. Collaborative forest is supposed to contribute in the a) local and national economy through development and sustainable management of forests, b) engage distant users in forest conservation and supply of forest products, c) increase productivity of forests, d) conserve biodiversity and watersheds, and e) improve livelihoods of local communities. Collaborative forest user groups (CoFUGs) are the key governance unit, made up of representatives selected from multiple wards (including women, Dalit and Janajati). Under CoFM, 40% of the production revenue goes to the National Treasury, 10% goes to the local government and 50% goes to the represented communities. There are currently about fifteen Collaborative Forests in the ER program area totaling 58,242 ha.

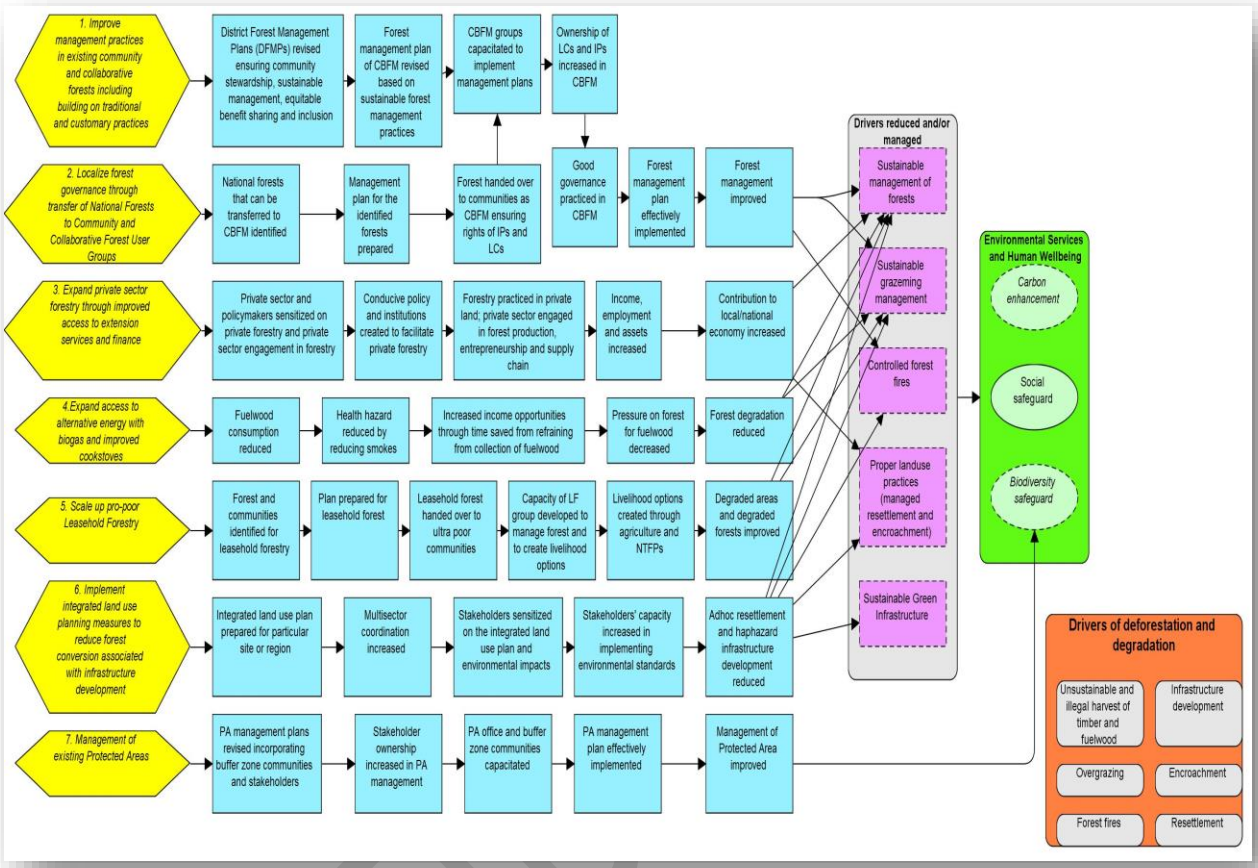
Leasehold forest (LF): Chitwan is the only district in the ER Program Area in which the LF has been implemented. Under this program, a very small area (about 600 ha) of degraded forests has been handed over to 199 leasehold forestry groups comprising 1,519 households (http://www.lflp.gov.np/resource.html#). The LF specifically targets the poorest, landless communities and combines elements of forest stewardship with improvement livelihoods and social cohesion.

Based on several district, regional and national consultations (see Section 5.1. for details), the ER Program prioritizes seven key interventions to address the drivers of deforestation and forest degradation in the Terai Arc Landscape (see Figure 7 for Theory of Change). In addition, the ER Program aims to ensure that these interventions are climate-smart and improve the overall resilience of communities and ecosystems in the TAL. All of these activities will build off ongoing conservation and forestry activities in the region, notably those highlighted in Section 4.1. The interventions align with the National REDD+ Strategy (2016) and the Project Bank.[40] The seven interventions of the Nepal ER Program are as follows:

1. Improve management practices in existing community, collaborative and government forests including by building on traditional and customary practices
2. Localize forest governance through transfer of National Forests to Community and Collaborative Forest User Groups
3. Expand private sector forestry through improved access to extension services and finance
4. Expand access to alternative energy with biogas and improved cookstoves
5. Scale up pro-poor Leasehold Forestry
6. Implement integrated land use planning measures to reduce forest conversion associated with infrastructure development
7. Strengthen the management of existing Protected Areas

[40] MoFSC (2016) Project Bank in the Forestry Sector of Nepal

Figure 7: Theory of change of the ER Program



The goals for ER Program activities are detailed by district in Annex 9: Detailed list of planned interventions by district. The following table shows how the proposed interventions map to the drivers of deforestation and forest degradation outlined in Section 4.1.

Table 10 Relationship between the ER Program interventions and the drivers of deforestation and forest degradation

Driver	Activity addressing driver	Rationale
Unsustainable and illegal harvest of fuelwood and timber	1, 2, 3, 4, 6	• Improved supply of timber and fuelwood, reducing pressure on unsustainable and illegal harvesting • Decreased demand for unsustainable fuelwood harvesting through alternative energy promotion
Overgrazing	1, 2, 4, 5	• Integrated grazing including stall feeding in CBFM areas • Increased enforcement and management in CBFM areas • Incentive to maintain cattle for biogas plants • Improved livestock management under leasehold forestry programs
Forest fires	1, 2	• Fire training and fire management under CBFM models • Improved silvicultural practices to reduce uncontrolled fire risks • Fire monitoring and early warning system
Encroachment	1, 2, 6	• Improved enforcement and management in CBFM areas • Support for federal encroachment policies
Resettlement	1, 2, 6	• Improved enforcement and management in CBFM areas • Improved federal and district planning for appropriate resettlement management
Infrastructure development	6	• Improved land-use planning to support infrastructure development and minimize or avoid deforestation • Improved coordination among agencies and consultation with stakeholders. • Enforcing EIA requirements

4.3.1 IMPROVE MANAGEMENT PRACTICES IN EXISTING COMMUNITY AND COLLABORATIVE FORESTS BUILDING ON TRADITIONAL AND CUSTOMARY PRACTICES

The ER Program will broadly build on and expand Nepal's successful CBFM practices and address key gaps in resources for enforcement and sustainable management of forests (SMF). CBFM is well documented for contributing to the improvement of forest cover in Nepal[41], and many once-degraded forests have been restored to mixed tree species or monoculture plantations. Notwithstanding this, stocking densities in the Program Area are far below optimum productive forest levels and CBFs could be managed to provide multiple benefits including improved carbon storage potential. The carbon stock in forests of the Program Area, calculated through field plots and the LAMP

[41] See e.g. Nepal Swiss Community Forestry Project (2011) Two Decades of Community Forestry in Nepal: What Have we Learned? for a review of the impacts of sustainable forest management in Nepal.

methodology, is between 80-110tC/ha compared to average carbon stocks in protected areas of 291.55 tC/ha.[42]

Under this first intervention area, the District Forest Management Plans (DFMPs) for all existing community forests (321,115 ha) and collaborative forests (58,242 ha) in the ER Program Area will be reviewed and updated to include SMF practices that improve carbon stocks, sustain ecosystem services, and increase the supply of forest products to Community and Collaborative Forest User Groups. Management practices will include selective thinning, longer rotation periods, fire breaks, and optimization for construction timber.[43]

The REDD IC will coordinate with the DoF and DFOs to develop clear guidelines for SMF in CoFUGS and CFUGS. DFOs will then work with the FUGs to improve and update their DFMPs, which are updated on a 5-year basis. Thus, over the period of the ER Program all DFMPs will be revised at least once in line with new SMF guidelines. DFMPs will be developed with collaboration and full and effective participation and engagement of local communities and IPs, as well as of the private sector and local government agencies.

Established regional training centers will improve understanding of the benefits of best practices among representatives from the different forest user groups. Trainings will also include important gender and social inclusion components, as well as the importance of biodiversity conservation in SMF. Training models will help to familiarize vulnerable populations, including women and marginalized communities with their rights and empower them to improve their participation and access to benefits under improved management regimes.

DFMPs will also be made climate-smart to take into account the impacts of climate change. This will follow climate vulnerability assessments at the local and community level, and will be supported by research and piloting of climate-smart practices. This could include assessing whether or not community forests are more vulnerable to drought or more variable rainfall given their location. Research into climate tolerant tree species will also be supported through the central government.

This intervention will coordinate with the Pilot Program for Climate Resilience (PPCR), which has been operational in Nepal for four years and—among other things—seeks to improve the resilience of smallholder farmers in the Terai.

Table 11: Summary of intervention actions for Improved Forest Management in Community Forests

Intervention Area: Improved forest management in community forest	
Intervention Action	Description
Identification of community forest	• DFO identifies potential community forests in the district in consultation with CFUGs (forests are at least 100 ha for CF, but the target is 200+ ha)
Discussions with CFUGs and stakeholders	• DFO initiates the consultation process with CFUGs, users and other stakeholders, including District Forest Coordination Committee
Determination of silvicultural system / management systems	• DFO and CFUGs determine the silvicultural systems in consultation with forestry experts

[42] Gurung, Mohan B., et al. "Estimation of carbon stock under different management regimes of tropical forest in the Terai Arc Landscape, Nepal." *Forest Ecology and Management* 356 (2015): 144-152.
[43] This will improve the supply of timber domestically and ultimately contribute to the long term harvested wood pool.

Conduct detailed forest survey, followingdivisions of blocks, compartments and sub-compartments	• CFUG is responsible for forest surveys in consultation with DFO • As technical expertise may be needed, CFUGs outsource to private firm or individual experts to conduct forest survey and blocking
Conduct forest inventory for each block and compartment/sub-compartment	• CFUG is responsible for conducting forest inventory with guidance from DFO • CFUGs outsource to private firm or experts if necessary • Inventory will be done per SFM guidelines (2014)
Prepare management plan with detailed actions, usually covering 10 years	• Detailed forest management plan is prepared by CFUGs. Due to limited capacity, CFUGs may outsource; however, all the decisions are made by CFUGs
Approval of management plan	• DFO approves the management plan
Implementation of management plan	• CFUGs implement management plans • Capacity of CFUGs is developed for forest resource management, group management and benefit sharing (including gender and social inclusion) • Most of the interventions prescribed by management plans (e.g. thinning, harvesting) will be outsourced to private firms. Private sector will be engaged in the entire supply chain of forest products, per CFUGs decisions
Monitoring	• DFO to monitor management plan implementation and overall forest management. • Capacity of DFO to be developed for monitoring (training and additional human resources0

* Forest management will be improved through implementation of sustainable management of forests. We will largely follow the Scientific Forest Management Guidelines 2014 to implement this intervention.

Table 12: Summary of intervention actions for Improved Forest Management in Collaborative Forests

Intervention area: Improved forest management in collaborative forests	
Intervention Action	Description
Identification of collaborative forest	• DFO identifies the potential collaborative forest in consultation with user groups, with a size of more than 500 ha
Discussions with CFMUGs and stakeholders	• DFO initiates consultations with CFMUGs, users and other stakeholders, including District Forest Coordination Committee and local government
Determination of silvicultural system / management systems	• DFO and CFMUGs determine silvicultural system suitable for the particular forest in consultation with forestry experts
Conduct detailed forest survey following divisions of blocks, compartments and sub-compartments	• CFMUG is responsible for forest survey in consultation with DFO • As forest survey and block division requires technical expertise, CFMUG/DFO may outsource to private firms or experts
Conduct forest inventory for each block and compartment/sub-compartment	• CFMUG and DFO are responsible for conducting the inventory. As it requires technical expertise and DFO have limited staff, forest inventory and

	blocking of the forest will be outsourced to private firms or individual experts • Inventory will be completed according to the SFM guidelines (2014)
Prepare management plan, usually for 10 years, with detailed actions	• Detailed forest management plan to be prepared by CFMUG. CFMUGs outsource to private firm or individual experts to develop management plan; however, all the decisions are made by the groups
Approval of management plan	• DoF approves the management plan
Implementation of management plan	• CFMUGs and DFO implement management plans • Need to develop capacity of CFMUGs for forest resource management and benefit sharing • Most of the interventions prescribed by management plans (e.g., thinning, harvesting) may be outsourced to engage the private sector in the entire supply chain of forest products
Monitoring	• DFO/DoF monitor management plan implementation and overall forest management • Need to support capacity development of DFO for effective monitoring of management plans (training and human resources)

* Forest management will be improved through implementation of sustainable management of forests. We will largely follow the Scientific Forest Management Guidelines 2014 to implement this intervention.

Table 13: Potential risks and impacts of community forest management interventions for Indigenous Peoples and remedies

Potential risks/impacts perceived by IPs	Proposed Remedies
Non-recognition and/or indifference to the traditional knowledge, skills and customary practices, including the collective ownership and usage of forests, of Indigenous Peoples in the sustainable management of forests	Traditional knowledge, skills and customary practices, including the collective ownership and use of forests, of Indigenous Peoples will be respected, recognized and fulfilled
Exclusion of Indigenous Peoples, including women, in efforts for sustainable management of forests	Effective participation and proportionate representation of Indigenous Peoples, including women, will be ensured in actions taken for the sustainable management of forests
Non-respect of prerogative and collective rights of Indigenous Peoples	Indigenous Peoples, having symbiotic relationship with forests, would be given prerogative and collective rights in the sustainable management of forests

Gender Considerations

Community based forest management regimes have greatly contributed to gender empowerment and social inclusion; however, there still are areas for improvement. Some of the key gender issues identified include:

- Forest management- related interventions, forest-based income generation activities and technical skills do not always relate to the needs, priorities and interests of women, particularly the poor and marginalized women.

- The role of women in decision-making processes could be strengthened, particularly for poor women from marginalized minority groups, who are also the day- to-day users and managers of forests.
- Women have less access to and control over government and non-government financial and technical resources, new knowledge, information, and skills related to forest management.

The proposed ERPD activities for forest management address gender issues, and directly target marginalized women, particularly the daily users and managers of community forests. During the implementation of this intervention, REDD IC will endeavor that:

a. The revision of the CBFM operational plans respect and recognize the roles and contributions of women, particularly from marginalized groups and ensure their full participation and benefit sharing;
b. At least 50 % of 200 LRPs trained and developed will be women, with 50% of these from marginalized minority groups;
c. The executive committee members of the proposed 600 CBFMGs, government service providers such as the DADO/DLO, etc., would also be trained on inclusive leadership to increase and improve accountability toward women and particularly from marginalized minority groups;
d. Support women, particularly from marginalized groups, to access skills and networks to become skilled forestry technical resource persons/service providers;
e. The extension programs to promote government procedures would be organized and facilitated in ways that enable women's participation, particularly from marginalized minority groups. Such programs will include information on the rights of women and IPs.
f. The ER Program will ensure at least 50% of women particularly of marginalized groups benefit from alternative livelihood activities.

The ER Program will conduct participatory assessments to ensure that proposed forest-based IGAs and indigenous arts and skills are based on the needs, priorities and interests of women, particularly of marginalized minority groups; promote IGA's and micro enterprise value chains that are tested and successful in the ER Program Area.

4.3.2 LOCALIZE FOREST GOVERNANCE THROUGH TRANSFER OF NATIONAL FORESTS TO COMMUNITY AND COLLABORATIVE FOREST USER GROUPS

This intervention proposes to gradually transition approximately 200,000 ha of government managed forests (equivalent to 40% of the remaining government forests in the Terai) to community or collaborative forest management user groups. These CoFUGs and CFUGs will be implemented with improved management plans as outlined in Section 4.3.1 above. To establish which areas will be handed over, the REDD IC will work closely with the DoF and DFRS to identify national forests that can be transitioned to CBFM in the ER Program Area. There is already a pipeline and backlog of applications that will form the basis of this pipeline. Since the National REDD+ Center (NRC) will be placed at the federal level as per the constitutional provision of regulating forest carbon services, the implementation of ERPD will mainly take place at local and community levels, which are almost clear even in the current transition of the state restructuring. NRC will take initiatives to introduce REDD+ related roles and responsibilities in organizations during the restructuring of the forestry sector (REDD Strategy, 4.6). As per the article 56-60 of the constitution of Nepal, the provincial and local governments need to respect the federal and provincial law on forest, which has already mentioned in the local governance law as well.

The DoF will work with DFOs to initiate the hand over process as per the laws, rules and regulations of the Government of Nepal (see 4.4 and 4.5 below). Newly created FUGs will follow existing modalities including revenue and benefit sharing arrangements and will be undistinguishable from existing

FUGs. DFOs will coordinate with communities to initiate the process for handover including demarcation of the forest area, initiation of Initial Environmental Examinations (IEE) and EIAs, and development of DFMPs to improve the management of the forests. This will require substantial outreach and planning from DFOs in close collaboration with local communities across the Program Area.

This intervention will provide the resources required for initial implementation of best management practices to both increase the supply of forest and non-forest products as well as forest ecosystem services, including carbon sequestration. This will result in both reduced deforestation as stewardship is moved to more local levels, and improved productivity as sustainable silvicultural practices are put in place. Pending the change of management regime, the intervention proposes to improve enforcement of existing laws on nationally managed forests to ensure that leakage into these forest areas is minimized if not avoided.

National Forest Strategy (2016-25) targets to have 2.3 million ha of community forests and 265,000 ha of collaborative forest through handover national forest by 2025. Currently 1.7 million ha forests remain as community forest and 60,000 ha forests remain as collaborative forest in the country. ERPD targets to handover 200,000 ha of national forests to the communities as community and collaborative forests in 10 years. The data shows that in the ER Program Area in last 15 years, 379,357 ha (CF: 321,125 ha and CoF: 58,242 ha) of national forests handed over to communities as CBFM, about 25,000 ha per year in an average.

Moreover, vibrant community-based national federations, such as Federation of Community Forestry Users Nepal (FECOFUN), Association of Collaborative Forestry Users Nepal (ACOFUN) and Nepal Federation of Indigenous (NEFIN). These federations contribute to forest resource management as well as improving governance, social and gender inclusion and equitable benefit sharing in forestry.

Table 14: Summary of Intervention Area for Transfer of Government Managed Forests to Community Forests

Intervention area: Transfer of government managed forests to community forests	
Intervention action	Description
Identify/mapping of government managed forest that are available to transfer as CF (currently handed over CF area in the ERPD districts is 321,115 ha)	• District Forest Office to identify potential forests to be handed over as CF. NRC (currently RIC) coordinate with DoF and DFOs to implement proposed ER programs including this
Identify users (proximate to the forests, traditional users)	• DFO identify the actual users of the forests based on the proximity and traditional use rights
Register CFUGs as per the interest of the communities in managing forest in particular area as CF	• DFO to raise awareness to expedite forest handover to communities. • DFO facilitate in the registration process and technical support • DFO/CFUG may need support to have technical experts in writing users constitutions to include gender and social inclusion, and benefit sharing among the users
Conduct forest inventory and prepare Forest Operational Plan with explicit management prescriptions (based on appropriate silvicultural systems and principles of SMF whereas customary practices are also valued)	• CFUG is responsible to conduct forest inventory of their forests. As it requires technical expertise, CFUGs outsource to forestry technicians to perform forest inventory FOPs to be drafted following the standards and guidelines
FOP finalization and submission for approval	• Draft FOP is discussed in detail by General Assembly of each CF and is endorsed

	• After endorsement, CFUGs submit the FOP to DFO for approval
FOP approval	• DFO to approve the FOP • Capacity building of DFO may be required to accomplish the work
FOP implantation	• CFUGs implement FOPs • Need to develop capacity of CFUGs for forest resource management, group management and benefit sharing (including gender and social inclusion) • Some of the interventions prescribed by FOPs (e.g. thinning, harvesting) may be outsourced to private firm or individual experts. Private sector be engaged in the entire supply chain of forest products • All the decisions should be made by CFUGs but actions can be outsourced
Monitoring	• DFO to monitor FOP implementation and overall forest management • Need to support capacity development of DFO for monitoring

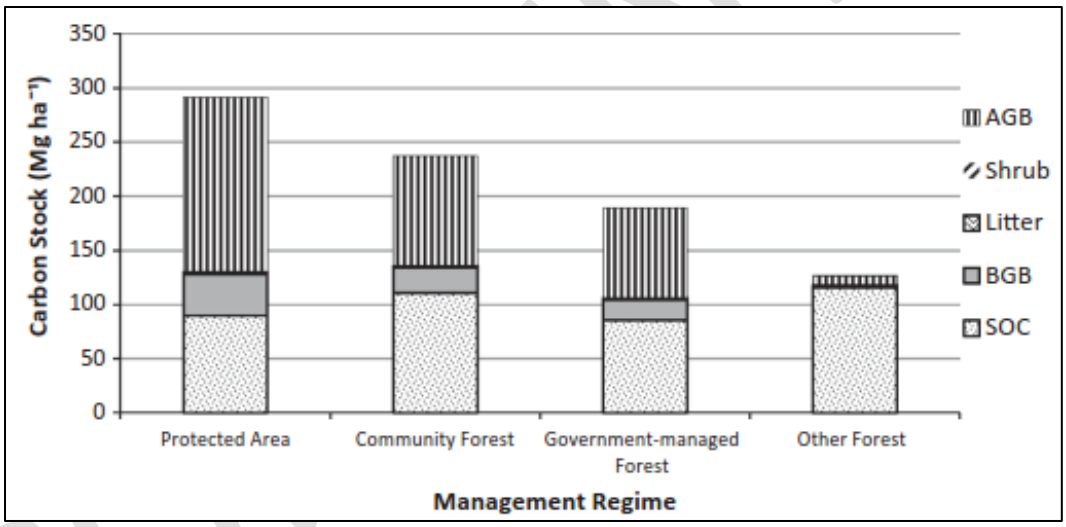
Table 15: Summary of Intervention Actions on Transfer of Government Managed Forests to Collaborative Forests

Intervention area: Transfer of government managed forests to collaborative forests	
Intervention Action	Description
Identification of mapping of government managed forest that is available to transfer as CFM (currently handed over CFM area in the ERPD districts: 58,242 ha)	• DFO to identify potential forests to be handed over as collaborative forest
Identify users, both proximate and distant users	• DFO to identify the users. • DFO to be strengthened with human resources
Conduct forest inventory and prepare Forest Operational Plan with explicit management prescriptions, based on appropriate silvicultural systems and principles of SMF that value customary practices	• CFMUG is responsible to conduct forest inventory. As it requires technical expertise, CFMUGs outsource to forestry technicians to perform forest inventory FOPs to be prepared by CFMUGs. It can be outsourced to private firms or experts. • FOPs to be prepared following the standards and guidelines, including adequate consultation with communities and local government
FOP finalization and submission for approval	• DFO finalize the FOP in consultation with CFMUG. DFO submits the FOP to Department of Forests through Regional Forest Directorate. • Capacity development of DFO is important at this stage.
FOP approval	• DoF approves the FOP
FOP implementation	• DFO implements the FOPs of collaborative forests • Need to develop capacity of DFO to implement the plan • Interventions prescribed by FOPs (e.g. thinning, harvesting) may be outsourced, and would engage the private sector in the entire supply chain of forest products

	• DFO to ensure benefit sharing, including 40% for government treasury, 10% for local government and 50% for community forest user groups
Monitoring	• DFO, Regional Directorate of Forest and DoF to monitor FOP implementation and overall forest management

Advancing the model of localizing forest governance is supported by the results of a landscape scale study, which indicate that threats to forests (including encroachment, poaching, forest fire, mining, infrastructure development and fuelwood collection) are better and significantly mitigated in community-managed forest compared to government managed forests, and is potentially a better management model for landscape conservation.[44] Another recent study indicates that shrub and sapling density and basal area were higher in community forests compared to government managed forest, suggesting that community management helps to improve tree regeneration and overall forest health.[45] Furthermore, a study estimating carbon stock under different management regimes in the Terai found that the carbon stock in community forests, across five carbon pools, exceeded the carbon stock in government-managed forest.[46] The following table summarizes the results of this study:

Table 16: Distribution of carbon stock (Mg ha^{-1}) across forest management regimes



Gender Considerations

Gender considerations on this intervention will be same as in the first intervention. While implementing various activities under this intervention, special emphasis will be given to women, particularly of the poor and marginalized groups. Extension activities will inform women and IPs of their rights in relation to land use and benefits, as per the government policies.

[44] Lamsal et al (2014). Threat reduction assessment approach to evaluate impacts of landscape level conservation in Nepal

[45] Paudel et al (2015). Effects of different management practices on stand composition and species diversity in subtropical forests in Nepal: implications of community participation in biodiversity conservation

[46] Gurung et al (2015). Estimation of carbon stock under different management regimes of tropical forest in the Terai Arc Landscape, Nepal

4.3.3 EXPAND PRIVATE SECTOR FORESTRY THROUGH IMPROVED ACCESS TO EXTENSION SERVICES AND FINANCE

Despite the rich soils in the TAL, privately-run forestry operations have never been extensive, in part because private land owners lack the means to wait for a financial return from long rotation cycle timber products. In contrast, other agricultural commodities can be grown seasonally and quickly brought to market. Nepal's post-earthquake recovery prompted significant, ongoing demand for domestic timber, met largely thus far through imported sources. The earthquake recovery plan identified the need for more than 50 million cubic feet of timber for reconstruction work. This is significantly increasing the demand for timber as well as the need for processing facilities to treat the wood for construction purposes. Some part of this supply can be met sustainably from the ER Program Area.

Currently, there are only 639 registered private forest user groups (PFUGs) in the Program Area covering 550 ha of forest management.[47] In reality, most private forests have not been properly accounted for and the actual area and number of private forests are probably much larger. Some efforts have been made to increase private sector forest management, as reflected in the Forestry Sector Strategy 2016 that includes policy measures to incentivize commercial forestry nationally and to scale up private forestry to 100,000 ha by 2025.

Since the government cannot handover national forests to the private sector, engagement will be encouraged through private sector investments in forest management activities such as harvesting, supply chain roles, and other forest based enterprises that also generate employment. Per Section 201 of the 2nd amendment of Forest Act 1993, block forests greater than 500 ha can be managed under partnerships between government and private sector. CBFM groups can also collaborate with private sector for plantation management, harvesting and forest based enterprises.

Under this intervention area, 10% of forests in the ER Program Area will be developed as private forests including in agro-forestry. Long-term, low-cost capital will be provided to small-scale landholders to incentivize plantation production and maintenance of forests on their private lands. These landholder groups will be provided with training and seedlings to develop culturally, and ecologically appropriate timber products, with specific attention to native and climate-resilient species. As outlined in 4.3.1 and 4.3.2, research and extension services will be provided to support these climate-smart forestry practices. Existing small-scale nursery operations of DFOs will also be scaled to meet increasing demands for seedlings.

This intervention area will also include the training of local resource persons (LRPs) and local level forestry staffs on various aspects of private forestry including nursery management, silviculture practices, disease and pest management, soil fertility and nutrient management, harvesting and post-harvest handling through site visits and demonstration sites.[48] Increased private and commercial forestry is expected to improve multiple ecosystem services through reduced erosion and landslides, protection of downstream water supplies, and reduced the risk of flooding and sedimentation as well as increasing soil carbon and above ground biomass in the intervention areas.

[47] DoF 2012. Hamro Ban. Department of Forests, Ministry of Forests and Soil conservation, Government of Nepal.
[48] Multi Stakeholder Forestry Programme (MSFP) 2014 Potential of Forestry Sector in Economic Growth and Development Short Concepts on Five Themes.

Table 17: Potential risks and impacts of private sector forestry activities on Indigenous Peoples and remedies

Potential risks/impacts perceived by IPs	Proposed Remedies
Imposition of fees and administrative hurdles for forest owners	Fees for private forest owners would be made reasonable and administrative procedures would be simplified as much as possible
Loss of the owner control over their own private forests (use and sale of forest products, felling trees, etc.)	Rights and freedom to a reasonable extent would be bestowed on forest owners in terms use, sale and ownership of forest products
Room for irregularities in private forests	Good governance would be practiced in forestry sector
Invasion of profit oriented companies and other actors in forestry sector	Cultural biodiversity and the environmental integrity would be maintained.
Negative impacts on culture and/or biodiversity	For-profit activities in the forestry sector should respect, promote and fulfill the rights of Indigenous Peoples and other communities

Gender considerations

Women across all social and economic groups have little control over private forest resources. The proposed ER program activities have potential to spur innovation to engage more women in private forest management through many of the targeted activities, including, for example, the following measures:

- Support women, particularly from marginalized groups to access capital, skills, networks and subsidized quality seeds to become successful entrepreneurs and skilled forestry technical resource persons/service providers;
- Provide Business Literacy Classes (BLC) for women entrepreneurs, learning from the successful classes conducted by USAID and IFAD.
- Provide soft loans to women, particularly from marginalized groups
- Made efforts to improve land tenure rights for women of marginalized groups
- Develop or incentivize establishment of cooperative business models, including, for example, using invasive species and other biomass for bioenergy supply chain

4.3.4 EXPAND ACCESS TO ALTERNATIVE ENERGY WITH BIOGAS AND IMPROVED COOKSTOVES

As discussed in Section 4.1, the demand for fuelwood in the TAL has outpaced the capacity of the forests to provide supply. Improved forest management practices and the scaling up of private forestry should increase supply considerably over the long-term, but must be coupled with efforts to address the demand side. In this regard, the GoN has extensive experience in the TAL, which can be leveraged in the ER program with the acceleration of efforts to install biogas units and improved cook-stoves (ICS) across the region. Biogas units decrease the need for fuelwood by producing methane cooking gas from the breakdown of animal, agricultural and human wastes. Similarly, ICS demonstrate significant efficiency improvements relative to open cooking fires, are readily installed, and can benefit households who do not keep livestock.

The success of both of these technologies has already been proven in Nepal under a voluntary Gold Standard project and multiple Programs of Activity (PoA) developed by the Alternative Energy

Promotion Centre (AEPC).[49] Both technologies also have the advantage of directly and sustainably addressing the underlying driver and deliver significant additional social and environmental benefits. Some of the social benefits include time and labor savings for women, significant reduction of respiratory and eye infections and increased school enrollment rates for children due to extra income earned by parents. In addition, with stall-fed livestock producing slurry, children have milk to drink, improving nutritional baselines. Environmental benefits include improved water quality through decreased run off of natural by-products into local waterways, and increased soil quality through the use of organic fertilizers derived from cow waste slurry.

The necessary institutional and policy frameworks are already in place to make this intervention feasible. In 1996, the GoN established the AEPC under the then Ministry of Science Technology and Environment (MoSTE), now the Ministry of Population and Environment (MoPE), to promote access to renewable energy technologies. AEPC subsequently developed the Rural Renewable Energy Subsidy Policies to improve access to renewable energy technologies for people living in rural areas, minimize pressure on forests, and bring about multiple benefits.[50] Under these programs, over 200,000 biogas units have been installed in the Program Area. However, a national analysis suggests that only 15% of demand for biogas has been met, due in part to significant up-front costs to support installations

Under the proposed ER program, the GoN will expand existing initiatives and install an additional 12,000 biogas plants per year in the ER Program Area. A revolving financing mechanism will expand and accelerate these installations with up-front funds. To complement the biogas plants, which only benefit households with livestock, the GoN will expand its Clean Cookstove Initiative and install on average 2,000 ICS per district per year in each of the ER Program districts[51], or a total of 24,000 ICS/year program wide. Both of these initiatives will be implemented through the existing AEPC program, which will receive additional finance from the ER Program to support further rollout in the TAL.

To avoid double counting in the ER Program, the following processes will be adopted:

a. The REDD IC will inform the Ministry of Population and Environment (focal point for the UNFCCC and the Designated National Authority) that any carbon credit projects in the ER Program Area under REDD+ need to be evaluated and reported in coordination with the carbon accounting and reporting for the ER Program.
b. For any carbon benefits generated by the biogas plants installed under the ER Program, the REDD IC will inform AEPC through a letter of understanding that it cannot separately account for these carbon credits during the life of the ER Program. If separately funded biogas plants or cookstoves are installed in the ER Program Area and any carbon benefits transacted, these will be discounted from ERs reported by the ER Program (also see Section 18.1).

Table 18: Expand access to alternative energy with biogas and improved cookstoves

Intervention area: Expand access to alternative energy with biogas and improved cookstoves	
Intervention Action	**Responsibility**
Assess and map demand for additional biogas units and cookstoves	• CBFM groups estimate demand within their forest management units

[49] See https://products.markit.com/br-reg/services/processDocument/.../103000000002030 and https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/7BSCYZMH2U05TWXFJKELND18PRQ96O/view

[50] The Nepal Electricity Authority (NEA) serves only 15% of the country's total population, and an even smaller percentage of the Terai. In addition, electricity provides less than 0.05% of Terai cooking needs and is therefore not considered under this intervention.

[51] 2,000 is an average across all districts, and demand may be different in each district,

Identify suppliers of biogas and cookstoves	• CBFM groups with the support from AEPC
Establish agreements between CBFM groups and companies for installation of biogas and cookstoves	• CBFM groups initiate with support of cooperatives or BFIs • AEPC provides subsidy per relevant rules
Install biogas plants and cookstoves	• CBFM groups and individual households to install biogas and cookstoves with the support from companies
Monitoring	• AEPC/DFO to monitor the operations • CBFM groups to monitor in their areas

Table 19: Potential risks and impacts of this intervention on Indigenous Peoples and remedies

Potential risks/impacts perceived by IPs	Proposed Remedies
Large hydroelectric dams and projects have numerous social and environmental impact	Small scale, localized projects (such as biogas and ICS) owned and managed at local level by Indigenous Peoples and other local communities would be encouraged/promoted.
Some of the sources of clean energy are not culturally and socially appropriate for Indigenous Peoples.	Interventions in energy sector would strive to be culturally, socially and environmentally sound.

Gender considerations

Some potential gender issues around the promotion of renewable energy include:

- Poor assessment of energy needs, priorities and interests of women, particularly poor and marginalized minority women, who are the primary daily users/managers of forests and firewood;
- Limited information flow and poor extension services on energy related resources, technologies, subsidies and incentives, particularly to poor and marginalized women
- No assessment of non-participation and non-adoption of renewable energy technologies by poor and marginalized minority women, or strategies to address this gap

To address these issues, REDD IC will adopt the following measures as feasible:

- Empower women, particularly from marginalized groups, e.g., with training to serve as Renewable Energy Service Providers and entrepreneurs, providing information about the benefits of biogas and ICS, subsidies and micro-credits,
- Engage women, particularly of marginalized groups, in developing bioenergy supply chain using invasive species and available biomass;
- Assess demand from women and link with micro-credit providers in the respective districts; introduce innovative strategies to encourage the use of bio-gas and ICS such as awarding renewable energy technician champions (both among beneficiaries and SPs) and increasing the incentive amounts to offset upfront costs of biogas installation for the poorest and most marginalized women
- Use "Window of Opportunity" funds and resources to promote new technologies to reduce household workloads

4.3.5 SCALE UP PRO-POOR LEASEHOLD FORESTRY

While several activities described above are essential to reduce the conversion of forests to other land uses, they are not sufficient if local communities do not have access to forest resources and opportunities for alternative livelihoods. Under this intervention area, the GoN, in coordination with

ongoing poverty reduction initiatives such as the Poverty Alleviation Fund, Feed the Future, and Rastrapati (President) Chure Terai Madhesh Conservation and Development Program, will seek to expand pro-poor Leasehold Forestry to reduce socio-economic pressure on forests. The main beneficiaries of this intervention are expected to be the most socially and economically disadvantaged rural households in the Program Area, namely women, *Dalit* and *Janajatis* (Indigenous Peoples) and other communities who depend on forests for their livelihoods.

This intervention will expand the Leasehold Forestry Program (LFP), which has been successful in providing employment opportunities to economically disadvantaged communities in other parts of Nepal. In 2014, there were more than 7,000 LFUGs in Nepal managing over 40,000 ha of LFs and involving of over 62,000 families. The program has helped to alleviate poverty in these families through the production of forage, fodder, agroforestry, medicinal and aromatic plants, and other NTFPs.[52] The pro-poor LFP will also help reduce forest degradation unmanaged forest exploitation.

To date, the LFP has only been implemented in one district of the TAL (Chitwan); however, this intervention will be scaled to all 12 districts in the ER Program. Under this activity, DFOs will identify areas suitable for leasehold forestry and maintain a roster of these lands for potential applicants. National NGOs and IPOs will facilitate "match-making" to connect potential beneficiaries to DFOs through community outreach programs and awareness raising campaigns.

The costs of scaling up the pro-poor LFP are relatively small; success will instead depend on establishing better linkages between relevant stakeholders and DFOs. Support will initially be provided to DFOs to provide skill-based training in SMF techniques to leasehold forest user groups (LHFUGs) as well as access to seedlings, and other inputs, to ensure that new forests users are able to quickly scale up planting and silvicultural practices.

Table 20: Potential risks and impacts of this intervention on Indigenous Peoples and remedies

Potential risks/impacts perceived by IPs	Proposed Remedies
Disruption of Indigenous Peoples' traditional knowledge, skills and cultural and conservation practices	Protection and continuity of traditional knowledge systems, skills, occupations and practices
Knowledge and skills gaps	Capacity of forest dependent communities and Indigenous Peoples will be enhanced for them to be able to pursue alternative livelihood practices
Cultural lag	Alternative livelihood options will build on and be based upon the traditional skill, knowledge, practices and the culture/world view of the peoples of the respective areas of intervention

Gender Considerations

One of the major challenges within Leasehold Forests is identification of poor and marginalized women and provision for their access and control over forest based resources for the development of appropriate livelihoods and enterprise-related activities. Women are more likely than men to be without land rights, so it is critical that Leasehold Forestry User Groups have strong participation of women and ensure their rights to long term leases.

To address these issues, REDD IC will adopt the following measures:

[52] Laduari and Kaini (2014) Nepal's Pro-poor Leasehold Forestry Program: Processes, Policies, Problems and Ways Forward. http://www.nepjol.info/index.php/INIT/article/viewFile/10258/8337

- Support successfully tested and implemented value chains for marginalized women in two districts (in road corridors)
- Apply lessons learned from IFAD/HVAP and Heifer Nepal to develop/establish pro-poor value chains with well-developed human resources, structures and markets.
- Implement Business Literacy Classes (BLC), learning from the successful classes conducted by USAID and IFAD. The BLC packages will be modified in the context of leasehold forests to include technical components such as on REDD+, sustainable forest management, good-governance, leadership and fairness in benefit sharing, access to information and resources, basic book-keeping, and finance.

4.3.6 IMPROVE INTEGRATED LAND USE PLANNING TO REDUCE FOREST CONVERSION ASSOCIATED WITH ADVANCING INFRASTRUCTURE DEVELOPMENT

In 2012, the Ministry of Land Reform and Management developed the National Land-use Policy, which aims to support district level planning and land management including natural resource management. However, to date this policy has had little support, and additional resources and capacity building of relevant government staff are required to translate the policy into land-use plans and follow-through at the local level. Similarly, the Ministry of Population and Environment is mandated to regulate Environmental Impact Assessments (EIA) for infrastructure projects, but a key challenge lies in monitoring and evaluating the implementation of approved EIAs once the projects are operational. The reasons for this are primarily capacity and financial gaps. The ER Program provides an opportunity for the GoN to implement these guidelines and minimize deforestation and the loss of biodiversity due to unmitigated infrastructure development projects.

This intervention includes several components to improve and integrate land use planning to reduce forest conversion. Firstly, the ER Program—through the Apex Body—will strengthen cross-sectoral coordination in implementation of local land-use plans. A coordination mechanism between the forestry sector and other sectors at the national, provincial and local levels will be implemented to ensure that goals across sectors are better harmonized (e.g., better siting of infrastructure projects). To support this coordination, the REDD IC—with support from DoF and DFRS and coordination with the Department of Land Reform and Management (DoLRM) and Department of Land Information and Archive (DoLIA) under the Ministry of Land Reform and Management—will develop a detailed map, zoning all CBFM areas and potential resettlement areas. The map will also delimit potential sites for afforestation and reforestation, including for new plantations for private commercial forestry operations. At the district level, DFOs will support infrastructure zoning by developing District Land-Use Plans integrating development and traditional land-use practices. Additional coordination efforts will be made with the local governments to employ land use planning and reduce unnecessary conversion of forests.

Complementary initiatives are also underway to reduce disaster risks and relocate people following flooding or landslide events; these will be strengthened through the ER Program. Policies are also being formulated to integrate disaster risk management into local land use plans.

As one indicative example, the Rashtrapati Chure Terai Madhesh Conservation and Development Programme was established in 2013 with NRs 250 million (USD$2.4 million) from the national budget to improve and maintain the ecological integrity of the Chure hills, which lie along the northern edge of the Program Area. The program has been categorized as the program of national pride. The ER Program through the local line agencies of the MoFSC will work in coordination with the Rashtrapati Chure Terai Madhesh Conservation and Development Program to build capacities in improved forest management and support integrated land use planning. A 20-year master plan for Churia has been formulated by the Board and endorsed by the GoN. The Churia Master Plan has three key objectives. These are: 1) to mitigate expected damages related to climate change and natural disasters through

sustainable management of natural resources of the Chure hills; 2) to mitigate expected damage from floods and landslides and maintain environmental services in Chure region through integrated river system management; and 3) to improve availability of forest products including timber and fuelwood, including for distant users. Anticipated outputs of the program for the first five years of the Master Plan period that are relevant to ERPD interventions include: a) reclaiming encroached areas (140,000 ha), b) improving forest management (165,000 ha), and c) establishing plantations on private lands (8.9m seedlings).

Table 21: Perceived risks of this intervention to Indigenous Peoples and remedies

Potential risks/impacts perceived by IPs	Proposed Remedies
Displacement of landless households and Indigenous Peoples from their settlement areas	Efforts are made in coordination with other agencies to manage settlements for landless and Indigenous Peoples prior to displacement
Involuntary relocation and resettlement of Indigenous Peoples from their ancestral territories	Without their free, prior and informed consent (FPIC), Indigenous Peoples would not be relocated from their ancestral territories
Confiscation of land customarily owned and used by Indigenous Peoples	The land collectively owned and used by Indigenous Peoples as per their customary laws would be recognized

Gender considerations

To mainstream gender in this intervention, REDD IC will endeavor to:

- Ensure that women, particularly from marginalized groups, are actively engaged in all planning, monitoring, and benefit sharing activities related to land use planning.
- Support extension initiatives that inform women and IPs of their rights in relation to land use and benefits, as per the government policies.
- Employ women, particularly of marginalized groups, in plantation establishment and maintenance activities.
- Respect and adopt women's knowledge of traditional land use systems.

4.3.7 STRENGTHEN THE MANAGEMENT OF PROTECTED AREAS

Protected areas are located in five districts of the TAL (Parsa, Chitwan, Banke, Bardia and Kanchanpur) and account for 28% (0.3 million ha) of the forest area in the TAL. With the exception of Banke National Park, which was established in 2010, the other protected areas have a long history of management. Bardia National Park was established in 1984, Chitwan National Park in 1973 (in 1963 it was a Rhinoceros Sanctuary), Parsa Wildlife Reserve in 1984; and Shuklaphanta National Park in 2017 (it was a hunting reserve in 1969 and Wildlife reserve in 1976). Maintaining these protected areas is critical to the preservation of Nepal's native and critically endangered flora and fauna, to economic opportunities associated with both domestic and international tourism, and to continued delivery of several other non-carbon benefits.

Protected areas in Nepal are monitored and maintained through army patrols, and generally are not subject to significant historical deforestation and forest degradation. However, stewardship of these areas is included in the ER Program for the significant non-carbon benefits that they provide and to safeguard against social and environmental impacts (e.g., human wildlife conflicts) that could arise due to the implementation of the ER Program.

This intervention area comprises five activities: anti-poaching, smart patrolling, grassland management, human wildlife conflict relief, and eco-tourism. These interventions contribute to

biodiversity safeguards and livelihoods of local people. Biodiversity monitoring protocol will be implemented to make the interventions effective.

4.3.8 APPROXIMATE TIMELINE OF PLANNED ER PROGRAM MEASURES

An estimated operational timeline for implementation of the ER Program activities is presented in Table 7. Please refer to Annex 9 for area-based goals by district.

Table 22: Approximate timeline of planned ER Program Measures

Activity	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
1. Improve management practices in existing community forests building on traditional and customary practices	Revise CBFM operational plans to include & implement SMF principles respecting traditional practices									
	Train & develop 100 LRPs (inclusive) to implement SMF principles, forest fire control (indigenous methods & new tools) "Train & develop 100 LRPs (inclusive) to implement SMF principles, forest fire control (indigenous methods & new tools)									
	Improve governance in CBFM regimes to ensure inclusiveness, participation, accountability & transparency targeting around 60 CBFMGs									
	Revise DFO sectoral & operational plans	Build capacities of 100 executive committee members of CBFM including IP/NEFIN, DALITS, HIMMAWANTI/ WOMEN on SMF				Revise DFO sectoral & operational plans	Build capacities of 100 executive committee members of CBFM including IP/NEFIN, DALITS, HIMMAWANTI/ WOMEN on SMF			

	Simplification of government procedures including registration to sustainably harvest and timber in all forest management models through discussions		Enhance coordination with the DADO/District Livestock Office to improve livestock management							
Activity	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
2. Localize forest governance through transfer of National Forests to CFUGs	Educate communities & awareness raising									
	Enhance the capacities of FEDERATION OF USERS GROUPS/IP/DALITS/ WOMEN in SMF									
	Increase programs for CBFM handover in the Annual Programme of Work across all districts									
		Implement improved forest management techniques in newly handed over forests								
Activity	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
3. Expand private sector forestry through improved access to extension services and finance	Provide insurance mechanism									
	Training and capacity building through federations and private associations									
	Access to soft loans (deprived sector loans)									
	Product valuation to improve negotiation capacity with buyers through cooperatives of land holders									
	Provide subsidies for seedlings and quality seedlings									
Activity	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
4. Expand access to alternative energy with biogas and improved cookstoves	Building local capacities and skills to construct biogas plants and install RETs	Develop bioenergy supply chain using invasive species and available biomass								
	Access to micro credits through cooperatives enhance access to RETs									

	Scale up installations of biogas									
	Scale up installations of improved cook-stoves									
		Window of opportunity to promote new feasible technologies as it develops or is innovated					Window of opportunity to promote new feasible technologies as it develops or is innovated			
Activity	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
5. Scale up pro-poor Leasehold Forestry	Execute existing practice & criteria to identify poor households									
	Provide skill based trainings & inputs to LHFUG (e.g. access to & marketing of NTFP) for 100 pax									
	Facilitation by NGO/CSO to connect poor to DFO									
Activity	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
6. Improve integrated land use planning associated with infrastructure development	Enhance sectoral and cross sectoral coordination to implement district land-use plans									
	Zone CBFM area, Map potential hazard zone areas & possible settlement areas									
	Map potential sites for afforestation and reforestation in the districts and conduct plantation									

	Develop District Land-use Plans to enhance understanding on integrated development and traditional land-use									
	Enhance Land Information Management System									
Activity	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
7. Strengthen the management of Protected Areas	Antipoaching Operations									
	Smart Patrolling									
	Grassland Management									
	Human and Wildlife Conflict relief fund support									
	Eco tourism development									

4.4 ASSESSMENT OF LAND AND RESOURCE TENURE IN THE ACCOUNTING AREA

The Constitution of Nepal (2015), the Forest Act 1993, National Park and Wildlife Reserve Act 1971, the Land Act 1964, Land Revenue Act 1978, Local Self-Governance Act 1999 and the Muluki Ain (General Code) 1963 are the main legal instruments which regulate land and resource tenure in Nepal (see Table 23). The Forest Act 1993 and Forest Regulation 1995 have classified Nepal's forest into two broad tenure categories: national and private forest. According to the Forest Act, national forest is further classified into six sub-categories: Government-managed forest, Collaborative Forest, Protected Forest, Community Forest, Leasehold Forest, and Religious Forest. The National Parks and Wildlife Conservation Act 1973, and various subsidiary regulations, govern the protected area systems.

Table 23 Major legal instruments on land and resource tenure rights in Nepal

Acts	Regulations
Forest Act 1993	Forest Regulations 1995
National Parks and Wildlife Conservation Act 1973	Buffer Zone Management Regulations 1996
Environment Protection Act 1996	Environment Protection Regulations 1997
Mines and Minerals Act 1986	Mines and Minerals Regulations 1999
Soil and Watershed Conservation Act 1982	
Land Act 1964	
Public Roads Act 1974	
Local Self Governance Act 1999	Local Self Governance Regulation1999
National Land Use Policy 2012	

Legally, the government holds the rights to land in all types of forest models except private forest. However, access and use rights vary across forest management models. Community-based regimes are endowed with certain rights to manage and use forest resources, whereas in government managed forest use rights to forest products remains with the government. Pursuant to schedule 5 of the constitution, the federal government has sole right over carbon stock. However, the respective CBFM groups have rights over the forest benefits such as timber and medicinal plants as harvested according to management plans. The federal government will transfer ER title without jeopardizing the rights of CBFM groups over the forest resources under the existing laws. CBFM groups are part of carbon beneficiaries under the agreed benefit sharing mechanism. Key forest tenure categories and associated rights are shown in Table 24 below.

In 2013 about 29% (0.34 million ha) of the TAL's forest area was considered protected forest, a further 24% (0.28 million ha) was community forest and 5% (0.06 million ha) collaborative forest; the remainder (42% or 0.5 million ha) is predominantly government forest (See Figure 8). [53]

[53] REDD, Forestry and Climate Change Cell, Ministry of Forest and Soil Conservation, Government of Nepal. Emission Reductions Project Idea Note. Kathmandu, Nepal, 2014.

Figure 8 Forest area in the Program Area by tenure type

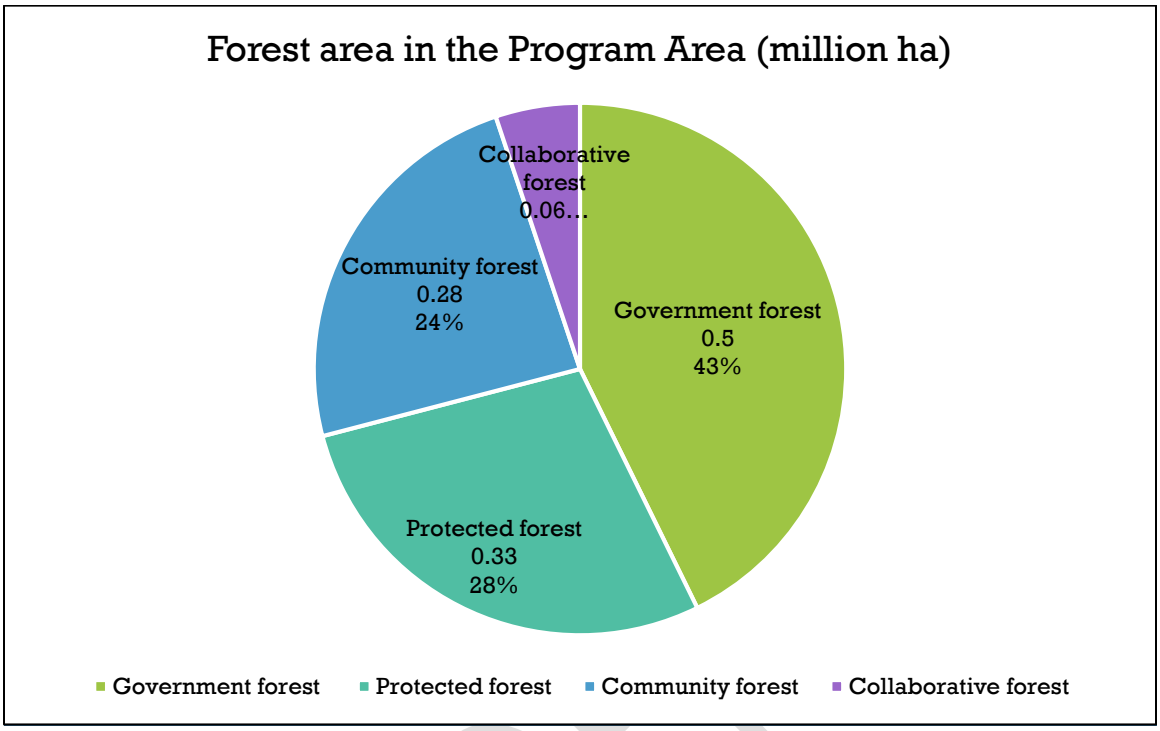


Table 24 Categories of forest tenure in Nepal and their associated rights. Adapted from Jhaveri and et.al (2015)[54]; FAO (2015)[55]; and REDD IC (2015)[56]

Categories of forest tenure	Elements of bundle of rights				
	Access	Use	Management	Exclusion	Alienation
Private forest	Private land owner can enter in their forest at any time	Land owner can extract, collect, or harvest forest resources	Land owner can invest and choose species and silviculture practices for the management of forest	Land owner can prevent others from entry into forest land	Land owner have rights to lease, transfer or sell the land and forest resources at any time
National Forest					
Government managed forest	General public has access rights in forests except in rainy season	Forest users can collect basic forest products (such as grass, fodder firewood, etc.)	Legally there is no provision for community involvement in the forest management	Government can prevent to entry into this forest and can exclude from decision	Government can transfer property right to others such as leasehold company or private sector

[54] Jhaveri, N.J. & Adhikari, J. (2015). Nepal Land and Natural Resource Tenure Assessment for Proposed Emission Reductions Program in Terai Arc Landscape. Washington, DC: USAID Tenure and Global Climate Change Program.
[55] FAO (2016), Report on Assessment of Forest Tenure Policies in Nepal, Bangkok, Thailand
[56] REDD IC (2015). Study of Forest Carbon Ownership, REDD Implementation Centre, Kathmandu, Nepal

			and decisions making	making process	for a define period
Collaborative forest	Forest users have rights to enter into forest within specified period and months	Forest users can collect basic forest products during specified period	Committee members involve in the decision making and management activities	Committee can exclude the non-users	Collaborative forest users group have no rights to alienate forestland
Protected Forest[57]	Forest users have limited access in the forest	Forest users can collect forest products from protected forest based on approved plan	Individual council decides on protection and management of protected forests	DFO and council can exclude non-users	Nobody has right to alienate land of protected areas, though resources can be alienated.
Community Forest	Each member of group has access rights according to approved management plan	User groups can extract, collect, or harvest forest resources	User groups have right to decide for the utilization of resources and management of the forest	User groups can exclude the non-members	User groups can allocate some areas of forest to poor group for pro-poor leasehold forest, but can't alienate the land
Leasehold forest	All members have access to forest land and forest resources	All forest resources can use by the members except those forest products which were produced before leasing of forest	User groups have right to decide for the management of forest	User groups can exclude the non-members	Users group have no rights to alienate land- no sale, transfer, inherit, mortgage or put as collateral
Religious forest	All members of religious group have access to forest and forest resources	All forest resources can be used only for domestic purposes by the members	Religious groups have right to manage such forest based on approved management plan	Religious groups can exclude the non-members	Religious groups have no rights to alienate land and forest resources.

Assessment and strengthening of customary rights

Both the National Forest Policy (2015) and National Forest Strategy (2016) recognize customary rights over forest resources. Four recent reports conducted by the REDD IC and its technical and financial

[57] Protected forest is not Protected Area and it is a part of National Forest. Government of Nepal has developed separate directive to regulate protected forest. Most of the protected forest is declared in the areas of community forests.

partners contribute to the state of understanding of customary rights in Nepal. The major finding of these assessments is given in Table 25 below.

Table 25 Status of customary rights associated with forestland tenure according to recent studies

Assessment reports	Major findings and recommendations on customary rights to make the ER Program a success
Report on Forest Carbon Ownership (2015) http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Final-Report-FCO_Revised_29_10_2015_ERI_Final_01-11-2015.pdf	• Several customary practices for forest management are in place, though they are less recognized in the formal management plans of all types of forests. CFUGs should be required to incorporate customary rights in the regular revision process of forest management plans through.
Report on Assessment of Forest Tenure Policies in Nepal (2016) (http://www.fao.org/3/a-i6247e.pdf)	• The customary rights are recognized in the policy instruments and guidance documents, though less recognized in the forest management plans, which should be recognized during the revision of all types of forest management plans.
Documentation and assessing customary practices of managing forest resources at local level in Nepal (2015) http://mofsc-redd.gov.np/page_id=14	• In the ER Program Area, there are various customary practices of Tharu communities and other forest dependent IPs related to the collection of forest products for cultural as well as religious practices. These should be protected and promoted as customary rights during the implementation of the ER program.
Nepal Land and Natural Resource Tenure Assessment for Proposed Emission Reductions Program in Terai Arc Landscape (2015) (https://www.land-links.org/wp-content/uploads/2016/10/ USAID Land Tenure_TGCC_Nepal_Tenure_Assessment.pdf)	• The forest management plans of all types of regimes have recognized very limited customary rights of IPs, therefore during the revision of such plans, there is a requirement to ensure the customary rights in all types of forest management plans including management plans of Buffer Zones.

These and other assessment reports on forest tenure conclude that forest management plans are weak in terms of recognition of customary rights and there should be recognition and inclusion of customary rights during the regular revision of forest management plans of all types of forests in the future, which is one of the major activities of this ER Program. Considering the above-mentioned findings and recommendations on customary rights, the National REDD+ Strategy has also proposed a separate strategy to recognize and integrate traditional and customary rights, knowledge and practices in forest management plans, particularly in CBFM regimes. An assessment will be required in the future to assess how and what types of customary rights are recognized in the management plans of all type of forests during the implementation of the ER Program. For further discussion on the promotion of safeguards in the design of the ER Program refer to Table 29 in Section 5.2 and general consideration under Section 14.1 on safeguards.

4.4.1 CONSTITUTIONAL PROVISIONS FOR SECURING LAND AND RESOURCE TENURE

The recently enacted Constitution of Nepal (2015) provides several additional provisions related to land and resource tenure. Article 25 of the Constitution of Nepal has recognized the rights to secure property rights and land/resource tenure of individuals. The rights of private landholders are protected according to these fundamental rights ensured by the Constitution. The government has authority to develop and implement plans and programs for environmental protection, and planned housing and urban development, by following due process of law.

The Constitution has not incorporated any specific fundamental rights for **securing rights of IPs**, though under the state policies of the constitution, the state has expressed strong policy commitment for the promotion of traditional rights of IPs. For this purpose, the Article 51(j)(8) has expressed that the state will make an appropriate arrangement for the indigenous nationalities to participate in decisions concerning that community by making special provisions for opportunities and benefits in order to ensure the right of these indigenous nationalities to live with dignity, along with their identity, and protect and promote traditional knowledge, skill, culture, social tradition and experience of the indigenous nationalities. The ER Program has proposed activities to promote the traditional and customary rights of IPs considering the legal provisions of the country and additional comments received during the consultation process. These are outlined in Sections 4.3, 14.1 and 16.1 and include activities that safeguard against the loss of IP rights and practices (see ER Program Area Specific SESA and ESMF) as well as those that actively promote them (e.g. Programs to preserve IP traditional knowledge, skills and customary practices will be introduced).

Article 40(5) of the constitution ensures that the State shall **provide land to the landless Dalit** in accordance with law and article 40(6) has stated that the State shall, in accordance with law, arrange settlement for the Dalit who do not have housing. Close coordination will be needed across ministries to ensure that when fulfilling this law, forest land is not converted, considering the legal provisions on land-use planning as envisioned in the section 51g of Land Act 1964 and section 67a of the Forest Act 1993.

Under the rights to social justice, article 40(4) of the Constitution has ensured that **every farmer shall have the right to have access to lands**, select and protect local seeds and species which have been used and pursued traditionally, in accordance with law. However, considering the section 67a of the Forest Act 1993, forest lands will not be converted into agricultural land during the exercise of this fundamental right and the land redistribution law and policy will be applied to execute this fundamental right considering the recommendations made by High Level Land Reform Commission and Environmental Committee of the Parliament in 2015.

The constitution of Nepal (article 32) has guaranteed the cultural rights and based on these fundamental rights the IP/LCs can exercise their bio-cultural rights through their own community protocols or approved forest management plans. Some of the customary rights to collect or harvest forest resources are incorporated in the forest management plans. The gaps will be addressed during the implementation of ER program through revision of forest management plans. Therefore, the revision of forest management plans will be one of the important interventions in the ER program. Conflict resolution mechanism will be established to resolve potential conflicts.

The Constitution of Nepal has made a provision to establish a separate Constitutional Commission on Indigenous Peoples and that commission will be responsible to develop various guidance on customary sustainable use rights of IPs in the future.

4.4.2 POTENTIAL IMPACTS OF THE ER PROGRAM ON EXISTING LAND AND RESOURCE TENURE

The potential impacts of the ER Program on resource tenure rights were discussed during district and national consultation and are highlighted in Section 5. These are summarized in Table 26 below.

Table 26 Potential impacts of the ER Program on existing land and resource tenure

Proposed activities of ER Program	Potential impacts on existing resource tenure and actions to address the impacts
1. Improve management practices in existing community forests building on traditional and customary practices 2. Localize forest governance through transfer of National Forests to Community and Collaborative Forest User Groups	Activities under this intervention will promote the expansion of CBFM and improve the governance of CBFM groups. Special attention will be made in the forest management plan to ensure equity and inclusion of forest dependent poor, socially marginalized groups, women and distant forest users of the lowland areas.
3. Expand private sector forestry through improved access to extension services and finance	There will be no negative impact from this activity on resource tenure.
4. Expand access to alternative energy with biogas and improved cookstoves	There will be no negative impact from this activity on resource tenure.
5. Scale up pro-poor Leasehold Forestry	Activities offering alternative livelihoods to the local poor and forest dependent groups will have no impact on resource tenure.
6. Improve integrated land use planning to reduce forest conversion associated with advancing infrastructure development	There is a high demand for forest areas for urban settlement, resettlement of landless households, expansion of agriculture land, infrastructure development. Any impact on land tenure during the development of land-use plans will be addressed through regular multi-stakeholder and multi-sectoral coordination and dialogues.
7. Strengthen management of Protected Areas	Protected areas are federally owned, there will therefore be no negative impact from this activity on resource tenure.

Land-use and resettlement law: Conversion of forestlands to settlements and agriculture is a continuing problem particularly in the districts of ER Program Area. Most encroachment and informal settlement in forests, along river sides and road sides, takes place as a result of landlessness. Natural disasters also have produced a new round of landless, and this is likely to intensify as climate change advances. Forestland has been distributed to the landless households under various land reform commissions. Despite numerous commissions to address the landless issue, there has been only limited success.

To respond to this, the Government of Nepal has enacted the Encroachment Control Strategy 2011 and Land-use Policy 2015 to control further encroachment into forests. The Land Act 1964 and Forest Act 1993 has made special provision to control illegal registration and encroachment into forests. According to Section 67a of the Forest Act, forestland will not be converted into settlements or resettlement areas except for those people who are affected by natural disaster and nationally

prioritized projects. These legal and policy instruments have been taken into consideration during the design and implementation of the ER Program.

Competing rights and conflict resolution mechanisms: The legal provisions of Nepal have established various mechanisms for the resolution of forest tenure disputes. The forestry sector and other cross-sectoral legal systems have given authority to CFUGs, DFOs, local governments, constitutional bodies, quasi-judicial bodies and judicial organs for resolution of forest tenure disputes. Forest law has provided limited access to CFUGs to participate in judicial proceedings, though they can use other general legal measures to do so. The Community Forestry Development Guideline has established steps to prevent forest tenure disputes at the community level. The government authority at the district level is also responsible to prevent any conflicts related to forests.

The DFO is the key agency responsible for settling the boundary conflicts between different community-based forest user groups in the districts (rule 27). The DFO has authority to investigate and decide about illegal registration of any part of the community-based forest by any individual in the name of private land registration. The DFO should cancel an illegal registration of forest land from an individual (section 16). The DFOs have rights to investigate and provide suggestions to CFUGs and other community-based forest user groups about the distribution of forest products, utilization of fund and implementation of approved forest management plans.

According to section 33 of Local Self-Governance Act 1999, the Village Development Committee (VDC) has jurisdiction to hear and settle the cases related to the boundary of public land, pasture land, grass, and fuelwoods. The Commission on Investigation of Abuse of Authority (CIAA) is a constitutional body in Nepal responsible for investigating the cases related to abuse of authority and irregularities in all public spheres including forestry. The Civil Code of Nepal 1963 and the Constitution of Nepal 2015 both have provided a legal opportunity to the citizen or groups of citizens to go to the ordinary courts individually or collectively for a legal remedy in any cases related to public interest including protection of environment and forest tenure rights. All these measures will be applicable to the dispute resolution during the implementation of ER program.

The main conflicting issue in the ER Program Area is to address the landlessness through providing appropriate areas to them for housing or settlement. The Government of Nepal had enacted Bonded Labor (Prohibition) Act, 2002 to address the landlessness related problems of freed bonded labor and based on this act, the district level committee on bonded labor have been working to resolve the problems of landlessness and this mechanism will be functional in the future as well.

These issues are discussed further and addressed in Section 14.3 on the Feedback and Grievance Redress Mechanism.

4.5 ANALYSIS OF LAWS, STATUTES AND OTHER REGULATORY FRAMEWORKS

Nepal has several policies, statutes and legal frameworks in place to address the drivers of deforestation and forest degradation and/or to support the conservation and enhancement of carbon stocks (summarized here by driver and detailed in Annex 7).

Driver	Legislations	Policies, strategies
Deforestation		
Encroachment	Forest Act 1993, Land Act 1964	Land-use Policy 2012, Forest Encroachment Control Strategy 2011

Resettlement	Land Act 1964	Land-use Policy 2016
Infrastructure	Environment Protection Act 1996 Environment Protection Regulations 1997	Climate Change Policy 2011 Forest Policy 2015 NBSAP 2015
Degradation		
Over grazing	Forest Regulation 1995	Forest Policy 2015 NBSAP 2015
Forest fire	Forest Act 1993 (sensitization and control environmental crime)	Forest Fire Management Strategy
Illegal harvesting of timber products	Forest Act 1993	Forest Policy 2015
High dependency on fire woods	Forest Regulation 1995	Forest Policy 2015 Forest Sector Strategy 2016 Renewal Energy Subsidy Policy 2016
Expansion of invasive species	National Park and Wildlife Reserve Act 1973	National Biodiversity Strategy and Action Plan 2014
Unsustainable forest harvesting practices	Forest Regulation 1995	
Natural hazards		Climate Change policy 2011

The Forest Act 1993 and Forest Regulation 1995 are core legislative instruments in Nepal to regulate forest tenure and forest management. The National Parks and Wildlife Reserve Act 1973 and associated regulations[58] provides a basis for protected area management. The Environment Protection Act 1997 and Environmental Protection Regulation 1997 are also important legal instruments mainly for the Chure Environmental Protection Area which covers a significant part of the ER Program Area. The Soil and Watershed Conservation Act, 1982, and Formation orders on Chure Terai-Madesh Conservation Development Board 2014 are cross-sectoral legal instruments having Articles and clauses related to forest management, forest tenure and associated rights issues. Finally, the Local Self-Governance Act 1999 has played a key role in advancing forest tenure and management of forests at the local level, although it is not directly related to forests as such. The level of influence of these regulations in forestland tenure is significant. The section 67b of the 2nd amendment (2016) of Forest Act 1996 has stated that the management, utilization and benefit sharing of environmental service (including carbon service) will be as prescribed in the forest regulation. Therefore, during the 6th Amendment (in the future) in Forest Regulation 1995, the government will define legal nature and title to transfer the Carbon Environmental Services/ERs considering the schedule 5 (27) of the Constitution of Nepal.

The following subsections highlight those domestic policies and frameworks that are most relevant to the specific program activities outlined above in Section 4.3.

Policy and legal instruments addressing unsustainable and illegal harvest of timber and fuelwood: One of the main objectives of Forest Act 1993 and Forest Regulation 1995 is to manage forests sustainably and to control unsustainable and illegal harvest of forest products. According to Forest Act 1995 (sections 20 and 25), the District Forest Offices and the Forest Users Groups are required to include measures in forest management plans to control unsustainable and illegal harvesting of timber and other forest products. The Government also developed separate Timber Harvesting, Sales and Distribution Directives[59] for both government-managed and community forests which have

[58] 12 separate regulations including Buffer Zone Management Regulation 1994 are enacted from government for the implementation of National Parks and Wildlife Reserves Act 1973.

[59] Directives on Forest Products (Timbers, firewood and other forest products) harvesting, sales and distribution from Community Forestry 2015; Directives on Forest Products (Timbers, firewood and other forest products) harvesting, sales and distribution from Community Forestry 2017

help to control unsustainable harvesting of timber through provisions for measurement and monitoring of timber harvesting activities in forest areas.

Section 49 of Forest Act 1993 includes a list of prohibited activities in all types of forests in order to control illegal harvest of timber, for example, by authorizing fines and/or imprisonment for persons found to be involved in illegal harvesting of forest products including timber and fuelwood. Similarly, Section 29 of the Forest Act 1993 gives authority to Community Forest Users Groups to control illegal harvest of timber in community forests.

Related to the objectives and strategy of Forest Policy 2015 and the National Forest Strategy 2016, the government and local communities have also developed a system for the equitable distribution of timber and firewood from government-managed and community forests and particularly to forest-dependant poor households, socially marginalized groups and families affected by natural disaster.

Policies to manage overgrazing: According to Rule 19 of Forest Regulation 1995, a license must be obtained from the District Forest Office for grazing in some forest management areas. According to the Forest Regulation, management of grazing should be an integral part of forest management plans of all types of forest including community forests. According to the Community Forestry Development Program Guideline (revised 2015) and Community Forestry Inventory Guideline, each CFUG should allocate a designated area in the community forest for grazing and in the last few years, many CFUGs have been establishing zero grazing areas in the community forests to control open- and overgrazing. The CFUGs, DFOs and Livestock offices are also implementing fodder production program for livestock at local levels to reduce over/open grazing in forest areas.

Policies to control forest fires: In response to many major wildfire events, the Government formulated the Forest Fire Management Strategy 2010. This strategy has four components (law enforcement, capacity building, community-based fire management and coordination/monitoring) for forest fire management. The objective of this strategy is to strength capacities to control forest fires with the broad involvement of stakeholders, adopting a community-based approach to control forest fires. Each FUG develops a program and activities to control forest fire through local level mobilization. The Forest Act 1993 (section 50) also includes provisions for punishment for setting of illegal fires.

Legal mechanism to control encroachment and managing resettlement: The Constitution of Nepal 2015 (art. 51) commits to maintain national forest area goals and also incorporates state policies in the constitution to control forest encroachment, a critical issue in the Program Area. Nepal formulated a Forest Encroachment Control Strategy 2011 that prohibits conversion of forests into other land-use except forest utilization for nationally prioritized projects. The strategy also proposes activities to control forest encroachment.

The second amendment of Forest Act 1993 in 2016 as includes provision to control forest encroachment. According to section 16 of this act, no one has rights to ownership over forest areas and if anybody has registered the forest area in the name of an individual, such illegal registration shall be *ipso facto* cancelled by the DFO at any time. Section 49 of the Forest Act prohibits conversion of forest land for other use such as agriculture and settlement. Similarly, section 67a of this act strictly prohibits settlement or resettlement programs in forest areas; however, if there are no other options for the settlement, based on the Environmental Impact Assessment reports, the government can allocate some parts of forest lands for the settlement of natural disaster affected households and households displaced due to the implementation of nationally prioritized projects.

Environmental standards on infrastructure development: Section 68 of Forest Act 1993 described that in cases where there is no alternative except to use forest areas for the national priority plans, and if there will be no significant adverse effects on the environment, government may allow for the use of forestlands for the implementation of such plan. The government recently developed

procedures to prevent abuse of this government authority. This Procedure (2017) to utilize the forest land for nationally-prioritized infrastructure projects includes mandatory provisions to conduct Environmental Impact Assessment before deciding to allocate any forest for infrastructure development. According to this procedure, the infrastructure project developer should develop an environmental management plan for the rehabilitation of forest lost during the infrastructure development, including through mitigation measures such as plantation and other measures.

Implementation of Multilateral Environmental Agreements

Nepal is a party to several multilateral environmental agreements (MEAs) concerning climate change, biodiversity conservation and sustainable natural resource management. To some extent Nepal has been able to fulfil the commitments to these agreements effectively. The implementation status of some of the MEAs that are relevant to REDD+ are briefly presented in Table 27 below, see Annex 4: Multilateral Environmental Agreements to which Nepal is a Party, for further details

Table 27: Implementation status of major MEAs that are relevant to REDD+ in Nepal

Policy and legal arrangement	Institutional arrangement	Remarks
United Nation Framework Convention on Climate Change, 1992		
CC Policy 2011 NAPA 2010 LAPA framework 2012 NAP (under preparation) National REDD Strategy (draft) INDC	MoPE – focal ministry CC Council – chaired by Prime minister CC Division – under MoE Line ministries – forest, agricultural, local development, energy, irrigation etc. working as a program coordinating agencies NGOs – working for technical support and capacity building local communities – implementing program at local level for adaptation/mitigation	Ratified by Nepal on 2nd June 1994
United Nation Convention on Biological Diversity, 1992		
National Park & Wild Life Reserve Act, 1973 and 10 regulations including Buffer Zone Regulation under this act Forest Act, 1993 Environment Protection Act, 1997	MoFSC - a focal ministry for this convention. Environment Division of MoFSC is working as a coordinating body for the implementing of convention. IUCN, ICIMOD, WWF, NTNC, forestry projects, FUGs networks and NGOs are supporting to implement convention. FUGs and Indigenous Peoples (IPs) are foundation for the implementation of convention at local level	Ratified by Nepal 23rd November 1993

4.6 EXPECTED LIFETIME OF THE PROPOSED ER PROGRAM

The lifetime of the proposed ER Program is 10 years (2018-2028), extending three years beyond scheduled sunset of the Carbon Fund. It is expected to take up to five years to appreciate significant emission reductions, but given accelerating rates of forest loss (see Section 8), it is essential that these activities are put in place immediately to stem additional loss of the TAL's forests.

Tentative timeline for ER Program

Signing of an Emission Reductions Payment Agreement (ERPA) – 2018
First MRV and performance based payment –2018-2023
Second MRV and performance based payment–2023-2025

5. STAKEHOLDER CONSULTATION, AND PARTICIPATION

5.1 DESCRIPTION OF STAKEHOLDER CONSULTATION PROCESS

Stakeholder consultations are central to the design and implementation of Nepal's ER Program. The Government of Nepal—supported by the ER-PD development team—followed an extensive, bottom-up consultation approach that generated district- and community-level activities that could be feasibly implemented during the project lifetime, and that have the ownership and inclusion of local stakeholders. All consultations were carried out following the "Guidelines on Stakeholder Engagement in REDD+ Readiness" on agendas ranging from institutional arrangements, benefit sharing, and roles of stakeholders, carbon and non-carbon benefits, safeguards and strategies for implementation of ER Programs and activities.

Consultations were principally organized by the REDD IC, Regional Directorate of Forest, Department of Forests and District Forest Offices, as well as district chapters of different stakeholders like Indigenous Peoples (IPs), Community Forest User Groups and Dalit NGO Networks. The consultations engaged marginalized groups, women's groups and Madhesi and Muslim communities to ensure these important stakeholders have full and adequate representation in the consultation process. A wide range of stakeholders[60] and right holders[61] were also consulted in designing and planning the ER Program and activities. This involved representation of government and nongovernment institutions, traditional and customary organizations, private sector, and representatives of local forest dependent communities, women, Dalits, IPs, Madhesis and Muslims. These consultations had the dual purpose of disseminating information on the proposed ER Program and activities, and seeking feedback from the participants and stakeholders involved. They also aimed to enhance the capacity and build knowledge and expertise on REDD+ among the participants. See Annex 5: Stakeholder Consultations and Workshops for a breakdown of the representation of different communities in the consultations.

Consultation from and with Indigenous Peoples and local communities
NEFIN is an autonomous and politically non-partisan, national level organization of IPs. NEFIN organized a regional-level consultation workshop to explore the issues, agenda and concerns of IPs in the design and implementation of the ER Program. Based on the consultation workshop, NEFIN has developed a 28-point common position, which has been formally submitted to REDD IC from 12 District Coordination Council of NEFIN through its national secretariat. This position paper strongly recommended ensuring the resource rights of IPs over forestland during the design and implementation of ER Program. These recommendations have been taken into account during the design of the ER Program and NEFIN's concerns will be addressed and respected during the implementation of the ER Program as well. Among these positions, points 15 and 16 in particular will be addressed through the revision of CBFM plans to recognize the rights of IPs. The position paper concerning IPs can be found in Annex 11.

FECOFUN is a representative organization of CFUGs in Nepal and organized two regional-level consultations on the design and implementation of the ER Program. Based on these regional consultations, FECOFUN developed a seven-point position paper, which was submitted to REDD IC.

[60] Stakeholders for ER Programs are those whose interests are potentially affected by the program or who can affect and influence the programs.
[61] Rights-holders are those individuals, groups and organizations (including both government and nongovernment) whose existing rights, whether formally recognized or granted based on customary law might be potentially affected by the ER Program

This position paper recommended including a program to hand over national forest to local communities as a CBFM regime.

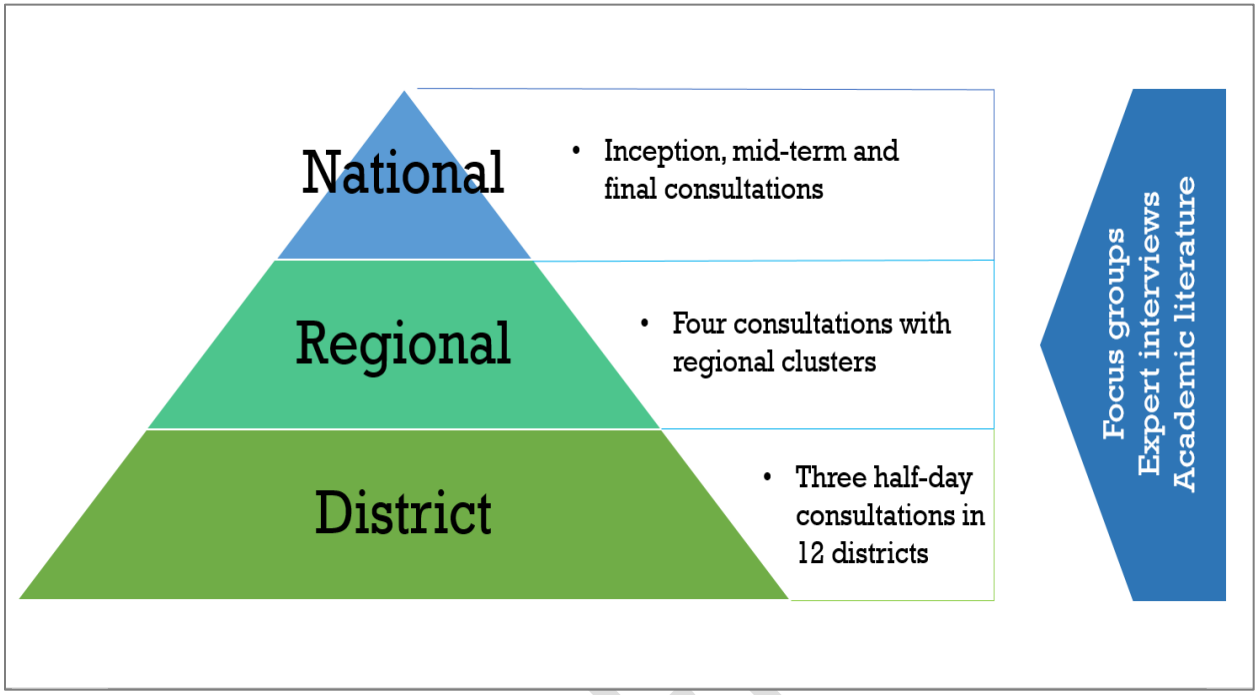
The district consultations were organized and conducted through the Association of Collaborative Forest Users Nepal (ACOFUN) and the Community-based Forestry Supporters' Network (COFSUN), which organized six district consultations each.

5.1.1 ORGANIZATION OF CONSULTATION WORKSHOPS AND MEETINGS

In line with guidance from the REDD Implementation Centre and suggestions received during the inception workshop, the Government of Nepal, in collaboration with the ER-PD development team, conducted three national, four regional and 36 district-level consultations. These consultations were conducted in collaboration with the Nepal Federation of Indigenous Nationalities (NEFIN), the Federation of Community Forestry Users Nepal (FECOFUN), Dalit NGO networks and field partners. Participants that were present in the national workshops also attended district and regional workshops and the REDD IC aimed for continuity of participants between workshops.

An initial national inception workshop helped to inform and guide the ER-PD development team as well as ensure the political buy in of all relevant stakeholders in Nepal. Following this, three half-day consultations were carried out in each ER Program district to ensure that lessons and recommendations can be aggregated back up to the national level. Following these district-level consultations, four regional cluster consultations were organized, specifically targeting marginalized groups who may otherwise be inadequately consulted during district level consultations. Finally, the REDD IC conducted a mid-term and final consultation with national-level stakeholders to share the results of district and regional level consultations. In parallel to the bottom up consultations, a number of focused group discussions with marginalized groups, academics, and experts were conducted on specific elements of the ER Program design (see Figure 9 below). For a full list of participants see Annex 5: Stakeholder Consultations and Workshops.

Figure 9 Planning of Consultations for ER-PD



5.1.2 DISTRICT LEVEL CONSULTATIONS

The 12 districts of the TAL were divided into two groups (eastern and western) with six districts each. The consultations were organized in parallel with the leadership of DFOs and in coordination with the REDD IC so as to invite all district level stakeholders (e.g., district government line agencies, political leaders, CSOs, IPs, local communities, I/NGOs, FUGs, private sector, marginalized groups, women's groups, and experts). The first consultation meeting in Rupandehi district was a combined meeting to ensure consistency and alignment in the consultation processes. After this first meeting, the consultations were conducted in other districts in coordination with the DFOs.

The stakeholders in district-level consultations represented a variety of sectors, including government, development agencies, CBFM user groups, NGOs and CSOs, IPs, Dalits, women, and academic and research organizations. The participation of both stakeholders and right-holders was deemed vital in the ER Program design and implementation, particularly to identify effective interventions; mitigate risks with regards to potential conflicts and impacts, and ensure the rights of the impacted individual and groups. The stakeholders are categorized in Table 28 below.

Table 28 Key Stakeholders Consulted during ER Program Design

Category of stakeholders	Institutions, entities, and representatives of stakeholders/rights holders involved in consultation process	Description of stake, influence& interests
Government agencies of different sectors at different levels	MFSC: DFRS, DoF, REDD IC, Other MFSC departments Relevant Line Ministries- Land Reform, Agriculture and Cooperative, Water Resources, Physical Infrastructure and Transportation, Local Development, Energy, Science, Technology and Environment, Finance and National Planning Commission (NPC), local government bodies- DDCs and VDCs	REDD IC through concerned ER Program District Forest Office (DFO) is the primary government agency that takes policy decision making, formulates, implements and oversees the ER Programs. Considering the integrated nature of ER Programs, relevant line agencies such as district agriculture office, Land revenue office, district livestock office and local bodies like district development committee (DDC), village development committee (VDC) and municipalities have legitimacy and power to affect and influence the ER Programs
Forest Users/Beneficiary Groups	Community based forest managers e.g. CFUGs, CFM groups, LHFGs, local communities of different caste/ethnic, gender, religious and linguistic backgrounds (women, Dalits, IPs, Madhesis and Muslims communities and forest dependent communities)	They are the main right holders of the ER Program considering that it is their lives and livelihoods that are directly at stake.
NGOs/CSOs/ Federation of Forest User Associations/ Federation of Indigenous Nationalities (NEFIN)	Association of Collaborative Forest Users, Nepal (ACOFUN); Federation of Community Forest Users, Nepal (FECOFUN); IPOs, Dalit Networks and District and VDC level IPOs and district and VDC wings of Nepal Dalit Networks and Organizations and CBOs and NGOs working directly or indirectly in forestry sector with aims and functions related to community based sustainable forest management	Ensure good governance in the system in favor of IPs, local forest managers and marginalized forest dependent groups Capable of advocating and mobilizing the user groups, local communities and CBOs on sharing benefits of ER Programs and related issues
Donor communities and other international development agencies	WB, ICIMOD, WWF, DFID, SDC, Donor funded forestry projects	Provide financial and technical resources to ensure SMF, livelihoods security and poverty alleviation; strengthening democratic governance mechanisms

		Influences policy processes and outcomes, including development financing
Professional groups/association and Academia/Research Institutions	Nepal Foresters' Association (NFA), universities and forest and natural resource research organizations such as Tribhuvan University, Institute forestry; Information Center of Government of Nepal	Knowledge and technology transfer through research and development initiations Remain at the center of science and technological development
Owner/managers of Private forestry, Forest Based Entrepreneurs and Workers	Individuals and organized entities involved in farming private forests; operating industries based on forest resources. It also includes the labor force involved in the entrepreneurship.	Play key role to develop and invest in public private venture in ER Programs

Consultations were conducted using locally appropriate procedures, including use of Nepali languages or hiring LCs or IPs as facilitator. A letter was sent from the REDD IC to all DFOs in the TAL to invite stakeholders to the consultations, including a tentative list of stakeholders. The concerned DFO then issued invitation letters to all possible stakeholders in his/her district. The invitation letter issued by the DFO to invite stakeholders described briefly the objectives, process and procedures of the consultation process, with program details including venue and date of the consultation.

Consultations were organized in a standardized format across all 12 districts. The three half-day consultations were broken down as follows:

Identification of Drivers of Deforestation and Forest Degradation: Participants were divided into three groups to identify key drivers of deforestation, forest degradation, and enhancement. Each group was given an hour and a half to two hours to brainstorm, prioritize, and fill in information pertaining to their theme and district. Upon completion of the task, group leaders - assigned by their teammates - presented the group's analyses. This was followed by an approximate half hour discussion where all participants were encouraged to comment, critique and add information that may otherwise have been missing.

Identification of Policies and Measures to Address Drivers: After identification of key drivers of deforestation and forest degradation as well as opportunities to enhance forest carbon stocks for each district, the participants of these groups were requested to propose specific policies and measures for each identified area. After discussing key hotspots and areas, each group proposed activities to address the drivers of deforestation and forest degradation or enhance forest carbon stocks identifying responsible authorities and entities. They also identified key legal, technical and social challenges and barriers.

Identification and Ranking of Non-Carbon Benefits: Participants were informed about non-carbon benefits (NCB), including their meaning and categories and how NCBs can be incentivized alongside the generation of emission reductions during the implementation of the ER Program. The participants were then requested to list possible NCBs that could be generated while implementing different activities (based on the previous session's group work) in each district. The participants were also requested to express the existing practices of monitoring community forests in general and NCBs in particular, and measures (if any) to strengthen the monitoring system..

Social and Environmental Safeguards: The participants were requested to identify the likely social and environmental impacts and corresponding mitigation measures if the proposed interventions were to

be implemented in each district. Participants were encouraged to assess the likely adverse impact in terms of: Risk of restriction of access to resources; Risk of relocation/displacement of forest dependent communities/HHs; Risk of biodiversity degradation; Risk of leakage (in terms of deforestation, degradation & over exploitation of forest resources); Risk of loss of livelihoods and incomes; and Impacts on IPs and vulnerable communities.

Legal Basis and Institutional Arrangement: The participants were informed about the current legal and constitutional provision related to forests and climate change as well as the institutional framework proposed in the National REDD+ Strategy for implementing REDD+ activities including projects related to ERs. Focus group discussions were then held with the participants, who were requested to hold participatory discussions and to provide their feedback on the presentation as well as their possible roles and responsibilities in the implementation of the ER Program.

Benefit Sharing Arrangements: Preliminary discussions related to benefit sharing were informed by several stages of consultations prior to the development of the ER-PD. This included consultations at the local, district and national level, including the development of benefit and revenue sharing arrangements under the various CBFM regimes, and was part of the National REDD+ Strategy development process.

5.1.3 REGIONAL LEVEL CONSULTATIONS

In addition to the district consultations, four regional level consultations were organized. These targeted IP groups and CFUGs at the grassroots level to ensure that marginalized groups, women's groups, and other important stakeholders have full and adequate representation in the consultation process.

Consultation with IPs: A regional level consultation with IPs was organized on October 26-27, 2016 in Chitwan, Nepal to collect and document Nepal's Indigenous Peoples' concerns, stances and demands regarding Nepal's ER Program. The consultation workshop was facilitated by Climate Change Partnership Program of Nepal Federation of Indigenous Nationalities (NEFIN). The two-day consultation workshop was divided into two parts. The participants were first introduced to the key elements of the ER Program and were provided quick updates on the REDD+ process. Facilitators used presentations, meta-cards, and held question and answer sessions to explain the points and issues. Following this, facilitators conducted intensive plenary discussions amongst the participants for one and a half days to gather views and recommendations from IPs participants. The details of the concerns and issues raised by the participants, along with their recommendations, are presented in Section 5.2 below. More than 75 participants, including representatives from NEFIN's District Coordination Council and its affiliated organizations (i.e. federation of indigenous journalists, student, women), NEFIN CCPP staff members attended and contributed to the program.

Consultation Workshops with Forest User Groups: Regional consultations with forest user groups were held on September 27-28, 2016 in Butwal and 29-30 September 2016 in Dhanghadi with the purpose of collecting and documenting concerns, stances and demands of forest user groups (FUGs) and forest dependent communities regarding the ongoing process of preparing Nepal's ER Program. These consultations were organized by FECOFUN and participants were mainly members of the CFUGs and FECOFUN district chapters. Consultations emphasized land-use planning to avoid the use of forests for other purposes, such as resettlement, infrastructure development and community infrastructure.

Consultation Workshop with the Private Sector: REDD IC, supported by WWF Nepal in collaboration with the Association of Family Forest Owners Nepal (AFFON), organized a half day focus group discussion with the private sector. The discussion started with an introduction of the AFFON and their role in the districts. WWF briefed the team on the ER-PD and the process. The REDD IC briefed the

group about the scope of work of the REDD IC and the ER-PIN. The key issues highlighted by the private sector include the following:

a. Tree tenure along with the land tenure in which the trees were planted.
b. Simplify process for the private sector to harvest the planted trees
c. Provision of quality seedlings for plantation
d. Technical support for the choice of tree species
e. AFFON members are required to plant a minimum of 10 trees a year. They need technical advice on tree species choice. They prefer fast growing (exotic) species, but this could conflict with the environmental safeguards
f. Insurance mechanism for plantations
g. Capacity building of the private sector on REDD+
h. Investment opportunities in green enterprises
i. Market development

5.1.4 NATIONAL LEVEL CONSULTATIONS

In addition to the district and regional consultations, the REDD IC in collaboration with the ER-PD development team conducted three national workshops and bilateral conversations with key ministries.

Inception Workshop: The one-day inception workshop was hosted by the REDD-IC on August 14, 2016. The objective of the inception workshop was three-fold: 1) Officially launch the ER-PD development process; 2) Provide key stakeholders with an overview of the ER-PIN, the ER-PD development process, and the role of World Bank and Carbon Fund in the ER-PD; and 3) Receive feedback on the existing ER-PIN, along with the proposed ER-PD development process and the project's five core intervention activities. The inception workshop was divided into two sessions and comprised a total of six informative presentations. Each session of the program included a plenary question and answer session. The morning session began with an overview of the ER-PD development process, followed by remarks from key government ministers. The afternoon session focused on the five interventions proposed in the ER-PIN and the cross cutting elements of the ER-PD including the legal, social and technical considerations.

Midterm Workshop: A midterm review workshop was organized on December 7, 2016 after completion of district- and regional-level consultations. The one-day workshop was hosted by the REDD-IC and a total of 46 participants representing right holders, stakeholders of the ER Program, and relevant institutions attended the workshop. A full list of participants is available in Annex 5: Stakeholder Consultations and Workshops. The overall goal of the midterm workshop was: 1) to review the objectives of the proposed ER Program; 2) review the proposed ER Program design and feedback from national stakeholders; and 3) provide an overview of the process including project timelines, consultation and review, and key deliverables. The workshop was divided into three main sessions—opening, technical and closing, and comprised opening remarks by representatives of key stakeholders and chief guest, four technical presentations on ER-PD preparation and ER Program design, and closing remarks by the chair summarizing the whole program. Each session of the program included a plenary floor discussion and question and answer session.

Inter-ministerial discussions: Discussions were held with the various ministries and departments at the federal level and intergovernmental and non-governmental organization (NGOs) present in Kathmandu. This included discussions with the Ministry of Finance (MoF), Department of Forests (DoF), Department of Forest Research and Survey (DFRS), Department of National Parks and Wildlife Conservation (DNPWC), UNREDD program, Alternative Energy Promotion Centre (AEPC), International Centre for Integrated Mountain Development (ICIMOD), Nepal Federation of Indigenous Nationalities (NEFIN), Association of Collaborative Forest Users Nepal (ACOFUN), and Federation of

Community Forestry Users Nepal (FECOFUN). Comments from these groups were taken into account during the design of the ER-PD, and they will continue to be consulted and will participate in the implementation of the ER-PD.

Focus Group Discussion: Four focus group discussions (FGD) were conducted separately with women, Dalit, CFUGs, and IPs. The final draft ER-PD was shared with participants and their feedback was collected to further improve the ER-PD. The date and venue of the FGD and the details of participants is included in Annex 5: Stakeholder Consultations and Workshops.

Final Workshop: A final workshop was held on April 27, 2017 to present the ER-PD to national stakeholders. This workshop was conducted after a review period of the ER-PD by national stakeholders, including an ER-PD draft working group established during the inception workshop. The goal of the final workshop was to launch the ER Program nationally and collect final issues and concerns from relevant stakeholders identified during the ER-PD development process. Following the national workshop, the ER-PD was made available online, including a translated summary version in Nepali.

5.1.5 ONGOING CONSULTATIONS DURING IMPLEMENTATION OF ER PROGRAM

The Government of Nepal has maintained a transparent and consultative process since the outset of its REDD+ program in Nepal. A Consultation and Participation Plan was developed as a part of the implementation of the Readiness Preparation Proposal (R-PP) and the preparation of the R-PP also included consultation and participation of stakeholders from the public and private sectors, NGOs, indigenous communities, and civil society organizations. The Government of Nepal and the REDD IC is committed to continuing a robust consultation process, building on earlier consultations during the implementation of the ER Program through transparent stakeholder information sharing and consultation mechanisms that ensure broad support and effective participation of relevant stakeholders, particularly local forest dependent communities, women, IPs, Dalits, Madhesis, and Muslims.

To engage stakeholders in the REDD+ process in Nepal, a REDD+ stakeholder forum (REDD+CSO Alliance) has been established that comprises representatives of government, CSOs, IPOs and donors. The REDD+ stakeholder forum will be strengthened during ER Program implementation to use their existing networks and decentralized structures to enhance participation, communication and outreach. Field-based activities will be developed and implemented using participatory approaches and a range of formal and informal consultation methods will be adopted including: focus group discussions (FGDs), public meetings, community discussions, in-depth and key informant interviews; and censuses and socio-economic surveys.

The REDD IC, working through relevant district level line agencies, will ensure that all the right holders and stakeholders of the ER Program are informed and consulted on ER Program activities to be implemented. Similarly, the REDD IC will ensure that views of ER Program beneficiaries, particularly IPs, Dalits, Madhesis, distant users, women and forest dependent communities, are incorporated and addressed while conducting screening, social and environmental assessment and preparing safeguard planning documents.

Language, technical and attitudinal barriers will be minimized through translation of ER Program related documents into Nepali, and explained to stakeholders in dedicated sessions. Summaries of the final ER-PD, safeguard plans, REDD+ strategy and other documents related to ER Program implementation will also be translated into Nepali and made publicly available both online and in public places such as offices of respective wards of rural municipalities and municipalities of the ER Program location. As per Clauses 3, 7 and 8 of Right to Information Act, 2064 (2007), copies of these

documents will be provided to any requester by charging the photocopy cost. The information to be disclosed will include, at a minimum, a short summary written in Nepali about the key elements of the proposed ER Program, its likely impacts and benefits, measures proposed for minimizing adverse impacts and maximizing beneficial impacts, grievance redress mechanism and contact information. The implementation of the ER Program will also make use of a Feedback and Grievance Redress Mechanism (FGRM) to address REDD+ related grievances (see Section 14.3).

5.2 SUMMARY OF THE COMMENTS RECEIVED AND HOW THESE VIEWS HAVE BEEN TAKEN INTO ACCOUNT IN THE DESIGN AND IMPLEMENTATION OF THE ER PROGRAM

The district and regional level consultation meetings received many important comments, suggestions and recommendations from stakeholders and IPs, which together have been a key guideline in the process of designing the ER Program. Table 29 provides a summary of the key concerns and comments raised by the stakeholders and participant of district and regional workshop with IPs, as well as how these comments have been responded to or reflected in the ER Program design process. Further details can be found in Annex 5: Stakeholder Consultations and Workshops.

Table 29 Summary of the key concerns and comments raised during stakeholder consultations and how these comments have been responded to or reflected in the ER Program design process

Key issues and concerns raised by participants	How the issues, concerns and recommendations have been addressed and reflected in ER-PD?	Type of consultation		
		District	IPs	National
Increasing wildlife populations	Fencing, support for watchman, compensation if there is conflict with wildlife	X		
Fencing limits mobility of wildlife	Develop wildlife and biodiversity corridors around CBFM user areas	X		
Monoculture plantations are established	Local and diversified species in the plantation	X		
Invasive species may affect regeneration of native species	Possible risks of alternative management practices consider and incorporated where possible	X		
Restriction of tenure and use rights of forest dependent communities	Rights and responsibilities of forest dependent communities to access and control forest resources will be strengthened and ensured, to include all traditional users in CF/CFM groups IP rights over natural resources and forests will be established, and IPs and LCs will be allowed to collect forest products freely to continue to exercise their traditional occupations and religious and cultural practices Customary laws will be respected and recognized, and free, prior and informed consent (FPIC) will be obtained while delineating tenure and use rights of forest areas	X	X	
Forced eviction, involuntary relocation and resettlement	IP rights over ancestral territories, forest and land will be respected Free, prior and informed consent (FPIC) will be obtained while delineating the borders of forest areas, and the result of FPIC will be 'consent' or 'no-consent' in the event of relocation and resettlement Landless people will not be forcibly displaced unless there is a long-term settlement arrangement provided Before the delineation of forest areas, proper mapping of the lands traditionally owned and used by IPs will be conducted New settlement areas will be determined with IP traditional institutional representation and participation	X	X	

Customary practices in forests (livestock rearing, recreation, and culture) by IPs are prevented or are considered encroachment	Customary laws and practices will be respected and recognized with regard to use of forests No restriction will be imposed on forests and pasture lands that impacts IP economic, social and cultural lifeway Programs to preserve IP traditional knowledge, skills and customary practices will be introduced	X	X	
Lack of representation and participation of IPs in stakeholder engagement mechanisms	Effective participation and institutional representation of Indigenous Peoples as right holders at all levels of forest governance will be ensured Information and programs will be delivered to IPs in their native language in a timely, transparent and culturally appropriate manner, and ensures participation is meaningful, effective and proportionate way	X	X	
Negative impacts on livelihoods and incomes of forest dependent communities, households and IPs from decrease in agricultural land and livestock grazing	Provide training and capacity building for alternate livelihood opportunities and income generation Alternative livelihoods will be based on IPs traditional knowledge, skills and culture, and should minimize social and environmental impacts Provide support for agriculture using high yielding crop varieties, without eliminating native seed varieties Support livestock husbandry by increasing fodder supply, provide improved breeds of cattle (without eradicating local breeds), and support shed improvement and stall feeding	X	X	
Increased workload of women	Ensure ownership of women in biogas, ICS and solar technology for cooking Measure the value of women's work Equitable division of responsibility among family members.	X		
Revenue from ecotourism does not reach IPs	Effective participation of Indigenous Peoples in ecotourism development activities	X		
Lack of access to means or raw materials for culturally and socially appropriate alternative energy	Access to raw materials (such as collection of leaves to create biomass briquette) and medium of alternative energy Interventions related to energy will be culturally, socially and environmentally sound and viable for IPs	X	X	
Sustainable management of forests excludes IPs, including indigenous women	Effective participation and proportionate representation of Indigenous Peoples, including indigenous women, will be ensured in sustainable management of forests, and traditional knowledge, skills and customary practices should be respected		X	
Increase in production of forest products does not benefit IPs as distribution mechanism is not transparent and inclusive, timber mafias form, encroachment occurs on	Distribution mechanisms will be made transparent, inclusive and with proper participation of IPs Consideration will be taken not to encroach IP land while establishing depots Depots should not only be established in the southern plains but also in the communities who own the forest	X		

IP land, and depots are established in areas that do not benefit IPs				
Difficult for IPs and other marginalized communities to access grants and seed capital	IPs and marginalized communities will have access to grants and seed capital	X		
Exclusion of Indigenous Peoples in wildfire control efforts and networks	Effective participation of Indigenous Peoples in wildfire control efforts, including in the formation of wild fire control network, and in the process of defining divers of deforestation and forest degradation		X	
Imposition of exorbitant fees and administrative hassles on forest owners	Fees for private forest owners will be made reasonable and administrative procedures will be made simple and efficient		X	
Owners lose control over their own private forests in terms of use and sale of forest products, and felling trees	Rights and freedom to a reasonable extent will be bestowed on forest owners in terms use, sale and ownership of forest products		X	
Governance irregularities in private forests	Good governance will be practiced in private forestry sector		X	
Profit oriented companies dominate forestry sector	Investment in forestry sector will not violate the rights of Indigenous Peoples and other communities.		X	
Ensure legal rights of CFUGs over forest resources are respected during design, implementation and monitoring of ER program	The legal rights of CFUGs will be observed and respected during the design, implementation and monitoring of the ER program			X
Ensure forest tenure rights and carbon rights of the CFUGs during the	Forest tenure rights and carbon rights of CFUGs will be ensured during title transfer of emissions reductions to the Carbon Fund			X

title transfer of emissions reductions to Carbon Fund				
Prioritize community-based forest monitoring system to generate local information on performance and include a specific program for the capacity building of local community for monitoring	Community-based forest monitoring systems will be created to build capacity of local communities to monitor performance of the program			X

6 OPERATIONAL AND FINANCIAL PLANNING

6.1 INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

At the national-level, the REDD+ process is operationalized through a three-tier structure comprising the REDD Multi-sectoral, Multi-stakeholder Coordinating and Monitoring Committee (Apex Body); the REDD Working Group (RWG) at the coordination and decision-making level; and the REDD Forestry and Climate Change Cell (now REDD IC) as the REDD+ program management entity. These three organizations are supplemented by two informal structures, the REDD Multi-Stakeholder Forum and REDD CSO and IPO Alliance (formed by the Alliance itself). The roles of these groups and their relationship are described further below.

- **REDD Implementation Center:** The REDD IC functions as the primary operational body to provide national program leadership, coordinate ER Program planning, and bridge district-level planning and priorities under the national REDD+ strategy. The REDD IC works closely with the REDD Working Group on overall strategic planning and priorities, with the Division of Planning to ensure close coordination of activities across districts, and with the Division of Foreign Aid Coordination to ensure harmonization of the ER Program with other finance streams. Under the ER Program there would be several staff members of the REDD IC who are dedicated to national-level coordination of the program.
- **REDD Apex Body**: The Apex body is an inter-ministerial institution that will directly synchronize REDD related activities with national plans and policies and promote cooperation at the highest level. It includes members from the Ministry of Finance; Ministry of Population and Environment; MoFSC; Ministry of Culture, Tourism and Civil Aviation; Ministry of Energy; Ministry of Agriculture and Cooperative; Ministry of Land Reform and Management; Ministry of Industries; Ministry of Federal Affairs and Local Development; Ministry of Physical Planning and Transport; Ministry of Science and Technology, and representatives from the private sector, civil society and government organizations, totaling 49 members.
- **REDD Working Group:** The RWG is expected to proactively provide innovative ideas, monitor program activities and help to integrate program priorities with the national REDD strategy. In addition, the members of the RWG will advocate and lobby at the political level to guarantee that their local constituencies are represented in the regional planning process.
- **REDD Multi-stakeholder Forum**: The REDD Multi-Stakeholder Forum functions as the principal consultation, outreach and communication platform.
- **REDD CSO and IPO Alliance**: The Alliance functions as a platform to discuss and develop a common understanding of REDD+ on behalf of Civil Society Organizations and IPs Organizations.

At the district level, the ER Program will be implemented through forestry divisions of the states. All districts will have a **District Coordination Committee (DCC)** responsible for cross-sectoral coordination. In each district, the DCC will play a similar cross-sectoral role to that of the Apex Body at the national level. Under guidelines promulgated by the MoFSC, a sub-committee of the DCC (roughly equivalent to current DFSCCs) in each district will oversee the forestry sector with a cross-sector perspective.

State REDD+ Focal Officer: To coordinate ER program implementation among various divisions, a REDD+ Focal Officer (RFO) position will be created under the state-level Department of Forests, with five main functions:

1) Ensure coordination among districts on ER program implementation
2) Provide advice and guidance to district/divisions and REDD+ Program Management Unit
3) Liaise with REDD IC and RFO as needed for technical guidance and advice

4) Monitor ER Program implementation at the district/division level
5) Report to REDD IC and DoF/DNPWC on ER Program implementation in the districts.

To complement the role played by the RFO, there will also be a REDD+ Focal Office at the Department of Forest and DNPWC at the federal level, which will liaise with the REDD IC and the Regional REDD+ Focal Offices. It can also communicate directly with the District REDD+ Program Management Unit (DRPMU) as needed. The structure and function of the units responsible for the implementation and monitoring of REDD+ activities might evolve with other changes to MoFSC associated with transfer of power to other federal units at state and local levels.

In addition, a REDD Multi-Stakeholder's Forum will be created to function as the principal outreach and communication platform in the district. The ER Program Management Unit will coordinate and provide secretariat services in organizing stakeholder forum activities. The forum includes representatives primarily from district chapters of the national REDD+ Multi-Stakeholder Forum involving the private sector, civil society, media, government organizations, community-based organizations, local and international NGOs, donors, academia, research organizations, and all stakeholders interested in climate change and REDD+. The forum will increase access to information among stakeholders and enhance their role in the decision-making process. The involvement of different stakeholders ensures transparency and accountability during ER Program implementation. The forum will also provide feedback to the ER Program Management unit regarding the ER Program management.

Similarly, the RFO will facilitate the creation of a District Alliance of REDD+ CSOs and IPOs in each district, which will perform a similar function to that of the national REDD+ CSO and IPO Alliance. This will serve as a platform for CSO and IPOs interested in REDD+ to pursue the following:

- Discuss and develop a common understanding of REDD+ on behalf of CSOs and IPOs in the districts
- Empower and build capacity of CSOs and IPOs on contemporary issues of REDD+ in the district
- Provide support and advice to DRPMU in the district on ER Program management
  Provide suggestions and feedback on REDD+ policy processes through DRPM and REDD+ CSO and IPO alliance.

Implementation of the ER Program
As the national REDD+ program entity, the REDD IC has overall responsibility to administer and manage the ER Program. The overarching functions of the agencies and institutions engaged in the ER Program are summarized in Table 30 and detailed in Annex 2: Agencies and organizations participating in the ER Program. The programmatic engagement of relevant agencies in the ER Program's key intervention areas is summarized in Table 31. Finally, given significant ongoing changes in the Nepal government associated with the constitutional devolution of powers, a transition summary is provided in Table 33 that describes how institutional arrangements for the ER Program may (or may not) be effected by the devolution process and avenues to mitigate any associated risks (also see discussion of devolution in Section 4.4).

Table 30 Overarching functions of leading agencies and institutions in ER Program

Function in ER Program	Lead institutional arrangements for implementation
Administrative arrangement of the ER Program	REDD IC in close coordination with MoFSC, Ministry of Finance, DoF, DFRS and other relevant agencies, institutions and stakeholders
Development and operation of the Reference Level and Forest Monitoring System	DFRS, REDD IC, DNPWC and Environment and Biodiversity Division of MoFSC

Financial management	MoF, MoFSC, REDD IC (through annual budget and other windows)
Implementation of Benefit Sharing Plan and relevant safeguard plans	REDD IC, AEPC, District/local agencies, local government, FUGs
Feedback and grievance redress mechanism(s)	REDD IC, District Forest Office and Regional Forestry Directorate
Stakeholder consultations and information sharing	REDD IC, District/local agencies and representative organizations of IPs, local communities, women, Dalit, Madhesi and forest workers' unions
Implementation of ER Program measures	REDD IC, DoF, District Forest Office and Regional Forestry Directorate, FUGs, identified sectoral agencies at center and local level.

Table 31: Engagement of agencies and institutions in ER Program activities

Activity	Sub Activity	DoF	AEPC	DNPWC	DLO	DFO	DADO	CBFM UGs	CSOs	Financial institutions	Private companies	Nepal Army
1. Improve management practices in existing community forests building on traditional and customary practices	Revise CBFM operational plans to include & implement SMF principles respecting traditional practices	x				x		x				
	Train & develop 100 LRPs (inclusive) to implement SMF principles, forest fire control (indigenous methods & new tools)	x				x		x				
	Improve governance in CBFM regimes to ensure inclusiveness, participation, accountability & transparency targeting around 60 CBFMGs	x				x		x				
	Revise DFO sectoral & operational plans to include & implement SMF principles respecting traditional practices	x				x		x				
	Build capacities of 100 executive committee members of CBFM including IPs (NEFIN), Dalits, women (HIMAWANTI) on SMF					x		x	x			
	Simplification of government procedures including registration to sustainably harvest and timber in all forest management models through discussions	x				x		x				
	Promote alternative livelihoods options & traditional practices for communities IP dependent on forest resources to sustainably use forests	x				x		x				
	Promote knowledge, skills & art craft of Indigenous Peoples related with forest & market outreach while carrying out SMF					x		x	x			
	Enhance coordination with the DADO/District Livestock Office to improve livestock management				x	x	x	x				
2. Localize forest governance	Educate communities & awareness raising	x				x		x	x			
	Enhance the capacities of Federation of Users Groups, IPs, Dalits and women in SMF					x		x	x			

through transfer of National Forests to CFUGs	Increase programs for CBFM handover in the Annual Programme of Work across all districts	x				x		x				
	Implement improved forest management techniques in newly handed over forests	x				x		x	x		x	x
3. Expand private sector forestry through improved access to extension services and finance	Provide insurance mechanism	x				x				x	x	x
	Training and capacity building through federations and private associations	x				x			x		x	x
	Access to soft loans (deprived sector loans)	x								x		
	Product valuation to improve negotiation capacity with buyers through cooperatives of land holders					x			x		x	x
	Provide subsidies for seedlings and quality seedlings	x				x			x			
4. Expand access to alternative energy with biogas and improved cookstoves	Building local capacities and skills to construct biogas plants and install RETs		x									
	Develop bioenergy supply chain using invasive species and available biomass		x									
	Access to micro credits through cooperatives; enhance access to RETs		x						x	x		
	Scale up installations of biogas		x						x		x	x
	Scale up installations of improved cook-stoves		x						x		x	x
	Window of opportunity to promote new technologies		x						x	x	x	x
5. Scale up pro-poor Leasehold Forestry	Provide skill based trainings & inputs to LHFUG (e.g., access to and marketing of NTFP)	x			x	x			x			
	Facilitation by NGO/CSO to connect poor to DFOs	x			x	x			x			
	Execute existing practices and criteria to identify poor households	x			x	x			x			
6. Improve integrated land use planning	Enhance sectoral and cross sectoral coordination to implement district land-use plans	x				x		x	x			
	Zone CBFM area, map potential hazard zone areas and possible settlement areas	x				x		x	x			

associated with infrastructure development	Map potential sites for afforestation and reforestation in the districts and establish plantations where appropriate	x							x			
	Develop District Land-use Plans to enhance understanding of integrated development and traditional land-use	x				x		x	x			
	Enhance Land Information Management System	x				x		x	x			
7. Strengthen the management of Protected Areas	Antipoaching operations			x		x		x	x			x
	Smart patrolling			x		x		x	x			x
	Grassland management			x		x		x	x			x
	Human and wildlife conflict relief fund support			x		x		x	x			x
	Ecotourism development			x		x		x	x			x

Table 32: Transition management for institutional arrangements of the seven intervention areas in Nepal's federal restructuring process

Intervention	Current arrangements	Proposed arrangements in federal governance transition	Adaptation strategies
Improve management practices under CBFM models building on traditional and customary practices	• Community Forestry User Groups (CFUGs) and Collaborative Forest User Groups (CFMUGs) have primary responsibility but can outsource activities (e.g., management plan formulation) to individual experts and/or private sector. • CFUGs and CFMUGs are responsible for implementing the management plans. • Staff of DFO backstop technical aspects of forest management and conduct monitoring.	• All CBFM regimes including community and collaborative forests will remain unchanged. • Community Forestry User Groups (CFUGs) and Collaborative Forest user groups (CFMUGs) outsource tasks as needed to private firms or individual experts to formulate new management plans and to conduct silvicultural operations such as thinning and harvesting. • CFUGs and CFMUGs are responsible for implementing the management plans. • Technical backstopping and monitoring will be provided either by the proposed Forest and Environment section of the local government or the division/district forest office under State Government	No substantial effects are expected. DFO will continue providing services. The arrangements for technical backstopping may change from DFO to forestry officials at local government. The functions currently performed by the staff of DFO may shift to forestry staff in the proposed Forest and Environment Section of local level government if changes occur. In such case, training to be provided to the forestry officials at local governments.
Transfer of National Forests to Community and Collaborative FUGs	DFOs hand over national forests to CFUGs. DFOs also make arrangements for collaborative forest management.	DFOs or any other forest entity under the Department of Forests will be responsible for handing over forests to local communities as community and collaborative forests.	Department of Forests under the State Government will be responsible for handing over community and collaborative forests. State Government delegates this authority either to Forest and Environment Section of the Local Government or the Division/Unit of State Forest Department at local level.

Engage private sector forestry through improved access to finance and inputs	• Farmers or individuals grow forests in the private lands. • Block forests which are more than 500 ha can be managed in collaboration between government and private sector.	• Farmers and individuals grow forests in the private lands. • Block forests which are more than 500 ha can be managed in collaboration between government and private sector.	Restructuring does not affect the private forestry interventions.
Expand alternative energy with biogas and improved cook stoves	Alternative Energy Promotion Center distributes biogas and improved cook stoves.	Alternative Energy Promotion Center distributes biogas and improved cook stoves.	AEPC will continue working as it currently does so restructuring does not affect this intervention.
Scale up pro-poor Leasehold Forestry	DFO hands over leasehold forests to poor households. DFO and District Livestock Development Office continue support to the households engaged in leasehold forestry groups	District Forest Offices or other forest entity under the Department of Forests will be responsible for handing over forests to local communities.	Forest and Environment Section as well as Livestock Development Section in the local government will continue support to the households engaged in leasehold forestry groups.
Support integrated land use planning to reduce forest conversion associated with infrastructure development	Ministry of Forests and Soil Conservation and the Ministry of Land Reform are supposed to coordinate land-use planning as it relates to forests; however, no such coordination has taken place effectively.	Every local government (municipalities and rural municipalities) is required to develop a comprehensive plan for the land-use in their jurisdiction.	National REDD+ Centre and respective Forest and Environment section in each local government contribute to developing comprehensive plana and land-use plans to minimize forest impacts.
Protected Area management	Central Government is responsible to manage the PAs.	Federal Government will be responsible for the management of PAs.	There is no substantial difference between Central and Federal Government.

6.2 ER PROGRAM BUDGET

The table in Annex 1: Summary of Financial Plan provides a snapshot of the financial plan to implement the proposed ER Program. The cost of implementing the major interventions identified to address the drivers of deforestation and forest degradation - based on current costs and past experiences – is estimated to be US$ 177 million over ten years. It is estimated that approximately US$70 million over ten years will be contributed to the implementation of the ER program by the government through DoF.[62] An additional US$51 million will be invested by local communities through cofinancing of biogas stoves and cookstove projects (US$26 million), and reinvestments of revenues from sales of timber from Community and Collaborative Forest User Groups (US$25 million).

Additional funds will be invested as co-financing by:

- Annual budget allocated to 12 District Forest Offices or equivalent forestry units at local level, 10 District Soil Conservation Offices or equivalent units at local level, 6 Protected Area Offices in the ER Program Area as per Line Ministry Budget Information System (LMBIS) totaling approximately USD 70m for 10 years at current price.
- Annual budget allocated to President Chure Terai Madhesh Conservation Development Program (PCTMCDP), a project of national pride: Approximately USD 80m at current price (About 40% of the PCTMCDP lies in the ER Program Area) for next 10 years. Will help support four interventions proposed by the ERPD, i.e. improve management practices in existing community and collaborative forests, localize forest governance through transfer of national forest to community and collaborative forests, expand private sector forestry, and scale-up pro-poor leasehold forestry. As the PCTMCDB program does not claim carbon emissions, activities under Chure Program are complementary to the interventions proposed in the ER Program.
- Potential contributions of CBFM groups in forest management: USD$25m. Preliminary data derived during district consultations show approximately USD$100m income of CBFM groups in the program area. Out of total income, CBFM groups are required to spend at least 25% in forest management per the provision of Forest Act 1993.
- National Parks: USD$1m in ER Program Area. 50% of the income of National Park goes to local communities through buffer zone program per the NPWC Act 1993.
- MoFSC Terai Arc Landscape Program supported by WWF: USD 10m for 5 years (2017-21). This program complements all seven interventions proposed in the ERPD.
- Potential results based payment as per LOI between FCPF and Ministry of Finance, USD$70m for 14 mtCO2e.
- Other potential co-funding sources:
    - Local government funds (pro-rata basis of the unconditional grant for environment)
    - Proposed Resilient Churia project (GCF proposal being developed by FAO and MoFSC)
    - Landscape Restoration Project (GEF proposal being developed by WWF and MoFSC)

Additional revenues are expected from bilateral and multilateral donors. This is conservatively estimated to be US$5 million in grant financing from the Forest Investment Program (FIP) and US$35 million in loans are projected from the FIP and Nepal's International Development Association (IDA 18) replenishment. These would be repaid over the course of the project, in part through the sale of carbon revenues.

[62] The contribution from the government and other partners only reflects the budget related to the implementation of activities identified in the ER Program, and does not include expenses related to other activities, personnel costs, and management costs

The Government of Nepal anticipates the sale of 14 $MtCO_2e$ at US$5/$tCO_2$ corresponding to US$70 million in revenue from the Carbon Fund over ten years to close the gap. These revenues are projected to occur in years 5 (2022), and 8 (2025) of the ER Program, assuming a start date of 2018, and following successful field verification of ERs. Given that the ER Program will generate in total 36 $MtCO_2e$ this represents less than a half of total ERs generated (see Table 48). After the deduction of the buffer and ERs sold to the Carbon Fund, the ER Program will generate an additional 15 $MtCO_2e$ over the 10-year period. The Government of Nepal may either seek external carbon market finance to purchase these ERs to catalyze further activities in the Program Area after the project period, or use these to contribute to domestic mitigation targets. Existing and anticipated financial flows (under constitutional devolution) are shown in Figure 11 (See also Section 15 on benefit sharing).

Cost estimates have been developed in consultation with district, regional and national stakeholders through multi-stakeholder consultations, workshops and bilateral meetings. See Annex I for further details. In addition to the carbon benefits outlined above, the ER Program is expected to deliver significant non-carbon benefits including improved livelihoods, enhanced biodiversity, improved health (e.g., with biogas and ICS installations) and increased resilience to climate change. Some of these benefits can be quantified, and will contribute to the economy of Nepal and the welfare of local communities; others cannot be readily monetized but are nonetheless central to the implementation of the ER Program. These NCBs are discussed in further detail in Section 16.

Figure 10: Existing Financial Flow

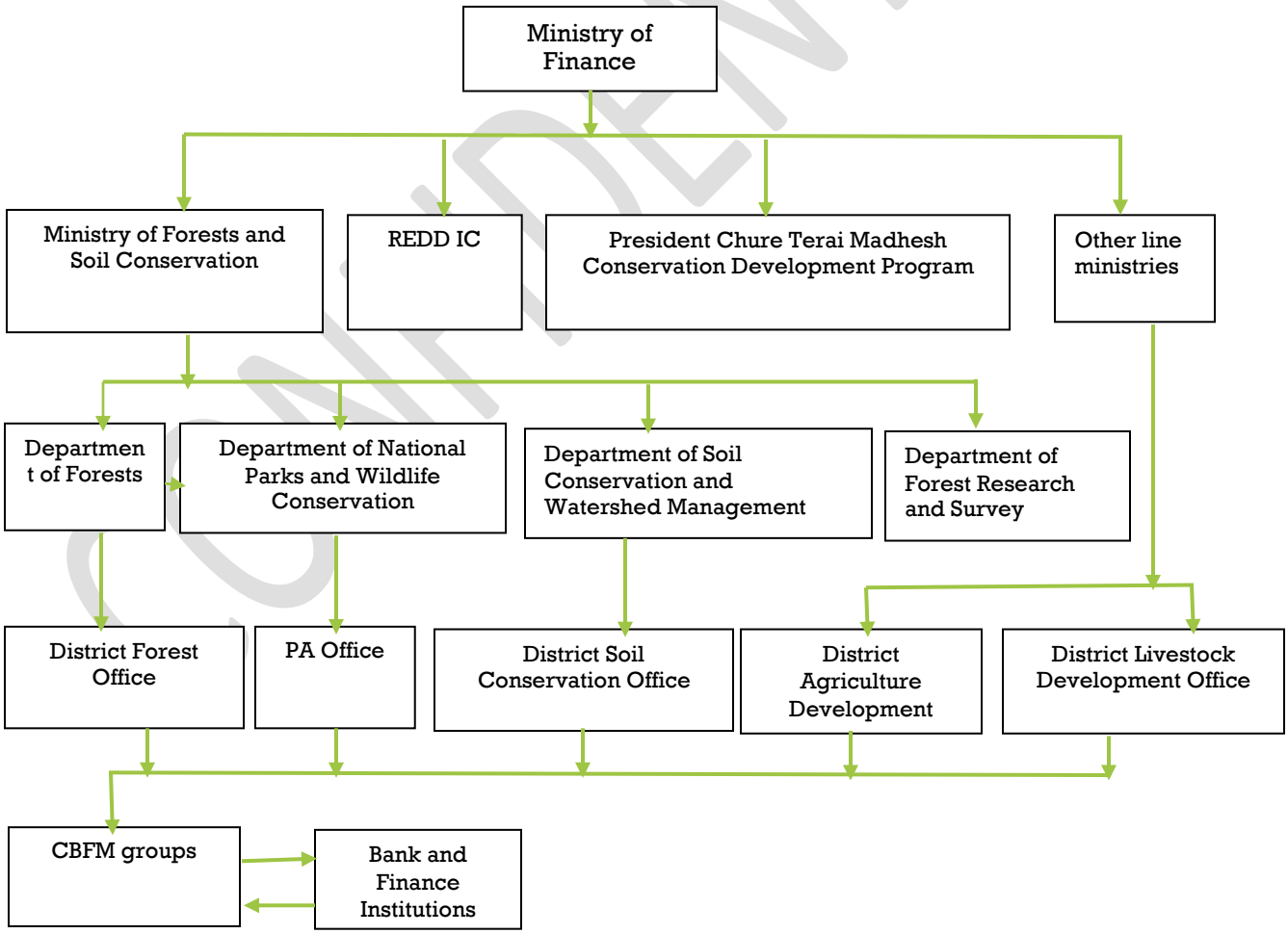
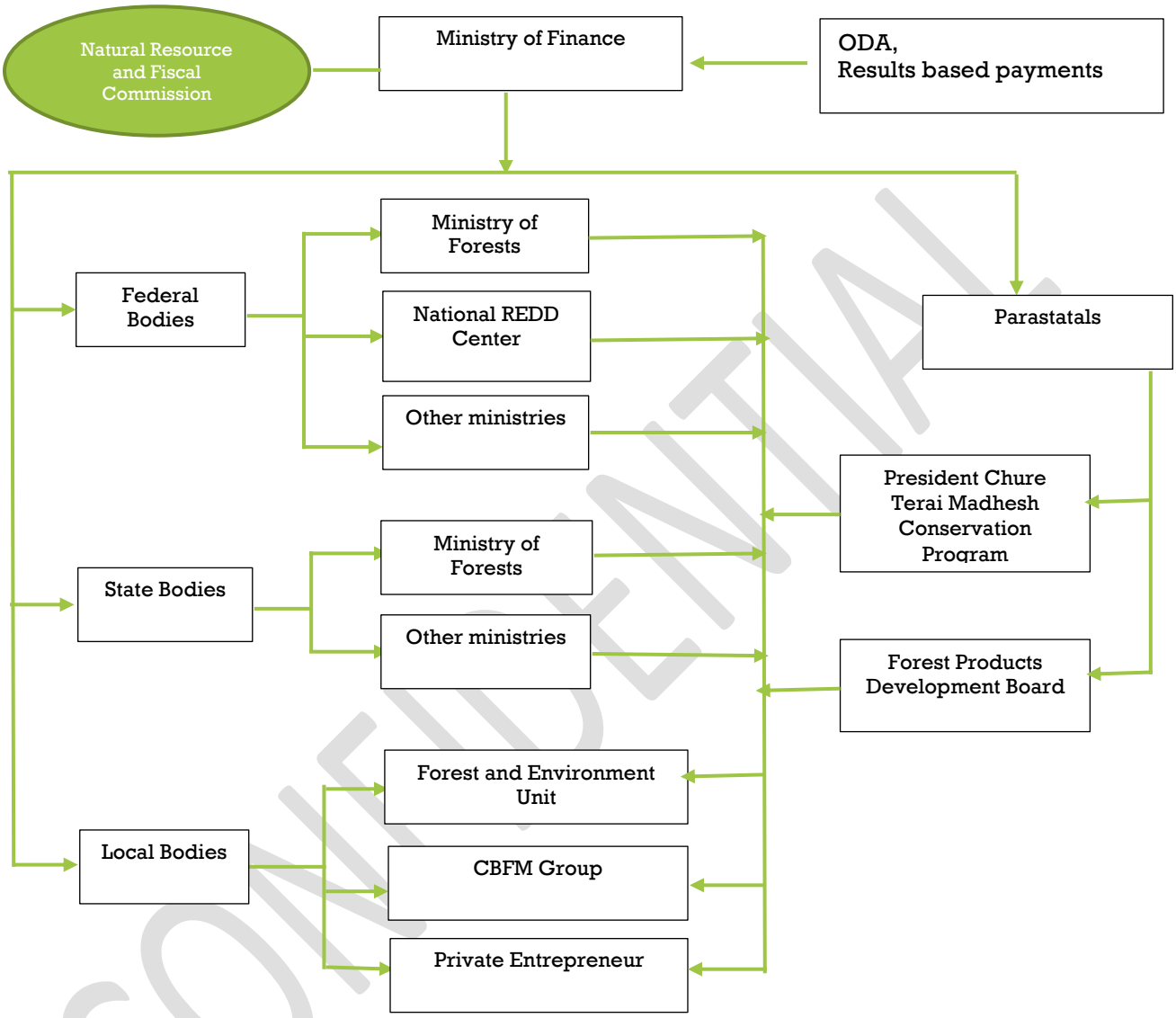


Figure 11: Proposed Financial Flow



7 CARBON POOLS, SOURCES AND SINKS

7.1 DESCRIPTION OF SOURCES AND SINKS SELECTED

Table 33: Description of Sources and Sinks selected

Sources/Sinks	Included?	Justification / Explanation
Emissions from deforestation	Yes	Emissions from deforestation and forest degradation are significant source of GHG emissions in TAL and therefore are included in the reference level. The RL analysis shows that during the 10-yer period between 2004 and 2014 a total of 32,303,812 tCO2e was emitted from the forest sector in the TAL, an average annual emission of 3,230,381 tCO2e /yr
Emissions from forest degradation	Yes	
Enhancement of forest carbon stocks	Yes	Enhancement of forest carbon stocks by regeneration, afforestation and reforestation is included in the reference level
Conservation of Forest	No	Any emissions or removals that occur in protected areas or managed forests are included in three aforementioned REDD+ activities. The impact of sustainable forest management, especially in community forests, can be seen in the enhancement of carbon stocks and afforestation that are included in the emission estimates.
Sustainable management of forests	No	

7.2 DESCRIPTION OF CARBON POOLS AND GREENHOUSE GASES SELECTED

Table 34: Description of Carbon Pools and greenhouse gases selected

Carbon Pools	Selected?	Justification / Explanation
Aboveground biomass	Yes	These two pools constitute the majority of GHG emission and will be measured in a sound statistical manner, with a level of uncertainty that is statistically determined. The above-ground biomass accounts for over 80% of forest biomass and the below-ground biomass was calculated as 20% of the above-ground biomass as per the default values in IPCC GPG (IPCC 2006).
Belowground biomass	Yes	
Dead wood	No	Based on NFI analysis, it is estimated that dead organic matter, litter and debris contribute 1.19 t C/ha against an average above ground forest biomass of 108.88 t C/ha. As such, litter does not seem to constitute a significant pool and is excluded.
Litter	No	

Soil Carbon	No	Since primary activities are related to avoided deforestation and degradation and do not include significant ground disturbance, exclusion of soil carbon is likely conservative.

Greenhouse gases	Selected?	Justification / Explanation
CO_2	Yes	Nepal has no coastline or mangroves; thus, there are no CH4 or N2O emissions associated with organic and mineral soils for the management activities of extraction (including construction of aquaculture and salt production ponds), drainage and rewetting and revegetation as provided in the 2013 Wetlands Supplement to the 2006 IPCC Guidelines. Experience under the Kyoto Protocol's CDM also suggests that emissions from using fertilizer and planting leguminous plants and trees will not be significant (FCPF Decision Support Tool Part 1). A significant proportion of CH4 emissions in Nepal come from enteric fermentation, solid waste disposal and waste water treatment as well as from the rice fields as reported by the Initial National Communication (2004). These are not associated with forestry though, so they are not relevant for the FRL calculation. Fires in Nepal are more frequent outside the forest than in forest lands (FAO 2015). Most forest fires will not be followed by land conversion but regenerate over the years leading –in the long term- to no net change in emissions/removals. To understand whether non-CO2 emissions associated with forest fires provide a significant contribution to total emissions from forests, Nepal performed an estimation of annual non-CO2 emissions from fire using equation 2.27 (IPCC 2006, Volume 4, Chapter 2). Input data in the equation was derived from the Global Forest Resources Assessment 2015 burned forest area estimate for Nepal (the average for the years 2003-2010), the average above ground biomass (mass of fuel available for combustion) as obtained from Nepal's National Forest Inventory (2010) and IPCC default values for fuel biomass consumption, the combustion factor and emission factor of dry matter burnt per mass. This calculation suggests a total of non-CO2 emissions of 281,470 tCO2e, which consists of 12% of the total annual emissions included in Nepal's FRL. As such, Nepal concludes the contribution of non-CO2 gases is not significant and considering the country doesn't dispose of reliable fire data it is decided to omit non-CO2 gases associated with fire. The excluded GHGs therefore are CO, CH4 and N2O because: • There are no mangroves in Nepal • There are no seasonally or permanently flooded forest areas in Nepal • Fires are not a significant source of emissions
CH_4	No	Our reference level conservatively excludes emissions from methane and other GHGs.
N_2O	No	

8 REFERENCE LEVEL

8.1 REFERENCE PERIOD

The start-date for the reference period is 2004 and end-date is 2014. Following interpolation guidance in FCPF Guidance document 1, linear interpolation has been adopted and it can be seen from our carbon stock maps at years 1999, 2002, 2006, 2009, 2011 and 2014 that the interval 2002 to 2006 did not contain significant forest loss.

8.2 FOREST DEFINITION USED IN THE CONSTRUCTION OF THE REFERENCE LEVEL

The definition of forest used in Nepal is "forest as an area of land of at least 0.5 ha and a minimum width/length of 20 m with a tree crown cover of more than 10% and tree heights of 5 m at maturity." In 1998, Government of Nepal topographic, land cover and land use maps with forest and non-forest classes were used to derive a forest mask for each time period between 1999 and 2011. This provides a conservative estimate because new forests outside the 1998 forest mask are not accounted in the process. This government-approved dataset was the only available data source at the time.

In constructing RL's, we have used four forest types, namely Sal Forest, Sal Mixed Forest, Other Mixed Forest and Riverine Forest. These types were aggregated from 26 original forest types that were produced in a Landsat based forest type classification, following the process described below. Aggregation was conducted to be able to define two forest conditions, namely intact and degraded forest, for each forest types and have sufficient area in the resulting eight forest classes in the randomly sampled sub-area that was covered by LiDAR. LiDAR provides for accurate estimation of tree height and allows highly accurate average Above-Ground Biomass (AGB) estimates to be provided for forest types with sufficient aerial representation in the LiDAR-scanned area.

The ER-PD uses Landsat data (30m resolution) for wall-to-wall mapping of land use change and corresponding activity data, namely changes between the two forest conditions described above or actual deforestation (forest land turning to non-forest). LiDAR is only used to define mean AGB in each forest class and thereby providing emission factors for activities apart from regeneration. The FREL uses the stock change method, outlined in Equation 2.5 in IPCC Guidelines. Since stock change is applied only to the area classified as Forest in Nepal's official Forest mask from 1998, the only land use category considered (from those listed in IPCC Equation 2.1) is Forest Land. For Forest Land, the change in carbon stock covers the pools Above-Ground Biomass and Below-Ground Biomass from IPCC Equation 2.3.

8.3 AVERAGE ANNUAL HISTORICAL EMISSIONS OVER THE REFERENCE PERIOD

Preparation of the RL follows the principles of the Intergovernmental Panel on Climate Change (IPCC) for reporting of national emissions and removals of GHGs, which include: (1) transparency, (2) completeness, (3) consistency, (4) comparability, and (5) accuracy. The RL has attempted to minimize errors through conservative estimates, verification of results through multiple data sources, field verification studies, and statistical analysis of error and uncertainty. The RL is reported in tCO2e following the guidance of the IPCC Good Practice Guidelines (GPG) for National Greenhouse Gas Accounting. It incorporates various tiers from the IPCC guidance but primarily Tier 2 and Tier 3. This

effort is viewed as providing credible preliminary estimates of emissions in the TAL in support of the ER Program and as laying the foundation for development of a Tier 3 RL over the next five years.

The ERPD uses the stock change method, outlined as Equation 2.5 in IPCC Guidelines. Since stock change is applied only to the area classified as forest in Nepal's official forest mask from 1998, the only land use category considered from the ones listed in Equation 2.1 is Forest Land. For Forest Land, the change in carbon stock covers the pools Above-Ground Biomass and Below-Ground Biomass from Equation 2.3 and justification for excluding other pools is provided in Section 7. For these pools, carbon stock change is calculated as difference in Activity Data calculated between three forest conditions of four Forest Land strata, multiplied by corresponding Emission Factors, as depicted in Equation 2.2.

The process utilized in developing the current TAL RL is the LiDAR-Assisted Multi-Source Program (LAMP), and is described in detail below and in Kauranne et al (2017)[63] and its references. It is based on the following data sets: airborne-collected LiDAR data covering 5% of the extent of the Program Area; best available Landsat and other satellite data (e.g. RapidEye for activity data verification); the 1998 Government of Nepal Topographic Base Maps; field data collected in 2011 (738 plots of 12.6-meter radius) and 2013 (46 plots of 30-meter radius); and MDA Information Systems LLC's Persistent Change Monitoring global dataset. The Nepal LAMP process is based on the generation of activity data (using the five activities defined by the IPCC) through analysis of land cover change for the period 2004-2014, and emission factors through the correlation of LiDAR-based mean carbon values for each of the strata in the study. The methodology was tested with data from 2011 because these were the only time validation data available, but the same methodology was applied on all intervals.

Estimation of Aboveground biomass

A wide variety of field plots sampling designs and protocols have been used to calculate above-ground biomass (AGB) in different forest types and structural classes. In general, the diameter at breast-height (DBH) and the height of the tree are measured and then allometric equations specific to forest types (dry, wet, temperate, tropical, etc.) are used to calculate live AGB. The AGB is then converted into carbon stock by multiplying AGB by 0.47.[64] In recent years, airborne LiDAR (Light Detection and Ranging) technology has been used to sample large areas more efficiently and accurately than manual field measurements, providing the numerous samples required to provide statistically valid AGB estimates. LiDAR has become an integral part of operational forest inventory in Scandinavian countries[65] and has also been used as a sampling tool to generate a high-resolution carbon distribution in tropical countries (Asner *et al.* 2009, Asner *et al.* 2012, Asner *et al.* 2013). The process used in the TAL, the LiDAR-Assisted Multi-source Programme (LAMP), combines LiDAR sample data with field plots and satellite data to develop stratified aboveground carbon estimates down to one-hectare level surrogate plots size. The detailed steps of this process are described below.

LiDAR survey design

To produce a LiDAR sample that reflects the full range of variation in biomass over the study area and that covers not only the most common forest types but also the rare ones, different weights were assigned to the grid cells based on importance of forest types and amount of remaining forest in each type. These weights were assigned utilizing the forest classification of TAL based on LANDSAT 7 satellite data from 2001 by Joshi et al as a base map.[66] This is the latest available forest classification of

[63] Kauranne, T., Joshi, A., Gautam, B., Manandhar, U., Nepal, S., Peuhkurinen, J., Hämäläinen, J., Junttila, V., Gunia, K., Latva-Käyrä, P., Kolesnikov, A., Tegel, K. and Leppänen, V.: LiDAR-assisted Multi-source Program (LAMP) for Meauring Above Ground Biomass and Forest Carbon. Remote Sensing 2017, 9, 154.

[64] IPCC. 2006. Good Practice Guidance for National Greenhouse Inventories. Agriculture, Forestry and Other Land Uses (Vol. 4). Geneve, Switzerland. http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf.

[65] Næsset, E. (2007). Airborne laser scanning as a method in operational forest inventory: status of accuracy assessments accomplished in Scandinavia. Scandinavian Journal of Forest Research, 22, 433-442.

[66] Joshi, A.R., Shrestha, M., Smith, J.L.D., and Ahearn, S. (2003). Forest classification of Terai Arc Landscape (TAL) based on Landsat7 satellite data. A Final Report submitted WWF-US. 2003.

the TAL that has been field verified with an overall accuracy of 84.5 % with a Kappa value of 0.75. Then 5 km by 10 km grids (LiDAR blocks) were laid over the entire TAL; probability proportional-to-variation sampling was used to select the areas for LiDAR data collection, resulting in 20 LiDAR blocks representing 5% of the study area selected for LiDAR data collection (see Figure 12). The current four major forest types and two forest conditions were aggregated from the forest classification of Joshi et al. (2003) to have a statistically significant area of each type and condition under the randomly selected LiDAR blocks. This was applied to get statistically reliable Emission Factors for each forest type from surrogate plots, and to reduce forest type misclassification errors.

LiDAR data collection and processing

All 20 LiDAR blocks were scanned wall-to-wall from 2,200 meters average height above ground. Airborne LiDAR raw data were classified by the vendor into three categories: ground, vegetation and error returns. Further pre-processing included calculation of an exact Digital Terrain Model (DTM) from the ground returns, removal of the overlaps from the raw data, and conversion of height coordinates (z-values) of the vegetation returns from absolute elevation into distance-to-ground using the DTM. From the pre-processed LiDAR data, several LiDAR features were calculated for building the LiDAR-to-AGB model. The features have been taken from Junttila et al[67,68] and are an extended and modified version of those published by Næsset.[69] They include: 1) different height percentiles for the first-pulse and last-pulse returns, 2) mean height of first-pulse returns above 5 meters (high-vegetation returns), 3) standard deviation for first-pulse returns, 4) ratio between first-pulse returns from below 1 meter and all first-pulse returns, and 5) ratio between last-pulse returns from below 1 meter and all last-pulse returns.

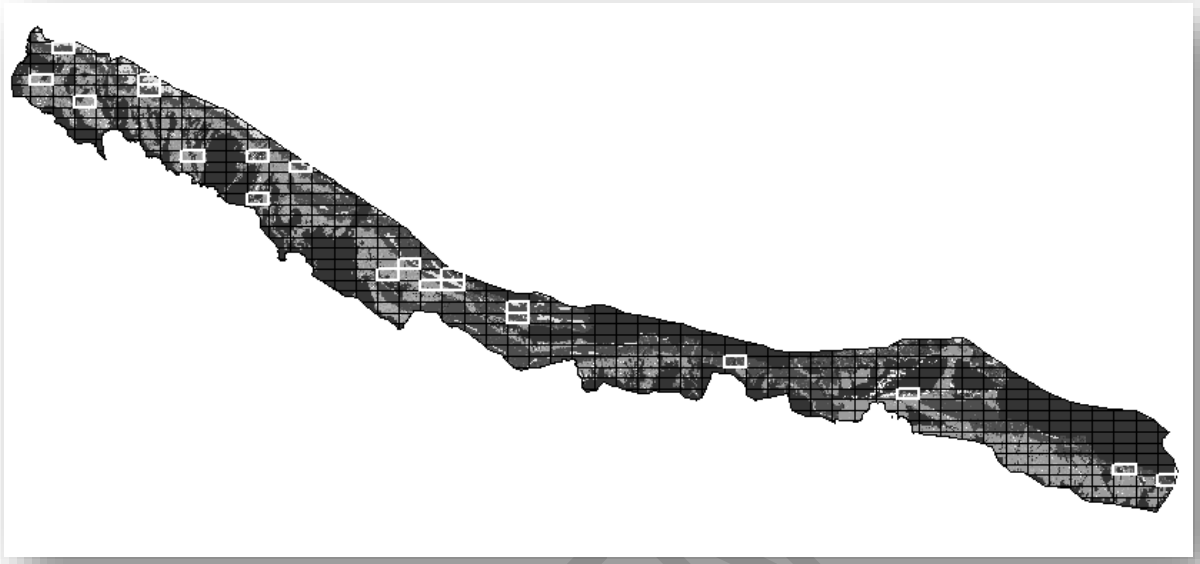
Below is a grid of 5km x 10km blocks used for sampling, and location of sampled blocks (white boundaries) in the study area. Background map: Vegetation types with assigned weights in grey-scale (dark = low weights, bright = high weights

[67] Junttila, V., Maltamo, M., and Kauranne, T. (2008). Sparse Bayesian Estimation of Forest Stand Characteristics from Airborne Laser Scanning. Forest Science, 54, 543-552.

[68] Junttila, V., Kauranne, T., and Leppänen, V. (2010). Estimation of Forest Stand Parameters from Airborne Laser Scanning Using Calibrated Plot Databases. Forest Science, 56, 257-270.

[69] Næsset, E. (2002). Predicting forest stand characteristics with airborne scanning laser using a practical two-stage procedure and field data. Remote Sensing of Environment, 80, 88-99.

Figure 12 Grid of 5km x10km blocks used for sampling, and location of sampled blocks



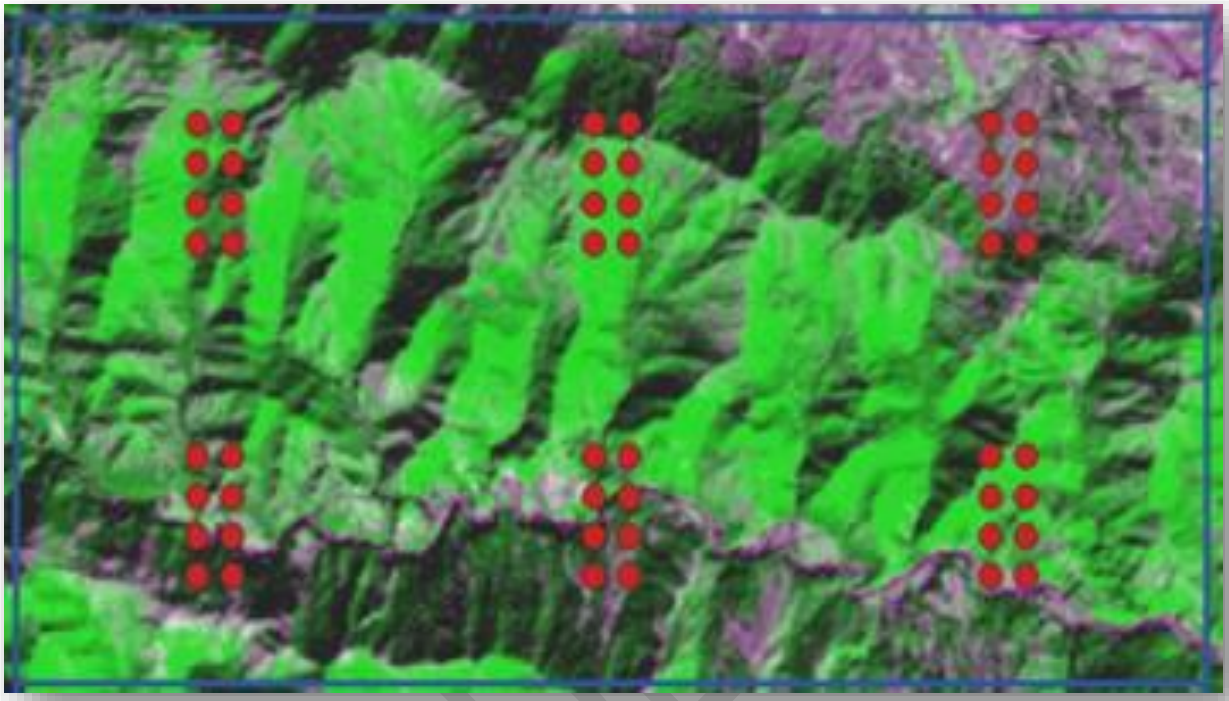
Field data collection for LiDAR calibration

The location of sample plots was designed using a systematic cluster sampling within LiDAR blocks. Each LiDAR block contained six clusters of eight sample plots each. The distance between cluster centers was 3,333 meters in west-east and 2,500 meters in north-south direction. Within the clusters, the sample plots were aligned in two parallel columns in north-south direction, with 4 plots per column (see Figure 13). The distance between plots was 300 meters in west-east direction, and 300 and 150 meters in north-south direction in Terai and Siwalik, respectively. The smaller north-south distance for Siwalik was chosen because of the large variation of altitude in this undulating and dissected hilly region. The plots are of fixed circular shape with a radius of 12.62 meters (500 m^2). Field sample plots were collected with sub-meter accuracy using a differential L1 GPS with Ashtech Magellan ProMark 3 and MobileMapper CX devices, and corrected in post-processing mode (GNSS Solutions software and MobileMapper Office software).

Data were collected from 738 field plots (12.6-meter radius). These plots were collected in collaboration with the national FRA project. In each plot diameter of all the trees with Diameter at Breast Height (DBH) > 5cm were measured and species were recorded. The tree heights were measured for every 5th tallied tree. If there are some tree species that were tallied, but heights were not measured for any trees in that species, then additional trees were selected for each of such species for height measurements. Individual tree height per plot was then calculated using species group-specific height-diameter relationships. Above-ground biomass for each plot was computed using individual tree height and diameter at breast height, based on species group-specific volume equations published by Sharma and Pukkala (1990).[70] The equations from Sharma and Pukkala (1990) were used because these were developed for Nepal and widely used by the government.

[70] Sharma, E.R., and Pukkala, T. (1990). Volume Equations and Biomass Prediction of Forest Trees of Nepal. Publication series of the Ministry of Forests and Soil Conservation of Nepal, Forest Survey and Statistics Division, 47, 1-16.

Figure 13 LiDAR block with six clusters of eight field plots each



Field data collection for LiDAR validation

For LiDAR verification purposes, 48 plots of 30-meter radius were collected in 2013 as verification plots in two LiDAR blocks. In each plot diameter of all the tress with Diameter at Breast Height (DBH) > 5cm were measured and species were recorded. The heights all trees with DBH > 5 cm were measured. Above-ground biomass for each plot was computed using tree height and diameter at breast height, based on species group-specific volume equations published by Sharma and Pukkala (1990).

LiDAR was used to create a valid, adequate sample over the whole study area and all forest types, and it provided accurate emission factors, especially for degradation. A total of roughly 10,000 LiDAR based samples were used, for which the statistics were validated using the 738 field measurements. LiDAR based surrogate plots also covered areas not reachable for field measurement.

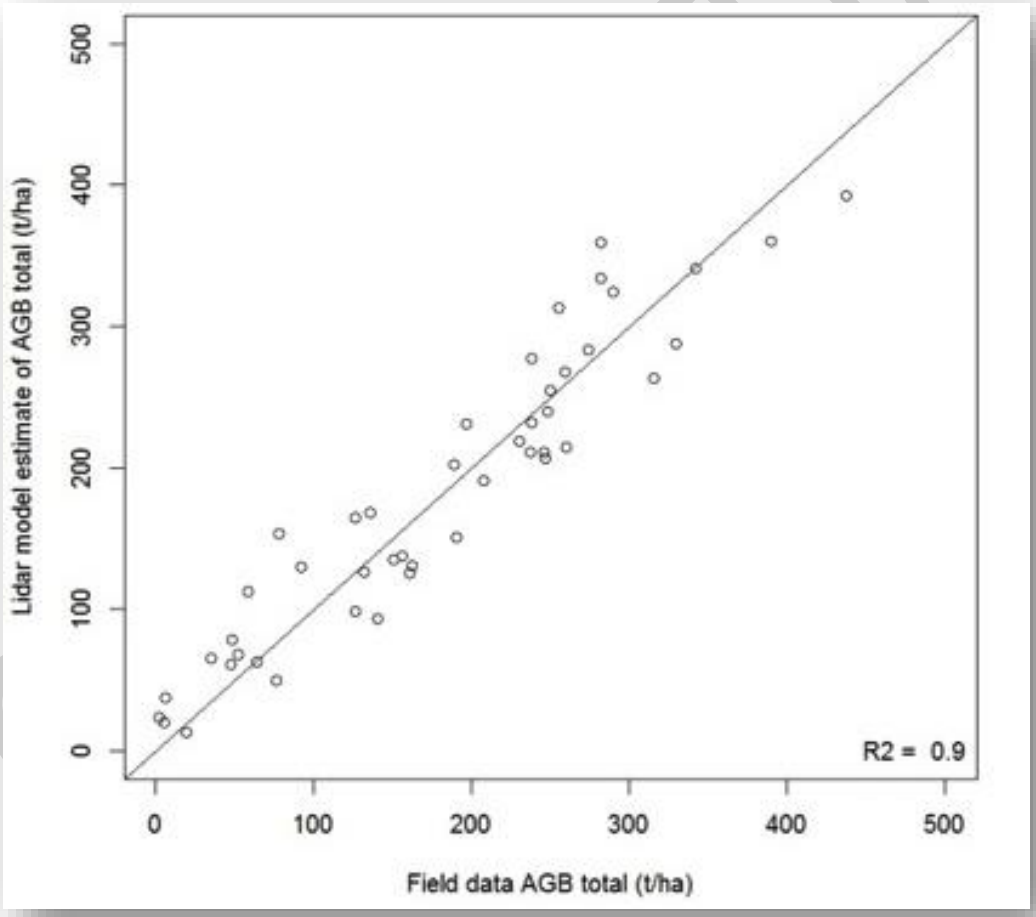
LiDAR-to-AGB model

The 20 LiDAR blocks were collected at a 5% acceptance probability by a weighted random sample of identical candidate blocks covering all of TAL. The weights were later inverted in the generation of 1 ha surrogate plots, so that they form a clustered simple random sample of all of TAL. Weights were applied to ensure that also rare forest types get chosen into the sample, as suggested in Recommendations 2 and 3 Espejo and Jonckheere[71]. In the first phase of LAMP, a Sparse Bayesian method was used to develop a LiDAR-to-AGB model (A. R. Joshi et al. 2014, pp.26-27). A regression model was generated based on the relationship between LiDAR metrics (height and density

[71] Espejo, A.E. and I. Jonckheere. (2017). Draft proceedings of technical workshop (Roma, Italy) on lessons learned from accuracy assessments in the context of REDD+. Global Forest Observations Initiative, Food and Agriculture Organization of the United Nations, and Forest Carbon Partnership Facility.

distribution) and field measurement based biomass training data. It has been shown that Sparse Bayesian methods offer a flexible and robust tool for regressing LiDAR pulse histograms with forest parameters. While performing comparably to traditional regression methods, they are computationally more efficient and allow better flexibility than step-wise regression.[72,73] The model showed strong correlation with field measured AGB when validated against an independent set of 46 field plots with 30-meter radius (2,826 m^2). The Relative Root Mean Square Error (RMSE) was 0.19 (19%), and the achieved coefficient of determination (R^2) was 0.90, which means that the estimate of AGB in the almost 10,000 locations of the surrogate plots is 90% accurate. No significant bias was present (Relative bias 0.016). Full validation results are shown in Figure 14 and Table 35. The model was then used to predict AGB for all 20 LiDAR blocks.

Figure 14 Scattergram showing aboveground biomass (AGB) from independent field data against the estimates of the linear model from LiDAR data.



[72] Junttila, V., Maltamo, M., and Kauranne, T. (2008). Sparse Bayesian Estimation of Forest Stand Characteristics from Airborne Laser Scanning. Forest Science, 54, 543-552.
Junttila, V., Kauranne, T., and Leppänen, V. (2010). Estimation of Forest Stand Parameters from Airborne Laser Scanning Using Calibrated Plot Databases. Forest Science, 56, 257-270.
[73] A.R. Joshi et al. 2014. An accurate REDD+ reference level for Teria Arc Landscape, Nepal, using LiDAR assistend Multi-source Programme (LAMP). Banko Janakari 24 (1): 23-33).

Table 35 Statistics for the LiDAR estimates of aboveground biomass validated against independent field data. Total AGB (t/ha)

Standard deviation of estimates	103.1
Mean of reference plots	180.4
SD of reference plots	108.5
RMSE	34.5
Relative RMSE (%)	19.1
Bias	2.9
Relative bias (%)	1.6
R^2	0.9
Mean of estimates	183.3

Computer software used for satellite data analysis

ImgTools software was used to conduct Spectral Matrix Analysis (SMA) of Landsat satellite imagery and provide an initial unsupervised classification of forest structural classes (intact or undisturbed forest, degraded forest and non-forest) for each satellite scene for each time period. ImgTools was developed for identifying forest disturbance from selective logging and forest fires in Brazilian Amazon forests.[74] It has also been used for studying historical emissions from deforestation and forest degradation in Mato Grosso, Brazil.[75] Imazon, a non-profit research institute, has been using ImgTools to monitor forest management projects and develop deforestation and forest degradation maps in the Amazon, Brazil.[76]

The decision trees built in the software for forest classification and forest change analysis were based on the forest structure of the Amazon, therefore these modules had to be adjusted for the TAL. The decision tree was adjusted based on natural break points for forest structure classification within ImgTools, to conduct an initial classification of forest structure into intact, deforested and degraded classes. These classified maps were then processed in the ERDAS Imagine software to generate transitional matrix for the time-series analysis at the pixel level.

8.3.1 ACTIVITY DATA

Description of the parameter including the time period covered (e.g. forest-cover change between 2000 – 2005 or transitions between forest categories X and Y between 2003-2006):	During the development of the ER-PIN, the Landsat satellite data were used to analyze forest-cover change between 1999-2014 to calculate deforestation, forest degradation, regrowth and no changes categories. The analysis was done for five time periods, 1999-2002, 2002-2006, 2006-2009, 2009-2011 and 2011-2014. To meet the requirements

[74] Souza Jr., C., Roberts, D. A. and Cochrane, M. A. (2005). Combining spectral and spatial information to map canopy damage from selective logging and forest fires. Remote Sensing of Environment.98 329-343p. Doi: 10.1016/j.rse.2005.07.013.

[75] Morton, D. C., Sales,M. H., Souza, C. M., and Griscom, B. (2013). Historic emissions from deforestation and forest degradation in Mato Grosso, Brazil: 1) source data uncertainties. Carbon Balance and Management 2011, 6:18, 1-13.

[76] Monteiro, A., and Souza Jr., C. (2012). Remote Monitoring for Forest Management in the Brazilian Amazon. In: J. J. Diez (Org.), Sustainable Forest Management - Current Research, p.67-86. InTech.2012. Disponívelem: <http://www.intechopen.com/books/howtoreference/sustainable-forest-management-current- research/remotemonitoring-for-forest-management>. Acessoem: 9 nov. 2012.

	of *the Methodological Framework,* data from 1999-2002 was not used for the reference level and data for 2004-2006 was obtained by halving the data from time window 2002-2006, assuming equal annual forest change between 2002-2006, to generate RL period 2004-2014, due to lack of cloud free satellite data from leaf-on season for 2004. Following the interpolation guidance in FCPF Guidance document 1, linear interpolation has been adopted and it can be seen from the carbon stock maps at years 2009, 2002, 2006, 2009, 2011 and 2014 that the interval 2002 to 2006 did not contain significant forest loss.
Explanation for which sources or sinks the parameter is used (e.g. deforestation or forest degradation):	The forest cover change data from four time periods, 2004-2006, 2006-2009, 2009-2011 and 2011-2014 were used for deforestation, degradation and regeneration.
Data unit (e.g. ha/yr):	ha/yr
Value for the parameter:	
Source of data (e.g. official statistics) or description of the method for developing the data, including (pre-)processing methods for data derived from remote sensing images (including the type of sensors and the details of the images used):	Landsat 5, 7 and 8 satellite images and remote sensing tools were used to generate activity data. Image processing methods are described in further detail below.
Spatial level (local, regional, national or international):	Sub-national level comprising 12 administrative districts of Nepal.
Discussion of key uncertainties for this parameter:	A full discussion of uncertainty is given in Section 12 below
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Accuracy, precision and confidence intervals are provided in Section 12 below

Image pre-processing

Landsat imagery from USGS pre-processed to level L1T was used[77]. Figure 15 below shows the steps that were carried out in each satellite scene to minimize variations due to atmospheric conditions and geographic position errors.

[77] See metadata for USGS Landsat data products at https://landsat.usgs.gov/level-1-landsat-data-products-metadata

Figure 15 Basic image processing steps in ImgTools (adopted from Souza and Siqueira, 2013 with permission)[78]

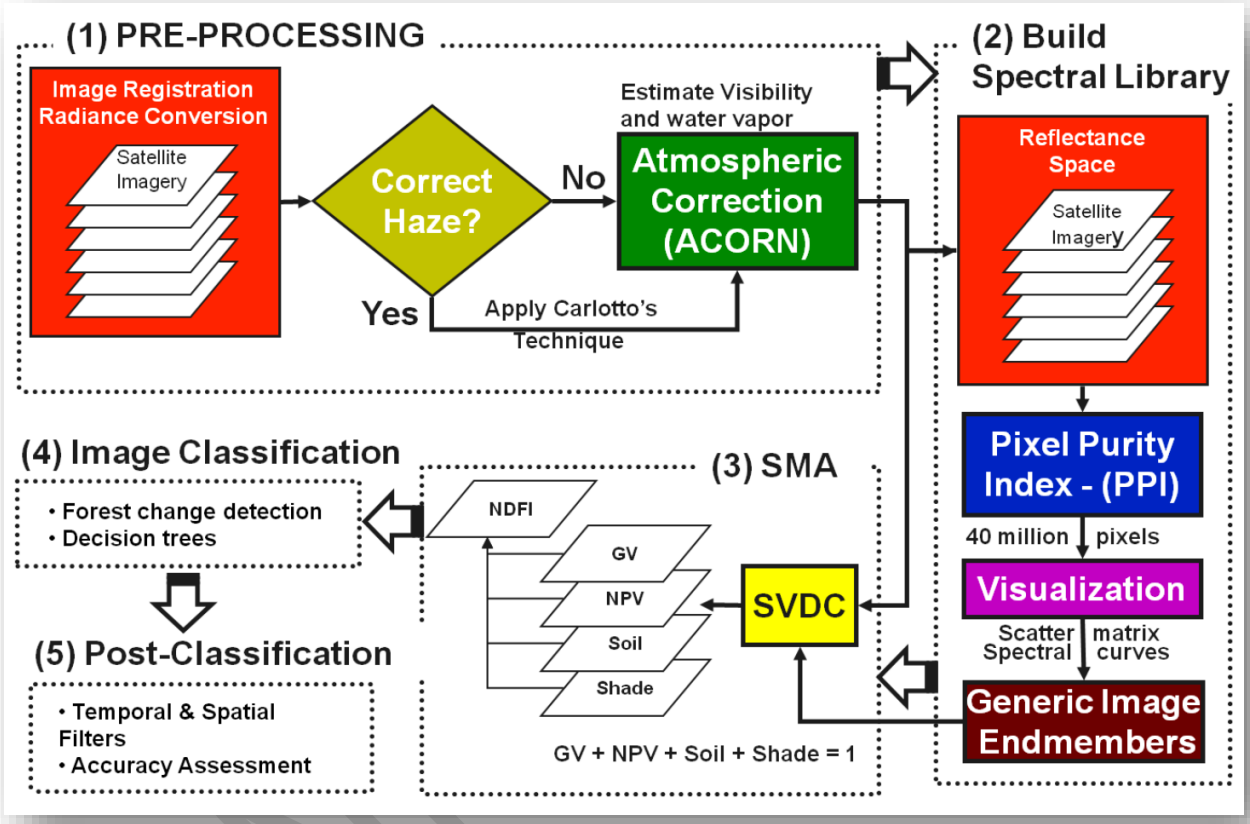


Image processing

Image processing was done using different modules in ImgTools which are described below Spectral Mixture Analysis (SMA): ImgTools was used to carry out spectral mixture analysis for each Landsat scene. The SMA module of ImgTools decomposes the spectral mixture, commonly found in the pixel reflectance values of remotely sensed data, into fractions with natural break points, known as endmembers. SMA module uses these endmembers to develop generic spectral libraries for green vegetation (GV), non-photosynthetic vegetation (NPV), bare soil and clouds.[79]

- Water Mask: This module creates a water mask as a layer using fractional image.
- Cloud and Shade Mask: This module creates a cloud and shade mask layer that is used in deriving Normalized Difference Factional Index (NDFI).
- Normalized Difference Factional Index (NDFI): In this module, the fractions developed from the SMA analysis: GV, NPV, Soil are processed to quantify the percentage of pixels lying outside the range of zero to 100% and to evaluate fraction value consistency for pixels over

[78] Souza Jr., C. and Siqueira, J. V. (2013). ImgTools: a software for optical remotely sensed data analysis. In: XVI Simpósio Brasileiro de Sensoriamento Remoto (SBSR). Foz do Iguaçu-PR. 8p.

[79] Souza Jr., C., Roberts, D. A. and Cochrane, M. A. (2005). Combining spectral and spatial information to map canopy damage from selective logging and forest fires. Remote Sensing of Environment.98 329-343p. Doi: 10.1016/j.rse.2005.07.013.
Souza Jr., C. and Siqueira, J. V. (2013). ImgTools: a software for optical remotely sensed data analysis. In: XVI Simpósio Brasileiro de Sensoriamento Remoto (SBSR). Foz do Iguaçu-PR. 8p.

time (i.e., that pixels with closed canopy forest values were similar over time). Only pixels with at least 98% of the values within zero to 100% and those that showed mean fraction value consistency over time were used by the software algorithm for computing Normalized Difference Fraction Index (Souza Jr. et al., 2005).

$$NDFI = \frac{GV_{Shade} - (NPV + Soil)}{GV_{Shade} + NPV + Soil}$$

Where GV_{Shade} or (GVs) is the shade-normalized GV fraction given by,

$$GV_{Shade} = \frac{GV}{100 - Shade} \frac{GV}{100 - Shade}$$

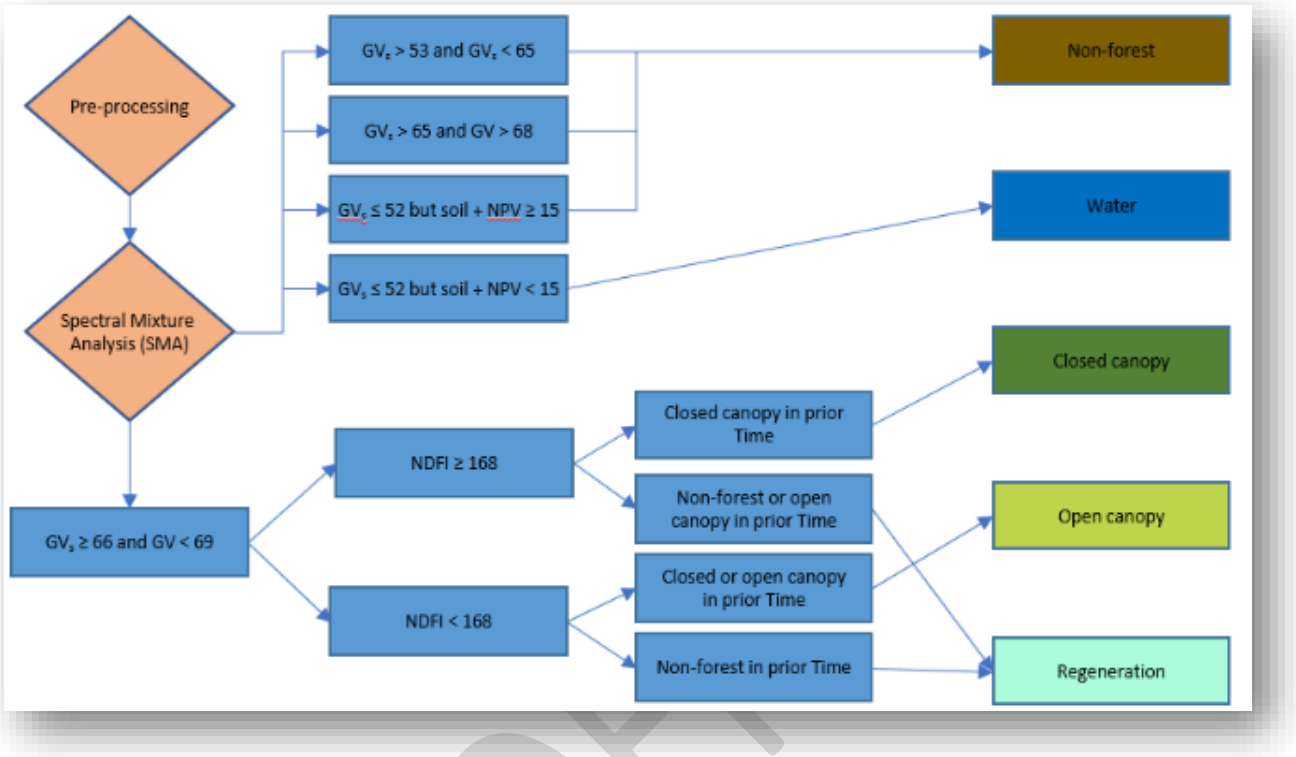
Image Classification

A decision tree (see Figure 16) to provide the unsupervised classification of forest structure built in ImgTools was adjusted for the TAL based on the spectral curves of SMA components, to classify images into forest, non-forest, water bodies using fractional cover and GVs. The forest was further classified into closed canopy forest and open canopy forest using NDFI values. In order to avoid spectral confusion in areas previously non-forest or open canopy forest, this historical contextual information was used in combination with spectral curves to delineate areas of regrowth.

- Non-Forest - An area is classified as non-forest when it meets one of following criteria:
  - GVs > 53 and < 65
  - GVs > 65 and GV > 68
  - GVs < 52 but soil + NPV >14
- Water –
  - GVs < 52 but soil + NPV < 15
- Forest - a pixel with
  - GVs ≥ 66 and GV < 69 (Justification here is forest will have shade from tall trees but the grassland will have virtually no shade)
  - Closed canopy forest
    - NDFI > 168
  - Open canopy forest –
    - NDFI < 168

The classification results from the decision tree analysis were verified with an independent Persistent Change Monitoring (PCM) dataset from MDA Information Systems LLC for non-forest areas only. RapidEye imagery, panchromatic band of Landsat and HAG (Height Above Ground) model derived using LiDAR data and Landsat data for TAL (J. Stoker, unpublished) to spot check validity of non-forest and open canopy classes. A Monte Carlo simulation of field measured and LiDAR predicted AGB supports separation of distinct deforestation and degradation classes based on mean. The decision tree classification was then used to classify each satellite image into five classes: closed canopy (undisturbed) forest, open canopy (degraded) forest, non-forest, water and cloud-shadow classes.

Figure 16 Decision Tree and Definition of Forest for Terai Arc Landscape



Generating forest types and conditions map

The forest classification above provides only the structural classes, closed canopy, open canopy, or non-forest. However, carbon stocks in the forest vary by both forest types as well as forest structure. The only available forest type classification map that has been ground verified (based on 2001 data by Joshi et al. 2003) was used to extract forest polygons for four major forest types of TAL: 1) Sal forest, 2) Sal dominated mixed forest, 3) other than Sal dominated forest (here after "other mixed forest") and 4) Riverine. These four forest types were overlaid on the forest structural map to generate forest types and conditions maps for each time period. The study assumed forest types do not change from one type to another type (i.e., from Sal forest to mixed forest or riverine forest or vice versa) in 10-20 years.

Image series Analysis

To delineate areas of deforestation, degradation and enhancement, a time--wise-image series analysis of forest change for the TAL was completed for four time periods, 2002-2006, 2006-2009, 2009-2011, and 2011-2014 using the classified images. A pair of classified images for the same satellite scene was run through a change detection algorithm in the ERDAS Imagine, to produce a change matrix at pixel level. This results altogether in 45 activity data types, i.e. possible status transitions between pixel classes for the first set of image pairs, time periods T1 and T2. Any forested area under the cloud and cloud shadow (could-shadow class) was considered as unchanged between the two periods. Likewise, areas remaining in same classes between the two periods were also considered unchanged. The change classes derived from the change matrix are listed below (see Table 36) as Deforestation 1-3, Degradation, Enhancement and Regeneration.

Table 36 Activity data classes derived from the change matrix

T1 \ T2	Closed canopy	Open canopy	Non-forest
Closed canopy	-	Degradation	Deforestation 1
Open canopy	Enhancement	-	Deforestation 2
Non-forest		Regeneration	
Regenerated forest			Deforestation 3

For the subsequent image series analysis, the base classified image for that series (time T1) was adjusted to reflect changes in the previous time period; for example, activity data derived in Table 36 as a change between T1 and T2 were delineated and re-coded in the T2 scene. The change analysis between 2002 and 2006 resulted in a 6-class matrix representing actual change in forest conditions. These change classes were adjusted in the base image (2006) for analyzing time series 2006 to 2009. The same process was repeated for 2009 to 2011 and 2011-2014 series. The areas under each activity for each time series analysis were used to generate activity data (see Table 37).

Post-processing adjustments

As with all satellite-based land use classification analyses, some areas may be misclassified because of differences in illumination, season or mountain slopes. Post-processing adjustments are carried out in order to detect and eliminate such cases of misclassification that leave a clear signature. Examples of such clear signatures include back-and-forth transitions between classes, as well as biologically unrealistic forest growth rates

An analysis of the map data by identifying areas that undergo transitions back-and-forth between open canopy forest, non-forest and closed canopy forest has revealed that the total area of regeneration or deforestation that could be artificial is 61 000 ha. Beyond this, misclassification between regeneration and grassland or field, further artificial regeneration can also occur. Field validation plots were used to assess if regeneration is real or an artifact. These plots were collected in a separate field campaign. Of the 407 plots measured in this campaign, 36 had been pre-classified as regeneration. Out of these 36 plots, 28 (78%) were validated in the field as regeneration, whereas 8 plots (22%) were deemed to be artifacts: there was less than 10% canopy cover on those sites, so no true regeneration had occurred. Of the plots that had been labeled as regeneration none were in closed canopy forest; therefore, in principle these were realistic regeneration sites. In line with the field samples, 22% of remote sensing data classified as regeneration has been excluded from the final activity data for regeneration.

The original purpose of this field campaign was not to assign probabilities to errors in activity data, but rather to get quantitative insights into the prevalence of different drivers of deforestation and forest degradation, and estimate qualitatively the accuracy of activity type identification on the ground, both with relatively limited time and resources. Therefore, in none of the four field campaigns conducted during the years 2010-2014 in TAL was the primary purpose to collect data for RL estimation; rather, these data were subsequently (and opportunistically) used for RL estimation.

One additional hurdle in RL estimation was the availability and timing of Landsat imagery. Ideally, we would have obtained Landsat imagery in 2011, synchronized with the field and LiDAR data collected that summer. Unfortunately, usable imagery was not available in this period, forcing us to use an image from a drier season in 2010. This seasonal misalignment of imagery may be partially responsible for the apparent spike in deforestation during the period 2009-2011 (i.e., this spike could be partially artificial, see Annex 12). We are exploring ways to address this problem in the near future with systematic post-processing, but the data presented below reflects the direct output of the LAMP method from the images available.

Another possible approach to reduce the impact of variable imagery on estimates of Activity Data would be to adopt and modify a methodology presented e.g. in Naesset at al. 2013[80]. Though the method presented in this article relies on wall-to-wall repeated LiDAR data collection to build estimators, it could be adopted in the LAMP context by creating surrogate plot pairs where estimation of AGB is post-processed by classification into activities, based on a teaching set and regression model within each forest type, featuring LiDAR-classified forest conditions of intact, degraded or deforested as strata. Since such an effort has not yet been tried and scientifically documented in conditions comparable to Nepal, the idea has not been pursued further yet, but it would be interesting as a part of MMR activities if original LAMP calibration plots were to be revisited periodically to provide ground truthing.

[80] Naesset, E., Bollandsås, O. M., Gobakken, T., Gregoire, T. G. and Ståhl, G.: Model-assisted estimation of change in forest biomass over an 11-year period in a sample survey supported by airborne LiDAR: a case study with post-stratification to provide "activity data". Remote Sensing of Environment 128 (2013) 299-314.

Table 37 Activity data for different forest types between 2004 and 2014 (see Annex 12)

Forest Type	Activity	Activity data(ha)			
Year		2004-2006	2006-2009	2009-2011	2011-2014
Sal Forest	Deforestation 1	1 043	9 488	17 914	4 055
	Deforestation 2	339	615	1 651	773
	Deforestation 3	453	2 117	6 655	2 661
	Degradation	671	3 141	17 488	14 667
	Regeneration	17 976	6 313	10 008	33 120
	Enhancement	7 492	1223	1078	13 797
Sal Mixed	Deforestation 1	1 145	10 588	20 332	3 141
	Deforestation 2	697	964	1 927	709
	Deforestation 3	998	3 405	12 821	3 746
	Degradation	831	10 003	10 375	17 004
	Regeneration	20 499	4 995	11 886	34 877
	Enhancement	8113	2 022	874,17	7 440
Other Mixed	Deforestation 1	136	2 661	3 308	175
	Deforestation 2	87	514	284	111
	Deforestation 3	87	870	1 536	269
	Degradation	108	380	1 250	1 241
	Regeneration	2 620	1 251	3 461	2 636
	Enhancement	1 066	300	129	841
Riverine	Deforestation 1	80	255	1 663	289
	Deforestation 2	29	39	163	56
	Deforestation 3	38	147	752	291
	Degradation	41	225	877	992
	Regeneration	1 653	510	244	2 856
	Enhancement	514	95	52	707

8.3.2 EMISSION FACTORS

Table 38: Emission Factors

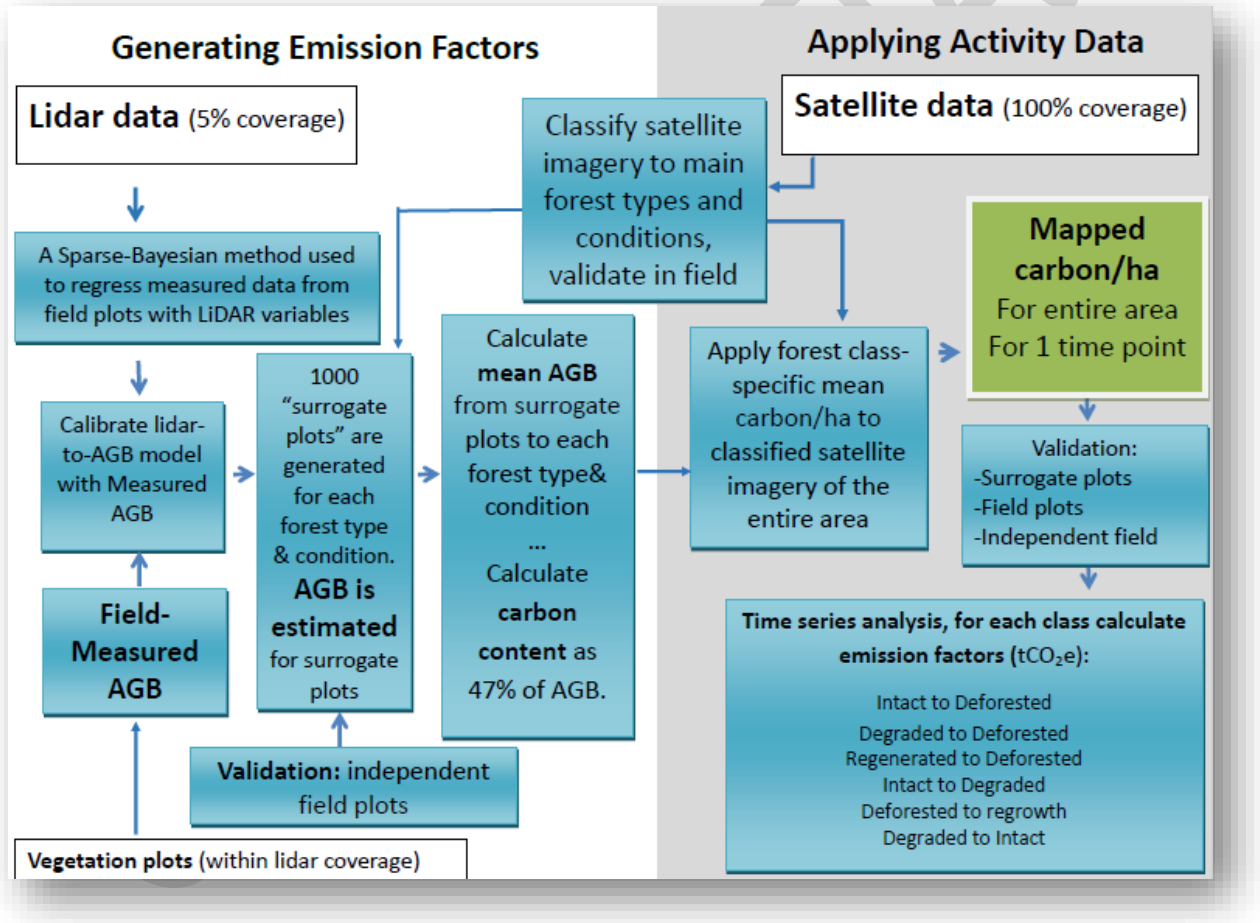
Description of the parameter including the forest class if applicable:	The parameters for the development of the RL are consistent with the FCPF Carbon Fund Methodological Framework, and the RL accounts for all activities included in the ER Program (Criterion 3), including deforestation, forest degradation, and regeneration. The emissions generated by forest degradation are 25% of total emissions and consequently are

	accounted for separately because this amount exceeds the Methodological Framework threshold of 10%. Emission factors were calculated for two forest conditions: 1) intact and 2) degraded for the four major forest types. For the forest regeneration IPCC default value for the region was used and adjusted to make it realistic for the time window applied for RL calculations. The average time window was 2.5 years long, so the IPCC annual regeneration rate was multiplied by 2.5.
Data unit (e.g. t CO_2/ha):	t CO_2/ha
Value for the parameter:	
Source of data (e.g. official statistics, IPCC, scientific literature) or description of the assumptions, methods and results of any underlying studies that have been used to determine the parameter:	Emission factors were calculated using LiDAR-Assisted Multi-Source Program (LAMP) described in further detail below
Spatial level (local, regional, national or international):	Sub-national level comprising 12 administrative districts of Nepal.
Discussion of key uncertainties for this parameter:	A full discussion of uncertainty is given in Section 12 below
Estimation of accuracy, precision, and/or confidence level, as applicable and an explanation of assumptions/methodology in the estimation:	Accuracy, precision and confidence intervals are provided in Section 12 below

LiDAR-Assisted Multi-Source Program (LAMP)

The LiDAR-Assisted Multi-Source Program (LAMP) process is shown in Figure 17 below and is described in detail in two published journals.[81] LAMP is based on the following data sets: airborne-collected LiDAR data covering 5% of the extent of the Program Area; best available Landsat and other satellite data; the 1998 Government of Nepal Topographic Base Maps; the 1984 Government of Nepal Land Resource Mapping Project (LRMP); field data collected in 2011 (738 plots of 12.6-meter radius) and 2013 (46 plots of 30-meter radius). Emission Factors were generated through the correlation of LiDAR-based mean carbon values for each forest type and conditions.

Figure 17 LAMP approach for calculating emission factors



Mean carbon stocks of different forest types

Based on the four major forest types of TAL: 1) Sal forest, 2) Sal dominated mixed forest, 3) other mixed forest and 4) Riverine forest and two forest conditions: 1) intact and 2) degraded, eight mean carbon densities of forests in the TAL have been derived (see Table 39). Emissions factors were

[81] Joshi, et al 2014. An accurate REDD+ Reference Level for Terai Arc Landscape, Nepal using LiDAR Assisted Multi-Source Program (LAMP). *Banko Janakari, A Journal for Forestry Information in Nepal. Vol 24-1 (p23-33).* http://dfrs.gov.np/downloadfile/Banko%20Janakari%20Vol%2024-1_1449572268.pdf; and Kauranne, et al 2017. LiDAR-Assisted Multi-Source Program (LAMP) for Measuring Above Ground Biomass and Forest Carbon. *Remote Sens.* **2017**, *9*, 154. http://www.mdpi.com/2072-4292/9/2/154

derived by calculating the difference between the carbon and CO_2e values in Table 39 to reflect the loss or gain in carbon when land is converted from one forest type to another.

When the forest changes from intact or degraded forest to deforestation all carbon was assumed to be released. But when forest goes from intact to degraded the difference in the mean carbon contents between intact and degraded forest is assumed to be emitted, for example when intact Sal forest changes to degraded Sal forest, 29.3 tC/ha or 107.5 tCO_2/ha are emitted. For the emission factors for regeneration forest changing to deforestation or degradation, and sequestrations due to regeneration are calculated with the IPCC default value of 2.8 tC/ha/yr or 10.3 tCO_2/ha/yr. Deforested land is assumed to have a default carbon stock of 5tC/ha which is taken from IPCC GPG Table 3.3.8 for annual cropland in the first year following deforestation.

Table 39 The mean carbon density and CO2e values for different forest types and conditions

Forest type and condition	tC/ha	tCO_2e/ha
Sal intact	110.7	406.0
Sal degraded	81.4	298.5
Sal mixed intact	86.1	315.7
Sal mixed degraded	68.8	252.3
Other mixed intact	87.4	320.7
Other mixed degraded	67.3	246.8
Riverine intact	80.4	294.9
Riverine degraded	46.7	171.3
Deforested land	5	18.3

Calculation of the average annual historical emissions over the Reference Period

The RL is generated by multiplying areas changed under each activity by the appropriate emission factor, i.e., mean carbon stocks in each forest type to calculate amount of CO_2 emission due to that particular activity.

$$RL = Activity\ data \times Emission\ factors$$

The amount of CO_2 released due to loss of forest carbon resulting from deforestation and degradation is termed as gross emissions while intake of CO_2 by growing plants during forest regeneration is called sequestration and results in removals of CO_2 from the atmosphere. Therefore, net carbon loss is equal to gross emissions minus removals. The reference emissions level (RL) for TAL is based on net carbon accounting process.

Calculating Net Emissions Level

Following formula was used to calculate RL d for TAL.

$$Reference\ Level = \frac{\sum Em_{def1} + \sum Em_{def2} + \sum Em_{def3} + \sum Em_{deg} - \sum Seq_{reg} - \sum Seq_{en}}{y}$$

Where,

$\sum$ Em $_{def1}$ - is the sum of emissions from deforestation of intact forest over "y" years,
$\sum$ Em $_{def2}$ - is the sum of emissions from deforestation of degraded forest over "y" years,
$\sum$ Em $_{def3}$ - is the sum of emissions from deforestation of regenerated forest over "y" years,
$\sum$ Em $_{deg}$ - is the sum of emissions from degradation over "y" years,
$\sum$ Seq $_{reg}$ - is the sum of sequestrations from regeneration over "y" year

$\sum Seq_{en}$ - is the sum of sequestrations from enhancement over "y" year

We used emission factors from IPCC guidelines for regeneration (-2.8tC/ha) and used an average 2.5-year window to estimate annual regeneration of the sub-periods (see Section 8.3.2 below). For enhancement, the emission factor is the negative of the emission factor for degradation for each forest type. The RL analysis shows that during the 10-year period between 2004 and 2014 total of 34.4 $MtCO_2e$ was emitted from forest sector in the TAL, an average annual emission of 3.4 $MtCO_2e$. Because regeneration takes over twenty years to replace a forest lost, while deforestation is assumed to lose all forest above-ground biomass down to the level of 5 tC/ha immediately, estimated emissions in an interval-based estimation will exceed those in the corresponding book-end estimation over periods of less than twenty years' duration. This difference corresponds roughly to one half of the emissions from forests in TAL during the period under investigation, and is also being further troubleshooted to ensure the ultimate approach is unbiased.

8.4 UPWARD OR DOWNWARD ADJUSTMENTS TO THE AVERAGE ANNUAL HISTORICAL EMISSIONS OVER THE REFERENCE PERIOD (IF APPLICABLE)

Not applicable.

8.5 ESTIMATED REFERENCE LEVEL

Year	Average annual historical emissions from deforestation over the Reference Period (tCO_{2-e})	If applicable, average annual historical emissions from forest degradation over the Reference Period (tCO_{2-e})	If applicable, average annual historical removals by sinks over the Reference Period (tCO_{2-e}/yr)	Adjustment, if applicable (tCO_{2-e})	Reference level (tCO_{2-e})
2004-2006	707093	86 150	-1 599 799		-806 556
2006-2009	3 496 392	428 376	-262 164		3 662 605
2009-2011	10 008 377	1 712 126	-527 704		11 192 800
2011-2014	1 347 475	1 195 759	-1 663 025		880 209
10-yr	35 962 542	8 468 959	-10 030 570		34 400 931
Annual	**3 596 254**	**846 896**	**-1 003 057**		**3 440 093**

8.6 RELATION BETWEEN THE REFERENCE LEVEL, THE DEVELOPMENT OF A FREL/FRL FOR THE UNFCCC AND THE COUNTRY'S EXISTING OR EMERGING GREENHOUSE GAS INVENTORY

In January 2017, the Government of Nepal submitted its draft national RL to the UNFCCC and this is currently in technical assessment.[82] The national RL similarly uses Landsat data to develop activity

[82] MoFSC (2016) National Forest Reference Level of Nepal (2000 – 2010) http://redd.unfccc.int/files/nepal_frl_jan_8__2017.pdf

data on deforestation and afforestation. However, due to the absence of degradation data at the national level, proxy approaches were used to assess two key drivers of forest degradation, namely grazing and fuelwood harvesting; other potential factors contributing to degradation were not included. With this approach, the national RL estimates annual emissions and removals due to deforestation and afforestation to be 0.92 MtCO2e/yr and 0.15 MtCO2e/yr respectively. Degradation due to unsustainable fuelwood extraction and grazing is estimated to result in emissions of 0.34 MtCO2e/yr and 1.77 MtCO2e/yr respectively. This results in estimated net emissions of 2.88 MtCO2e/year across Nepal.

The TAL RL methodology is not directly comparable to the national methodology at this time and results, unsurprisingly, in very different estimates (Table 41 compares the TAL program area RL to the Terai region component of the national RL).

Table 40 Comparison between emissions and removals in the TAL RL and the national reference level including total and Terai-level emissions

	TAL RL (MtCO2e)	National RL (MtCO2e)	
		Terai	Total
Deforestation	3.6	0.47	0.92
Afforestation	-1.00	-0.03	-0.15
Degradation (Fuelwood)	0.84	0.06	0.34
Degradation (Grazing)		0.09	1.77
Total	3.44	0.59	2.88

There are likely several contributing factors for the differences in these estimates:

- The two reference levels use fundamentally different approaches for calculating emissions from deforestation and forest degradation. As noted, the ER Program RL uses a stock-difference approach based solely on classification of Landsat and LiDAR imagery, assuming a constant carbon stock within each of four distinct forest types with varying levels of degradation, and measures area changes between these classes. This essentially accounts for carbon stock changes due to the impact of all the drivers operating on these forests. The national RL uses a stock difference approach for deforestation and afforestation, but applies a gain-loss approach for forest remaining forests, using proxy data for wood-fuel (using the WISDOM model) and cattle grazing data, so its scope is limited to these specific drivers.

- The ER Program RL evaluates the reference period of 2004-2014, and the national RL uses the reference period 2000-2010 (based on available Landsat analysis at the time for these years).

- The ER Program RL estimates deforestation and degradation at the end of each of several time intervals within the reference period (a "time series approach") and then sums these to obtain total deforestation-based emissions from 2004-2014, facilitating accounting for inter-annual changes. A similar approach was followed for afforestation (regeneration). The national RL uses forest cover data for 2000 and 2010 for a "bookend" change assessment without accounting for changes through nested time intervals.

- The ER Program RL reports changes at the individual pixel level (30mx30m), roughly equivalent to 0.1 ha. In the national RL, given the broader geographic extent and the associated high terrain complexity, shadows, heterogonous and fragmented characteristics over mid and high hill regions, change areas only greater than 2.25 ha were reported (with a bias correction) in order to improve accuracy. The greater resolution for the ER Program RL allows much greater sensitivity, but also brings added variability and associated uncertainty levels.

- The ER Program and national RL use different approaches to develop emissions factors. Specifically, the ER Program reference level derives emissions factors using a combination of field plots and surrogate LiDAR plots to develop average carbon stocks for four different forest classes, each with two conditions (intact or degraded). The national RL uses FRA and NFI data to develop emission factors for deforestation and afforestation, based on one forest type for the Terai physiographic region. It uses a combination of national data and IPCC default values to calculate emissions from degradation.

- Finally, it is also possible that there are other errors or discrepancies in data processing, underlying assumptions or methodologies that are not yet understood in one or both methodologies that could also contribute to the significant differences in estimates. Notwithstanding these, the national RL approach is complementary to the ERP area RL in the sense that the national approach allows the GoN to directly target these key drivers of emissions with measures, while a stock-difference approach will facilitate the direct assessment of the effectiveness of these measures in the TAL.

In view of some of these issues, it is likely that the national FRL under-estimates deforestation/afforestation changes leading to lower emissions and removals. National RL has identified these limitations in the RL submission and is considering possible improvements.

Members of the current consortium are participating actively in discussions on the national level submission strategy at REDD IC. Based on technical experiences gained and detailed datasets generated during TAL RL study and limitations identified in the national RL, it is necessary to explore development of more comprehensive datasets at the national level, keeping in view national circumstances, costs and capacities.

The RIC and DFRS recognize these outstanding issues and are planning an aggressive course of additional work in the coming months to resolve them prior to launch of the ER Program, noting that these issues do not reflect on the anticipated scope of program interventions or their effectiveness, but rather on the ability to measure these impacts in a fully transparent and unbiased manner, as well as for subnational and national methodologies to be mutually informed.

Key outstanding issues:
1) Methodological inconsistencies ("inform and informed by") between Terai and national RLs
2) Numeric discrepancies between Terai and national RLs
3) Potential imagery problem creating a 2009-2011 spike in Terai RL
4) Potential bias in Terai RL estimates for regeneration in short time intervals
5) Capacity building to position DFRS to fully implement MRV through performance period

Date	Process Step	Lead	Contributing
September 2017	Independent technical assessment of Terai and national methodologies with view to achieving consistency with Carbon Fund and UNFCCC guidance	Winrock International	RIC, DFRS, Arbonaut LTD., WWF, technical lead on national RL TBD, Dr. Murthy
October 2017	Working level technical workshop to assess options and develop roadmap for Terai and national RLs	DFRS, RIC	WWF, Winrock Int, Arbonaut LTD, technical lead on national RL, FMT or TAP expert
October – November 2017	Begin implementation of roadmap for Terai RL	DFRS, Arbonaut LTD	RIC, WWF, Winrock Int

November 2017	Update final ERPD to show progress and remaining steps on roadmap for Terai RL with updated estimates if feasible	DFRS, Arbonaut LTD	RIC, WWF, Winrock Int.
December 2017 – April 2018	Final implementation of roadmap for Terai RL	DFRS, Arbonaut LTD	RIC, WWF
2018	Continued development of national RL and resubmission to UNFCCC	RIC, DFRS	TBD

9 APPROACH FOR MEASUREMENT, MONITORING AND REPORTING

9.1 MEASUREMENT, MONITORING AND REPORTING APPROACH FOR ESTIMATING EMISSIONS OCCURRING UNDER THE ER PROGRAM WITHIN THE ACCOUNTING AREA

The TAL monitoring system will align with the national forest monitoring system of Nepal and will be designed in coordination with the Ministry of Population and Environment (MoPE), MoFSC, REDD IC, and DFRS. In line with Decision 11/CP.19, The monitoring system will provide data and information that are transparent, consistent over time, suitable for measuring, reporting and verifying anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest-area changes. The system will support decision making related to REDD+ strategy options and provide information to governmental organizations, NGOs, research institutions, other relevant institutions and general public. The MRV system includes remote sensing and ground-based forest carbon inventory data. The information produced by the MRV system for the TAL ER Program will be integrated into the National Forest Database (NFD) and National Forest Information System (NFIS) of the Government of Nepal and will be shared with relevant stakeholders. These systems will be web-based. Monitoring of drivers will be conducted in parallel to assess the contribution of each driver and any changes in their relative importance over time that can be measured using a gain-loss approach envisaged in the national RL submission. The total impact of interventions, on the other hand, will be measured with a MMR process described below, as a direct follow-up of the derivation of RLs for TAL.

The design of the monitoring system will be built on the activities conducted under the FRA project, national MRV and NFD/NFIS. The FRA has established plots for the NFI but there are very limited plots in the TAL to support future monitoring. Thus, the DFRS will re-measure the 738 field plots that were established in the TAL during this RL construction to maintain certain accuracy for future monitoring. The design of a monitoring system will be closely linked with the technical approach for assessing emissions and removals, since the system will be designed to monitor carbon stock changes over time. It is based on an integrated method using remote sensing data and periodic ground measurements throughout all major forest types in the ER Program districts.

In concrete terms, the monitoring will involve first a stratification of fresh Landsat 8 imagery into the forest types and conditions used in RL determination using the same method as was applied in RL generation. Post-processing will also be conducted by the same process as with RL, which is yet to be revised to improve removal of artefacts with the help of time series filtering of Landsat images[83]. In order to establish realistic emission factors for regeneration and enhancement that may be forest type dependent, annual or biennial re-measurement of TAL calibration plots that have been stratified to have undergone these activities is envisaged and such revised emission factors applied (for regeneration and enhancement only) as soon as there is adequate statistical accuracy available for reliably estimating them[84].

Local communities will be involved as much as possible in the measuring and monitoring activities, in collecting forest level information as well as socio-environmental baseline data for the Safeguard Information System (SIS). Forest-level data collection is already a central component of DFO and CFUG activities and local communities and IPs will work closely with the monitoring of forests during

[83] Espejo, A.E. and I. Jonckheere. (2017). Draft proceedings of technical workshop (Roma, Italy) on lessons learned from accuracy assessments in the context of REDD+. Global Forest Observations Initiative, Food and Agriculture Organization of the United Nations, and Forest Carbon Partnership Facility.
[84] Ibid.

the ER Program through community-based forest monitoring. This will strengthen and enhance the engagement of local communities and IPs in the monitoring of forest carbon stocks on the ground. In addition, the ER Program will incorporate non-carbon indicators developed in national stakeholder processes and apply them in the ER Program Area where possible, to assess the improvement of other benefits in the ER Program.

Activity Data and Emission Factors

The FRL uses spatially explicit activity data (IPCC Approach 3) and forest strata level emission factors (Tier 3) within the TAL. Activity data will rely on the reference forest map used as a benchmark and the periodic assessment of land cover changes and changes in carbon stock in forest areas that remain forests. The approach in TAL will provide spatially explicit data on land-cover and transitions between land-cover classes. Change detection between forest conditions is carried out by exactly the same method as described in section 8, analyzing fresh Landsat imagery through a processing chain described in detail in the associated text.

The main parameters to be measured for activity data are deforestation, forest degradation and forest enhancement/regeneration. The land cover baseline will contain the land cover categories defined in the existing frameworks for the LULUCF sector under the UNFCCC: forest land, cropland, grassland, wetlands, settlements, and other land. Forest land will be further subdivided by forest type and forest density: closed, medium stocked and open. The thresholds generally adopted for density classes and used in the NFI are 0-10%, 10-40%, 40-70% and 70-100%.

By using multi-temporal analysis of remote sensing data in combination with field verification, that will involve local communities, activity data on forest area changes and forest degradation will be estimated. Changes in carbon content within forested areas will be accurately monitored, using a combination of satellite imagery, field plots and LAMP models that are available. This method was already successfully applied in TAL (Joshi et al. 2014) and proved to be a robust methodology for long-term forest monitoring that provides activity data and emission factors of above- and below-ground biomass.

Furthermore, community interviews were already applied in a separate targeted deforestation and forest degradation field campaign that was used to validate the conclusions particularly on forest degradation indicated in the above study. This validation study targeted one hundred forest sites of one-hectare size each. At each site, AGB was explicitly measured using a mobile phone based AGB estimation service. In addition, local people were interviewed about their views on the causes of deforestation and forest degradation. The study found the preliminary analysis of deforestation and forest degradation to be highly accurate, to almost 90 per cent, but the interviews made it possible to quantify also the relative significance of different causes of deforestation and forest degradation.

The MRV system proposed here is independent of forest ownership structure and will uniformly apply to private and community forests. Trees outside forests (TOF) will require specific attention but the total amount of carbon stored in TOF is likely to be very small compared to the main intervention areas of the ER Program. Ancillary information on forest degradation such as decrease in species diversity, soil depletion etc., can be monitored through permanent sample plots established by the FRA project. The need to reliably detect change in forest condition has also been used in the selection of the spatial resolution for forest patches of minimal size that is set at 1 hectare. This size will provide a sufficient sample of Landsat pixels to calculate forest condition classification in a statistically reliable fashion, although such a choice may not fully acknowledge the positive impact of very fine-grained small-scale measures.

Parameter:	Deforestation, degradation and enhancement
Description:	
Data unit:	Hectares

Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international) and if and how the data or methods will be approved during the Term of the ERPA	Landsat satellite data Field plots LiDAR data FRA data
Frequency of monitoring/recording:	2 years
Monitoring equipment:	Vertex, diameter tapes, measuring tapes, GPS, mobile phones with field data collection forms, field cameras, topographic maps, satellite images,
Quality Assurance/Quality Control procedures to be applied:	***QA/QC for field measurements:*** Rigorous and detailed standard operating procedures will be developed for all steps of fieldwork to ensure that the measurements taken by different teams or at different times are consistent and comparable. Once standard operating procedures have been developed, field crews will be fully trained in all aspects of data collection, including ensuring the accuracy of data. After every field visit the team will produce a document which verifies that all steps in every standard operating procedure have been followed and lists all deviations. These documents should be filed with the project, which is in turn responsible for updating standard operating procedures when any significant issues arise. A program for auditing field measurements and sampling will be established. It will include three types of checks: hot, cold, and blind. During a *hot check*, auditors observe members of a field crew while they are collecting data on a sample plot. This type of check is primarily for training purposes and allows for the correction of errors in techniques. *Cold checks*, in contrast, are those which are conducted when field crews are not present, and *blind checks* include the complete re-measurement of a plot to establish measurement variance. Blind checks should be conducted on about 10% of plots and the resultant data compared with the original data. Any errors detected should be corrected and measurement error estimated by expressing the number of errors as a percentage of the total number of plots rechecked. ***QA/QC for data entry:***

	In most cases, data will be entered into computers in the field as well as transferred directly to the server using mobile phones. In the case of manual data entry, the following process will be followed. This process is often a significant source of error, so extreme care must be taken. Errors can be reduced by having independent personnel make spot checks of the entered data and outliers can be identified by checking whether each value is within the expected range. If a significant number of errors is uncovered during spot and range checks, all data should be re-checked by independent personnel. Regular communication among all personnel involved in measuring and analyzing data is critical to resolve anomalies before the final analysis is completed. In addition, the units used in the field must be accorded special attention. Typical mistakes include confusing the diameters and circumferences of trees as well as units of length (mm, cm, and m). All measurements must have the unit clearly indicated. If an anomaly cannot be resolved, the anomalous data should not be included in the analysis. ***QA/QC for data archiving:*** Because of the relatively long-term nature of MRV activities, data archiving and storage is important. The following three steps should be adhered to: ● The original laboratory data and field measurements, whether data sheets or electronic files, should be maintained in their original form and stored in a secure location. ● Copies of all data analyses, models, final estimates, GIS products, and measuring and monitoring reports should all be stored in a secure, preferably offsite location. ● Taking into consideration how fast data is produced and when reporting periods fall, software and hardware for storing material should be periodically updated in a format that can be accessed by whatever new or updated software or hardware is currently in use.
Identification of sources of uncertainty for this parameter	The potential sources of errors are: ● Field measurements - measurement error, error in AGB estimates ● Sampling - sampling error ● Geographical location - spatial inaccuracy of field sample plot location and LiDAR measurement location

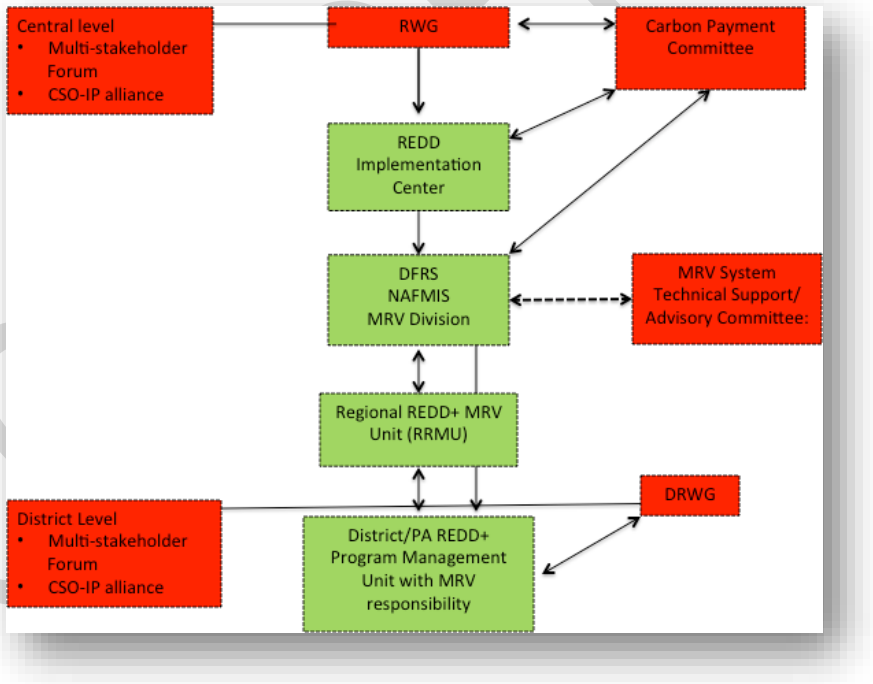
	• LiDAR-to-AGB model - model-error[85] • Forest classification - misclassification Surrogate plots - sampling error
Process for managing and reducing uncertainty associated with this parameter	1. Using high resolution satellite data and visual interpretation 2. Using field verification
Any comment:	

9.2 ORGANIZATIONAL STRUCTURE FOR MEASUREMENT, MONITORING AND REPORTING

A three-tiered institutional structure of central, regional/sub-national and district/program levels is proposed for Nepal's MRV system.

At **the national level** the monitoring and MRV function will be included in the current survey division of the DFRS. The division will be renamed to 'Forest Survey and NFMS & MRV System Management Division' (this will be referred to as the MRV Division) to ensure effective, efficient and transparent governance of measurement, monitoring and management of data under the MRV system. The proposed position of the DFRS/NFMS/MRV division is illustrated in Figure 18 below.

Figure 18 Proposed position of DFRS/NFMS/MRV Division (REDD+ Strategy, 2016)



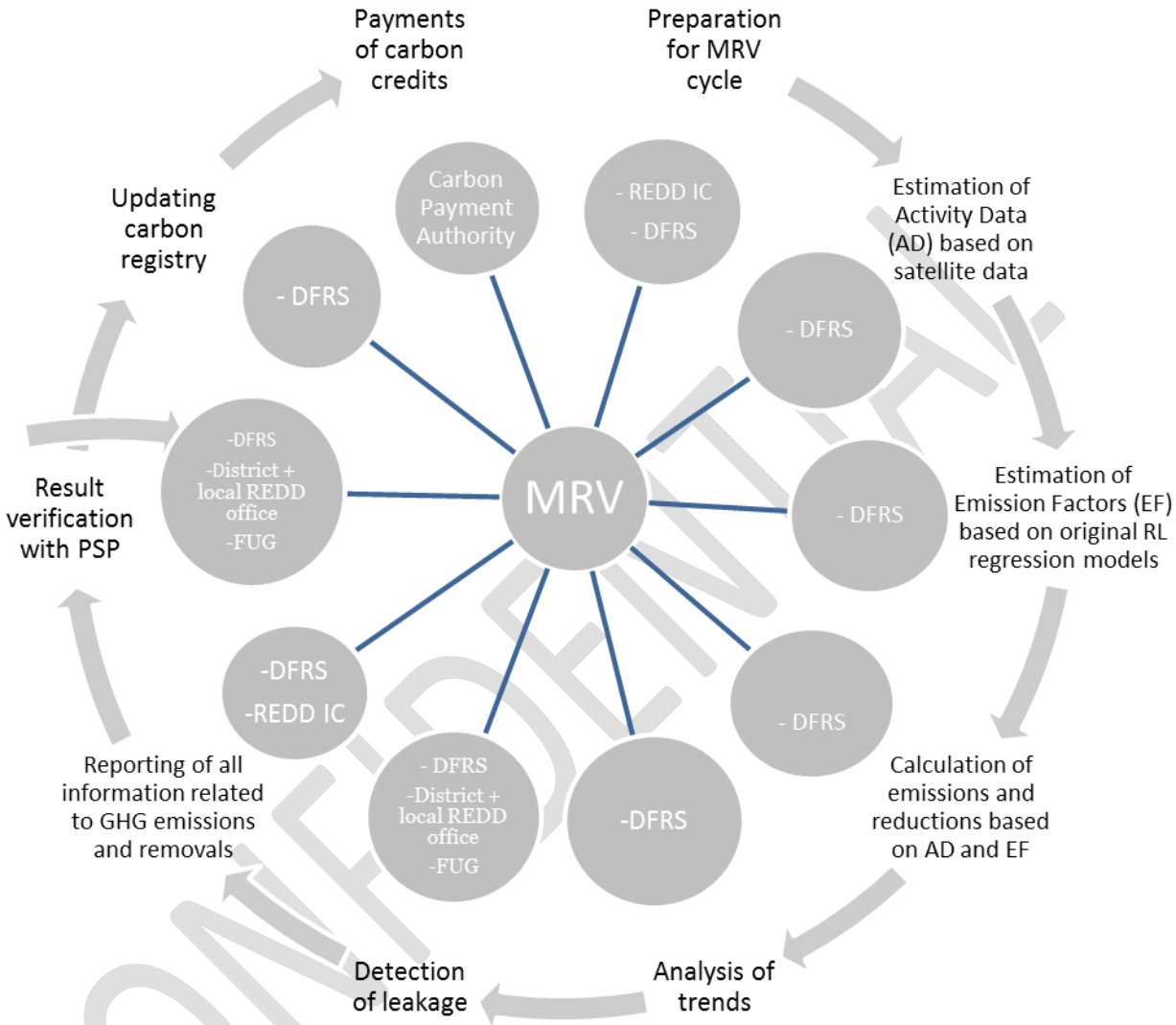
To ensure effective, efficient and transparent governance of measurement, monitoring and management of data under the MRV system, DFRS, the national MRV Implementing agency under the overall guidance of the REDD WG will be responsible for:

[85] Note that these LiDAR model errors are from the RL approach and will not be recalculated during the performance period.

- Periodic execution of forest assessments for deforestation and forest degradation monitoring;
- Designing, maintaining and operating the National Forest Monitoring System (NFMS);
- Coordinating the collection of sub-national level information so that double counting of emissions is eliminated by allocating each district to a single sub-national level area only;
- Disseminating NFMS deliverables through national web portal;
- Providing technical guidance and institutional/capacity support to the parallel institutional setups at sub-national/district/local community levels.

DFRS hosts many capable forest professionals to manage the national forest monitoring system. It recently successfully completed the national Forest Resource Assessment (FRA) between 2011 and 2015, including the associated campaign that captured LiDAR data for TAL. DFRS also already started step-wise periodic forest inventory in Terai and Siwalik physiographic zones. Some development and training in satellite data interpretation and REDD+ information systems will build additional capacities for staff who will conduct the relevant MRV tasks. These steps are outlined fully in Figure 19.

Figure 19 Proposed Steps and Institutions to be involved in MRV in the TAL/Nepal (Revised after national MRV report)



At the **sub-national level** a Regional REDD+ MRV Unit (RRMU) will be established under the Regional Office at the regional forest office, which will coordinate with and guide the district/local level forestry institutions and also supervise and monitor the MRV related activities. At the **district/local level** a District/PA MRV section (DMRVS) will be established under the District/PA REDD+ Program Management Unit of DFO with computer and internet-based database management arrangements. Community-based forest monitoring systems will be created to build capacity of local communities and to strengthen the quality of national data. Forest carbon measurement data from all CBFM units and other FMUs participating in REDD+ will be validated by the DFO/PA authority, refined and entered in the database maintained at the district/PA level.

The sub-national/regional, district and/or local government level MRV institutional frameworks will act as the implementing entities, implementing the decisions taken by respective sub-national/regional/District Forest Coordination Committees (DFCCs). These sub-national/regional/district and/or local level entities will have a REDD Unit (as a new section) within the Regional Directorate and DFO structure. Production of a detailed action plan to incorporate MRV

activities conducted by DFRS into the mandate of REDD IC, especially vis-à-vis the national Reference Level calculation will be a major challenge to be resolved in due course.

9.3 RELATION AND CONSISTENCY WITH THE NATIONAL FOREST MONITORING SYSTEM

The information produced by the MRV system for the TAL ER Program will be integrated into the National Forest Database (NFD) and National Forest Information System (NFIS) of the Government of Nepal and will be shared with relevant stakeholders. The design of the monitoring system of carbon is built on the activities conducted under the FRA project, and the work already carried out for Terai Arc Landscape (TAL) and Nepal's NFD and NFIS. The design of a monitoring system is closely linked with the technical approach for assessing emissions and removals, since the system will be designed to monitor carbon stock changes over time. It is based on an integrated method using remote sensing data and periodic ground measurements throughout all major forest types in Nepal. The baseline forest map made under the FRA and in the future the maps for NFD/NFIS will be applied in emission factor estimation to ensure the emission factors are based on field plots from correct forest types. This ensures consistency with the NFI as well as the national MRV which use the same data. In addition, the NFMS will use the Permanent Sample Plots (PSPs) established under the NFMS for regular monitoring.

The process to calculate emission factors for the rest of the country beyond TAL would use field measurements collected in the FRA, and satellite image based analysis of activity data following the current approach. While additional LiDAR sampling campaigns would be valuable in other jurisdictions as well to provide emission factors, it appears feasible to replace them by emission factors calibrated in the TAL and modulated by FRA plots that cover the whole country.

10 DISPLACEMENT

10.1 IDENTIFICATION OF RISK OF DISPLACEMENT

This section discusses the risk of displacement/leakage, i.e. the increase of emissions outside the Program Area due to program activities. The table below provides an analysis of the main drivers of deforestation and forest degradation identified in Section 4.1 and the risk of displacement along with a corresponding justification for the assessment.

Driver of deforestation or degradation	Risk of Displacement (Categorize as High, Medium or Low)	Explanation / justification of risk assessment
DEFORESTATION		
Encroachment	Low	Migration within Nepal has historically occurred from north to south, with communities from the hills moving to the Terai in search of livelihoods from agriculture and lucrative timber opportunities. This has resulted in a steady encroachment on forestland and a conversion of forests to settlements and agricultural land. The reverse has not been the case in Nepal, and in fact, today, out-migration is more common with Nepali men seeking labor opportunities in the middle east in construction and infrastructure development. There is therefore a very low risk of displacement due to reductions in encroachment to other areas of Nepal. In addition, the trend in encroachment has been in steady decline and is expected to continue in coming years.
Infrastructure development	Low	Infrastructure planning is typically designed to serve a given area, e.g. a road, airport, school, and is therefore not at risk of displacement outside the ER Program Area. Where changes to designs do occur (e.g. moving the railway outside the Chitwan National Park) they are still within the same district boundary and within the ER Program accounting area. There is therefore minimal risk of displacement due to infrastructure development displacement.
Resettlement	Low	Resettlement differs from encroachment insofar as it is planned. When resettlement plans are being formulated, for example due to infrastructure development, national services (e.g. army, police), or the declaration of conservation areas/national parks, the resettlements are made in areas that are in the same locality or around the same area so that people do not lose their culture, traditional customs and identity. Resettlements are therefore confined within districts and in general do not occur across districts. Resettlement plans that extend far and wide across the country are rare except for cases when the institutional setups are moved hence the risk of displacement due to resettlement is low.

FOREST DEGRADATION		
Timber Extraction (Unsustainable/Illegal)	Medium	The demand for timber in Nepal and the Terai far exceeds the current sustainable supply of timber. Timber trade in Nepal includes both inter-district and cross border flows with much of Nepal's domestic demand being met through international sources or from domestic, illegal supply. Post-earthquake recovery is expected to sustain the high demand for construction timber through the lifetime of the ER Program. Curbing illegal timber extraction in the TAL could therefore cause additional pressure in forests outside the project area or promote illegal timber extraction within the project boundary. Counterbalancing this is the often-local nature of timber extraction in the Terai to serve the needs of local districts and communities. We have therefore ranked the risk of displacement of timber extraction as medium.
Fuelwood extraction	Low	Fuelwood in the Terai is almost exclusively extracted from within the vicinity of wood fuel users and therefore minimizes the risk of displacement. Some displacements could occur, particularly in district border areas but is expected to be minimal and is therefore ranked as low.
Overgrazing	Low	Grazing also typically occurs within the vicinity of villages, however cattle from the low lands will not go as far to the highlands to graze thus rendering the fact that the displacement from overgrazing can be ranked as low. However, some displacements could occur partially in border areas but will be very less.
Forest fire	Low	The chances of displacement due to forest fire cannot occur as forest fires in Nepal unlike in many parts of the world are generally started by people. Therefore, the displacement from forest fires is estimated to be very low

10.2 ER PROGRAM DESIGN FEATURES TO PREVENT AND MINIMIZE POTENTIAL DISPLACEMENT

The primary risk of displacement identified above is the risk of displacement due to unsustainable and illegal extraction of timber outside the ER Program Area. To minimize this risk the ER Program primarily proposes to increase the supply of timber from the ER Program Area. Over time this is expected to narrow the supply demand deficit and minimize the risk of illegal supply outside the ER Program Area. In addition, the handover of government managed forests to CBFM, engages both indigenous, local and marginalized communities to build their respective capacities to sustainably manage forests therefore minimizing the risk of leakage within the project boundary. Similarly, the program also proposes to enhance access to renewable energy technologies such as biogas and ICS to minimize the dependency on woodfuel and increase the production of timber from forests.

Regarding cross border, and international leakage, since Nepal and India have an open border, cross-border issues such as illegal timber trade, wildlife trade, poaching and cross border grazing are an issue. To address these issues, there is currently a mechanism in place to hold annual bilateral meetings on transboundary biodiversity conservation between Nepal and India since 2010. Similarly, Nepal and China have signed a Memorandum of Understanding (MoU) for transboundary biodiversity conservation. Nepal also has a regional project financed by the World Bank to improve the

effectiveness of wildlife and habitat conservation across Bangladesh, Bhutan, India and Nepal. As part of ER implementation, the MoFSC will collaborate with the Government of India to develop a mutual understanding addressing potential cross-border issues. Through improved forest law enforcement governance and trade (FLEGT) and trans-boundary coordination, international leakage will be mitigated.

11 REVERSALS

11.1 IDENTIFICATION OF RISK OF REVERSALS

During the ER-PD development phase, the REDD IC and ER-PD development team identified the following anthropogenic and natural risks of reversals. These risks are analyzed in Table 41 below. Overall the risk due to reversals is estimated to be 11%.

Table 41: Anthropogenic and natural risks of reversals identified during ER-PD consultations

Risk Factors	Description	Level of Risk of Reversal	Justification of the evaluation
A. Lack of broad and sustained stakeholder support	• Are stakeholders aware of, and/or have positive experience with FGRM, benefit sharing plans etc. or similar instruments in other contexts? • Have occurrences of conflicts over land and re-sources been addressed? • Is there a track record of key institutions in implementing programs and policies?	**2% - Low**	Stakeholders have been engaged throughout the REDD+ process with multiple consultations at all levels. There is broad support for the ER Program across stakeholder groups. There is a low risk of land conflict, with the handover of forest to communities, and the chances of migrations and politically motivated encroachments are low. However, there are some chances of encroachment in National Forests, which the Government will work to avoid as far as possible. Further handover to CBFMs will reduce the chances in migrations and politically-motivated encroachment. The chances of resettlement into community owned forest areas is low. There could be a possibility to relocate people in forest areas due to big projects like hydropower; however, this can be minimized through proper land use planning and identification of appropriate government land for relocation as a substitute for forest areas.
B. Lack of institutional capacities and/or ineffective vertical/cross sectoral coordination	• Is there experience of cross-sectoral cooperation? • Is there experience of collaboration between different levels of government?	**5% - Medium**	This risk has been classified as Medium. There is experience of cross-sectoral cooperation in Nepal through existing programs within the forestry sector. However, the MSFP was ultimately unsuccessful due to a lack of cooperation between key ministries. The MSFP was an important learning process in Nepal and the institutions are more closely aligned as a result. In addition, there is a broad buy in to the ERDP process and Annex 10 shows the strong level of commitment across ministries for the ER Program. Finally, the evolving constitution in Nepal and the process of devolution represents a risk in terms of the vertical collaboration within government from the federal level down to the community level. The government is mitigating this risk through the development of a

			risk matrix that provides options for ERPD implementation under the different institutional arrangements that might emerge.
C. Lack of long term effectiveness in addressing underlying drivers	• Is there experience in decoupling deforestation and degradation from economic activities? • Is relevant legal and regulatory environment conducive to REDD+ objectives?	**2% - Low**	Several factors may impact the risk of reversals due to a lack of long-term effectiveness in addressing the underlying drivers. These have overall been assessed to be low risk. **Infrastructure**: The demand for infrastructure will keep growing with the growth in population. This risk is mitigated through the land use planning intervention, which will help to minimize deforestation. **Political fuel blockades resulting in demand for fuelwood**: This was a one-time event, but given international pressure there are less likely chances of political fuel blockade. Nepal is also diversifying its energy mix and expanding biogas and solar programs which will be alternative sources **Uncontrolled grazing due to increased stray cattle**: The handover of forest to communities will reduce the risks of uncontrolled grazing to some extent, but stray cattle - especially oxen - can lead to uncontrolled grazing.
D. Exposure and vulnerability to natural disturbances	• Is the Accounting Area prone to fire, storms, droughts, etc?	**2% - Low**	Several factors affect the risk due to climate-related and non-anthropogenic impacts. Overall these have been given a Medium risk **Increased demand for timber due to non-climatic hazard like earthquakes**: Nepal lies in a seismic zone and there is still a forecast of a big earthquake in the western region. The earthquake that struck Nepal in April 2015 saw an in increased demand for house construction and wood demand, causing increased pressure on forests. The interventions proposed here should significantly increase the supply of timber and this risk is considered to be low. **Floods, soil erosion and landslides in riverine forest areas** Though there are chances of floods and soil erosion, the impact on forest loss has historically been low. Similarly, there is a chance of forest degradation in hill slopes, but generally areas that have less

			vegetation bear the brunt of landslides compared to forested areas that hold the soil. **Climate change and droughts**: Nepal faced acute droughts in 2009 and a winter and summer drought in 2016, but these have, to date, not impacted forest area due to either an increased need for agricultural land, or direct impacts on tree mortality. Our ERPD also proposes several interventions to increase understanding of climate vulnerability and to address climate change impacts through improved tree species selection.

11.2 ER PROGRAM DESIGN FEATURES TO PREVENT AND MITIGATE REVERSALS

The ER program in the TAL is viewed as a long-term commitment with a foundation in CBFM and equitable sharing of benefits. With this strong local ownership of forest management, the risks of anthropogenic reversals within Nepal are significantly mitigated. The history of CBFM in Nepal has demonstrated that the benefits are long lasting once these local models are in place. The following proposed actions are aimed at limiting the risk of reversals in the ER Program Area.

Improved land use planning and cross sectoral dialogue: To prevent and mitigate the risk of reversal through resettlement and infrastructure development the ER Program includes a cross-cutting component of land use planning in all the districts that will map, zone and develop appropriate land use plans across the TAL. The land use plans will also identify appropriate sites that could be a result of mitigation measures as identified for infrastructure projects. The land use plans will also map and zone potential areas for resettlement and or new institutional set-ups in the districts as appropriate so as to have minimum impacts on the forest areas thus reducing the risk of reversal due to ad-hoc resettlement plans and new institutional set ups in the districts. Cross sectoral dialogue with local government agencies and political leaders on a regular basis to implement the land use plans will help minimize the risk of reversal of in-migrations and politically motivates encroachment.

Addressing the supply demand deficit: The supply-demand deficit in the timber market within Nepal has resulted in most timber being consumed within Nepal with no significant export market other than illegal sales to India. The silvicultural interventions in the ER Program Area will result in increases in both carbon stocks and timber supply, reducing pressures on the forest. Similarly, enhancing access to renewable energy technologies for cooking and while substantially reducing dependence on fossil fuels and fuelwood for cooking and heating will reduce the risk of reversal due to political fuel blockades resulting reduced forest degradation.

Improved forest stewardship and awareness raising: A central component of the TAL ER Program is the training in improved sustainable forest management techniques, including training on forest fire fighting techniques, awareness raising programs, and planting of more climate-resilient tree species. This is expected to minimize the risk of reversals due to forest fires, or increase tree mortality in a changing climate. Improved sustainable management of forest techniques and handover of national forest to community based forest management regimes will also minimize stray cattle in forest areas. In addition to this the enhanced coordination with the District Livestock Offices for improved varieties of cattle and improving cattle management will reduce the risk of forest degradation due to excess uncontrolled grazing.

Non-anthropogenic reversals are harder to mitigate. The Government of Nepal is very conscious of some of these issues, however, and is taking measures to prevent further impact due to natural hazards. For example, the design of houses, schools and buildings at the central regional and local areas has taken into account future risks of earthquake (and potential impact on the timber market for reconstruction of houses). In addition, the District Development Committee’s funds for disaster risk reduction, plantation programs will minimize the risk of floods, soil erosions and landslides.

The TAL contains the most productive forests in Nepal so managing this area will result in the stewardship of the most significant forest resources in the country without significant risk of displacing deforestation and forest degradation to other areas of Nepal.

11.3 REVERSAL MANAGEMENT MECHANISM

Table 42: Selection of Reversal Management Mechanism

Reversal management mechanism	Selected (Yes/No)
Option 1: The ER Program has in place a Reversal management mechanism that is substantially equivalent to the Reversal risk mitigation assurance provided by the ER Program CF Buffer approach	No
Option 2: ERs from the ER Program are deposited in an ER Program -specific buffer, managed by the Carbon Fund (ER Program CF Buffer), based on a Reversal risk assessment.	Yes

Nepal will use the Carbon Fund ER Program transaction registry to manage its buffer. Following the Carbon Fund ER Program Buffer guidelines, a total buffer allocation of 19% is used. This figure is based on estimated uncertainty of ERs of 30-60% (8% conservativeness factor) and risk of reversal of 11%. The REDD IC reserves the right to update this allocation based on updated methodologies and or data during project implementation.

11.4 MONITORING AND REPORTING OF MAJOR EMISSIONS THAT COULD LEAD TO REVERSALS OF ERS

Given the land-based approach to monitoring, reporting and verification, reversals will be monitored directly during project implementation. Due to the nature of reversals (as a deforestation event) it will not be possible to ascertain directly if reversals are due to underperformance in the ER Program or a genuine reversal event. During the monitoring process, the REDD IC will ascertain if deforestation events are due to underperformance or due to reversals and develop adaptive management approaches accordingly.

12 UNCERTAINTIES OF THE CALCULATION OF EMISSION REDUCTIONS

12.1 IDENTIFICATION AND ASSESSMENT OF SOURCES OF UNCERTAINTY

A comprehensive error analysis of all the components in the FRL calculation process is described below. Errors and uncertainty in carbon accounting from the LAMP process were assessed in the categories of error in emission factors, errors in classification and activity data, error in time resolution, and error in carbon pools. In addition, a Monte Carlo simulation was conducted to evaluate joint error validation of field sample measurement error, plot location error, sampling error and model error. An accuracy assessment of change analysis utilizing Olofsson et.al (2013) was also conducted. One of the key assessments was of the relation between above ground carbon values and LiDAR data, calculated from a LiDAR-based linear regression model independently calibrated with 46 large, 2,827 m2 random field plots that gave the model a R^2 value of 0.9. The tests of error and uncertainty provide a very high level of confidence that the results are accurate when measuring carbon flux and emissions at the scale of the district and at smaller scales in most cases. In addition to the aforementioned assessments of accuracy and uncertainty, the field verification of the results was conducted in 2014.

12.2 QUANTIFICATION OF UNCERTAINTY IN REFERENCE LEVEL SETTING

The processes used to generate RL include data from several sources collected at different times, scales and resolutions. At different stages of the process several assumptions were made, therefore results presented inherently have several errors and uncertainties. Some of the errors may cancel out while others may be additive. The potential sources of errors are:

- Field measurements - measurement error, error in AGB estimates
- Sampling - sampling error
- Geographical location - spatial inaccuracy of field sample plot location and LiDAR measurement location
- LiDAR-to-AGB model - model-error
- Forest classification - misclassification
- Surrogate plots - sampling error

Accuracy assessment for Emission Factors

The accuracy assessment for the emission factors was done using the recommended approach by the IPCC. The standard error (Eq. 1) and 95 percent confidence intervals (Eq. 2) of LiDAR estimations could be calculated for each class using class-specific mean and standard deviation, extracted from the independent sample of 46 plots. The standard error (SE) of the mean is the standard deviation of the error in the sample mean, relative to the true mean:

$$SE = \frac{sd}{\sqrt{n}} SE = \frac{sd}{\sqrt{n}} \qquad \text{Eq.1}$$

$$CI = mean\ AGB\ \mp 1.96 * SE \qquad \text{Eq.2}$$

Where sd is standard deviation, n is sample size, CI is confidence interval and mean AGB is the mean aboveground biomass.

As a non-stratified regression model was used to arrive on LiDAR-based biomass estimates for all forest classes, the within-class uncertainty in predictions was considered by calculating the mean error of an estimator ME (θ) for each class. The ME (θ) assesses the quality of an estimator in terms of

its variation and unbiasedness (Lebanon 2010, Moore et al. 2001). It is calculated as the root of the sum of the variance and the squared bias of the estimator:

$$ME\ (\theta) = \sqrt{var(\theta)\ +\ bias(\theta)^2} \qquad \text{Eq.3}$$

Spatial scaling of error measures

Scaling of mean error by size of estimation area decreases the error associated with corresponding average AGB in proportion to the square root of the area. Thus, each forest type and condition class was spatially scaled up to the area of each class on the LiDAR blocks. This way the maximum level of error was revealed for each class (Table 43). In order to derive the mean error at different spatial scales, the formula of ME (θ) was modified by replacing variance with the square of the standard error (Eq. 4) of the mean (Kandel *et al.* 2013). Using the sample size as an indicator of the spatial scale (area) at which a mean estimate is produced, the scale-dependent mean error was calculated as:

$$ME\ (\theta)_n)_n = \sqrt{SE^2\ +\ bias(\theta)^2} \qquad \text{Eq. 4}$$

Bias was calculated from 738 field verified plots for classes closed canopy forest and open canopy forest and assumed to be close to each other between the four forest types. The confidence intervals were scaled as a function of standard error as in Equation 2.

Table 43 Confidence intervals (CI) and Mean error (ME) of LiDAR-based linear regression model for each forest type and condition class on the minimum spatial scale of each class, i.e. the area of each class on 5 x 10km LiDAR blocks

Class	Mean AGB, (ton/ha)	Area on blocks, ha	CI, ton/ha	CI, % of the mean AGB	ME, ton/ha
Sal closed canopy	235.6	36549	0.14	0.06	6.36
Sal open canopy	173.2	1661	0.65	0.37	4.01
Sal mixed closed canopy	183.2	11074	0.25	0.14	6.36
Sal mixed open canopy	146.4	946	0.86	0.58	4.02
Other mixed closed canopy	186.1	1129	0.78	0.42	6.37
Other mixed open canopy	143.2	125	2.35	1.64	4.18
Riverine closed canopy	171.1	478	1.20	0.70	6.39
Riverine open canopy	99.4	58	3.46	3.48	4.37

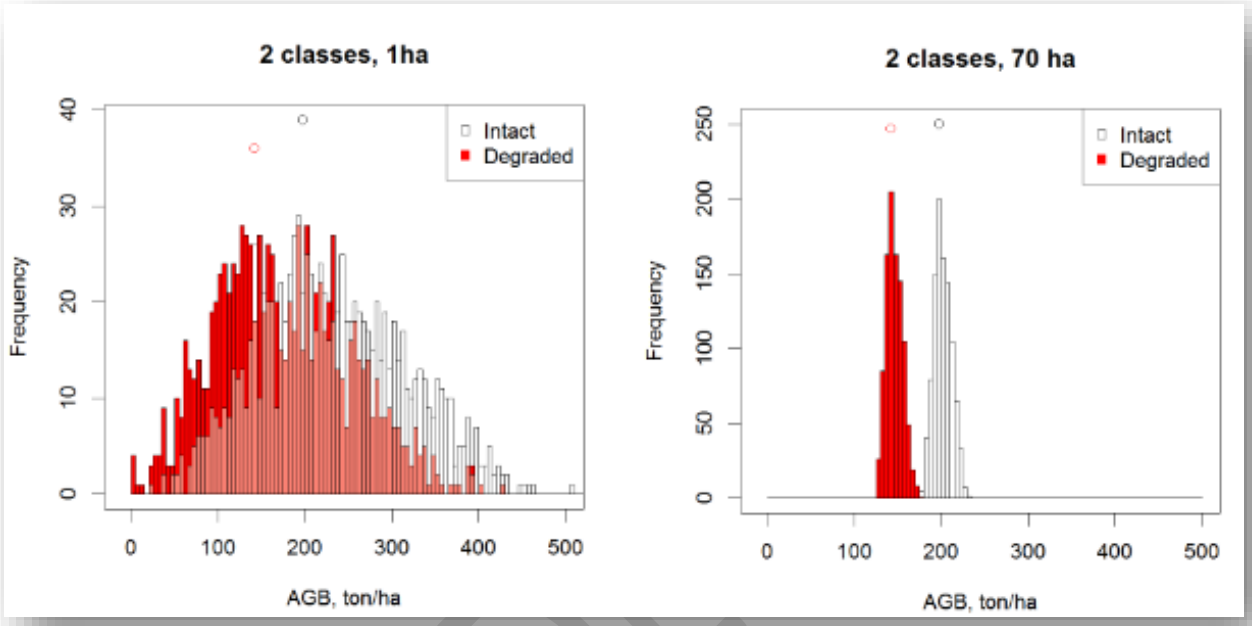
Accounting for stratification error in forest conditions

Stratification error in forest condition is substantial at high spatial resolution, but since reference levels are calculated initially at regional level only, the impact of stratification error in forest condition should be assessed over the corresponding spatial scales. The histograms of above-ground biomass estimations were scaled to spatially larger units to establish a level of spatial resolution where the two forest condition classes, closed canopy and open canopy, could be confidently separated.

At initial level of 1 hectare, the distribution of closed canopy and open canopy forest overlapped heavily in all forest types. The distributions of closed canopy and open canopy AGB cease to overlap at the level of 70 hectares and larger (Figure 20). This means that RL calculations can be confidently calculated at the district level in TAL.

Moreover, the confidence is strengthened when comparing LiDAR-predicted and field measured AGB separately for two condition classes. Figure 21 shows that estimates are unbiased also when condition classes are studied separately.

Figure 20 Histograms of estimated AGB for two forest condition classes at different spatial scales. The mean biomass of each class is indicated with a circle



The spatial level where condition classes were not overlapping was discovered in the following way. When the size of the scale is increased the area of one cell in relation to the whole area is decreased. The initial sample size of 1 hectare was scaled according to the following relation:

$$n_c = \frac{A_c}{A} * nn_c = \frac{A_c}{A} * n \qquad \text{Eq.5}$$

Where n_c is sample size of scale size c, A_c is area of one cell and A is area of whole area of the class.

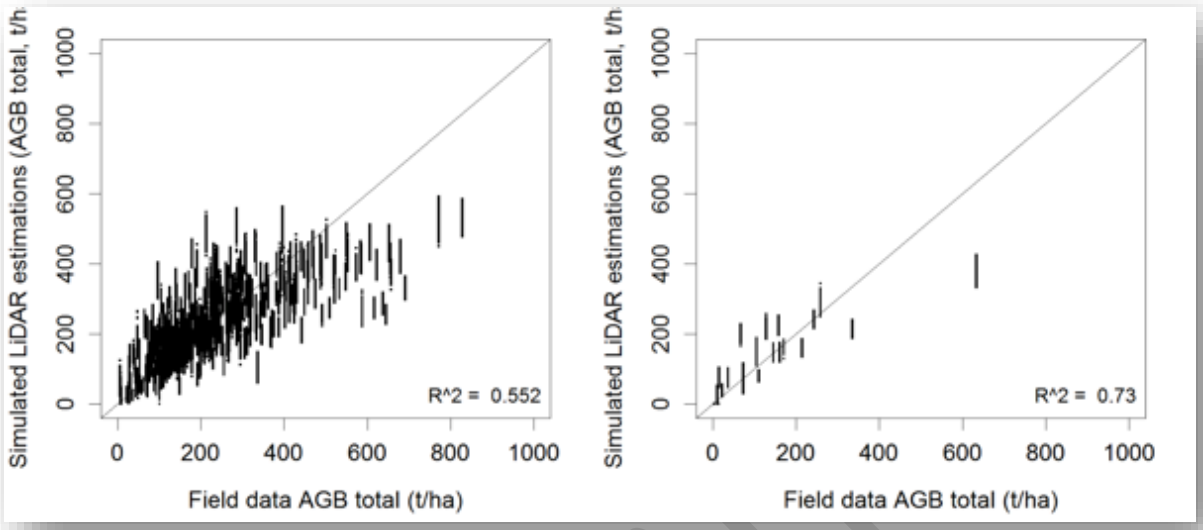
The testing was done starting from 1 ha. The CIs are used to scale the plot AGB values so that they would represent the value with a larger spatial scale. This scaling of plot values is done as in Eq. 6:

$$x_c = \frac{(CI\_up_c - CI\_low_c)(x - CI\_low_1)}{CI\_up_1 - CI\_low_1} + CI\_low_c x_c = \frac{(CI\_up_c - CI\_low_c)(x - CI\_low_1)}{CI\_up_1 - CI\_low_1} + CI\_low_c \qquad \text{Eq. 6}$$

Where x_c is the scaled plot biomass value with spatial scale c, CI_up_c is the upper confidence interval with spatial scale c, CI_low_c is the lower confidence interval with spatial scale c, x is the original plot biomass value, CI_low_1 is the lower confidence interval with original 1 ha spatial scale, CI_up_1 is the upper confidence interval with original 1 ha spatial scale. Monte Carlo analysis was applied for the calculation of CIs. For this purpose, equation 1 was modified by using the standard deviation that represents the mean of simulated AGB predictions (Figure 20, left).

By using the scaled plot biomass values the histograms get narrower the higher the spatial scale is. The point where the histograms are not overlapping indicates a spatial scale where condition classes can be separated with confidence.

Figure 21 Scattergrams (Left, closed canopy & right, open canopy) of LiDAR-predicted and field measured AGB in closed canopy and open canopy forest classes of Nsim = 1000 simulations with random training set of N − 200 = 538 plots



Accuracy Assessment of Activity Data

The accuracy assessment of activity data is limited to the penultimate time period (2009-2011) due to lack of reference data for previous time periods. Although accuracy assessment for previous time periods could potentially be done using high-resolution satellite data such as RapidEye or WorldView, it is currently cost prohibitive. Accuracy assessment was designed to be carried out in two phases, first using available high-resolution satellite imagery, RapidEye, Panchromatic band of Landsat 8, and preliminary secondary data, such as HAGs (Height Above Ground) model developed by J. Stoker for TAL using LiDAR and Landsat data. The second phase of accuracy assessment was conducted in 2014.

Phase I - Using high resolution satellite data and visual interpretation

For the phase 1 of the accuracy assessments RapidEye data that was available for the entire TAL from the year 2010 was used. Five percent of change polygons for each activity: intact (no change), deforested, degraded, regenerated and enhanced areas which are equal or greater than 5 hectares were randomly chosen using a random function. A center point for each polygon was extracted as a point layer in the ArcGIS. The points were plotted over the RapidEye imagery along with the HAGs layer, panchromatic band of Landsat 8, and raw Landsat5 scenes. Each point was then visually verified. The accuracy assessment accounts for the proportion of each category based on mapped area as per referenced data (Olofsson et al. 2013).

The error-adjusted changes in each category with confidence intervals are presented in Table 44 . The deforestation and degradation areas from the change analysis between 2009 and 2011 falls within the confidence interval of error adjusted changes for those categories. On the other hand, the areas for unchanged forest (intact) and regeneration forest fall outside the range of confidence interval of error adjusted change, which warns that there might be confusion between these two classes during classification. The omission error of 0.142 (14.2%) of regeneration (164,172 ha) arising from the intact (unchanged) category is responsible for increase in area of regeneration and decrease in area of intact forest. Since error analysis was conducted before post-processing was applied and artifacts have subsequently been removed, in reality this error has been further reduced and is therefore a conservative estimate.

Table 44 Error adjusted forest change between 2009 and 2011

Area in ha	Changed	95% CI	Low	High
Intact	706,027	63,666	642,361	769,693
Deforestation	85,338	22,798	62,540	108,136
Degradation	33,086	16,497	16,589	49,582
Regeneration	162,180	59,775	102,405	221,955

Phase II - Using field verification

A weighted random stratified sampling design was used to select 200 plots of 1-ha (100 x 100 m) covering intact (no change), deforested, degraded, and regenerated areas based on time series analysis. The goal was to cover about 5% area of each change category. However, after field visits, the team found 110 (>50%) sampling plots were concentrated in four eastern districts. Therefore, to maintain consistent sampling across the study area, only 50 plots were selected randomly from these four districts resulting 140 potential sampling plots across the TAL. Among these plots, field team was able to measure only 103 plots, other plots were inaccessible.

Using GPS, the field crew navigated to the center of 1-ha plot to collect information on forest condition types (intact, degraded, deforested and regeneration). The field crew also estimated % crown closure, % ground cover based on visual observation. A relascope was used to estimate basal areas of tress in each 1-ha plot. The plots were categorized based on these information as intact, degraded, deforested and regeneration. These plots were then overlaid over the forest change map from time series analysis between 2009 and 2011, to generate an error-matrix and 95% confidence interval for accuracy assessment.

The field plots were overlaid on the changed map resulted from a time series analysis of 2011 and 2014 satellite data, for an accuracy assessment of the activity data. The activity data from intact, deforested, degraded, and regenerations derived from the time series data and data observed/measured in the field were tallied. Tallied numbers were then multiplied by the proportions of area in each activity, based on the changed map derived from time series analysis of 2011 and 2014 data, to generate an error-matrix and 95% confidence intervals for each activity (Table 44), following the process used by Olofsson et al. (2014)[86]. The overall accuracy of activity data was 85 $\pm$ 14% at 95% confidence interval. The producer's accuracy and user's accuracy for each activity with 95% confidence intervals are presented in Table 45.

This field campaign had quite limited means at its disposal but it was felt important to conduct it anyway in order to validate qualitatively the accuracy of estimates of activity obtained from LAMP results. It was therefore decided to focus it on areas of detected activity only, and the measurement protocol was designed to identify the underlying reason to the activity and coarsely quantify its impact on biomass, so as to guide planning of interventions based on the empirical prevalence of drivers as detected on the ground.

[86] Olofsson, P., Foody, G. M., Herold, M., Stehman, S. V, Woodcock, C. E., & Wulder, M. A. (2014). Good practices for estimating area and assessing accuracy of land change. *Remote Sensing of Environment, 148*, 42–57.

Table 45 An error-matrix showing accuracy of forest change between 2009 and 2011 with confidence interval.

Activity	Closed canopy	Non-forest	Open canopy	Regeneration	Total	Map area (ha)	Wi
Closed forest	0.746	0.000	0.000	0.124	0.871	858910	0.870548
Non-forest	0.012	0.061	0.000	0.000	0.074	72700	0.073685
Open canopy	0.005	0.003	0.023	0.000	0.032	31398	0.031823
Regeneration	0.000	0.000	0.003	0.021	0.024	23623	0.023943
Total	0.764	0.065	0.025	0.146	1.000	986631	1
Overall accuracy	0.852+0.138						
Producer's	0.977+0.135	0.948+0.024	0.895+0.006	0.851+0.133			
User's	0.857+0.188	0.833+0.034	0.716+0.005	0.888+0.007			

Table 46 Error adjusted forest change between 2009 and 2011 after field verifications

Area in ha	Changed	95% CI	Low	High
Intact	753,480	133,878	619,603	887,358
Deforestation	63,864	23,861	40,002	87,725
Degradation	25,119	6,174	18,944	31,293
Regeneration	144,168	131,825	12,343	275,993

13 CALCULATION OF EMISSION REDUCTIONS

13.1 EX-ANTE ESTIMATION OF THE EMISSION REDUCTIONS

The following sections outlines the assumptions used in calculating the ERs generated by the ER Program (summarized in Table 47 below).

Table 47 Summary of ERPD interventions and assumptions for ER calculations

	Total	Units	EF	Assumptions
4.3.1 Improve existing CBFM	336,069	ha	2.8	Assume 10% handed over in first year and then 20% in subsequent four years and 10% in the final year
4.3.2 Transfer to CBFM	200,937	ha	2.8	Assume 10% handed over in first year and then 20% in subsequent four years and 10% in the final year
4.3.3 Private sector forestry	30,141	ha	1.46	Assume 10% handed over every year
4.3.4a Biogas	88,629	units	1.4	Assume each stove has a lifetime of 10 years and 10% of stoves are disbursed each year
4.3.4b ICS	16,962	units	0.22	Assume each stove has a lifetime of 4 years and 10% of stoves are disbursed each year
4.3.5 Pro-poor Leasehold Forestry	12,056	ha	2.8	Assume 10% handed over every year
4.3.6 Integrated land use planning	11,736	ha	75.8	Assume 10% avoided conversion each year (no repeat avoidance)

In total, the ER Program aims to reduce emissions by **35,6** MtCO2e. More than a half (53%) of these will be through the improved management of existing CBFM areas (intervention 4.3.1). A quarter of ERs (26%) will be generated from the transfer of government forests to CBFM (4.3.2) and the remaining 21% will come from a combination of the other interventions (see Table 48).

In addition to these estimated ERs, the REDD IC could additionally account for the long-term impacts on carbon sequestration in harvested wood products (HWP). This would add significant additional carbon benefits on top of those estimated above. This reduction has conservatively been excluded from the ER Program design and is an area for further improvement. Emissions from handling of animal waste under the proposed biogas program have also not been estimated here and are considered additional savings that may be sold separately to generate revenue outside of the sale of emission reductions under the ER program.

Assumptions used in ER calculations
The following assumptions were used to estimate ERs for the individual interventions:

4.3.1, 4.3.2 and 4.3.5 Improved management of existing and newly handed over community, collaborative and leasehold forests
Under these interventions 336,069 ha of existing and 200,937 ha of newly handed over forests are improved in the ER Program Area. The benefits of these interventions will be realized gradually, but will increase over time as improved management regimes become common practice. The benefits will also vary geographically and by management regime with greater carbon benefits realized in the lowlands where intensive carbon enhancement practices are suitable. Studies from the DoF estimate silviculture practices proposed in the OFMPs would increase the growth increment of forests by 5-6

times over a 20-year period (OFMP, 1995). Until more detailed baseline analysis is possible, the IPCC default value of 1.75 tons C/ha/year for forestland management in dry tropical forests has been used for lowland areas where the most intensive SMF will be conducted.[87]

4.3.3 Private Sector Forestry

Efforts to promote private forestry initiatives under the ER program will help establish 30,141 ha of new commercial private forests in the area (1,000 ha in each district) in five years. This intervention assumes an emission factor of 1.46 tons/ha, the average from the IPCC default value (0.55tC/ha/year) and the estimated EF of annual increment from the RL analysis (2.4tC/ha/year).

4.3.4 Biogas and ICS

Each biogas plant replaces the need for approximately 4.5 tons of fuelwood/year, or roughly 1.4 tC/year. Improved cookstoves (ICS) are estimated to increase fuel efficiency compared to an open hearth by approximately 30%. Given an estimated annual demand of 0.4 tons of fuelwood/person (Kanel et al 2012) converted to 1.94 tons of fuelwood/household, gives an estimated saving of approximately 0.22tC/year from ICS.

4.3.6 Integrated land use planning

From the reference level calculations and supplementary data on illegal forest conversion in Nepal, it is estimated that approximately 86,000 ha of forest, or on average, 7,000 ha/year, were lost during the reference period due to direct and indirect consequences of infrastructure development and legal resettlement, e.g., after floods and landslides. Land use planning interventions are expected to prevent at least 12,000 ha of forest from being deforested due to resettlement and infrastructure development in ten years of the ER program implementation period. Tier 2 RL numbers are used that assume for conversion of forests to non-forests in the reference period.

4.3.7 Protected area management

Emissions reductions are not estimated for protected areas since these are only included for non-carbon benefits.

[87] Section 4.4.1, *IPCC Special Report on Land-use, Land-use Change and Forestry*, 2000

Table 48 Estimated ex-ante emissions reductions during the ER Program accounting period (tCO_2) and proposed ERs sold to the Carbon Fund after discounting buffer.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
4.3.1	345,031	690,062	1,035,094	1,380,125	1,725,156	2,070,187	2,415,218	2,760,249	3,105,281	3,450,312	**18,976,717**
4.3.2	-	206,295	412,591	618,886	825,182	1,031,477	1,237,772	1,444,068	1,650,363	1,856,659	**9,283,296**
4.3.3	16,135	32,270	48,406	64,541	80,676	96,811	112,947	129,082	145,217	161,352	**887,440**
4.3.4a	45,496	90,992	136,489	181,985	227,481	272,977	318,474	363,970	409,466	454,962	**2,502,294**
4.3.4b	1,368	2,737	4,105	5,473	6,841	6,841	6,841	6,841	6,841	6,841	**54,731**
4.3.5	12,378	24,755	37,133	49,511	61,889	74,266	86,644	99,022	111,400	123,777	**680,778**
4.3.6	326,169	326,169	326,169	326,169	326,169	326,169	326,169	326,169	326,169	326,169	**3,261,762**
Total	**746,577**	**1,373,281**	**1,999,985**	**2,626,689**	**3,253,393**	**3,878,729**	**4,504,065**	**5,129,401**	**5,754,736**	**6,380,072**	**35,646,930**
Buffer	(141,850)	(260,923)	(379,997)	(499,071)	(618,145)	(736,959)	(855,772)	(974,586)	(1,093,400)	(1,212,214)	**(6,772,917)**
Net ERs	604,728	1,112,358	1,619,988	2,127,618	2,635,249	3,141,771	3,648,293	4,154,815	4,661,336	5,167,858	**28,874,013**
FCPF CF					**(8,000,000)**		**6,000,000)**				**(14,000,000)**
ERs	**604,728**	**1,717,085**	**3.337,073**	**5,464,691**	**99,940**	**3,241,711**	**890,004**	**5,044,819**	**9,706,155**	**14,874,013**	

14 SAFEGUARDS

14.1 DESCRIPTION OF HOW THE ER PROGRAM MEETS THE WORLD BANK SOCIAL AND ENVIRONMENTAL SAFEGUARDS AND PROMOTES AND SUPPORTS THE SAFEGUARDS INCLUDED IN UNFCCC GUIDANCE RELATED TO REDD+

The activities in the ER Program have been proposed to reduce deforestation and forest degradation and enhance forest carbon stocks across the twelve ER Program districts. They have been built on the basis of key interventions laid out in the ER-PIN and the policies and measures (PAMs) proposed in the National REDD+ strategy. They have been further improved and refined through consultations with key stakeholders and partners. These interventions are specific in their focus, and their design and implementation plan have been prepared with due consideration of relevant World Bank social and environmental safeguards, and in line with the Cancun safeguards guidance[88].These safeguard principles are designed to mitigate possible negative impacts (i.e. do no harm) and to ensure positive or additional benefits in terms of improving livelihoods and the rights of local and forest-dependent communities. Accordingly, the ER Program is designed around seven major interventions (discussed in detail in Section 4.3 above) with special focus on Indigenous Peoples, Dalits, Muslims and other vulnerable groups residing in the ER Program Area. Of the total population of the ER Program Area, IPs comprise 31% followed by 12% Dalits and 8.6% Muslims. Combined, these groups form a majority (52%) of the population in the ER Program Area. The ER Program will provide direct or indirect benefits to these groups as they are the key right holders and stakeholders in the activities proposed under ER Program. The ER Program is focused on promotion of the long term environmental and social benefits such as conservation of biodiversity, maintaining of cultural heritage, traditional practices and indigenous knowledge, poverty reduction, gender balance, capacity development and good governance.

In line with the safeguard policies of the UNFCCC and World Bank, the approaches adopted for designing the ER Program were extensive bottom-up, pre-informed multi-stakeholder consultations and participation engaging relevant government line agencies, private organizations, civil society groups, forest user groups and their federations, local communities including local forest dependent communities, women, IPs, Dalits, Madhesis, and Muslims. As discussed in Section 5, all consultations were carried out following the "Guidelines on Stakeholder Engagement in REDD+ Readiness"[89], and included specific targeted discussion on social and environmental safeguards and strategies in the context of the design and implementation of the ER Program and its associated activities. The details of the consultation approach and how the outcomes (concerns and issues raised by the stakeholders) have been incorporated into the ER Program document are provided in Section 5.

The Government of Nepal is committed to continuing a robust consultation process—building on earlier consultations during the formulation of the R-PP and ER-PIN—to inform the full design of the ER Program through transparent stakeholder information sharing and consultation mechanisms that ensure broad support and effective participation of relevant stakeholders. Looking ahead, the ongoing work of the SESA and ESMF will provide a clear framework, approaches, and engagement

[88] The WB safeguard policies provide mechanisms for avoidance, minimization and mitigation of adverse impacts through consultation with project-affected people (PAPs), Indigenous Peoples (IPs),) and civil society organizations (CSOs), disclose relevant project information to PAPs and key stakeholders and supervise compliance and outcomes during project implementation. In similar vein, the UNFCCC REDD+ safeguards cover a range of issues including the need for consistency with national objectives and priorities, transparent forest governance structures, respect for Indigenous Peoples and local communities, effective participation of relevant stakeholders, conservation of natural forests and biodiversity, permanence, and leakage. The UNFCCC REDD+ Safeguards aim not only to mitigate the risk of adverse social and environmental impacts of REDD+ activities, but also to actively promote benefits beyond carbon emission reductions, such as increased land tenure security, enhancing biodiversity, improving forest governance and empowering relevant stakeholders by ensuring their full and effective participation

[89] Guidelines on Stakeholder Engagement in REDD+ Readiness with a Focus on the Participation of Indigenous Peoples and Other Forest-Dependent Communities April 20, 2012 (revision of March 25th version)

process for meaningful consultation with stakeholders, including forest dependent IPs, Local Communities, Women, Madhesi, and Dalits. This will follow the principles of Free, Prior and Informed Consent (FPIC). The engagement process will include stakeholder analysis and engagement planning, disclosure of information, and meaningful consultation in a culturally appropriate and gender and inter-generationally inclusive manner.

The ER Program, in line with the REDD+ Strategy and ER-PIN, identified the need for policy reforms in terms of clarifying forest tenure, clarifying carbon rights, and ensuring fair and equitable benefit sharing among right-holders. This is essential to the overall success of the ER Program. In addition, there is the need to develop policies to address carbon transaction procedures and benefit-sharing arrangements. The policies and policy reforms will especially help in promoting sustainable management of forests and forest-related resources in the ER Program Area.

Potential Social and Environmental Benefits and Risks of ER Programs

The ER Program is expected to bring multiple benefits to local communities and forest dependent people in the ER Program Area. Depending on the location and type of intervention, these benefits include poverty alleviation, recognition and enhancement of rights of Indigenous Peoples and forest dependent communities, improved livelihoods of the local communities, technology transfer, sustainable use of forest resources and biodiversity conservation through community involvement. It also includes reform at the national level that will lead to improved forest governance. The range of social and environmental benefits arising from the ER Program are thoroughly discussed in Section 16 under Non-Carbon Benefits.

The key risks of the ER program identified during stakeholder consultations include: 1) Loss of livelihoods and incomes due to restriction of forest resources; 2) Restrictions on encroachment could lead to reduced livelihood opportunities for forest dependent communities; 3) Loss of livelihoods and traditional practices during implementation of grazing control and plantations; 4) Risk of escalation of human-wild life conflict; 5) Risk of social disturbances; 6) Risk of losing traditional skills-based occupations (and the knowledge they depend on) such as blacksmithing, wood carving, fishing, collection of herbs and honey hunting; 7) Risk of invasive species; 8) Risk of erosion in existing biodiversity due to promotion of monoculture; and 9) Risk of reduced supply of fuelwood to forest dependent peoples.

The details of social and environmental risks and corresponding mitigation measures identified and proposed by the stakeholders during district consultations is provided in Annex 8.

Strategic Environmental and Social Assessment (SESA)

The Government of Nepal has conducted a strategic environmental and social assessment (SESA)[90] and also prepared an Environmental and Social Management Framework (ESMF)[91] following both national and international (including both World Bank and UNFCCC) safeguard standards and requirements. The SESA team selected 14 likely strategic options for the purpose of the SESA in the absence of a National REDD+ Strategy. Most of the pre-supposed strategic options were built around the drivers and proposed strategies identified during the preparation of the R-PP, ER-PIN and several other REDD+ related documents, and together they created a suitable basis against which to undertake an assessment. The SESA assessed the likely environmental and social impacts of all the supposed strategic options indicating positive and negative impacts, considering both options of with and without the REDD+ Strategy including an assessment of how cumulative impacts arising from particular options or sub-options will be compounded.

The SESA provides the central set of requirements and procedures regarding social and environmental safeguards and their effective implementation on the ground. It represents a first, but

[90] http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Nepal-REDD-SESA-report-Final-revision-6-Aug-2014.pdf
[91] http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Nepal-REDD-ESMF-Final-revision-6-August-2014.pdf

important, step in assessing the impacts of the forthcoming REDD+ activities. It provides an analysis of the baseline conditions as they relate to environment; climate; social conditions; legislative, regulatory and policy regime; institutional setting for REDD+; and analysis of environmental and social impacts likely to be associated with REDD+ in Nepal.

Environmental and Social Management Framework (ESMF)
Based on the findings of the SESA, the ESMF serves as a framework for managing and mitigating the environmental and social risks and impacts for future investments (projects, activities, and/or policies and regulations) associated with implementing REDD+ activities on the ground. It seeks to both enhance environmental and social development benefits of REDD+ actions and projects, and mitigate any of their adverse impacts in line with GoN laws, policies, and regulations as well as applicable World Bank and UNFCCC Cancun safeguard policies.

The ESMF provides the basis for the preparation of necessary environmental and social safeguard planning documents, or plans, as needed for national, regional and/or district/local project activities and investments likely to be supported under the REDD+ Strategy. The ESMF discusses institutional arrangements for its implementation, procedures and methodologies including a recommended screening process for the interventions to be implemented. It also provides guidance on conducting initial environmental and social examinations (IESE) and environmental and social impact assessments (ESIA), conducting scoping for ESIAs and identifying mitigation measures to prevent or minimize negative impacts.

REDD+ Social and Environmental Standards (SES)
In 2013, Nepal also pioneered country specific, REDD+ social and environmental standards (SES)[92]. The REDD+ SES can be used by governments, NGOs, financing agencies and other stakeholders to support the design and implementation of REDD+ programs as well as to respect the rights of IPs and local communities, and generate significant social and environmental benefits. These standards are particularly designed for government-led programs of policies and measures that are implemented at the national, provincial/regional, or other levels. They are relevant for all forms of fund-based or market-based financing, which must be distinguished from more operational safeguard instruments (ESMF and ESMPs). The principles, criteria, and indicators developed under the REDD+ SES can serve as a basis for the national approach for implementing safeguards.

ER Program Area Specific SESA and ESMF
In addition to the national SESA and ESMF, the REDD IC has also begun to undertake ER Program Area-specific environmental and social assessment. This assessment will be followed by the development of an ER Program Area-specific ESMF. This ESMF, which will derive from the national-level ESMF, will serve as a tool to ensure the integration of different environmental and social considerations into the implementation of ER Program activities. The ESMF will also address the potential risks and impacts associated with the following issues:

1. **Involuntary resettlement**[93] due to ER Program interventions in ER Program Areas. The ESMF will include specific provisions and guidelines to assess the possibility of such impacts prior to any activities being undertaken on the ground. The ESMF will also include a Resettlement Policy Framework (RPF) needed to address the various types of land acquisition and resettlement that may occur during the program. The Resettlement Policy Framework lays down the principles and objectives, eligibility criteria of displaced persons, modes of compensation and rehabilitation, participation features and grievances procedures that will

[92] http://mofsc-redd.gov.np/?page_id=14
[93] The ER Program interventions are not expected to have any involuntary resettlement impacts. However, the RPF is required to guide and address such issues if they happened to crop up during implementation of the interventions.

guide the compensation and potential resettlement of these persons. It further describes the planning and documentation requirements for such activities under the program. In order to address impacts related to restriction of community access to natural resources[94], the ESMF will include a Process Framework (PF). The Process Framework will provide rules and guidelines for assessing and addressing restrictions in access to natural resources, and outline the remedies to these restrictions on a case-by-case basis.

2. **Indigenous Peoples.** The ESMF will include an IPs and Vulnerable Community Planning Framework (IPVCPF). Based on this framework, site specific IPs & Vulnerable Community Plans will be prepared. These plans establish the procedures and mechanisms that the concerned DFO as an implementing agency of the ER Program must adopt in its process for managing and assisting IPs in order to prevent or mitigate possible adverse effects resulting from the proposed ER Program interventions and activities. It also promotes full participation of Indigenous Peoples through adequate consultations with specific communities in specific locations. See Annex 11 for Indigenous Peoples and Local Communities Position Papers on Nepal's ER-PD.
3. **Physical and cultural resources** in ER Program Area. The ESMF will include specific provisions and guidelines to assess and mitigate the possibility of such impacts prior to any activities being undertaken on the ground.
4. **Use of hazardous chemicals and pesticides** in ER Program Area. The ESMF will include specific provisions and guidelines to screen, manage and mitigate the potential hazards and risks stemming from the overuse of pesticides and other agrochemicals.
5. **Natural habitats** within protected areas as well as other sensitive forest habitats under private or communal control in ER Program Area. During the formulation of the ER-PD, and throughout implementation, consultations will be carried out with key stakeholders to identify potential issues of concern associated with natural habitats and their constituent ecological function, flora and fauna species and genetic resources pool. During the implementation phase, monitoring activities will be established to ensure that critical and non-critical natural habitats are not adversely affected. The ESMF will include procedures, principles and provisions to assess and mitigate possible impacts prior to any actions being undertaken on the ground.

The management of social and environmental aspects of the ER Program shall be fully integrated into the design, monitoring, and evaluation of its activities. All activities implemented under the ER Program must comply with the requirements of the ESMF at every step of their implementation.

Based on the ESMF, site-specific environment and social management plans (ESMP) will be prepared and implemented to ensure that risks are mitigated as part of the implementation process, through periodic monitoring, reporting and evaluation. The ESMPs will be prepared in line with the legal and regulatory framework of the Government of Nepal and the safeguard requirements of the WB and the UNFCCC Cancun Agreements. The ESMPs will be prepared through Environmental and Social Impact Assessments (ESIAs) of those activities, which are triggered by screening processes and procedures prescribed in the ESMF.

How the ESMPs will be implemented

Nepal's REDD+ Strategy proposed institutional arrangements for implementing safeguards. The same safeguard implementation arrangements will be used to implement safeguards for the ER Program. The implementation of the various safeguard instruments—such as ESMF, IPVCPF, RPF, and REDD+ specific ESMPs—needs to be harmonized and integrated in the overall ER Program implementation arrangements. The safeguard implementation arrangements consist of institutional structures and

[94] The ER Program interventions have been designed to avoid any restrictions in community access to natural resources to the extent possible. However, a PF is required to guide and address such restrictions in access if they happened to crop up during implementation of ER Program activities.

responsibilities to minimize and mitigate social and environmental risks related to ER Program implementation. A three-level structure has been proposed:

At the national level, an Environmental and Social Assessment and Monitoring Unit (ESAMU) will be established within the REDD+ Implementation Center (REDD IC), which will serve as the coordinating and implementing agency for REDD+ safeguards. The ESAMU will be responsible for the overall coordination, planning, implementation and monitoring of REDD+ safeguards activities, particularly the activities proposed under the REDD+ project-specific ESMPs.

Regional REDD+ Focal Office (RRFO) at the regional forest office will have oversight and monitoring responsibilities over the respective District Forest Offices, PA Offices or Protection Area (PA) offices, and line agencies that will be implementing the REDD+ safeguard activities.

At district level, an Environment and Social Section (ESC) will be established in each District REDD+ Program Management Unit (DRPMU) to handle environmental and social concerns. The DRPMU will execute all the safeguard-related activities through the regional forest offices of each district.

14.2 DESCRIPTION OF ARRANGEMENTS TO PROVIDE INFORMATION ON SAFEGUARDS DURING ER PROGRAM IMPLEMENTATION

The ESMF sets out a mechanism for monitoring the environmental and social outcomes of implementing the national REDD+ strategy and arrangements for the participation of relevant stakeholders in this process, including appropriate roles and responsibilities. The ESMF also provides an outline of the necessary reporting procedures for managing and monitoring environmental and social safeguards related to project implementation.[95]

The monitoring of environmental and social safeguards through a Safeguard Information System (SIS) will be linked and integrated with the national forest information management system. The SIS will collect and make available information on how safeguards are being addressed and respected throughout the implementation of REDD+ at the national level, including activities under the ER Program. The SIS is currently being developed by REDD IC and has been included in the annual plan (FY 2017/18). A draft REDD+ SIS framework has been prepared considering potential activities, stakeholders and their specific concerns, anticipated outcomes and implications. The framework proposes two basic levels: (i) activity level; and (ii) program (national/sub-national) level of REDD SIS. The activity level SIS establishes a linkage between REDD+ activities being implemented and the safeguard principles triggered. Furthermore, it illustrates scope (activities, budgets, and targeted groups) and scale (spatial locations, area coverage, stakeholder coverage, and beneficiaries) of the activities, anticipated social and environmental effects and safeguards compliance indicators. The framework provides sources of information to verify safeguard compliance. Sources of information are separated into basic and complementary. Information directly related to the activity like progress/evaluation report, output/outcomes, feedbacks, project documents, and stakeholder engagement come under the basic source of information. Policy and measures related to the activities, institutions, and GRM reports are considered as complementary activities.

The program level SIS framework explains how UNFCCC and other safeguard principles are associated with the REDD+ program interventions. In addition to the correlation between program

[95] See Chapter 5 of the ESMF at http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Nepal-REDD-ESMF-Final-revision-6-August-2014.pdf

and the safeguard principles, this framework provides a list of information sources verifying that each of the associated safeguards are addressed and respected. Basic sources of information are directly related with the program implementation approaches, institutions and activities. Complementary sources inform how the REDD+ program and its safeguard concerns are likely to be addressed and respected by related policies, measures and institutional mechanisms.

Nepal can also utilize the REDD+ Social and Environmental Standards (SES) for the SIS. The REDD+ SES consist of seven principles, 28 criteria and a number of indicators which define issues of concern and conditions to be met to achieve high social and environmental performance, and a process for assessment (REDD+ SES, 2012). The principles provide the key objectives that define high social and environmental performance of REDD+ programs. The criteria define the conditions to be met related to processes, impacts and policies to deliver the principles. The indicators define quantitative or qualitative information needed to show progress achieving a criterion.

Monitoring of safeguards will be carried out at the national level by the ESAMU and at district level by DRPMU. In order to keep track of the environmental and social performance of REDD+ activities of the ER Program, the ESAMU will:

- Regularly monitor national and regional projects/activities in coordination with the Regional REDD+ Focal Desk and project developers/implementing agencies,
- Coordinate regularly with DRPMUS, which monitor district and local level projects/activities,
- Report the findings of monitoring to the REDD Working Group on behalf of the REDD IC, and
- Recommend necessary actions to improve and/or enhance environmental and social performance of the REDD+ activities and the ER Program.

For those projects subjected to an Environmental and Social Impact Assessment (ESIA) procedure, monitoring will need to be carried out in accordance with the Environmental Protection Rules 1997. Rule 12 requires the project developer to comply with the matters mentioned in the approved EIA (in this case ESIA) report, while the Concerned Agency is responsible for monitoring the impact on the environment resulting from the implementation of the project (Rule 13). Thus, the ESAMU will have to coordinate with the MoPE to carry out the monitoring. For projects for which ESIAs are undertaken and approved by MoPE, the formal responsibility for approving the ESIA report and monitoring compliance with ESIA recommendations lies with MoPE's Environmental Evaluation Section in the Environment Division. However, auditing is the responsibility of MOSTE's Department of Environment.

14.3 DESCRIPTION OF THE FEEDBACK AND GRIEVANCE REDRESS MECHANISM (FGRM) IN PLACE AND POSSIBLE ACTIONS TO IMPROVE IT

In 2013, the REDD IC prepared a report to assess the existing FGRMs in Nepal and to develop an appropriate FGRM with the support of FCPF.[96] The report highlighted the following characteristics of the existing FGRMs in the forestry sector in Nepal:

- FGRM related to forest resources vary according to forest type, type of users and type of forest management regimes..
- In the mountain region, grievances are mainly related to conflict between forest officials and the cattle herders and in the hill region grievances emphasize boundaries and user rights. In

[96] http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Final_GRM-Report-FINAL_01-11-2015.pdf

the Terai region, with its valuable timber, the main grievances are about boundaries and user rights related to users coming from distant areas.

- Grievances in the forest sector in Nepal are ultimately decided by the authorities of MoFSC, either through the DFO or warden or regional directorate, though forest users can go through the formal judicial process to settle their grievances if they are not satisfied with the redress given by the government agencies.

The existing formal legal system gives responsibility to government agencies, local government, quasi-judicial and judicial agencies and local communities to receive feedback and grievances in Nepal. The following FGRM principles will be applied to the ER Program considering the existing relevant policy and legal provisions:

Table 49 FRGM principles to be applied to the ER Program

Principles of FGRM	Existing provisions and their application to ER Program
Legitimacy	• The Forest Act 1993 and Forest Regulation 1995 has given authority to the District Forest Officer (DFO) to receive feedback and grievances related to the forest sector, and generally the Forest Users Groups and other stakeholders trust decision made by the DFO. • Good Governance (Management and Operation) Act, 2008 gives responsibility to the ministry, departments and district/local agencies to receive feedback and grievances through various tools and to take necessary steps and actions for redressing such feedback and grievances within a given timeframe. The general public, affected people and stakeholders trust the steps taken by the administrative agencies based on this legislation. • Local Self-Governance Act 1999 incorporated a special provision to establish a Mediation Council for grievance redress at the local government level. The interested people or groups of people can register their grievances in these Councils for remedial action. The Councils are also trusted by the public for providing redress in a cost-effective way.
Accessibility	• Good Governance (Management and Operation) Act, 2008, each government agency is required to post a Citizen Charter in a prescribed form and keep it in a visible place of the office. All agencies are required to appoint a spokesperson and FGR officer, and their responsibility is to provide adequate information to the stakeholder about the FGRM of concerned offices. • The government agencies have been announcing their citizen charter in various local languages to maintain accessibility to the general public. This is effective in ensuring public access to agencies, including DFOs, to register feedback and grievances.
Predictability	• The judicial and Quasi-judicial procedure related legislation, such as the Forest Act 1993, Forest Regulation 1995, National Parks and Wildlife Reserve Act 1973, Good Governance (Management and Operation) Act 2008, the Local Self-Governance Act 1999, Rights to Information Act 2007, Commission for the Investigation of Abuse of Authority Act 1991 and General Code 1964 provide clear procedures with indicative timeframe for each stage, and clarity on the types of process and means of monitoring implementation • There is limited awareness on these procedures among the general public. Therefore, the awareness level on procedures of FGRM will be enhanced based on strategies and actions of the National REDD Strategy.
Fairness	• Nepal enacted the Legal Aid Act 1997 to provide legal aid for people who are unable to protect their rights due to financial and social reasons. The Rights to Information Act 2007 also empowers people to obtain the required

	information from public agencies, bodies or institutions. The Constitution of Nepal 2015 guaranteed that all citizens shall be equal before law and no person shall be denied equal protection of law (article 18). ● The awareness level of the general public is low about these legal provisions and affected groups require advice for the utilization of these provisions. The experts or human resources will be developed in the government institutions and civil societies during the implementation of the ER Program to maintain equity and fairness in the FGR process.
Rights compatibility	● The forest Act 1993, National Parks and Wildlife Reserve Act 1973, Local Self-Governance Act 1999, Land Act 1964, and Land Revenue Act 1978 given quasi-judicial jurisdiction to different agencies for grievance redress. These quasi-judicial agencies are required to apply the rule of law and due process of law defined by the Special Procedure of hearing by the special legislation and Constitution of Nepal. Procedural law and constitutional provisions of Nepal for hearing any grievances redress process are compatible with international human rights. These procedures will apply in the grievance redress process during the implementation of the ER Program.
Transparency	● The Good Governance (Management and Operation) Act, 2008 gives responsibility to the ministry, department and district/local agencies to maintain transparency in the FGRM. According to the Constitution of Nepal 2015 and Rights to Information Act 2007, every citizen shall have the right to seek information on any matters of concern to her/his or the public. The Citizen Charter is also another important tool to provide the information on FGRM in Nepal. These instruments can be utilized by the general public and citizens to obtain information on FGRM during the implementation of ER Program.
Capability, adequate expertise and resources	● The government agencies have appointed an officer to operationalize the FGRM, though there is a need to develop their capacity regularly. The FGRM assessment report also recommended enhancing the capacity of these personnel for the effectiveness of FGRM. Therefore, a specific program will be implemented to develop the capability of government institutions to maintain effectiveness of FGRM and reduce further grievances in the ER Program Area. ● The National REDD+ Strategy and ER Program proposed specific actions to allocate resources to develop expertise of concerned officials and enhance capability of institutions, which will be instrumental during implementation of the ER Program to maintain effectiveness of FGRM.

Informal and Customary FGRM

According to existing FGRM studies in Nepal, about 85% of grievances or conflicting cases have been resolved by the local communities themselves, under the leadership of the community heads or their traditional leaders. The main reason that communities choose informal mechanisms to resolve grievances is that solutions are locally available; procedures are easier than formal systems; the system is familiar to the majority of people; the system is simple; the system can handle oral complaints; and it delivers immediate and effective justice at the local level.

The Tharu community, which is one of the dominant IPs in the ER Program Area, have their own customary practices to manage conflicts through community meetings called ''Bhalvansa''. The National REDD+ Strategy and the ER Program recognized this customary FGRM, and the Constitution of Nepal has a policy (Article 51) to promote such cultural or customary practices. The FUGs also have a responsibility under the ER-PD to promote customary practices for conflict management and redressing grievances considering such customary practices. If there are any grievances related to utilization of forest products, particularly between and within Tharu communities, these formal

institutions need to consider the opinions or recommendations of the Tharu leader "Bhalvansa" before taking decisions or approving of forest management plans.

FGRM procedures

The REDD IC prepared an assessment/study report on FGRM in the context of REDD+ in Nepal, and this report suggested the following procedure for FGRM:

Table 50: FGRM steps and procedures.

Steps	Procedures	Working days
Receive and register	• Legally identified FUGs, affected households, relevant individuals or stakeholders can submit their grievances to the DFO, regional forest offices, Director General of departments or secretary of MoFSC. • DFO, regional forest directorate, GD of departments or secretary of MoFSC will receive feedback or grievances through telephone/SMS, emails, feedback/complaint box or formal written complaints.	2
Acknowledge, screen, assess and assign	• DFO or the FGR officer screens each complaint and if the complaint is eligible, the DFO assigns an officer for the assessment and investigation about the feedback or grievances. • The investigation officers or FGR officer prepare and present a report on grievances and potential options.	10
Response and addressing	• The DFO or regional forest directorate or DG of Department propose options for redress and discuss with complainant and other affected party to reach a resolution to address the complaints.	6
Implement and monitor	• The DFO or regional forest directorate or DG of Department request to implement the agreed redress option and assigns FGR officer to monitor the progress and effectiveness of FGRM.	10
Report	• The DFO and DG of Department prepares the records of success or failure status of FGRM each year in the annual report of the Department of Forests.	2

15 BENEFIT-SHARING ARRANGEMENTS

15.1 DESCRIPTION OF BENEFIT-SHARING ARRANGEMENTS

Nepal is in the process of preparing its national REDD+ architecture, including the overall functioning of a Benefit Sharing Mechanism (BSM). Nepal's National REDD+ Strategy envisions benefits to be shared based on the costs for implementing sustainable forest resource management and performance. In addition, it proposes that benefits be shared at two levels: i) between the government and communities and ii) within communities. All resources received as payment for results shall be distributed and used to scale up further activities in the ER Program Area. The benefits generated by the ER Program should catalyze further actions that are then able to generate more emissions reductions in coming years.

Several principles are laid out for the design of the national BSM, including *equity* (fair benefit sharing with and within the poorest communities), *exclusivity* (addressing issues related to forest governance regimes), and *conditionality* (payments linked to performance). The National REDD+ Strategy also calls for the recognition of customary use rights and management practices of Indigenous Peoples in the benefit sharing arrangements through regulatory provisions and forest management plans. The BSM shall be country-driven and be coherent with existing national policies and measures. It is on this basis that the BSM for the ER Program is developed.

The ER Program will generate a range of carbon and non-carbon benefits from which communities and the country as a whole can benefit. Carbon benefits are defined as reductions in GHG emissions or enhancement of removals through reduced deforestation, reduced degradation or regeneration / afforestation / reforestation activities. Non-carbon benefits are defined as broader sustainable development benefits, including, improving local livelihoods, building transparent and effective forest governance structures, making progress on securing forest tenure and enhancing or maintaining biodiversity and/or other ecosystem services. These include health benefits (e.g. from bio-energy and improved cooking techniques), livelihood benefits (through reduced fuelwood collection), protection of religious sites, and improved forest tenure, and environmental benefits (e.g. enhanced biodiversity conservation, or reduction in invasive species and other threats to biodiversity).

The BSM will not aim to quantify all of the potential benefits arising from the ER Program, nor does it propose mechanisms for sharing and distributing all of these potential benefits. Instead, as laid out in the National REDD+ Strategy, the scope of the BSM is limited to the transfer and distribution of funds arising from carbon payments under the ER Program to cover the costs incurred by ER Program participants.

This section outlines the categories of potential beneficiaries, their eligibility and the types and scale of potential Monetary and Non- Monetary Benefits. This section will also describe the **criteria, process and timelines** for the distribution of Monetary and Non-Monetary Benefits for the ER Program. Three other sections of the ER-PD are also relevant in the context of costs and benefit sharing for Nepal's ER Program. Section 4 of the ER-PD, which describes the **prioritization** and timelines of the planned ER Program Measures, will clearly impact the potential beneficiaries engaged in the ER Program. These activities are prioritized based on the recognized drivers of deforestation and forest degradation in the National REDD+ Strategy, as well as their potential to deliver other non-carbon benefits. Section 6 of the ER-PD includes **cost estimates** for the activities/measures and components of the ER Program along with any revenue the ER Program Measures may generate. This may also include different sources of funding, including payments from the Carbon Fund, other donors, the government of Nepal and costs borne by the private sector, including contributions from local communities through community-based forest management and

the existing biogas subsidy program. Section 16 identifies priority **non-carbon benefits** for the ER Program and describes how the ER Program will generate and/or enhance such priorities.

Categories of potential beneficiaries
Following the Institutional and Cost-Benefit Sharing study in the ER Program Area, REDD+ beneficiaries can be divided into four groups:

1) **Indigenous Peoples and local communities** including women and forest dependent poor may receive benefits under the ER Program either directly or indirectly. These benefits could arise from a wide range of activities including participation in community based forest management regimes, implementation of bio-energy programs (e.g. biogas, charcoals, cookstoves), protection of religious and cultural practices related to forest resources, and so on.
2) **Government entities** at national, provincial, district and local levels will receive benefits for the implementation of the ER Program. These will cover transaction and institutional costs as well as implementation costs for government managed forests and Buffer Zone of protected areas.
3) **Private forest owners** engaged in managing forests on private property will participate in the ER Program and are eligible to receive benefits to improve private forest management. The benefits could be through technical assistance (e.g. to enhance carbon sequestration in managed forests) or through improved access to inputs (e.g. seedling nurseries, market access) and improvements in the governance system.
4) **NGOs including CSOs and IPLC Federations** are major stakeholders in the design and implementation of the ER Program and will be eligible to receive benefits under the implementation of ER Program activities. This could be as capacity building, technical advisory partners, or as direct implementers of ER Program activities at the community level.

Criteria, process and timelines for the distribution of Monetary and Non-Monetary Benefits
Identified beneficiaries will receive both monetary and non-monetary benefits under the ER Program. Monetary benefits will be distributed through existing community-based forest management groups or through existing local government channels, i.e. under the bio-energy subsidy programs devised under local governments with the support of government agencies, AEPC and private sector. Both monetary and non-monetary benefits will be monitored through district/local forest offices and relevant local government entities.

According to the national climate change policy, at least 80% of total funds available for climate change-related programs should be committed at the community level. On this basis, the ER Program will allocate at least 80% of available funds under the ERPA for field-level ER activities; that is to local communities, Indigenous Peoples and private forest owners. The allocation of these funds is outlined in Section 6 based on the agreed activities under the ER Program. The remaining 20% of funds will be used to support policies and measures across national and regional government institutions to facilitate the implementation of field-level activities. These costs include monitoring costs, legal costs, institutional costs and other transaction costs.

Benefits for grass-roots activities will be allocated based on costs incurred in line with existing national policies. Implicitly, therefore, benefits will be decoupled from the volume of ERs achieved. This will ensure that activities that indirectly support REDD+ outcomes are also supported, and that high-cost activities are given equal priority under the ER Program. Given the financial barriers to implementing ER Program activities, benefits will be provided up-front to communities, to support ER Program activities. The successful implementation of ER Program activities will be monitored by the relevant program entities (see below) to allow for corrections in the delivery of benefits during the lifetime of the ER Program.

The criteria and process for delivering benefits is defined within the individual ER Program measures (see Sections 4 and 6). The Government of Nepal already has systems in place for identifying new and additional areas that will be handed over to CBFM groups, and a process of identification of bio-

energy users households and groups. Similarly, there are existing criteria for the distribution of benefits within CBFM groups which will be adhered to under this ER Program. In line with the principle of country-driven implementation, the Government of Nepal will adopt existing modalities for the delivery of benefits through the ER Program. The modalities that may be used in the implementation of the ER Program are (not exhaustively) listed in Table 51 below.

The timelines for delivering benefits will also vary based on individual ER Program measures. It is expected that costs for the implementation of ER Program measures will be delivered in the form of ex-ante monetary benefits and that non-monetary benefits will accrue through ER Program implementation. Some monetary benefits may be distributed as performance-based payments upon the successful implementation of ER Program activities.

The full criteria and timelines for benefit sharing will be elaborated in the final BSP. The BSM will be developed reflecting:

- Out of the total result based payment under ER program, 80% will be dedicated to local level pursuant to climate change policy while up to 20% will be allocated for management costs.
- The 80% dedicated fund will be spent as a capital/investment/program in CBFM groups.
- Non-carbon benefits such as timber and medicinal plants will be distributed as per the approved management plans of the respective CBFM groups.

Monitoring provisions of the benefit sharing mechanism
The monitoring of costs and benefits under the BSM will build on the proposed monitoring system for carbon and non-carbon benefits. Costs and benefits incurred by IPs, local communities including Women and forest dependent poor, and other private sector actors will be reported alongside the reporting of other carbon and non-carbon benefits as outlined in Sections 9 and 16.

15.2 SUMMARY OF THE PROCESS OF DESIGNING THE BENEFIT-SHARING ARRANGEMENTS

As outlined in Section 5, the ER Program was developed using an extensive bottom-up approach that generated district- and community-relevant activities that can be feasibly implemented and that have the ownership and inclusion of local stakeholders was followed. All consultations were carried out following the "Guidelines on Stakeholder Engagement in REDD+ Readiness" including consultations on benefit sharing, the role of stakeholders and carbon and non-carbon benefits activities.

Preliminary discussions related to benefit-sharing were informed by several stages of consultations prior to the development of the ER-PD, including consultations at the local, district and national level, including the development of benefit- and revenue-sharing arrangements under the various CBFM regimes, as part of the National REDD+ Strategy development process. These consultations included national and district government, CSOs, IPs, local communities, I/NGOs, forest user groups, Women groups, Dalits, private sector, marginalized groups, and other experts.

The ER Program Area BSM has been supported by several stages of consultations prior to the development of the ER-PD, including consultations at the local, district and national level. These are:

- **National policy development**: prior to the establishment of the national REDD+ process, policies were developed which include benefit-sharing modalities that either explicitly or indirectly inform the BSM in forestry sector. These include the development of benefit and revenue sharing arrangements under the various CBFM regimes outlined in Table 51, the development of the biogas program through AEPC and local government, and others.
- **National REDD+ Strategy development**: as part of the National REDD+ Strategy development process, consultations were held with national, regional and district-level

stakeholders on the design of the REDD+ BSM. The REDD+ strategy was also informed by the ER-PIN development process, which consulted across the 12 districts of the ER Program Area and reviewed existing national benefit-sharing arrangements.

- **SESA development**: The SESA provides an assessment of institutional mechanisms to ensure equitable benefit-sharing and transfer of forest carbon payments to local communities, and an analysis of impacts of different interventions on improved benefit sharing for local communities.
- **TAL cost-benefit-sharing analysis:** During the REDD+ readiness process, the Government of Nepal commissioned a study on cost-benefit-sharing and institutional arrangements in the TAL. This study identified and assessed key agencies and stakeholders for the implementation of the ER Program in the 12 districts of TAL and analyzed their existing capacity and potential role in the ER Program. It assessed different options of institutional arrangements, and developed a model for the ER Program. Finally, it identified clear links between local, districts, provincial and national levels of forest management institutions including the national REDD-IC.

Finally, the ER-PD development team held two national level workshops in which the initial and draft benefit-sharing process was presented and feedback was received from a wide range of stakeholders including national and district government, CSOs, IPs, local communities, I/NGOs, forest user groups, women groups, Dalits, private sector, marginalized groups, and other experts.

In accordance with the MF, the final BSP will be made publicly available prior to ERPA signature in a form, manner and language understandable to the affected stakeholders for the ER Program. There will be additional consultations during the development and implementation of the BSP.

15.3 DESCRIPTION OF THE LEGAL CONTEXT OF THE BENEFIT-SHARING ARRANGEMENTS

The BSM for the ER Program draws upon a range of existing benefit sharing arrangements for timber and non-timber forest products in Nepal, including the precedent set by the Alternative Energy Promotion Centre (AEPC) of Nepal, and the benefit sharing guidelines established by the Climate Change Policy 2011. These policies have been formulated over several years and will continue alongside the BSM. Table 51 lists existing revenue- and benefit-sharing arrangements in place in Nepal for various forest management regimes.

Table 51 Existing revenue and benefit sharing practices under various forest management regimes

Forest management regime	Tax	Royalty	Income sharing		
			Allocation for forest management	Allocation for poor people	Invest for community development
Community forestry (section 30a of Forest Act 1993 & Fiscal Act)	VAT collection from buyer only on commercial transaction	15% royalty in commercial transaction of *Acacia catechu* and *Shorea robusta*	25% of the total income of CF for forest management	35% of the total income of CF for poor	40% of total income for community development
Collaborative Forest	Collection of VAT through auction of timber	Timber 50% Forest User Group	40% of the total income of CFM for forest management	50% of the income for pro poor activities,	10% administrative cost

(Section 24c of Forest Act 1993)		40% Central Government 10% Local Government		local and community development	
Buffer Zone CF (Rule 21 of BZ Regulation 1996)	Restriction on sale of timber outside of BZ group	Collection of revenue of the income from stray timbers	No mechanism for forest user groups		
Leasehold Forest (Rule 49 of Forest Regulation 1995)	-	NRs. 200- 1500 annual charge (Not for poor groups)	Depends on groups decision (for internal distribution)		
Protected areas (Section 25a of NPWC Act 1973)	-	-	30-50% income should be allocated for the community development of Buffer Zone areas		
Local Government (Schedule 26 of LSGR 1999)	-	-	Equal (50:50) distribution of the income of stray timbers between local government and central government. 10% revenue to the local government from the total income of forest at national level.		

Constitutional provision for benefits sharing of natural resources: According to Article 59(4) of the Constitution the Federation, State and Local level shall provide for the equitable distribution of benefits derived from the use of natural resources or development. Certain portions of such benefits shall be distributed, pursuant to law, in forms of royalty, services or goods to the project affected regions and local communities. The new constitutional provisions have given legal authority to all level of states to collect and share the royalty from natural resources including forest, though the detail legal framework will be developed after election of states and local institutions and establishment of such states at the beginning of 2018..

The ER Program activities will serve to strengthen and enhance existing benefit sharing arrangements by supporting various community-based forest management regimes, and the existing bio-energy (biogas, ICS and briquette) program and fire management programs in the ER Program Area. In this regard, it will deliver significant benefits to local communities and strengthen existing institutions.

The BSM builds on the guidelines established by the Climate Change Policy (2011), constitutional provisions as envisioned in the article 59(4), and the precedent set by the Alternative Energy Promotion Centre (AEPC). In principle, 80% of benefits received under the ER Program will be shared with local communities, Indigenous Peoples and private forest owners. This principle has already been applied under the AEPC biogas program, which receives funds from a variety of sources including The World Bank, UNDP, Government of Nepal, DANIDA, and NORAD. Under an ERPA signed with the World Bank Community Development Carbon Fund (CDCF) AEPC has also adopted an 80/20 ratio of benefit distribution to local communities to support biogas implementation and to deliver emissions reductions under the ER Program.

In addition, to the above principle, the BSM will also support the established modalities for revenue sharing under the CBFM regimes established under the Forest Act (1993), and Forest Regulation (1995) (see Table 51). Through this, the existing benefits being generated by CBFM areas will be promoted under the ER Program. The benefit sharing plan will be developed based on the timeframe shown in Table 52.

Table 52: Timeframe of Benefit Sharing Plan

Date	Process step	Lead	Contributing
September 2017	Terms of Reference (TOR) prepared for the BS plan (build on existing policy and legal instruments and previous studies) • Climate change policy: 80% communities and 20% management; • Community Forests: 100% community • Collaborative forests: 50% community, 10% local government, 40% central government; • Publications based on REDD pilot project implemented in 3 watersheds (2010-2013): 60% social criteria and 40% ecological criteria) • Non-carbon benefits such as timber and medicinal plants will be distributed as per the approved management plans of the respective CBFM groups.	RIC	MoFSC, Ministry of Environment
February 2018	Draft BSP prepared • Institutions and their roles identified • Stakeholders and right-holders identified (including IPs and LCs) • Benefit sharing criteria developed • Fund flow mechanism developed to fund the activities/interventions to address the drivers to benefits IPs and LCs through the identified governing institutions	RIC	MoFSC, Ministry of Environment, DoF, DNPWC, IPs and LCs
March 2018	• BSP endorsed	RWG/MoFSC	RIC, Ministry of Environment, DoF, DNPWC, IPs and LCs

16 NON-CARBON BENEFITS

16.1 OUTLINE OF POTENTIAL NON-CARBON BENEFITS AND IDENTIFICATION OF PRIORITY NON-CARBON BENEFITS

The proposed ER Program is expected to contribute to the improvement of forest and socioeconomic conditions by improving livelihood opportunities, governance reform, community empowerment and social change. The ER Program will result in visible positive changes in forest conditions, increasing production and the availability of forest products and concurrently reducing the time spent collecting forest products. Enhancing the production and marketing of forest products will generate financial capital, and ultimately support livelihoods of the communities. ER Program activities are intended to generate social capital through collective action, mutual trust, and conflict resolution, ensuring participation in decision making, and enhancing the access of poor, women, powerless and disadvantaged groups. Human capital will be developed by conducting capacity building activities (trainings, workshops, interactions and exposure visits), and financial capital will be developed by ensuring access to financial resources. The ER Program activities proposed for enhancement of forests support ecosystem services, such as carbon sequestration, biodiversity conservation, and maintenance of water flow and quality.

Categories and Key Elements of NCBs

A recent study on Non-Carbon Benefits (NCBs) commissioned by the REDD IC provided the following working definition of NCBs.[97]

> "*Non-Carbon Benefits (NCBs –also understood as co-benefits, multiple benefits or other benefits) has been defined as a wide range of positive outcomes beyond those associated with avoided CO2 emissions and/or carbon sequestration, resulting from the implementation of safeguards responsive REDD+ activities. Such benefits are both realized and/or appreciated by concerned stakeholders*".

This study further proposes the following five major categories of NCB values, including key elements under each of these categories for periodic monitoring at local and landscape/watershed levels. The categories include:

1. Livelihood values
2. Social values
3. Biodiversity values
4. Ecosystem values
5. Governance, Policy and Institutional values

In addition, Nepal's 2013 submission to the UNFCCC proposed more resilient ecosystems for climate change adaptation, which is an important non-carbon benefit that can arise from ecosystem based mitigation activities. The types of NCBs generated and corresponding beneficiaries can therefore be grouped according to the social, environmental and governance benefits as shown in Table 53

The aim and anticipated outcomes of the ER Program activities and interventions is to go beyond the minimum requirements of safeguards, which ensures that the program does no harm to livelihoods and biodiversity, by ensuring significant positive impact through enhancement of livelihoods, social norms and rights, generation of environmental benefits, conservation of natural forests and their

[97] Government of Nepal REDD Implementation Centre. Study of Forest Carbon Ownership in Nepal. http://mofsc-redd.gov.np/wp-content/uploads/2013/11/Final-Report-FCO_Revised_29_10_2015_ERI_Final_01-11-2015.pdf. August 2015.

ecosystem services, and promotion of effective forest governance mechanisms. In addition, the ER Program will improve the resilience of communities through ecosystem-based adaptation.

Approach for identifying priority NCBs

The potential NCBs that will be generated as a result of the proposed ER Program were identified, scoped and validated through district level consultations with communities and stakeholders in each ER Program district. During district consultation workshops, participants were informed about NCBs, including the meaning and categories, and how NCBs can be incentivized alongside the generation of emission reductions during the implementation of the ER Program. The participants were requested to list possible NCBs that could be generated while implementing different ER Program activities proposed by the stakeholders in each district. See Annex 5: Stakeholder Consultations and Workshops for a detailed summary of these findings.

Table 53 Key Categories of Priority Non-Carbon Benefits suggested during District Consultations

Governance	Environmental		Social	
Improved forest governance	Improvement in ecosystem services	Climate change adaptation	Improved economic conditions and livelihoods	Supported social and cultural values
• Easy, efficient and continue supply of forest products to distant (southern) users • Rights of IPs, Dalits and local user communities to access and control over forest resources respected • Improvement of bio-diversity • Increment in NTFPs and provide wood fuel for meeting energy requirements • Leadership development, social inclusion & women empowerment	• Increase supply of food and nutrients from forests • Enhance volume and quality of water flow and regulation • Improvement & increase opportunities for eco-tourism • Improvement in wildlife habitat and biodiversity • Soil conservation • Habitat services	• Control of flood, landslide & soil erosion • Promotion of agroforestry and crop diversification • Climate resilient communities • Possibility for financial commitment for climate change adaptation • Conservation ponds and run-off harvesting dam • Water source protection	• Employment generation, livelihood enhancement & income generation through promotion of forest based entrepreneurships • Capacity enhancement of women and forest dependent communities • Increased farm productivity and expansion of agroforestry • Improved health	• Protection and conservation of culture knowledge and skills of IPs, Dalits and local communities • Support for indigenous and local traditional community conserved areas • Forest conserved for cultural spiritual and service

Priority NCBs and their relation to ER Program activities
The following table displays the proposed ER Program activities and corresponding NCBs that can be generated through these activities.

Table 54 Priority NCBs generated through ER Program Activities

Key Activity	Potential Non-Carbon Benefits
Improving the Management of CBFM (Community Based Forest Management) models building on traditional & customary practices	• Employment generation, livelihood enhancement & income generation through promotion of forest based entrepreneurship • Improvement of biodiversity • Increment in NTFPs and provide wood fuel for meeting energy requirements • provide food and nutrients from forests, enhance quality of water and provide wood fuel for meeting energy requirements • Easy, efficient and continue supply of forest products to distant (southern) users • Respect knowledge and skill of customary practice of forest management • Recognition and promotion of knowledge, skills & art and craft of Indigenous Peoples related to forest
Access to Renewable Energy	• Improved health • Contained livestock reduces grazing pressure, improved soil fertility of forest lands • Biodiversity benefits from reduced pressure on forests • Reducing fuelwood collection time
Promoting Private Forestry	• Development of forestry based entrepreneurship • Continued supply of forest products including timber • Promotion of agroforestry • Enhancement of biodiversity due to reduced pressure on natural forests
Enhancing Pro-Poor Leasehold Forestry	• Employment generation, livelihood enhancement & income generation through promotion of forest based entrepreneurship
Handover of National Forests to CBFM regimes	• Improvement in forest governance, and easy, efficient and continued supply of forest products to distant (southern) users • Rights of IPs, Dalits and local user communities to access and control forest resources respected • Leadership development, social inclusion & women empowerment
Land-use Planning	• Environment friendly infrastructure development • Control further encroachment on forests • Reduction of disaster risks • Increase farm productivity
Protected Area Management	• Reduced human wildlife conflict • Control further encroachment of forests • Promotion of ecotourism • Protection of critically endangered flora and fauna

In addition to this extensive work on NCBs in the Terai, the REDD IC is also developing a program with the World Bank under the Wealth Accounting and Valuing Environmental Services (WAVES) program to strengthen their ability to collect data on natural capital's contributions to the economy, and to use that information to further shape the national REDD+ program. Natural Capital Accounting (NCA) will be used as a tool to capture the value of the market and non-market contributions of forests

and their link to the economy, reporting also on drivers and impacts of forest use. NCA will be used to connect biophysical information to economic information in a way that could be useful for the overarching policy frameworks in place and being designed in the country with the support of the World Bank. More importantly, NCA will provide a monitoring and reporting tool at the macro level, with indicators compatible with the National Economic Accounts and UN international standards.

16.2 APPROACH FOR PROVIDING INFORMATION ON PRIORITY NON-CARBON BENEFITS

Information on generation and /or enhancement of NCBs will be integrated into the SIS described in Section 14.2. The SIS is currently being developed by the REDD IC and will be in place prior to the signing of the ERPA.

17 TITLE TO EMISSION REDUCTIONS

17.1 AUTHORIZATION OF THE ER PROGRAM

Based on the constitutional and legal provisions, and ministerial decisions of Nepal, the REDD IC approved this ER Program through a formal meeting of the REDD Apex Body dated May 19, 2017. A formal letter of approval of the ER Program, and its consideration for inclusion in the FCPF Carbon Fund, is included in Annex 10: Formal letters of approval of the ER Program. According to the Government of Nepal (Business Allocation) Regulation 2015, the ER Program Entity and ERPA signing entity will not be same. The regulation gives authority to the Ministry to Finance to sign the ERPA. The Ministry of Finance will establish detailed working arrangements with MoFSC and REDD IC outlining how funds will be released prior to signing the ERPA. This will be developed in parallel to the benefit sharing arrangements outlined in Section 15.

Name of entity	REDD Implementation Center (REDD IC), on behalf of the Ministry of Forests and Soil Conservation (MoFSC) of Nepal.
Main contact person	Dr. Sindhu Parsad Dhungana
Title	Joint Secretary and Chief of the REDD IC
Address	Babar Mahal, Kathmandu
Telephone	977-1-4239126, 977-1-4215261
Email	info@mofsc-redd-gov.np
Website	www.mofsc-redd-gov.np
Reference to the decree, law or other type of decision that identified this entity as the national authority on REDD+ that can approve ER Programs	See Section 17.2 below

17.2 TRANSFER OF TITLE TO ERS

Legal and regulatory frameworks for Title transfer
The following constitutional and legal instruments define the MoFSC as the national authority on forests and REDD+, and as the legal entity with the ability to transfer title of ERs, including to the Carbon Fund under the ER-PD.

> **Constitution of Nepal:** The constitution of Nepal Schedule 5 (27) identified carbon as a service. The second amendment of the Forest Act 1993 identified carbon as an environmental service [section 2(c1) and 67]. The Constitution of Nepal defined and distributed power and jurisdiction by three main levels: federal, state, and local. In the context of federal power, such authority shall be exercised in accordance with the Constitution and the Federal law. According to article 57(1) and Schedule-5 (27) of the constitution, national forest policy and carbon services shall be regulated by the central government in accordance with the federal

law. The Government of Nepal, in February 2017, approved an unbundling report[98] related to detailing the list of exclusive and concurrent powers of the Federation, the State and the Local Level provisioned in the Schedule 5, 6,7,8,9 of the Constitution of Nepal. This report elaborated on carbon service related authority of federation and clearly states that the enhancement of carbon stocks, as well as fiscal management of the carbon service authority will be under the jurisdiction of federation.

Based on this constitutional provision (Schedule 5: List of Federal Powers/Jurisdiction), MoFSC can develop and approve policies, plans and programs on national forest and associated carbon services such as carbon trade and regulation and is not required to get consent from state and local governments. Accordingly, the REDD IC can approve the ER Program and transfer title to ERs to the Carbon Fund through a formal meeting of the REDD Working Group. The National REDD+ Strategy has also given this authority to the REDD Working Group.

According to article 59(4) of the constitution, the central government is required to make an appropriate arrangement to share the benefits generated from natural resource with the project affected local communities as prescribed by the law. Therefore, as an ER Program entity, the REDD IC will develop a Benefit Sharing Plan and Safeguards Plan considering this constitutional provision in the future before signing in the ERPA, or before receiving any upfront payment from the Carbon Fund for the implementation of the ER Program.

Government of Nepal (Business Allocation) Regulation 2015: This Regulation allocated the rights and responsibilities of each ministry of Nepal and based on these rules, the concerned ministry has the authority to approve any plan and program that is relevant to Schedule-2 of the Government of Nepal (Business Allocation) Regulation 2015. Schedule-2 (18.16) of this regulation gives authority to MoFSC to develop and approve plans and programs related to forest-based climate change mitigation. As a decision-making body on the REDD+ at the national level, the RWG, chaired by the Secretary of MoFSC, first approves the ER Program and decides to forward it to the REDD+ Apex Body, chaired by the Minister of MoFSC for final endorsement. The Apex Body will endorse the ER Program and decide to transfer title to ERs to the Carbon Fund. As a Secretariat of the RWG and Apex Body, the REDD IC will prepare a formal request and forward it through MoFSC to the Ministry of Finance to sign the ERPA with the FCPF Carbon Fund as per the Section 2(11)(13) of the Government of Nepal (Business Allocation) Regulation 2015.

Forest Act 1993: According to the Forest Act 1993, carbon stocks are not included under forest products and not counted as forest products/goods, but included under or counted as an environmental service, which will be managed and utilized based on forest regulation or contractual laws. The second amendment in Forest Act 1993 (2016) made a provision to manage environmental services generated through the sustainable management of forests. Section 2c1 of the Forest Act defined environmental services and according to this definition, forest carbon stocks are also counted as an environmental service generated from forests. According to section 67b of the Forest Act, the MoFSC has authority to make an appropriate arrangement for the management, utilization and benefit sharing of environmental services, including regulation of forest carbon stocks. Due to different environmental services, the carbon service will be regulated by REDD IC on behalf of MoFSC.

[98] Government of Nepal. 2017, Unbundling/Detailing of List of Exclusive and Concurrent Powers of the Federation, the State and the Local Level Provisioned in the Schedule 5,6,7,8,9 of the Constitution of Nepal (report), Federalism Implementation and Administration Restructuring Coordination Committee, February, 2017

Sub-arrangements: The forestry sector legislation of Nepal recognized FUGs as legal entities. In addition, the National Parks and Wildlife Reserves (NPWR) Act 1973 and associated regulations also recognized forest tenure rights of communities and individuals in the Buffer Zones and Conservation Areas in Nepal. FUGs prepare forest management plans and, according to the Community Forest Development Guideline 2015 (revised), FUGs may include provisions for the conservation and utilization of environmental services, including carbon stocks, in their forest management plans. Section 25 of the Forest Act 1993 authorizes DFOs to approve forest management plans, but only for the utilization of forest products and not for environmental services. As such, the Forest Act defines forest carbon as both an intangible asset and an environmental service, and gives resource rights to communities on the products or goods produced in the forest but not to the land, intangible property, nor environmental services (e.g., carbon stocks).

Assessment of carbon rights

The national REDD+ Strategy (2016) states that '*under the existing land and forest tenure regimes, substantive measures will be taken to secure carbon rights of the right holders. For this, forest legislation will clearly define carbon rights and its right holder.*' Considering this, the second amendment in the Forest Act (2016) included carbon sequestration/stock as an environmental service, which will be regulated according to the constitutional provision and procedures defined in the Forest Regulation 1995. Under the existing regulatory framework, carbon rights are therefore considered as a national right, not an individual right. According to the Constitution of Nepal, the federal government has the explicit authority to manage the fiscal responsibilities of carbon services, granting it the authority and ability to transfer ER Titles to the Carbon Fund. While forest carbon stocks are an intangible asset classified under the jurisdiction of the federal government, it is a key priority of Nepal's REDD+ Strategy to ensure that communities that have been managing the forests are entitled to benefit from the sale of carbon stored in the forests under clarified usufruct rights. Clarifying lend tenure for communities in Nepal is a key issue for effective REDD+ implementation.

Carbon Rights and Emission Reduction Title

The Constitution of Nepal (2016) Schedule 5, No 27 puts the following matter under the sole jurisdiction of federal power. In other words, the following matter is dealt with by the Federal Government, as opposed to State Government or Local Government: "National and international environment management, national parks, wildlife reserves and wetlands, national forest policies, carbon services".

REDD+ comes under both national and international environment management. On the one hand, the activities and interventions for implementing Emission Reduction Programs, or any other programs in the REDD+ Strategy, are guided by national laws, policies and annual budget/program of the government. On the other hand, REDD+ is also guided by UNFCCC and any contract made by the Government of Nepal with any international entities such as the World Bank's Carbon Fund and UN-REDD. Carbon rights and Emission Reduction Title directly belong to national and international environment management and carbon services. It is also a matter of national forest policies.

It is clear that the Federal Government has the right to transfer title of emission reduction to international entities based on its right over national and international environment management and carbon services, as well as the right to issue national forest policies. However, this right should not be viewed in isolation. The Federal Government has other obligations and commitments toward its citizens and natural resources including forests and biodiversity.

Under the Policies of the State, Article 51 (g) relates to the protection, promotion and use of natural resources, which state:

- *"(1) to protect, promote, and make environmental friendly and sustainable use of, natural resources available in the country, in consonance with national interest and adopting the concept of inter-generational equity, and make equitable distribution of fruits, according to priority and preferential right to the local communities*,
- *(6) to maintain the forest area in necessary lands for ecological balance*,

- *(7) to adopt appropriate measures to abolish or mitigate existing or possible adverse environmental impacts on the nature, environment or biological diversity,*
- (*8) to pursue the principles of environmentally sustainable development such as the principles of polluter pays, of precaution in environmental protection and of prior informed consent"*

The State Policies imply that the benefits of natural resources, including the benefits from carbon services, are equitably distributed. Local communities have preferential right over management and sustainable use of natural resources, including forests. Principles of prior informed (currently free prior informed) consent are applicable in REDD+ processes and results, including benefit sharing.

Since emissions are reduced from the contribution of the activities carried out by people, biological persons (private tree grower individuals) or legal persons (government entities and groups of forest users, such as community forest user groups, collaborative forest user groups, leasehold forest user groups), the title of the emission as property rests with the person (private or legal), and hence is also pursuant to the Fundamental right relating to property in the Constitution. The Constitution defines property as "*any form of property including movable and immovable property, and includes an intellectual property right"* (Article 25). The same Article 25 (Right relating to Property) states:

- *"(2) The State shall not, except for public interest, requisition, acquire, or otherwise create any encumbrance on, property of a person. Provided that this clause shall not apply to any property acquired by any person illicitly*
- *(3) The basis of compensation to be provided and procedures to be followed in the requisition by the State of property of any person for public interest in accordance with clause (2) shall be as provided for in the Act"*

The title of carbon emission rests with the person (biological and legal) who contributes to reducing emissions. However, the individual person cannot transfer the emission title like other private property or tangible forest products, such as timber and medicinal herbs, because the Federal Government has power over carbon services as well as the land ownership of national forests. In other words, since the land under national forests, including community forests, is owned by the Federal Government (Forest Act, Article 67) and authority over carbon services is vested in the Federal government (Constitution Schedule 5 (27)), no person (biological or legal) can transfer title of emission reductions apart from the Federal Government. The Federal Government pursuant to other legislation (Article 25) and equitable benefit sharing plans (Article 51) can transfer title of carbon emission to any entity.

The Federal Government has started making provisions for carbon services in legislation. The second amendment of the Forest Act (1993) in 2016 has such a provision. Article 2 (C1) states that 'Ecosystem Services' mean the following services and benefits derived from ecosystems:

1. Carbon stock
2. Biodiversity conservation
3. Hydrological system
4. Eco-tourism
5. Any other benefit as defined

The provision related to the management of ecosystem services in Article 67(b) states: "*The management, utilization and benefit sharing of ecosystem services from forests shall be arranged as per the regulation."*

Forest regulation is yet to be amended to incorporate the Second Amendment of the Forest Act, including the elaboration of the management, utilization and benefit sharing of ecosystem services including emission reduction (carbon services). There is ample opportunity to incorporate the provision of carbon emission title, emission title transfer and benefit-sharing mechanism that is consistent with the Constitution of Nepal, Forest Act and Nepal's international obligations such as UNFCCC and Nationally Determined Contributions. There is a strong commitment on the part of the

Ministry of Law, Justice and Parliamentary Affairs to amend legislation or make new legislation to incorporate carbon title, which will be recommended by the Ministry of Forests and Soil Conservation.

The Government of Nepal (Allocation of Business) Rules (2012) allocates the responsibilities of all the Ministries in the Government of Nepal. Under the Schedule 2(2), the businesses of the Ministry of Finance include:

- International relation and coordination for social and economic development
- International relation and co-ordination relating to economic, banking and currency sector
- Foreign loan, grant and other bilateral and multilateral aid

On behalf of the Federal Government, the Ministry of Finance is the authority to sign an Emission Reduction Payment Agreement (ERPA) with an international entity, including FCPF's Carbon Fund. A detailed study on land and forest tenure, as well as the title transfer of emission reductions, has been undertaken by Jhaveri and Adhikari (2015) for the purpose of implementing the Emission Reduction Program in the Terai Arc Landscape. The document is submitted as an associated document to the ERPD. The study recommends setting up a central level entity under the Ministry of Forests and Soil Conservation with a mandate to transfer emission title as well as to manage benefit-sharing by amending Government of Nepal (Allocation of Business) Rules (2012). Nepal's draft National REDD+ Strategy proposes to elevate the existing REDD Implementation Centre to National REDD+ Centre as a semi-autonomous entity. This entity would be similar to the one recommended in the report by Jhaveri and Adhikari (2015). The Terms of Reference for the proposed National REDD+ Centre will include, though not limited to, the following:

- Explore and access national and international fund/result-based payments
- Central level coordination among sectors and actors for policy decisions
- Mobilize funds
- Coordinate to regulate green house gas emissions from forests
- Coordinate for benefit-sharing
- Coordinate for ensuring safeguards
- Coordinate between CBFM groups and the Ministry of Finance so the latter can transfer
- Establish and operate Safeguards Information System
- Coordinate to implement ERPD and REDD+ Strategy
- Carry out and publish research and studies
- Coordinate with DFRS for MMRV, National Forest Information System, Carbon Registry
- Make contractual arrangement with private forestry owners willing to transfer emission title under the mutually agreed upon forest management plan.

18 DATA MANAGEMENT AND REGISTRY SYSTEMS

18.1 PARTICIPATION UNDER OTHER GHG INITIATIVES

As stated in Section 6.2, the ER Program is not currently planning to participate in any other GHG initiatives; however, the GoN may sell additional ERs generated under the ER Program through external carbon market transactions to catalyze further activities in the Terai. Since several biogas and cookstove projects operate at the national level and in the Terai, any ERs generated and sold through other initiatives that result in reductions in fuelwood use in the Program Area will be deducted from ERs generated by the ER Program. These will be tracked through the national registry.

18.2 DATA MANAGEMENT AND REGISTRY SYSTEMS TO AVOID MULTIPLE CLAIMS TO ERS

The National REDD+ Strategy indicates that a central-level, independent carbon registry, which would work as a repository for REDD+ related information (e.g., information on the location, ownership, carbon accounting, financial flows for sub-national and national REDD+ programs and projects) will be established and maintained within the REDD IC. The registry will enforce standards and engage in carbon transactions by maintaining broad-based participation of stakeholders in the management of the registry. Projects at the national and sub-national level will register their performance at the registry.

The central registry will aggregate and track multiple levels of REDD+ activities (national, subnational and project-based) and provide governments, donors and stakeholder with transparent and meaningful data from which to make results-based payments. The registry system will be consistent with existing national policies, and local stakeholders (e.g. REDD-IC, departments, ministry, local communities, CSOs) will be involved to the extent possible. The system will be linked with the NFD & NFIS and national MRV section. The registry will enforce standards and engage in carbon transactions by maintaining broad-based participation of stakeholders in the management of the registry. Establishing an independent carbon registry system would enable Nepal to maintain its position as national registry's authority.

A national carbon registry system will have two main components. The **REDD+ program/project database** supports the registering and reporting on REDD+ projects/programs on following parameters (FCPF 2013):

i) Managing official approvals and compiling/distributing information on location of project/program proponents;
ii) Collecting/distributing geo-referenced information on the location of REDD+ projects/programs;
iii) Collecting/distributing information on reference levels (RL/REL) at different scales;
iv) Collecting and distributing on MRV data to specific REDD+ projects/programs;
v) Collecting/distributing information on how safeguards are addressed and respected in specific REDD+ projects/programs;
vi) Collecting/distributing information on CF payments and benefit sharing for specific REDD+ projects/programs;

The **ER transaction registry** organizes the process of creating (issuing) offsets units with unique serial numbers and supporting the transfer of ERs between account holders with the registry and to other linked trading registries. The use of ER transaction registry refers to the system that supports (FCPF 2013):

i) The serialization of ERs that have been issued under a recognized standard or framework;
ii) Account holders' systems to manage positions and settlements for ER transaction;
iii) Accounting for non-permanence risk management (buffer reserves);
iv) Reporting;
v) The linking to other ER transaction registries e.g., i) a trading platform and ii) a GHG reporting tool will be implemented.

To meet the aforementioned criteria and to avoid double counting, the registry system's structure will:

- Maintain environmental integrity as well as track domestic leakage and double counting;
- Promote transparency of reference scenarios;
- Ensure efficiency through establishing a financially and operationally efficient management system;
- Be able to handle both carbon and non-carbon requirements of REDD+;
- Well defined linkages with NFIS

The carbon registry system will have following qualities:

- A simple web-based, user-friendly and affordable registry system that is automated and can be updated as Nepal progress with the REDD+ implementation;
- Clearly defined methodology with simple and easy process;
- Capable of effectively tracking double counting and leakage;
- Maintaining access to different stakeholder as per the policy of the government of Nepal;
- Be able to track and respect safeguards compliance and co-benefits;

During the initial period of implementation of the ER Program, while the appropriate systems are being established in Nepal, it is anticipated that the REDD IC will rely on the registry system of the World Bank. Upon successful establishment of the national registry, transactions will be duplicated in the national registry and transactions will subsequently be implemented through the national registry system.

Figure 22 Proposed Data Management and Carbon Registry System for Nepal

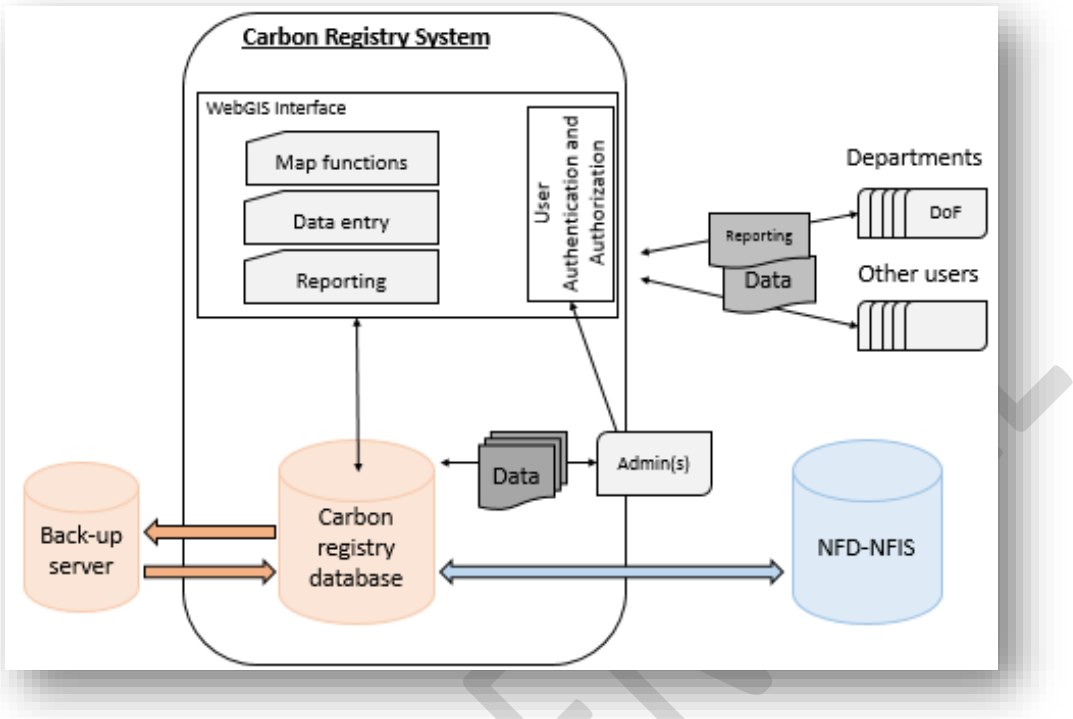


Table 55: Proposed timeframe to develop carbon registry system in Nepal

Date	Process step	Lead	Contributing
September to October 2017	• TOR prepared for assessing and recommending carbon registry mechanisms for Nepal	RIC/DFRS	DFRS
October 2017 to January 2018	• Study completed to assess and recommend carbon registry mechanisms for Nepal	RIC/DFRS	MoFSC, Ministry of Environment, WWF, ICIMOD, AEPC
February 2018	• Internal discussion of carbon registry options including with the Designated National Authority • External discussions with recommended carbon registries • Assessment of options for carbon registry	RIC/DFRS	MoFSC, Ministry of Environment, WWF, ICIMOD, IPs and LCs, AEPC
By April 2018	Decision on the choice of the carbon registry	RIC/DFRC MoFSC	MoFSC, Ministry of Environment

ANNEXES

ANNEX 1: SUMMARY OF FINANCIAL PLAN

Expected uses of funds	Description	Breakdown per year (USD)				
		2018	2019	2020	2021	2022
Costs related to administrative oversight		300,000	316,000	330,000	348,000	364,000
Program Implementation	4.3.1 Improve existing CBFM models	6,271,620	9,654,340	9,605,840	9,442,840	9,442,840
	4.3.2 Transfer to CBFM	50,900	3,186,710	4,878,070	4,853,820	4,772,320
	4.3.3 Private sector forestry	870,300	870,300	870,300	870,300	870,300
	4.3.4 Biogas and ICS	5,210,406	5,528,406	5,528,406	5,174,406	5,174,406
	4.3.5 Pro-poor Leasehold Forestry	63,600	39,600	39,600	39,600	39,600
	4.3.6 Integrated land use planning	75,500	75,500	27,500	27,500	27,500
	4.3.7 Protected area management	50,000	50,000	50,000	50,000	50,000
Safeguard costs		125,423	193,549	209,497	204,085	203,270
Costs related to MRV and forest monitoring		150,000	158,000	165,000	324,000	183,000
	Total uses	13,167,749	20,072,405	21,704,213	21,334,551	21,127,236
	Cumulative uses	13,167,749	33,240,154	54,944,367	76,278,918	97,406,153

Expected sources of funds	Description					
Government budget	DoF	5,562,450	5,840,570	6,132,600	6,439,230	6,761,190
Grants	FIP		5,000,000			
Loans	FIP	5,000,000	5,000,000		5,000,000	
	IDA	2,026,000	2,127,300	2,233,670	2,345,350	2,462,620
Cofinancing	CFUG and CoFUG cofinancing	2,026,000	2,127,300	2,233,670	2,345,350	2,462,620
	HH rural energy cofinancing	2,587,203	2,587,200	2,587,200	2,587,200	2,587,200
Revenue from sale of Emission Reductions	Assumes deduction of buffer			15,000,000		20,000,000
	Total sources (before taxes)	15,175,653	20,555,070	25,953,470	21,371,780	31,811,010

Cumulative sources (before taxes)	15,175,653	35,730,723	61,684,193	83,055,973	114,866,983
Net revenue before taxes (=total sources – total uses)	2,007,903	482,665	4,249,257	37,229	10,683,774
Cumulative revenues	2,007,903	2,490,569	6,739,826	6,777,055	17,460,829

Expected uses of funds	**Description**	**Breakdown per year (USD)**				
		2023	**2024**	**2025**	**2026**	**2027**
Costs related to administrative oversight		382,000	402,000	422,000	444,000	466,000
Program Implementation	*4.3.1 Improve existing CBFM models*	6,123,120	2,769,400	2,769,400	2,731,400	2,731,400
	4.3.2 Transfer to CBFM	7,721,420	6,061,560	4,384,700	4,384,700	4,365,700
	4.3.3 Private sector forestry	870,300	870,300	870,300	870,300	870,300
	4.3.4 Biogas and ICS	5,174,406	5,474,406	5,474,406	5,174,406	5,174,406
	4.3.5 Pro-poor Leasehold Forestry	39,600	39,600	39,600	39,600	39,600
	4.3.6 Integrated land use planning	24,000	24,000	24,000	24,000	24,000
	4.3.7 Protected area management	50,000	50,000	50,000	50,000	50,000
Safeguard costs		199,528	152,393	135,624	132,244	132,054
Costs related to MRV and forest monitoring		192,000	361,000	211,000	222,000	403,000
	Total uses	20,776,374	16,204,659	14,381,030	14,072,650	14,256,460
	Cumulative uses	118,182,528	134,387,186	148,768,216	162,840,867	177,097,327
Expected sources of funds	**Description**					
Government budget	*DoF*	7,099,250	7,454,210	7,826,920	8,218,270	8,629,180
Grants	*FIP*					
Loans	*FIP*		(15,000,000)			
	IDA	10,000,000	(15,000,000)			
Revenue from sale of forest products	*CFUG and CoFUG cofinancing*	2,585,750	2,715,040	2,850,790	2,993,330	3,143,000
		2,587,200	2,587,200	2,587,200	2,587,200	2,587,200

Revenue from sale of Emission Reductions			35,000,000			
Total sources (before taxes)		22,272,200	17,756,450	13,264,910	13,798,800	14,359,380
Cumulative sources (before taxes)		137,139,183	154,895,633	168,160,543	181,959,343	196,318,723
Net revenue before taxes (=total sources – total uses)		1,495,826	1,551,791	(1,116,120)	(273,850)	102,920
Cumulative revenues		18,956,655	20,508,446	19,392,326	19,118,476	19,221,396

ANNEX 2: AGENCIES AND ORGANIZATIONS PARTICIPATING IN THE ER PROGRAM

Table 56 Agencies and organizations participating in the ER Program

Name of participating agencies & organizations	Contact name, telephone and email	Core capacity and role in the ER Program
Government agencies (Ministries)		
Ministry of Finance	**Contact name**: Baikuntha Aryal (International Economic Cooperation Coordination Division) **Telephone**: 4211837 **Email**: moev@mof.gov.np	Ministry of Finance will flow the financial resources for the implementation of ER Program through MoFSC and REDD IC.
Ministry of Population and Environment (MoPE)	**Contact name**: Ram Prasad Lamsal Joint Secretary **Telephone**: 9851019316 **Email**: info@mope.gov.np	MoPE will be responsible for collecting monitoring information and will link the progress of ER Program with the achievement of targets sets in the INDC.
Ministry of Livestock Development	**Contact name**: Joint Secretary **Telephone**: info@mold.gov.np **Email**: 01-4211706	Ministry of Livestock Development will support to implement ER Program through its local level agencies which are responsible for the implementation of livestock program to reduce presser in forest for overgrazing.
Ministry of Agricultural Development	**Contact name:** Dr. Annapurna Nand Das, Secretary **Telephone**: 977 01 4211905 **Email**: memoad@moad.gov.np	Ministry of Agricultural Development will support to implement ER Program through its local agencies which are responsible to provide seedling to land owner for the tree plantation in farm land.
Ministry of Energy	**Contact name:** Mr. Anup Kumar Upadhya, Secretary **Telephone**: 977-1-4211516 **Email**: info@moen.gov.np	Ministry of Energy will support to develop environmental friendly transmission line in ER Program Area and also will also create supportive environment to avoid forest for the establishment of transmission lines as much as possible.
Ministry of Federal Affairs and local Development	**Contact name:** Secretary, Kedar Bahadur Adhikari **Telephone**: 01-4200309 **Email**: info@mofald.gov.np	Ministry of Federal Affairs and local Development is highly responsible to facilitate local government to apply Environmental Friendly Local Governance (EFLG) Framework to promote environmental friendly local development through local government.
Ministry of Land Reform and Management	Contact name: Mohan Krishna Sapkota, Secretary **Telephone**: 977-1- 4211708 **Email**: info@molrm.gov.np	Ministry of Land Reform will be responsible to develop and implement the land-use plan at local level through local government.
Ministry of Urban Development	**Contact name**: Mr. Dipendranath Sharma, Secretary **Telephone**: 977-1- 4211673	Ministry of Urban Development will be responsible to develop and implement urban planning, urban land-use plan and urban forestry through

	Email: info@moud.gov.np	municipalities which is supportive for the forest enhancement program under ER Program.
Ministry of Physical Infrastructure and Transport	**Contact name**: Secretary, Dhana Bahadur Tamang **Telephone**: 977 - 1 - 4211782 **Email**: info@mopit.gov.np	This ministry is responsible to promote for the roadside plantation and protection of rode side forest which one of the important program of ER Program for forest enhancement.
Ministry of Irrigation	**Contact name**: Mr. Gajendra Kumar Thakur, Secretary **Telephone**: 977-1-4211426 **Email**: info@moir.gov.np	Ministry of Irrigation will be responsible for the conservation of watersheds, construction of environment friendly irrigation structures, source conservation and adhere to the principles of biodiversity offsetting during the construction and operation of the irrigation systems in the country.
Departments		
Department of National Park and Wildlife Conservation (DNPWC)	**Contact name**: Man Bahadur Khadka Director General, **Telephone**: 0977-1-4227926 **Email**: info@dnpwc.gov.np	DNPWC was established in 1980 to conserve rare and endangered wildlife, including floral and faunal diversity. DNPWC will be one of the active partner agency for the implementation of ER Program and developing NCBs monitoring system in BZ.
Department of Soil and Watershed Conservation (DSCWM)	**Contact name:** Bijaya Raj Paudyal, Director General, **Telephone:** 977-1-4220828 **Email:** dscwm2031@yahoo.com	DSCWM was established in 1974 to address the challenges of soil erosion and watershed degradation faced by the country. At present DSCWM is providing SCWM service to 12 districts of ER Program Areas through six District Soil Conservation Offices (DSCO). There are altogether 647 staff within the department. DSCWM has been planning, implementing and monitoring soil conservation and watershed management programs/activities based on the principles of integrated watershed management particularly in Chure areas of ER Program Area.
Department of Plant Resources	**Contact name:** Rajdev Prasad Yadav, Director General, **Telephone:** 977-1-4251161 **Email:** info@dpr.gov.np	Department of Plant Resources was established in 1960. This organization is conducting and providing services in the field of research and development of plant resources. It is a multidisciplinary organization comprising mainly of botanists, chemists and pharmacists. There are 2 district level offices of this department in the ER Program Area and they will be supportive for the research on plant resources in ER Program Area.

Regional Offices/Provincial and local government		
Regional Offices	Regional Offices of MoFSC	The regional offices of the MoFSC are main responsible agencies for the monitoring of forest management activities carried out by the DFO and local communities at district and local level. The regional offices will be responsible for the monitoring of implementation status of ER Program at their respective region.
Provincial government agencies	Provincial agencies	The Constitution of Nepal has given authority to provincial government to make plan and program for the management of national forest, therefore the provincial government agencies will coordinate and provide guidance to local agencies for the effective implementation of ER Program in their respective states.
Local Governments	Village institutions and Municipalities	The Constitution of Nepal has also given authority to local governments (Municipalities and Village Institution) to make plan and program for the conservation of environment including forest, therefore, the local government will also create conducive environment for the implementation of ER Program.
Indigenous Peoples		
Nepal Federation of Indigenous Nationalities (NEFIN)	**Contact name:** Tunga Bhadra Rai, National Coordinator (Climate Change Partnership Program) **Telephone**: 977 1 4415376 **Email:** info@nefinclimatechange.org	As a representative organization of IPs, NEFIN has been playing active roles to promote the rights of IPs in REDD+ and forestry policy process. NEFIN will have an important role to support the government in implementing ER Program by mobilizing IPs, advocate IPs' rights and safeguards at policy level, and build capacity of IPs on REDD+ and ER Program at ground level during the design, implementation and monitoring of ER Program. NEFIN has District Coordination Council in each 12 districts of ER Program Area.
Local Communities		
Federation of Community Forestry Users Nepal (FECOFUN)	**Contact name:** Ganesh Karki, Chairperson **Telephone**: 977-1-6616408 **Email:** fecofun@wlink.com.np	FECOFUN is a representative organization of community-based forest user groups including CFUGs. FECOFUN will have an important role to support the government in implementing ER Program by mobilizing CFUGs, advocate CFUGs' rights and safeguards at policy level and build capacity of CFUGs on REDD+ and ER Program at ground

		level during the design, implementation and monitoring of ER Program.
Association of Collaborative Forest Users Nepal (ACOFUN)	**Contact name:** Ram Rup Kurmi, Chairperson **Telephone**: 051-621819 **Email:** info@acofun.org.np	ACOFUN is a representative organization of collaborative forest user groups. It will have an important role to support the government in implementing ER Program by mobilizing Collaborative Forest Users Groups, advocate their rights and safeguards at policy level, and build capacity of their members on REDD+ and ER Program at ground level during the design, implementation and monitoring of ER Program.
Dalit Communities		
Dalit[99] NGO Federation (DNF)	**Contact name:** Ram Lakhan Harijan, Chairperson **Telephone**: 977-1-5527559 **Email:** dnf@dnfnepal.org	As a representative organization of Dalit Communities and NGOs of Dalits, DNF will have an important role to support the government in implementing the ER Program by mobilizing dalits, advocate dalits' rights and safeguards at policy level, and build capacity of dalits on REDD+ and ER Program at ground level. DNF has district chapter in each districts of ER Program Area.
Women's Group		
Himalayan Grassroots Women's Natural Resource Management Association (HIMAWANTI)	**Contact name**: Ms. Rama Ale Magar, Chairperson **Telephone**: 977-1-5536245 **Email:** nhimawanti@gmail.com	HIMWANTI is dedicated to strengthening the capacity of rural women for sustainable natural resource management. It will have an important role to support the government in implementing the ER Program by mobilizing rural women, advocate their rights and safeguards at policy level, and build capacity of rural women on REDD+ and ER Program at ground level. HIMWANTI has district chapter in each districts of ER Program Area.
Non-Governmental Organization		
NGO Federation Nepal	**Contact name**: Chairperson **Telephone**: 977 1 4782908 **Email**: info@ngofederation.org	NGO Federation has its own district chapter in each districts of ER Program Areas which will play an active role for the strengthening governance of local communities during the implementation of ER Program.

[99] Dalit are defined as those communities who, by virtue of atrocities of caste based discrimination and untouchability, are most backward in social, economic, educational, political and religious fields, and are deprived of human dignity and social justice (National Dalit Commission - NDC).

WWF Nepal	**Contact name:** Santosh Mani Nepal, Senior Director, Policy and Outreach **Telephone**: +977 1 4434820 **Email:** santosh.nepal@wwfnepal.org	WWF Nepal will have a role to provide technical and financial support to the government in developing and implementing the ER Program.
ICIMOD	**Contact name:** Bhaskar Singh Karky, Resource Economist **Telephone**: 977 1 5003222 **Email:** info@icimod.org	Support to exchange knowledge on REDD+ at national and trans-boundary level.
Private Sector		
Federation of Forest Based Industry and Trade, Nepal (FenFIT)	**Contact name:** Shyam Sundar Dhakal, Chairperson **Telephone**: 977-01-5147152 **Email:** fenfitnepal@gmail.com	FENFIT is an umbrella organization of timber and non-timber forests products industries and traders in Nepal. It is a platform for forest traders and timber industries and work to find solutions to improve forest management practices as well. FENFIT works to ensure the permanent existence of forest areas through responsible forest utilization and marketing of forest products. It has district chapters in each districts of ER Program Area.
Private Forest Stakeholders Federation	**Contact name:** Chairperson **Telephone**: +9841511250 **Email:** bishnugyawali@gmail.com	
Association of Family Forest Owners, Nepal (AFFON)	Contact name: Chairperson Telephone: 977 01 4786734 Email: info@familyforestnepal.com	
Professional Organization		
Nepal Forester Association (NFA)	**Contact name:** Shekhar Kumar Yadav, Chairperson **Telephone**: 977-1-4220401 **Email:** nfa@mail.com.np	Provide technical support to implement ER Program at local level and support to develop capacity of forest user groups.
Development Partners		
UN REDD Program	**Contact name:** Mr. Vijay Prasad Keshari **Telephone**: +977 1 4211894, 1 6200894 **Email:** vijay.kesari@undp.org	Support under TS for review of PLR, support to develop PAMs, additional support to strength FRL and development of financial mechanisms for REDD+ implementation.

ANNEX 3: SOCIO-ECONOMIC CONDITIONS IN THE TERAI ARC LANDSCAPE

Modes of Livelihoods & Dependency on Forest Resources

Agriculture is the main form of livelihoods for the inhabitants of the TAL: a majority (57 %) are engaged in livestock raising (WWF, 2008). Forests are an important source of various products especially for the poorest people who live within or near these forests, who have limited alternative sources of livelihoods. Forests are used by some households for production and by others for subsistence livelihoods like gathering fuelwood, fodder and non-timber forest products (NTFPs). Forests also provide timber essential for housing, farm buildings, fences, irrigation canals, and agricultural tools. For these reasons, sustainable management of forests is a critical component of both livelihood improvement and poverty reduction.

According to CBS (2011) around two third households (65%) in ERP area used firewood for cooking purposes. More than 82 % households in Bardiya, Kailali and Kanchanpur districts used firewood for cooking which is a significantly higher rate of firewood consumption compare to rest of the districts within ER Program Area. Only 49 % households in Chitawan districts use firewood for cooking (Table 59). These data clearly indicate that some forms of interventions of promoting of alternative sources of clean energy are required to reduce carbon emission in the ER Program districts.

Demography and Caste Ethnic Composition

The Adiabsi/Janajati groups (IPs) are divided regionally into two distinct cultural groups: Hill Janajati[100] and Terai Janajati[101]. The total population of Adiabsi/Janajati (including both Hill & Terai groups) is 9267870 or 35.01% of the total population (26494504) of Nepal as of 2011 census. The total population of Adiabsi/Janajati groups (IPs) in ER Program Area is 2295649. It comprises 31.23 % of the total population in ER Program Area (Table 57), 8.66% of the total population of Nepal whereas they constitute almost one fourth (24.76 %) of the total population of Adiabsi/Janajati groups (IPs) in Nepal. Among the Adiabsi/Janajati groups in ER Program Area, Tharus are numerically dominant and distributed more or less in all ER Program districts with higher concentration in Kailali, Chitwan, Nawalparasi and Dang districts respectively. The Magars are numerically dominant in Nawalparasi and Rupandehi districts among Adiabsi/Janajati groups (IPs) in ER Program Area (see Table 57).

The Madhesis here comprise nearly 23% of the total population (excluding population of Terai Dalits) of ER Program Area are the Hindu caste groups of Terai origin. The Yadavs followed by Kurmis are the numerically dominant groups. The Yadavs are more or less distributed in all ER Program districts with higher constriction in Rautahat and Bara districts and the Kurmis are in higher numbers in Parsa district. The social structure of the caste-origin of the Terai groups is complex, reflecting four Varna groups with distinct hierarchical structures (Brahman (Maithil Brahman), Rajput (Chhetri), Vaisya and Sudra or low caste groups) within them. The three caste groups – Brahman, Rajput and Kayastha are the most powerful groups even today in terms of literacy, economic and political status, not only in Terai, but also in Nepal as a whole.

The high caste hill group, comprising of Brahmin, Thakurs, Chhetri and Sanyasi, constitutes nearly one fourth (24.37%) of the total ER Program Area. The mother tongue of these groups is the Nepali language. The social structure of caste-origin Hill groups is simple, reflecting only three groups in hierarchy in the Varna model (Brahman, Chhetri and Sudra) and there is no four Varna (color) or Vaisya category within this model.

The Dalits is a designation for a group of people belonging to the lower castes, many of whom are traditionally regarded as "untouchable" and are also divided into two groups: Hill Dalits and Terai Dalits. Altogether, they constitute 12.47% of the total population of the ER Program Area.

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100 Some of the Hill Janajati groups include Magar, Newari, Gurung Rai, Limbu, Sherpa, Sunuwar, Bhote, Raji, Raute and others

101 Some of the Terai (Madhesi) Janajati groups comprise Tharu, Dhimal, Gangain, Satar/Santhal, Dahngar/Jhangar, Koche, and others

Muslims account for 4.4% of the total population of Nepal and numerically occupy the 8th highest position in the 2011 census. They account for 8.63% of the total population of ER Program Area with higher concentration in Rautahat, Kapilbastu, Bara and Parsa districts respectively (see Table 57).

Indicators of Human Development

The Human Development Index (HDI) can be used to assess the social and economic development levels of particular country, regions or districts. Usually a composite statistic of life expectancy, education, and per capita income indicators are used to rank particular countries or regions and districts. The HDI Values for Nepal, Terai region and ER Program districts based on the geometric mean are presented in Table 58.

The HDI value for Program Area as a whole at 0.470 which is less than HDI value for Nepal (0.490) and it is slightly in higher side compared to HDI value of 0.468 for Terai region. Among 12 ER Program districts, Chitwan district has the highest HDI score at 0.551 and Rautahat district has the lowest HDI values at 0.386 (Table 58). The lowest HDI score for Rautahat is primarily due to its lowest per capita income and adult literacy rate among ER Program districts. On the other hand, Chitwan district has the highest scores in all indicators of human development.

Table 57 Caste and Ethnic Composition of ER Program Districts

ER Program District	Caste and Ethnic Composition of the Population												Total
	High Caste Hill Groups		Madhesis		Dalits (Hill + Terai)		IPs (Janajatis) (Hill +Terai)		Muslims		Others		
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	
Rautahat	31232	1.74	361052	21.47	89179	9.73	64711	2.81	135519	21.36	5029	17.23	686,722
Bara	54233	3.02	313625	18.65	82361	8.98	146279	6.37	89834	14.16	1376	4.71	687,708
Parsa	38844	2.16	297077	17.66	76953	8.39	93422	4.06	87212	13.74	7509	25.73	601,017
Chitwan	238750	13.32	11870	0.70	50655	5.52	270753	11.79	6780	1.06	1176	4.03	579,984
Nawalparasi	165195	9.22	97376	5.79	87608	9.55	268495	11.69	24167	3.80	667	2.28	643,508
Rupandehi	213107	11.89	250893	14.92	110987	12.11	228072	9.93	72468	11.42	4669	16.00	880,196
Kapilbastu	79227	4.42	211819	12.59	75531	8.24	97842	4.26	103856	16.37	3661	12.54	571,936
Dang	213915	11.94	12231	0.72	65731	7.17	255631	11.13	4777	0.75	298	1.02	552,583
Banke	128080	7.14	84743	5.03	62270	6.79	120036	5.22	93298	14.70	2886	9.88	491,313
Bardiya	99109	5.53	25301	1.50	42738	4.66	247878	10.79	11072	1.74	478	1.63	426,576
Kailali	295112	16.47	10810	0.64	101656	11.09	362272	15.78	4928	0.77	931	3.19	775,709
Kanchanpur	234554	13.09	4675	0.27	70808	7.72	140249	6.10	461	0.07	501	1.71	451,248
Total	1791358		1681472		916477		2295640		634372		29181		**7,348,500**
	24.37 %		**22.88%**		**12.47%**		**31.23%**		**8.63%**		**0.39%**		

Table 58 Nepal, Terai and ER Program Districts by Human Development Index (HDI) Value

Area/ Region/ District	Population			Health		Education				Income		HDI Geometric mean
	Male	Female	Total	Life expectancy		Adult literacy		Mean years of schooling		Per capita income (PPP $)		
				Value	Index	Value	Index	Value	Index	Value	Index	
Nepal	13,645,463	12,849,041	26,494,504	68.80	0.730	59.57	0.596	3.90	0.260	1160	0.409	0.490
Terai	6,772,323	6,546,382	13,318,705	68.85	0.731	54.24	0.542	3.52	0.235	1052	0.393	0.468
ER Program Districts												
Rautahat	335,643	351,079	686,722	70.99	0.766	33.89	0.339	2.19	0.146	757	0.338	0.386
Bara	336,464	351,244	687,708	70.50	0.758	43.25	0.433	2.72	0.182	1480	0.450	0.457
Parsa	288,659	312,358	601,017	70.25	0.754	48.69	0.487	3.09	0.206	1223	0.418	0.464
Chitwan	300,897	279,087	579,984	69.78	0.746	72.23	0.722	5.01	0.334	1537	0.456	0.551
Nawalparasi	339,833	303,675	643,508	67.81	0.714	63.75	0.637	3.97	0.265	1157	0.409	0.493
Rupandehi	44,8003	432,193	880,196	68.29	0.721	64.39	0.644	4.20	0.280	1123	0.404	0.498
Kapilbastu	286,337	285,599	571,936	67.56	0.709	47.10	0.471	2.83	0.189	990	0.383	0.432
Dang	291,524	261,059	552,583	67.33	0.705	62.41	0.624	3.83	0.255	1127	0.404	0.485
Banke	247,058	244,255	491,313	68.35	0.723	56.31	0.563	3.59	0.239	1133	0.405	0.475
Bardiya	221,496	205,080	426,576	67.26	0.704	56.54	0.565	3.46	0.231	1086	0.398	0.466
Kailali	397,292	378,417	775,709	66.46	0.691	58.86	0.589	3.62	0.241	942	0.374	0.460
Kanchanpur	235,206	216,042	451,248	67.08	0.701	63.04	0.630	3.97	0.264	938	0.374	0.475
Average HDI value for ER Program districts												**0.4701**

Source: Nepal Human Development Report, 2014

Table 59 Household by Usual Types of Fuel Used for Cooking in ER Program Districts

SN	ERP Districts	Total HHs	Fuelwood type							
			Wood / firewood	Kerosene	LP gas	Cow dung	Biogas	Electricity	Others	Not stated
Nepal		5,423,297	3,470,224	55,610	1,140,662	563,126	131,596	4,523	22,583	34,973
Terai Region		2,527,558	1,429,005	26,066	385,433	558,799	89,657	1,180	17,916	19,502
ER program Districts										
1.	Rautahat	106,652	57,868	1,648	2,263	40,456	768	14	1,968	1,667
2.	Bara	108,600	73,010	1,047	5,117	24,841	2,033	37	1,350	1,165
3.	Parsa	95,516	62,805	1,067	14,970	14,994	258	34	265	1,123
4.	Chitwan	132,345	64,933	997	52,545	211	12,238	234	669	518
5.	Nawalparasi	128,760	91,408	611	21,931	6,865	6,574	91	526	754
6.	Rupandehi	163,835	56,264	2,005	56,066	42,519	5,171	43	513	1,254
7.	Kapilbastu	91,264	49,561	1,089	6,654	29,890	3,106	17	168	779
8.	Dang	116,347	88,827	546	16,356	4,473	5,288	43	260	554
9.	Banke	94,693	67,651	844	19,473	3,963	2,044	41	133	544
10.	Bardiya	83,147	72,873	370	3,652	841	5,125	18	88	180
11.	Kailali	142,413	122,344	679	9,687	308	8,309	45	272	769
12.	Kanchanpur	82,134	67,369	467	6,353	257	6,939	14	149	586
Total TAL		1,345,706	874,913	11,370	215,067	169,618	57,853	631	6,361	9,893
Percentage of HHs		100%	65%	1%	16%	13%	4%	0%	0%	1%

Source: CBS, 2011

ANNEX 4: MULTILATERAL ENVIRONMENTAL AGREEMENTS TO WHICH NEPAL IS A PARTY

Table 60 Multilateral Environmental Agreements to which Nepal is a Party

Name of Convention	Entry into force in Nepal
Plant Protection Agreement of the Asia and Pacific Region, 1956	12 Aug. 1965
Convention on the High Seas, 1958	27 Jan. 1963
Treaty Banning Nuclear Weapon Test in the Atmosphere, in Outer Space and Under Water 1963 (Nuclear Test Ban Treaty)	7 Oct. 1964
Treaty on Principle Governing the Activities of the State in the Exploration and Use of Outer Space including the Moon and Other Celestial Bodies 1967 (Outer Space Treaty)	22 Nov. 1967
Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, 1970	23 Sep. 1976
Treaty on the Prohibition of the Emplacement of the Nuclear Weapons and other Weapon of Mass Destruction on the Seabed and Ocean floor and in the Subsoil thereof, 1971(Nuclear Weapon treaty)	18 May, 1972
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), 1971	17 Apr. 1988
Convention on for the Protection of the World Cultural and Natural Heritage, 1972	20 Sep. 1978
Convention on the Prevention of Marine Pollution by dumping of Wastes and other Matters, 1972	30 Aug. 1975
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	16 Sep. 1975
(a) Vienna Convention for the protection of the Ozone Layer, 1985	4 Oct. 1994
(b) Montreal Protocol on Substance that Deplete the Ozone Layer, 1987	4 Oct. 1994
(c) London Amendment to the Montreal Protocol on Substance that Deplete the Ozone Layer (London amendment), 1990	4 Oct. 1994
Convention on Biological Diversity, 1992	21 Feb. 1994
United Nation Framework Convention on Climate Change, 1992	31 Jul. 1994
Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical weapons and on their Destruction, 1993	18 Dec. 1997
Agreement on the Networks of Aquaculture Center in Asia and the Pacific, 1988,	4 Jan. 1990
Basel Convention on the Control of Trans-Boundary Movement of Hazardous wastes, 1989	18 Jan. 1997
Law of the Sea convention 1982	2 Dec. 1998
1982 agreement relating to the Implementation of part XI of the UNCLOS 1994	2 Dec. 1998
Annex 16, Vol. II (Environmental Protection: Aircraft Engine Emission) 1981 to the Chicago Convention on International Civil Aviation, 1944	18 Feb. 1982
Convention to Combat Desertification, 1994	15 Jan. 1997
International Tropical Timber Agreement (ITTA), 1994	1 Jan. 1997
Convention on Persistent Organic Pollutants (POPs), 2001	5 April, 2002
WTO (AoA and TRIPs)	2002
Kyoto Protocol to the UNFCCC, 1997	19 Apr. 2005
Cartagena Bio-safety Protocol, 2002	2005
International Treaty on the Plant Genetic Resource for Food and Agriculture, 2001	29 Jul. 2004
ILO convention No. 169, (Indigenous and Tribal Peoples Convention, 1989)	2007
Convention for the Safeguarding of the Intangible Cultural Heritage, 2003	April, 2010
Paris Agreement on Climate Change	October 4, 2016

Source: Nepal gazette

ANNEX 5: STAKEHOLDER CONSULTATIONS AND WORKSHOPS

District-level consultations

Table 61 Schedule of District-level Consultations

Western Districts		Date		Eastern Districts
Rupandehi	Friday	9	September	
	Saturday	10	September	
Dang	Sunday	11	September	**Kapilvastu**
	Monday	12	September	
Banke	Tuesday	13	September	**Nawalparasi**
	Wednesday	14	September	
Bardia	Thursday	15	September	**Chitwan**
	Friday	16	September	
	Saturday	17	September	
Kailali	Sunday	18	September	**Rautahat**
	Monday	19	September	
Kanchanpur	Tuesday	20	September	**Parsa**
	Wednesday	21	September	
Rautahat	Thursday	22	September	**Bara**
	Friday	23	September	

A total of 822 participants from different ethnic and caste backgrounds were involved in the consultation process. Caste/ethnic and gender composition of the participants is presented in Table 62. Out of the total participants, Brahmin and Chhetri comprised 44% followed by 28% IPs, 21% Madhesis and 7% Dalit backgrounds. Male and female representation of the participants was 80% and 20% respectively.

Table 62 Number of Participation in ER-PD District Consultation Workshops

S.N.	Name of Districts	Gender		Caste/Ethnicity				Total
		F	M	Brahmin / Chhetri	Janajati	Dalit	Madheshi	
1.	Kanchanpur	15	61	41	26	6	3	**76**
2.	Kailali	19	55	41	25	4	4	**74**
	Chetan CFUG	5	13	8	7	3		**18**
3.	Bardia	18	32	23	25	1	1	**50**
4.	Banke	16	55	32	29	9	1	**71**
5.	Dang	19	45	34	24	2	4	**64**
6.	Rupandehi	16	87	58	25	2	18	**103**
7.	Kapilbastu	6	64	24	12	2	32	**70**
8.	Nawalparasi	8	42	26	10	3	11	**50**
9.	Chitwan	6	37	27	11	0	5	**43**
	Chitwan (Dalit Focus)	18	13	6	2	23	0	**31**
10.	Rautahat	3	56	14	10	0	35	**59**
11.	Parsa	3	44	9	11	0	27	**47**

12.	Bara	9	57	18	15	4	29	**66**
Total		**161**	**661**	**361**	**232**	**59**	**170**	**822**

National-level consultations

Table 63 Participants in National ER-PD Inception Workshop

Name	Organization
Dr. Indra Sapkota	DFO, KTM
P.R Adhikari	MOAD
Hari Dhungana	SIAS
Gopi Krishna Khanal	MoFALD
Shayam Sunar	R.D.N
Pashupati Koirala	MoFS
Ram Hari Pantha	MoPE
Sindhu Dhungana	REDD IC
Srijana Shrestha	REDD IC
Santa M. Shrestha	DoF
Aman Dangaura	COFSUN, Nepal
Dr. Binod Pd. Devkota	DFO, Lalitpur
Krishna Man Pradhan	MLS
Sagendra Tiwari	Freelancer
Santa Lal	ACOFUN
Ram Prasad	
Bishnu Gyawali	FEPFOS
Bishnu Hari Poudyal	RECOFTC
Kiran Timilsina	GG Nepal
Prahalad Dhital	MWRFWC
Pragati Dhakal	Karobar Daily
Govinda Gajurel	NTNC
Pravin Bindari	MoFSC
Manohara Khadka	SDC/ Swiss Embassy
Chandra Man Dy	DoF
Rajesh Koirala	World Bank
Tunga Rai	NEFIN
Dil Raj Khanal	FECOFUN
Hari BhatTerai	WWF Nepal
Charlie Parker	WWF Nepal
Ishwari Poudel	MoFSC
Abdullah Miya	Kantipur Daily

Bhaskar Karky	ICIMOD
Deepak Kharal	DFRS
Prakash Nath Pyakuryal	-
Nabin Joshi	ANSAB
Hari K. Laudari	REDD IC
Surya Pokharel	MoF
Anita Pariyar	DANAR-Nepal
Ayush R. Manandhar	Urja Pro.
Hemant	Urja Pro.
Baikuntha Aryal	MoF
Jhuma Panenkoti	MECO
Sirjana Shakya	WWF
Resham Dangi	MFSC
Ganesh Jhu	DoF
Bijaya R. Paudyal	MFSC
Mohan Pd. Paudel	REDD IC
Shambhu Dangal	Forest Action Nepal
Ramchandra Khadka	REDD Imp.
Shiba Khadka	REDD Imp.
Damodar Sharma	DFAN
Bhola Khatiwada	COFSUN
Balkrishna Ghimire	NPC
Basanta Gautam	Arbonaut
Hari Pd. Pandey	REDD IC
Y.P. Kandel	WWF Nepal
Drona Raj Ghimire	World Bank
Y.N. Dahal	MoFSC
Christina Pradhan	RDF/Nepal
Ganesh Karki	FECOFUN
Bhim P. Khadka	FECOFUN
Phanindra Gautam	MoLJPA
Jai Ram	
Uday Chandra Thakur	MoFSC
Sujita Dhakal	WWF Nepal
Ugan Manandhar	WWF Nepal
Krishna Acharya	DNPWC

Table 64 Participants in National ER-PD Mid-term Workshop

Name	Organization
Sindhu P. Dhungana	REDD, IC
Kedar Koirala	Section Officer
Bishnu Prasad Oja	Agni Economist
Jitendra Karmacharya	Under secretary
Hari Prasad BhatTerai	Consultant
Bhola Khatiwada	COFSON Nepal
Bhim P. Khadka	FECOFUN
Resham Deji	MoFSC
Gehendra Keshari Upadhyaya	MoFSC
Ganesh poudel	DoF
Dil Raj Khanal	
Prayati Dhakal	Correspondent
Kumar Ghorsaini	
Shiva Khadka	
Mohan Poudel	REED IC
Ugan Mandhar	WWF
Sandhya sharma	WWF intern
Ganesh BK	RDN Nepal
Sunil Kr. Pariyar	Chairperson
Yadav Kandal	
Bachu shah	FECOFON Rautahat
Drona Raj Ghimire	Sr. Environmental Specialist
Ganesh Karki	Chairperson
Tunga B. Rai	NEFIN
Pasang Sherpa	Chair CIPRED
Kapil Pd. Adhikari	F President
Ram Raj Kumar	ACOFUN
Rakesh Karna	DoF
Yam Pd. Pokharel	DFR
Dhan Shyam Pandey	Green Foundation Nepal
Rajan Pd. Paudel	Conservation officer
Barsha Parajuli	NPO
Shambu Dangol	
Thay Bdr. Mahotra	Section Officer
Manish Rajbanday	SCO
Birkha B. Sthrestha	FECON

Charlie Parker	WWF
Arati Khadgi	WWF
Bed Pd. Bhandari	PCTMCDB
Surendra Kr. Yadav	
Kiran Timalsina	Chair GGN
Ananda Bhandari	Project coordinator
Bhola Bhandari	Chairperson NAFAN
Madhu Ghimire Acharya	Under secretary MOFSC
Srijana Shrestha	AFO, REDD IC
Santosh Mani Nepal	Senior Director

Focus Group Discussions

Table 65 Date and venue of the focus group discussion

S.N.	Focus Group Discussion with	Date	Venue	Participations nature
1.	Forestry Facilitators	Chaitra 7th, 2073 (March 20th, 2017)	Harfy the Tandoori Fast Food Café Pvt. Ltd. Sinamangal, Kathmandu	CF practitioner /Facilitators from different district,
2.	Women (HIMAWANTI)	Chaitra 15th, 2073 (March 28th, 2017)	HIMAWANTI office Jwagal kupandol, Lalitpur	Chair, member and staff
3.	Dalit -Dalit NGO Federation (DNF)	Chaitra 16th, 2073 (March 29th, 2017)	DNF office Chakupat, Lalitpur	DNF chair, Vice chair, secretary , EC member and different Dalit related organization represented,
4.	Nepal Federation of Indigenous Nationalities (NEFIN)	Chaitra 17th, 2073 (March 30th, 2017)	NEFIN office Kusunti, Lalitpur	Chair, vice chair, General secretary, Ex vice chair and member,
5.	Community forest user groups	Chaitra 18th, 2073 (March 31st, 2017)	COFSUN, Nepal office Manaharamarg, Koteshwor	Chair of FECOFUN, Founder and ex chair of FECOFUN, Committee member of FECOFUN, forest activists

Table 66 Participants number in FGD of ER-PD review

Participation in Focus Group Discussion								
Group Name	Female	Male	Janajati	Brahmin / Chhetri	Madheshi	Dalit	Others	Total
Forestry facilitators	10	19	8	11	6	3	1	29
HIMAWANTI	9	2	5	5		1	0	11
Dalit	2	16	1	1	0	16	0	18
NEFIN	3	10	12	1	0	0	0	13
CFUGs	6	14	7	13	0	0	0	20
Total	**30**	**61**	**33**	**31**	**6**	**20**	**1**	**91**

Priority NCBs identified during consultations

Table 67 summarizes priority NCBs of the ER Program activities suggested by the stakeholders in each ER Program district. These NCBs identified under the ER Program are consistent with the ER-PIN, REDD+ strategy and Government of Nepal's development priority, which take into consideration the broad definition and categories of NCBs, including social, environmental and governance benefits in accordance with national/subnational objectives and circumstances, while also being consistent with the World Bank's safeguard policies and relevant international agreements, conventions and instruments, including the Cancun Agreement.

Table 67 Priority Non-Carbon Benefits identified during district consultations

S. N	ER Program Districts											
	Kanchanpur	Kailali	Bardia	Banke	Dang	Rupandehi	Kapilbastu	Nawalparasi	Chitwan	Parsa	Bara	Rautahat
1	Control of flood, land slide & soil erosion	Biodiversity Improvement	Assurance of community rights and good governance	Assurance of rights of IPs, Dalits and local user communities to access and control over forest resources	Assurance of rights of users, IPs, Dalits and local communities to access and control over forest resources	Improvement in governance (easy, efficient and continue supply of forest products to distant (southern) users	Payment of ecosystem services	Payment of ecosystem services	Improvement of bio-diversity	Distance user will get more benefit	Increased Access to forest for distant user	Environmental balance
2	Assurance of rights of users, IPs, Dalits and local communities to access and control over forest resources	Control of flood and soil erosion	Livelihood improvement of poor through employment and income generation	Social inclusion and capacity enhancement of women and forest dependent communities	Opportunities for employment and income generation	Assurance of rights of users (IPs, Dalits, Madhesis and distant communities to access and control over forest resources	Biodiversity conservation	Livelihood and income generation	Social benefit	Alternative livelihood support from forestry	Watershed management	Supply of Timber, fire wood, leaf litter
3	Protection and conservation of culture knowledge and skills of IPs, Dalits and local communities	Assurance of right of IPs and forest dependent communities	Biodiversity enhancement & ecological balance	Increased farm productivity and expansion of agroforestry	Improvement & increase the value of Biodiversity	Improvement in ecosystem services, wild life habitat and biodiversity	Increase access of distant users to forest products	Increase access of distant users to forest products	Payment of ecosystem services	Biodiversity	Biodiversity conservation	Control of landslides, watershed management
4	Improvement & increase the value of Biodiversity	Protection and conservation of traditional knowledge and skills	Health improvement	Biodiversity enhancement, ecological balance, health improvement	Increment in NTFPs	Improvement & increase opportunities for religious tourism	Livelihood and income generation	Biodiversity conservation	Livelihood and income generation			Availability of NTFPs and other fruits
5	Improvement & increase	Promotion of agroforestry	Leadership development, social	Promotion of alternative energy	Improvement & increase opportunities				Governance and institutional			Increased wildlife and birds

	opportunities for Tourism		inclusion & women empowerment		for eco-tourism				development			
6		Management of open gazing livestock	Protection and conservation of traditional knowledge and skills	Increment in NTFPs								Social benefit
7		Promotion of Ecotourism	Increment in supply of NTFPs and medicinal herbs	Employment generation, livelihood enhancement & income generation through promotion of forest based entrepreneurships								Biodiversity conservation
8			Promotion of eco-tourism	Development of Ecotourism								Governance and institutional development

ANNEX 6: RESULTS OF CONSULTATIONS ON DRIVERS OF DEFORESTATION

Table 68 Results of consultations on drivers of deforestation showing the ranking of drivers of deforestation and forest degradation. First choice was given a weight of 3, second choice: 2, and third (or more) choice: 1.

Deforestation	Rank: 1	Rank: 2	Rank: 3+	Total
Encroachment	10	1	1	33
Infrastructure development	0	6	4	16
Illegal harvest	1	3	3	12
Resettlement	0	1	5	7
High dependence on fuelwood	0	0	2	2
Unsustainable forest management	0	1	1	3
Degradation	**Rank: 1**	**Rank: 2**	**Rank: 3+**	**Total**
Forest Fire	3	8	0	25
Overgrazing	6	2	1	23
Illegal harvest of timber	2	0	8	14
Unsustainable harvest of fuelwood	1	1	5	10
Invasive Species	0	1	7	9
Unsustainable forest management	0	0	6	6
River cutting, flood and landslide	0	0	4	4
Shifting Cultivation	0	0	2	2
Monoculture in private plantations	0	0	1	1
Infrastructure Development	0	0	1	1

Table 69: Results of consultations prioritizing drivers of deforestation and forest degradation by district

KEY

Drivers of deforestation		Drivers of degradation	
ENC	Encroachment	FF	Forest Fire
INF	Infrastructure development	OG	Overgrazing
ILL	Illegal harvesting	ILL	Illegal harvesting
RES	Resettlement	FW	Fuelwood
FW	Fuelwood	INV	Invasive Species
UFM	Unsustainable forest management	UFM	UFM
		ERO	Erosion
		SC	Shifting Cultivation

Priority	Rautahat	Bara	Parsa	Chitwan	Nawalparasi	Kapilbastu	Rupandehi	Dang	Banke	Bardia	Kailali	Kanchanpur
Prioritized drivers of deforestation												
1	ILL	ENC	ENC	ENC	SC	ENC	ENC	ENC	ENC	ENC	ENC	ENC
2	INF	ILL	ILL	INF	ENC	INF	ILL	INF	INF	INF	RES	UFM
3	ENC		FW	RES	ILL	ILL	RES	RES	UFM	RES	INF	FW
4					INF		INF				ILL	FF
Prioritized drivers of forest degradation												
1	OG	OG	OG	OG	OG	FW	OG	FF	FF	ILL	ILL	FF
2	FF	FF	FF	FF	FF	FF	FF	INV	OG	FF	FW	OG
3	ILL	ILL	ILL	SC	SC	ILL	ILL	FW	FW	ERO	INV	UFM
4	FW	FW	FW	ILL	ILL	ERO	INV	UFM	INV	UFM		FW
5			INV	INV	UFM	INV	ERO		ILL	OG		INV
6				FW		INF	UFM		UFM			ERO

The National REDD+ Strategy in 2015 conducted a thorough assessment and review of these (and additional) studies and conducted stakeholder consultations to produce the following prioritized drivers of deforestation and forest degradation in Nepal.

Table 70 Direct drivers, priority, their underlying causes, drivers for, affecting regions and corresponding relevant strategic actions. Taken from the National REDD+ Strategy

Drivers	Priority §	Underlying causes	Drivers for	Strategic Actions	Affecting regions
Unsustainable harvesting and illegal harvesting	1	Policy gaps and poor implementation - Poor implementation of policies - Very low priority to other alternative wood products such as composite wood and others - High dependency in forest products and gap in demand-supply - Forest management not demand driven (weak supply system) - High dependency on conventional forest products (firewood for energy and structural timber for construction) - Poverty and limited livelihood opportunities Subsistence agriculture and livelihoods Limited other livelihood opportunities - Poor governance and weak political support - Weak enforcement and poor coordination to control illegal harvesting - Poor decision making, weak governance and weak accountability	Forest degradation	- Intensify sustainable management of forest (SMF) - Invest in sustainable forest-based enterprises - Carry out forest zoning and phased transfer into different management modalities. - Recognize and respect customary forest and pasture management practices and indigenous knowledge systems. - Rehabilitate degraded land and shrub lands - Increase the supply of harvested wood products - Increase awareness and capacities of all stakeholders - Promote private forestry - Develop efficient and alternative timber technologies - Increase investment and promote fuelwood efficient and alternative energy technologies. - Promote sustainable, cost-effective and affordable renewable energy sources - Increase access to alternative energy technologies for forest-dependent poor and marginalized people. - Promote and increase access to cost effective wood technologies for forest-dependent poor and marginalized communities. - Re-structure institution and improve forest governance - Develop functional collaboration and cooperation with security forces, media, and civil society to control illegal forest activities. - Control cross-border illegal trade of forest products through inter-country cooperation - Develop incentive and penalty system to address illegal harvesting and illegal trade - Strengthen forest law enforcement to control illegal harvest and trade of forest products. - Establish and strengthen grievance-addressing mechanisms that are gender-	HM (2) MH (3) S (1) T (1)

				sensitive and respond to people's grievances and concerns	
Forest fire	2	Policy gaps and poor implementation - Weak forest management practices - No long-term forest fire protection and management strategy and plans; - Forest fire not mainstreamed into forest resource management Poor governance and weak political support - Inadequate resources (human, technology, equipment) for firefighting and control - Weak enforcement of legal instruments; Land use policy and insecure forest tenure Non-recognition of traditional and customary practices of land and forest management	Forest degradation	- Promote community-based management models - Intensify sustainable management of forest (SMF) - Update and improve management plans with provisions fire management - Enhance community participation and support for the control and management of forest fire. - Strengthen fire control capabilities with fire management plans, fire-fighting capacity building, fire monitoring, firefighting equipment and insurance mechanisms. - Promote Integrated Conservations and participatory models in PAs - Carry out forest zoning and phased transfer into different management modalities. - Improve public awareness and education	HM (1)* MH (3) S (1) T (2)
Infrastructure development (includes manmade disasters)	3	Policy gaps and poor implementation - Noncompliance of existing environment related policies - Unplanned and short-vision infrastructure development - Forest area given the priority for infrastructure development Weak coordination and cooperation among stakeholders	Deforestation	- Strengthen multi-stakeholder and integrated planning approach at various levels - Harmonize contradictory cross-sectoral policies and legal frameworks issues - Improve intra and inter policy coordination among different sectors - Carryout planning with climate change vulnerability assessment	HM (2) MH (1) S (2) T (4)
		No integrated planning and working in isolation Poor governance and weak political support Weak enforcement of legal instruments Political interferences		- Ensure environmental, social and economic measures in infrastructure development and maintenance - Implement climate smart infrastructure planning, implementation and monitoring ensuring social and environmental safeguards. - Avoid forest area for infrastructure development - Ensure effective implementation and compliances of IEE and EIA for all types of forest land use conversions - Adopt REDD+ international standards on participation, inclusion and Free, Prior, Informed Consent (FPIC).	

				- Promote increased use of GIS and remote-sensing/spatial planning applications - Improve forest law enforcement - Establish spatially explicit information systems on land use	
Over grazing/uncontrolled grazing	4	- Policy gaps and poor implementation - Weak forest /grazing management practices - Grazing regulation/management not mainstreamed into forest resource management - Weak linkages between rangeland policy and forest policy - Poor governance and weak political support - Inadequate resources (human, technology, equipment) for firefighting and control - Weak enforcement of legal instruments - Weak coordination and cooperation among stakeholders Weak coordination and cooperation among livestock, forestry and customary institutions Land use policy and insecure forest tenure Non-recognition of traditional and customary practices of use and management	Forest degradation	- Promote community-based management models - Intensify sustainable management of forest (SMF) - Update and improve management plans with provisions of grazing control - Enhance community participation and support for the control and management of grazing. - Promote Integrated Conservations and participatory models in PAs - Carry out forest zoning and phased transfer into different management modalities. - Recognize customary forest and pasture management practices by including good practices into forest and pasture management plans - Improve public awareness and education - Support to increase fodder and forage production - Promote multi-purpose fodder management and stall feeding	HM (1) MH (4) S (1) T (1)
Weak Forest Management practices (unmanaged/under- managed)	5	- Policy gaps and poor implementation - Poor implementation policies - Absence of forest land use classification at operational level and blanket approach of forest management across the country - Little efforts to bring productive and accessible forests under intensive management - Inadequate human resource development and management	Forest degradation	- Intensify sustainable management of forest (SMF) - Update and improve management plans with provisions of carbon stock measurements and carbon monitoring methods - Promote the landscape conservation and climate resilient approaches - Increase awareness and capacities of all stakeholders - Safeguard tenure security of forest user groups	HM (1) MH (3) S (1) T (1)

		- Frequent transfers and poor human resource management - No promotion and encouragement for specialization and champions of forest management - Poor governance and weak political support - No national priority given for forest management efforts - Inadequate resources (human, technology, equipment) Inadequate political commitment and support for forest management		- Increase and ensure access to forests, decision-making and benefits to women, Dalit, Indigenous People, vulnerable groups, forest dependent people, and other marginalized people - Recognize the traditional and customary practices of forest management and incorporate in community- based forest management - Develop and implement participatory M & E mechanisms - Re-structure institution and improve forest governance - Improve mind-set, competency, commitment and morale of forestry personnel - Promote and support partnership among government, community, and private sector to enhance the performance of government and Local Forest User Groups.	
Urbanization and resettlement	6	- Disproportionate population distribution and migration pattern No long-term population (migration and resettlement) policy - Policy gaps and poor implementation Priority given to forest area for resettlement and rehabilitation of disaster victims - Weak coordination and cooperation among stakeholders No integrated planning and working in isolation	Deforestation	- Develop and implement economic and market-based incentives packages to promote optimal land use - Promote increased use of GIS and remote-sensing/spatial planning applications - Avoid forest area for infrastructure development, resettlement - Support in the application of Sloping Agriculture Land Technologies - Increase access to crop & livestock breeding and husbandry improvement programs - Promote intensive agricultural practices and technology - Promote development of policies supportive of small- scale sustainable agriculture	HM (5) MH (5) S (1) T (1)
Encroachment	7	- Policy gaps and poor implementation Weak forest management practices Priority given to forest area to settle land squatter problem - Poor governance and weak political support Inadequate resources (human, equipment)	Deforestation	- Enhance community participation and support for the control of encroachment. - Promote increased use of GIS and remote-sensing/spatial planning applications - Strengthen forest law enforcement to control encroachments - Scale up investment in non-forestry sector employment programs and off-farm income generation activities targeting rural and urban (poor)	HM (5) MH (5) S (1) T (1)

		Inadequate political commitment and support for encroachment control Weak enforcement of legislation - Poverty and limited livelihood opportunities Geographical imbalances in development and livelihood opportunities - Weak coordination and cooperation among stakeholders		- Improve access to alternative technologies for forest dependent poor and marginalized communities. - Design and implement off-farm income generation projects through vocational and skill training for forest- dependent poor and marginalized households - Incentivize and support Forest User Groups to create incomes, livelihood options and job opportunities for forest dependent poor and marginalized communities.	
Mining /excavation (sand, boulders, stones).	8	- Policy gaps and poor implementation - Non-compliance of environmental legislations - Lack of forest sector land-use policy - Conflicting sectoral policy and legislations - Poor governance and weak political support Weak enforcement of forest legislation - Weak coordination and cooperation among stakeholders - Poor coping strategy to natural disasters and climate change Poor enforcement and implementation of EIA/IEE provisions and their safeguards Lack of integrated disaster management	Deforestation and Forest degradation	- Enforce forest law to control haphazard mining and excavation Strengthen multi-stakeholder and integrated planning and implementation - Harmonize contradictory cross-sectoral policies and legal frameworks - Improve intra and inter policy coordination among different sectors - Ensure effective implementation and compliances of IEE and EIA - Ensure implementation of environmental, social and economic measures - Adopt REDD+ international standards on participation, inclusion and Free, Prior, Informed Consent (FPIC). - Establish cost effective mechanisms for monitoring, reporting and verification	HM (5) MH (3) S (1) T (1)
Expansion of invasive species	9	Policy gaps and poor implementation Invasive species control not mainstreamed into forest / PA management Low priority to research and development	Forest degradation	- Update and improve management plans with provisions of invasive species control - Assess and implement remedial and preventive measures for the invasive alien species - Incorporate in monitoring indicators and establish community-monitoring systems in all community based management regimes	HM (5) MH (4) S (1) T (1)

Key

HM-High Mountain; MH- Middle Hills; S- Chure/Siwaliks; T- Terai and inner Terai

1- Very high effect; 2- High effect; 3- Medium effect; 4- Low effect; 5-Very low effect

**Effect of forest fire and grazing in terms of exposure, sensitivity and capacity to address*

§ Priority in terms of impact on the forests as identified by REDD Cell/MFSC, 2014c, consultations and expert judgments

ANNEX 7: LIST OF LAWS, STATUTES AND OTHER REGULATORY FRAMEWORKS

Table 71: Policies, statutes and legal frameworks in place to address the drivers of deforestation and forest degradation and/or to support the conservation and enhancement of carbon stocks

Legislation	Summary
Forest Act 1993 and Forest Regulation 1995	These two laws are the basis for the establishment of community, collaborative and leasehold forestry models through the formation of Forest User Groups (FUGs) in Nepal. According to this legislation, FUGs can function as an autonomous institution having legal authority to make decision on the management of forests and the price of forest products. In principle, the legislation is progressive as it appreciates the concept of devolution in forestry, but there remain a number of issues and shortcoming in practice at the community level (such as elite capture and exclusion of marginalized groups), which will be addressed during the implementation of the ER Program.
National Parks and Wildlife Conservation Act 1973	The National Park and Wildlife Conservation Act 1973 describes four categories of protected areas namely: national parks, strictly controlled nature reserves, hunting reserves, and conservation areas[102]. In these areas, without the permission of authorized officer, activities such as hunting of any animals or birds; building of any house or any other structure; clearing or cultivating any part of the land or harvesting of any crops; pasturing or watering of any domesticated animals or birds; cutting, burning or damaging any tree, bush or other forest products; and mining within protected areas are prohibited. The warden has authority to form a user's committee in coordination with local government for the management and use of dead and decayed trees, dry wood, firewood and grass inside a national park and conservation areas.
Buffer Zone Management Regulation 1996	During the establishment of Buffer Zone forests, the government needs to respect the rights of local people over their land and resources (section 3a of NPWR Act). User committees may be formed for the management and use of certain forest products in protected areas including Buffer Zones (section 16c of NPWR Act). Buffer Zone Community CFUGs and Buffer Zone Religious Forest User Groups (RFUGs) can manage allocated forests based on an approved management plan (rule 21 and 22 of BZ Rules).
Environment Protection Act 1997	This Act and its regulation requires environmental screening and assessment of infrastructure. The Act provides authority to delineate specific area as an environmental conservation area, with rich biodiversity containing rare wildlife or plants species and places of cultural or historical

[102] It is an area set aside to be managed in accordance with an integrated plan for the protection of the natural environment and the sustainable use of natural resources (section 2 (E1)).

	significance. It also provides authority to government officers to prohibit any kind of activity inside conservation areas by publishing a notification in Nepal Gazette (section 10). The Government of Nepal has declared 12.78% area of the country as Chure Environmental Conservation Area in June 2014 based on this Act and a large part of the Chure Environmental Conservation Area is located in the ER Program Area. This Act is ambiguous about the ownership of forest products, and whether they belong to the government or local communities (REDD IC, 2015). CFUGs have been advocating to secure their tenure rights over forest resources and the government has decided in July 2014 (2071/03/17) to ensure the rights of CFUGs over the forest resources as per legal provisions of Forest Act 1993 and approved management plans of CFUGs in the Chure area.
Local Self-Governance Act (LSGA) 1999	Under this law, local governments including the District Development Committees (DDCs), Municipalities and Village Development Committees (VDCs)[103] hold the right to manage specified natural resources including forests within their political jurisdiction. This Act gives authority to local governments to prepare plan and implement programs related to forests, vegetation, biodiversity, soil conservation, and environmental conservation in their jurisdiction. There exist some disputes between local communities and local government particularly about utilization of natural resources such as: stone, pebbles and sands from forest areas. The Government of Nepal is drafting a new bill for the local government based on the new Constitution of Nepal 2015 and the above-mentioned gaps will be addressed in the new legislation on local government.
Land Act 1964, Land Survey and Measurement Act 1963, The Land Acquisition Act 1977, and Land Revenue Act 1978	These are key regulations in the land sector in Nepal. These Acts have safeguarded individual/private rights over their land. These Acts have broadly classified land into three categories namely- private, government, and public and have given authority to the government to form a commission to address issues related to land ownership such as settlement of landless, redistribution of land through land reform etc.
National Land Use Policy 2012	Because of the local and national socio-economic implications associated with the loss of agricultural land due to increased fragmentation of fertile land and unplanned urbanization, the Government of Nepal introduced the National Land-use Policy (2012) to promote effective utilization and management of land.
Forest Policy 2015	One of the objectives of this policy is to manage forest sustainably and the policy has included a policy objective to address the impacts of climate change through mitigation and adaptation efforts through forestry sector. The policy has made various strategic actions to control deforestation and forest degradation through community-based forest management regimes and government programs such as encroachment control, plantation, fire management and effective implementation of environmental safeguards during the utilization of forest for infrastructure development.

[103] According to Constitution of Nepal 2015, now the name of Village Development Committee is Village Institution.

Land-use Policy 2016	The policy has classified land into ten categories including forestland and the policy has incorporated a strong strategy to halt deforestation after defining the forestlands in the land-use plans at all level. Nine strategic actions have been proposed in the policy to control deforestation and forest degradation as well as to improve the condition of the forest. This policy has also defined the environmental safeguards measures during the utilization of forest for other purposes such as infrastructure development.
Electricity Act 1992, Town Development Act 1988, Irrigation Regulations 2000, Mines and Minerals Act 1986, Public Roads Act 1974, Industrial Enterprises Act 2016, Income Tax Act 2002, Yearly Fiscal Act, Good Governance (Management and Operation) Act, 2008	Several other acts such as these are also important in regulating the uncontrolled expansion of other sectors into forests and ensuring that forests are not unnecessarily converted to other land uses.

ANNEX 8 SOCIAL AND ENVIRONMENTAL RISKS OF THE ER PROGRAM

ERPD Districts	Likely E&S Negative Impacts Identified	Mitigation Measures Suggested
Rautahat	Increased wild animals	Fencing, provision of watchman, compensation if harm by the animals
	Less access of school children on playground. Playground will be converted into forest due to plantation in school areas so that kids cannot play	Set aside playground and build well mange playground and carry out plantation only on the remaining land of educational institutions
	Limited access to firewood	Provide alternative energy to villagers
Bara	Adverse effect on livelihood after evacuation of encroached areas.	Secure alternative livelihood of the people so that they will not involve in conflict. Government should manage
	May affect development interventions:	Need clear development plan so that conservation and development go together
	Limited access to cattle grazing	After fencing the plantation site, people nearby that particular site will not graze his/her cattle. Need to provide Support for fodder production, help to stall feeding
	Monoculture Plantation-	There should be local and diversified species in the plantation
Parsa	Adverse effect on livelihood after evacuation of encroached areas	Need to provide alternative livelihood, skill based training so that he/she can survive; Facilitate the people before displace him/her and provide alternative and right place for their settlement
	Limited access to cattle grazing	After fencing the plantation site, people nearby that particular sites will not graze his/her cattle. Need to provide Support for fodder production, help to stall feeding
	Restrictions on and exclusion from traditional use rights	Need to include all traditional user in CF/CFM groups
Chitwan	Encroachment Control: After controlling the encroachment, there will be conflict between government and encroacher.	Government should manage alternative settlements to them and secure alternative livelihood of the people so that they will not involve in conflict
	Risk of loss of livelihood and access to traditional practices of grazing while implementing activities related to grazing control	Support alternative energy program in the targeted communities, stall feeding,
	Displacement	Provide settlement in proper place and Provide alternative livelihoods
Nawalparasi	Plantation; grazing control: This will impact the poor people who are using those open lands for grazing their cattle.	So there should be alternative land for grazing, or they need alternative support for their livelihoods.

	Sustainable Management of Forests (SMF): Due to opening of canopy, there will be a risk of invasion of invasive species. This may affect regeneration of the native species	So, in-depth study needed on possible risks of SMF before full fledge implementation of the management practice.
	Encroachment Control: escalation of conflicts	This may create conflict and it needs political commitment before implementation.
Rupandehi	Encroachments of forests is rampant in the district and risk of escalation of conflicts will be high while controlling forest encroachers	Secure alternative livelihood of the people so that they will not involve in conflict. Government should have proper resettlement planning to resettle them
	Decrease in livestock rearing and food production	Promote agroforestry to increase fodder supply, provide improved breeds of cattle with support for improvement of shed and support for using improve farm technologies
	Forest dependent communities and households(e.g. fire wood collectors) may lost their livelihoods and incomes	Provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
Kapilvastu	Impact on the people displaced due to evacuation of encroached areas	proper management of people for evacuation- actions: make proper arrangement of settlement of displaced people before evacuation from the forest land and provide them alternate livelihood opportunities
	Livelihoods of forest dependent communities may have adverse effect	provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities
	May have grazing problems for cattle and increased load for fodder collection	rotational grazing; provide improved breed of cattle; alternate livelihoods
	Limited access to local communities in forest due to fencing	promote agroforestry practices
	Limit mobility of wild animals due to fencing	allow wildlife corridor while fencing
	Monoculture may disturb biodiversity	species diversification
	Human wildlife conflict may arise due to increased forest cover nearby the farm land and settlements	allow corridors for wildlife movement while fencing; formation and mobilization of Wildlife control groups
	Fuelwood crisis due to control of illegal harvest	Promote private plantation; subsidy for biogas, improved cookstoves.
Dang	Restriction of access to forest resources due to minimization of traditional role and responsibilities of IPs and local user communities	The rights and responsibilities of IPs, Dalits and local user communities to access and control over forest resources should be strengthened and ensured. Details are described in the position paper submitted by NEFIN, Dang.

	Decrease in employment opportunities due to disturbance in Industrial sectors	Preparation and enforcement of land use policy at district level
	Increase workload of women	Promote biogas, ICS and Solar technology for cooking
	Decrease in livestock rearing and food production	Promote agroforestry to increase fodder supply, provide improved breeds of cattle with support for improvement of shed and support for using improved farm technologies
	Increase in human wildlife conflict	Provision of compensation with simplified procedure to be followed to get compensation in time
	Forest dependent communities and households (e.g. fire wood collectors) may lost their livelihoods and incomes	provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
Banke	Forest dependent communities (e.g. Rautes, Chepang) and households (e.g. fire wood collectors) may lost their livelihoods and incomes	Continue access to use forest resource must be ensured. If it is not possible, provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
	Risk of displacement of settlements established occupying and encroaching forests land	Design and implement appropriate resettlement plan to resettle the displaced people; provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
	Difficulties to promote industrial development	Preparation and enforcement of land use policy at district level
	Increase in human wildlife conflict causing damage of crops and human lives	Provision of "special fund for compensation" with simplified procedure to be followed to get compensation money in time
	Risk of losing traditional skill based occupation such as black smiting, wood carving and knowledge such as fishing, collection of herbs and honey hunting	Provision of compensation for those who lost or restricted to practice their traditional occupations. Provide support (technical as well finical) to promote and preserve indigenous and traditional skills and knowledge of local communities
	Risk of restriction of tenure as well as using right of forest dependent communities	The rights and responsibilities of the forest dependent communities to access and control over forest resources should be strengthened and ensured.
	Biodiversity loss (Only high carbon absorbent species are promoted)	Promote biodiversity
Bardiya	Risk of increasing human wildlife conflicts causing damage of crops, livestock and human lives	Provision of "special fund for compensation" with simplified procedure to be followed to get compensation money in time
	Agriculture production may be reduced due to decrease in agricultural lands(if used as private forests)	Provide support for commercial agriculture using high yielding crops varieties supplemented with high breeding livestock husbandry

	Forest dependent households may lost their livelihoods and incomes	Continue access to use forest resource must be ensured. Provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
	Risk of displacement of settlements established occupying and encroaching forests land	Design and implement appropriate resettlement plan to resettle the displaced people; provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
	Risk of extinction of traditional knowledge and skill	Provide support for promotion of traditional knowledge and skill and search for alternative ways to minimize the risks
	Risk of losing traditional skill based occupation such as black smiting, wood carving and knowledge such as fishing, collection of herbs and honey hunting	Provision of compensation for those who lost or restricted to practice their traditional occupations. Provide support (technical as well finical) to promote and preserve indigenous and traditional skills and knowledge of local communities
	Risk of interference in social and cultural aspects of local forest dependent communities	The rights and responsibilities of the forest dependent communities to access and control over forest resources should be strengthened and ensured.
Kailali	Risk of social disturbances, breaking of social harmony and escalation of conflicts while controlling encroachment of forests	Identify real landless people and resettle them in an plan ways giving alternative sources of livelihood
	Forest dependent peoples, HHs residing in public lands and distant users may be restricted to receive benefits from ER Program	Identify real user, distant user and adopt easy procedure to grant CF membership so that they are entitled to get benefits
	Forest dependent households may have lost their livelihoods and incomes	Continue access to use forest resource must be ensured. Provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
	Risk of displacement of settlements established occupying and encroaching forests lands	Design and implement appropriate resettlement plan to resettle the displaced people; provide alternate livelihood opportunities; training and capacity building for alternate livelihood opportunities and income generation
	Risk of escalation of human- wild life conflict causing damages of crops, property, livestock and human lives	Provide support for alternative agricultural practice (herbs farming, private forestay etc.) with assurance of easy marketing of the products; Provisions of wildlife domestication in private; Relocation of settlements in a proper plan way giving alternative sources of living; Management of Wildlife (permission for scientific hunting) provision of fund to compensate damages and loss due to wildlife
Kanchanpur	Escalation of human wildlife conflict causing damages of human lives and properties	Provision of compensation; Support for fencing of forest boundary

	Increase unnecessary interfere on traditional ways of life and cultural practices	Support to protect and preserve local traditional practices
	Risk of reduction and restriction of access to forests	Ensure continue access to forests
	Risk of reducing community's right over the forests	Ensure community right to control and manage and use forests

ANNEX 9: DETAILED LIST OF PLANNED INTERVENTIONS BY DISTRICT

Districts	4.3.1 Improve existing CBFM	4.3.2 Transfer to CBFM	4.3.3 Private sector forestry	4.3.4 Biogas and ICS		4.3.5 Pro-poor Leasehold Forestry	4.3.6 Integrated land use planning	4.3.7 Protected Area Management
				Biogas	ICS			
	Ha	Ha	Ha	Units	Units	Ha	Ha	Ha
Rautahat	16,800	3,630	544	5,952	4,046	218	259	0
Bara	15,716	12,106	1,816	7,406	2,484	726	460	0
Parsa	11,647	198	30	6,387	1,499	12	758	63,700
Chitwan	18,055	12,165	1,825	6,593	21	730	1,417	93,200
Nawalparasi	17,485	34,443	5,166	9,202	687	2,067	1,036	0
Kapilbastu	30,483	11,417	1,713	5,827	4,252	685	590	0
Rupandehi	12,772	4,933	740	5,065	2,989	296	251	0
Dang	103,151	35,812	5,372	8,937	447	2,149	1,927	0
Banke	27,760	13,440	2,016	6,850	396	806	1,164	55,000
Bardia	18,812	-	-	7,324	84	-	1,116	96,800
Kailali	47,036	60,481	9,072	12,302	31	3,629	1,982	0
Kanchanpur	16,352	12,311	1,847	6,784	26	739	776	30,500
Total	**336,069**	**200,937**	**30,141**	**88,629**	**16,962**	**12,056**	**11,736**	**339,200**

ANNEX 10: FORMAL LETTERS OF APPROVAL OF THE ER PROGRAM

ANNEX 11: POSITION STATEMENTS OF 10 NATIONAL NETWORKS REPRESENTING INDIGENOUS PEOPLES AND LOCAL COMMUNITIES ON NEPAL'S ERPD

Common Position Paper of Indigenous Peoples and Local Communities on Nepal's Emission Reduction Program Document (ERPD)

Nepalese Indigenous peoples, local communities, women, Dalits, Madhesis and the forest-dependent poor, as known to all, have been contributing to forest conservation and management with their traditional knowledge, skills and experiences since a long past. As a result, the forest area of Nepal has been significantly increased resulting in forest resources and products. Despite, these remarkable contributions, the forest-dependent communities mentioned above have hardly been able to reap the benefits from forests and forest products.

While the National REDD+ Strategy is yet to be finalized, the government, in haste, has started preparing Emission Reduction Program Document (ERPD) to formulate the Emission Reduction Program (ERP). Taking stock of this situation, the common position paper, incorporating the issues and concerns of the Nepalese indigenous peoples, local communities, women, Dalits, Madhesis, the Muslim minority, the differently-able people and other marginalized communities, has been prepared so that the government addresses the issues through the ERPD.

The position paper is an outcome of a national level multi-stakeholders' program entitled–Consultation and Dialogue of Indigenous Peoples and Local Communities on ERPD– held on the 5th and 6th of December 2016 in Kathmandu. The program was jointly organized by the Federation of Community Forest Users Nepal (FECOFUN), Nepal Federation of Indigenous Nationalities (NEFIN), National Dalit Network (RDN), Tharu Kalyankari Sabha, Nepal Indigenous Women Federation (NIWF), Association of Collaborative Forest Users Nepal (ACOFUN), Federation of Nepalese Indigenous Journalists (FONIJ), Centre for Indigenous Peoples' Research and Development (CIPRED), Green Foundation Nepal (GFN), ASMITA Nepal, Association of Family Forest Owners Nepal (AFFON) and the HIMAWANTI Nepal

Through this Common Position Paper, we would like to emphasize that Nepal as a party state, formulates Nepal's REDD+ Strategy and Emission Reduction Program Document (ERPD) in strict compliance with the provisions related with the rights of indigenous peoples and local communities provisioned in the various international treaties, conventions, protocols and commitments (including the Convention on Biological Diversity, the Universal Declaration of Human Rights, the Sustainable Development Goals, the ILO Convention 169, the United Nations Declaration on the Rights of Indigenous Peoples, the Paris Agreement), as well as the Fundamental Rights and the Directive Principles of State Policy as enshrined in the Constitution of Nepal.

Institutional Structure

- Inclusive, full, effective and decisive participation of the indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private forest owners, women, Dalits, Madhesis, the Muslim minority, the differently-able people and other marginalized communities be ensured in every level and process of ERPD's institutional structure.
- The inclusive, full, effective and decisive participation of the above-said peoples should be made from the community level to the central level as determined by Nepal's state restructuring.

Safeguards

- Indigenous peoples and local communities' rights over the natural resources should be ensured by acknowledging the indigenous peoples symbiotic relationships with land, forest and water while traditional knowledge, skills and livelihood practices should be respected keeping in mind their roles in promoting and safeguarding of these resources.
- The indigenous peoples and local communities should not be deprived of their rights to continue their traditional occupations.
- An appropriate arrangement with the provision of compensation should be made to mitigate the the possible risks.
- REDD+ safeguard measures in the ERPD should be provisioned as per the standards under the Cancun Agreement and various human rights-related national laws and policies and international instruments.
- The arrangement of the alternative energy should be made in participation of the afore-said peoples without tampering their traditional culture, values and norms, and such alternative energy should be available to them with cost-effective, easy and simplistic ways.

Benefit-sharing and Non-Carbon Benefits

- An independent and authorized committee should be formed for the indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private forest owners, women, Dalits, Madhesis, the Muslim minority, the differently-able people and other marginalized communities to have an easy, equitable and effective access to carbon and non-carbon benefits.
- The benefit-sharing standards, acceptable to the

indigenous peoples and local communities, should be specified and beneficiaries' expectation should be well-managed.

- An independent and authorized committee should be formed to address the dissatisfaction and grievances related with the benefit sharing with involvement of the indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private forest owners, women, Dalits, Madhesis, the Muslim minority, the differently-able people and other marginalized communities.
- The benefit sharing arrangement should ensure cent percent benefits for the forest owners of community-based forests, customary forests, and private forests while the allocation should be made as per the Climate Change policy in relations to other type of forests.
- Making sustainable development of the the forests, non-carbon benefit should be clearly defined including its evaluations and benefits. While doing so, the contributions to non-carbon benefits, made through traditional, customary practices at the community level, should also be recognized and taken into account.

Forest Tenure Rights and Control

- Preferential forest tenure rights should be given to the indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private forest owners, women, Dalits, Madhesis, Muslim minority, differently-able people and other marginalized communities.
- Preferential rights to forest carbon, in terms of its preservation, promotion and benefits resulting from it should be given to the indigenous peoples and local communities.
- The indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private forest owners, women, Dalits, Madhesis, the Muslim minority, differently-able people and other marginalized communities should be given their sovereign rights to forest tenure and forest management.
- There should be no government interferences in private and family forests; and carbon rights in such forests should be given to the forest owners.
- Rights of the indigenous peoples and local communities over the territories they have been traditionally using, for settlement, farming and grazing should be recognized and the ownership of such lands should be transferred to the respective communities.

Carbon Measurement and Monitoring

- National Forest Monitoring System should recognize and taken into account the contributions made by the indigenous peoples and local communities through their traditional and community-based forest management practices.
- While measuring, monitoring and verifying the forest carbon, traditional knowledge and skills of the indigenous peoples and local communities should be used for the adoption of the rights-based and community-based approach.
- While carrying out carbon measurement and monitoring program, an effective representation of the indigenous peoples and local communities should be ensured. Capacity building and technology transfer program should also be introduced for these peoples.
- The communities that have traditionally been managing forests at the local level should be identified, the data should be compiled and such data and community experience should be given authenticity.

Interventions in Deforestation and Forest Degradation

- Activities related to the lifestyles and cultures of the indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private/family forest owners, women, Dalits, Madhesis, the Muslim minority, the differently-able people and other marginalized communities should not be termed as drivers of deforestation and forest degradation.
- Physical infrastructures, hydropower projects and livelihood alternatives should not be developed in commercial interests that devalues, displaces or destroys the traditional knowledge, skills, environment conservation practices, arts and cultures of the indigenous peoples and local communities.

Free, Prior Informed Consent (FPIC)

- While planning and implementing the ERPD, consultations through FPIC procedure should be mandatorily carried out with the indigenous peoples, local communities, community forest users groups, collaborative forest users groups, private forest owners, women, Dalits, Madhesis, Muslim minority, the differently-able people and other marginalized communities through their federations or networks.
- FPIC should be conducted only after communicating in their mother tongue or the dialect and giving enough time to the concerned community.
- A mechanism should be put in place to redress grievances with regard to FPIC.

Hereby, we jointly call on the Government of Nepal, the Ministry of Forests and Soil Conservation, the donor agencies and the stakeholders to fully address these issues and concerns while formulating and implementing the Nepal REDD+ Strategy and the ERPD.

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Position Statement

NEFIN

Position Statement of Indigenous Peoples on Emission Reduction Program of Nepal

November 2016

Reiterating the fact that Nepal has ratified the International Labor Organization (ILO) Convention No.169, the Convention on Biological Diversity (CBD) and voted for the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP),

Reminding the fact that the Cancun Agreement on REDD+ Safeguards (2010) and the Climate Change Paris Agreement recognize Indigenous Peoples' rights,

Demanding that, as we, the Indigenous Peoples have an intrinsic relationship with the Nature, our rights over natural resources, including our lands and territories be recognized and that our rights to self-determination including the Free Prior Informed Consent (FPIC) procedure be ensured,

The Nepal Federation of Indigenous Nationalities (NEFIN) on behalf of the Indigenous Peoples of Nepal declares the following points as a minimal position of the Indigenous Peoples of Nepal with regard to Emission Reduction Program Document (ERPD) and Emission Reduction Program (ERP) implementation.

1. The UNDRIP, ILO C 169, FPIC, CBD 8(J), the Cancun Agreement on REDD+ Safeguards, the Climate Change Paris Agreement and other relevant international instruments related to Indigenous Peoples' rights should be implemented as minimum standards of ERPD and ERP.
2. The Indigenous Peoples should be recognized and established as the rights holders, not merely as the stakeholders in the ERP.
3. The Indigenous Peoples' rights to land, territories and natural resources inter alia forests, water, and timber and non-timber forest products should be ensured.
4. The customary laws and practices, indigenous knowledge, skills and technology, and tangible and intangible cultural heritages of the Indigenous Peoples should be recognized, respected, promoted and fulfilled.
5. It should be ensured that there are no negative impacts of ERP on the Indigenous Peoples' traditions and culture, life style, livelihood practices, and cosmo-vision.
6. Proportional and effective participation of the Indigenous Peoples through their collective and institutional representation in all institutional structures and through their recruitment, at all phases and levels, including at the national, provincial and local levels, should be ensured.
7. Proportional representation of the indigenous women should be ensured.
8. Indigenous Peoples experts should be actively engaged at all levels and phases of the ERP.
9. Awareness raising and capacity building of the Indigenous Peoples about ERP and REDD+ should be carried out.
10. It should ensure voluntary isolation of Indigenous Peoples and that the ERP strictly does not relocate and resettle the Indigenous Peoples without obtaining their FPIC.
11. Distribution of non-carbon benefits must prioritize the Indigenous Peoples as they contribute the most to the management and protection of the forest.
12. Equitable, transparent and coherent benefit sharing of both carbon benefits and non-carbon benefits should be ensured.
13. Relevant documents and information must be made accessible to and be provided to the Indigenous Peoples in their respective mother tongues in a manner and through a medium that are indigenous peoples-friendly.
14. Feedback grievances redress mechanism and the mechanism for ensuring the Indigenous Peoples' rights must be put in place.
15. Forests, territories and pasturelands that have been traditionally managed, used and protected by the Indigenous Peoples must not be converted into a community forest, a collaborative forest or a government forest.
16. In case any forest of the Indigenous Peoples is already converted into a community forest, or a leasehold forest or any form of government forest, that forest must be handed over back to the Indigenous Peoples.
17. The culture, the world-view and the need of the Indigenous Peoples should be taken into account while introducing support to livelihood options.
18. Necessary arrangements should be made to ensure the protection of intellectual property rights of the Indigenous Peoples and the occupations and livelihood practices based on the indigenous knowledge and skills should be promoted.
19. While introducing alternative sources of energy, the need of the Indigenous Peoples should be properly identified and consensus with them should be reached.
20. The ERP must not restrict the collection and consumption of forest products that have cultural and spiritual values for the Indigenous Peoples.
21. Traditional life styles and livelihoods of the Indigenous Peoples must not be restricted in the name of forest conservation and REDD+.
22. It should be ensured that there is no destruction of crops and harm against human life from the wild life of protected forests.
23. Incrimination and militarization against the Indigenous Peoples for their act of harvesting culturally and socially needed forest products from protected areas, forests and national parks must not occur.

ANNEX 12: SATELLITE IMAGE ANALYSIS TO TROUBLESHOOT HIGH DEFORESTATION NUMBERS IN 2009- 2011

In the program area, the ERPD methodology shows following deforestation rates over the time series analysis:

Year	Deforestation / ha
2004-2006	5 213,57
2006-2009	21 531,40
2009-2011	64 273,50
2011-2014	14 811,50

A satellite image analysis was conducted to troubleshoot estimated heavy deforestation in 2009-2011 interval. The deforestation estimates increase in four years from 21,500 ha to 64,000 ha and then back to 15,000 ha again in four years, raising the question of whether it they reflect real phenomena or methodological problems.

Background and spectral library

The same methodology was applied for all the years in time series analysis. After initial pre-processing, which is standard for Landsat program, a spectral library was collected. This is done by collecting a sample of pixels that the user *knows* to represent only one land use category (e.g., forest). The curve of reflectance is characteristic for vegetation, especially, because the green vegetation absorbs highly in red interval and vice versa emits radiation strongly in infra-red, which is referred as the "red-edge". This is pictured in image 1 below. Although the reflectance curve is very unique for vegetation class, the difficulty is to tell forest apart from all other green vegetation. Different soils have more even profile and water tends to absorb all radiation beyond the visible spectrum. Reflectance signals of typical LU classes are pictured in Image 2. Unfortunately, the reflectance characteristics are very similar between soil and dry vegetation (Figure 25).

Figure 23: Unique red-edge character found in reflectance curve of green vegetation

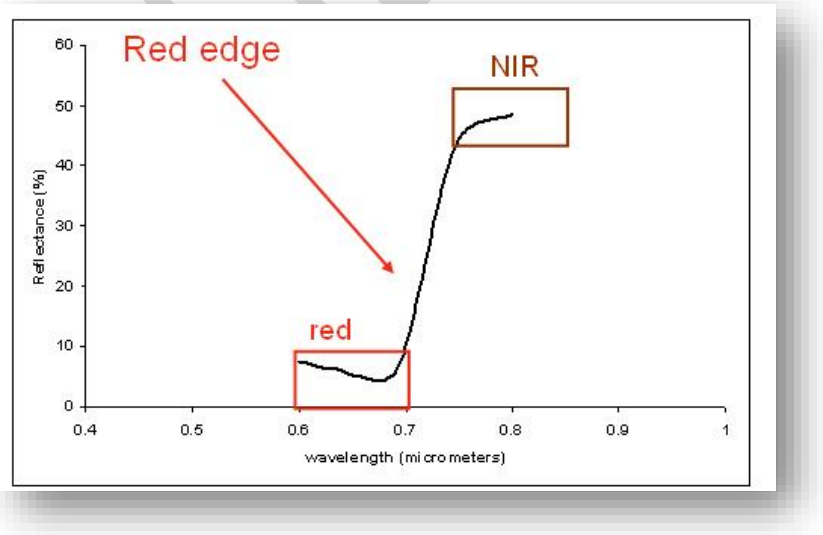


Figure 24: Typical reflectance curves of soil, green vegetation and water

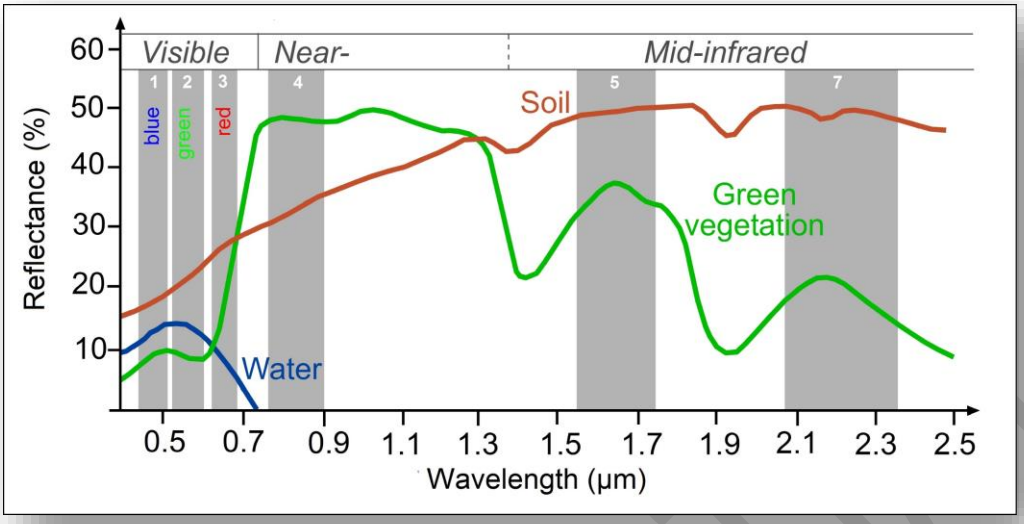
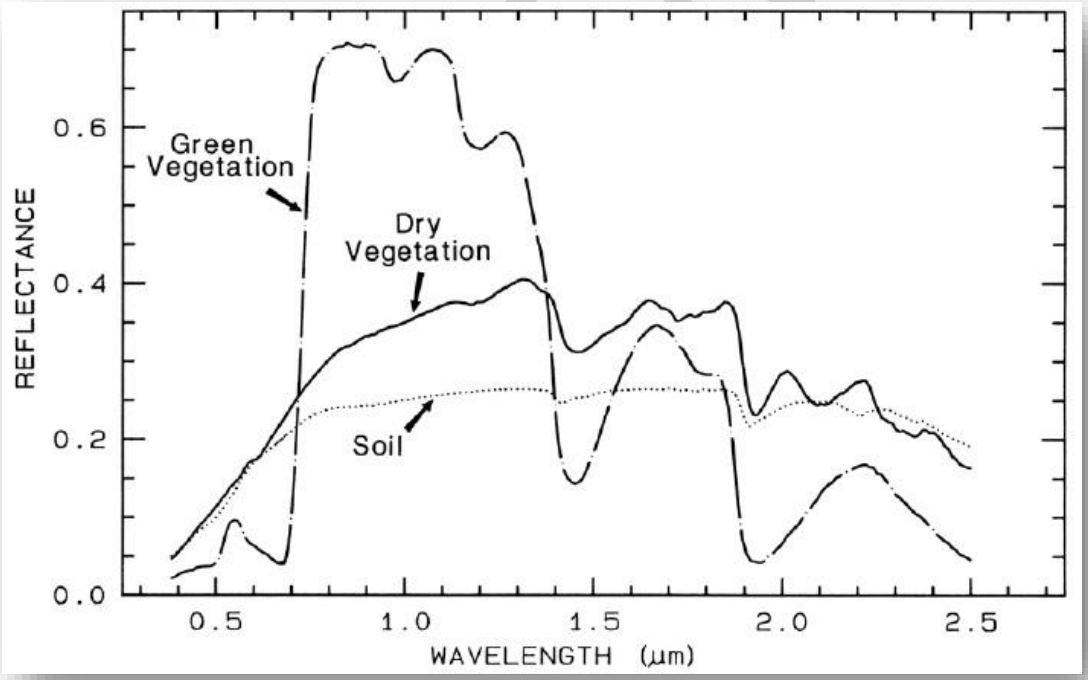


Figure 25: Reflectance curves of green vegetation, dry vegetation and soil



Spectral Mixture Analysis

After collecting reflectance characteristics from forest, soil, non-photosynthetic vegetation and shade, each pixel was analyzed against these pure land -use classes. A 30-meter Landsat pixel as viewed from above can include multiple land cover types, such as forest and soil. In spectral mixture analysis, each pixel was dismantled into fractions according to how much of its reflectance belonged

to each of four land use categories in spectral library. The fractions were exported into their own raster layers. For example, if a pixel was 30% forest and 70% soil, the pixel value in the forest layer is 30 and 70 in soil layer, and 0 in shade and NPV.
In the following classification, a pixel was classified as non-forest when it met one of following criteria:

a. 53 < GVs < 65
b. GVs > 65 and GV > 68
c. GVs < 52 but soil + NPV >14

Intact forest, degraded forest, regeneration, and water classes were separated similarly and their criteria is defined in Section 8.3.

Change detection
In change detection, a pixel was assigned to class Deforestation, if its class transformed from Intact Forest, Degraded Forest, or Regeneration to Non-Forest. For this phase, it is crucial that the images are all from the same phenological period. In TAL, they were all selected from between October – February based on length of the rainy season in the area. Due to a Landsat 7 malfunction after 2003, the Landsat 5 was the only data source in 2009 – 2011. Images from 2010 are used to complement 2011, because good-quality imagery from 2011 was not available.

Image acquisition dates 2009-2011:

2009-10-11	**2010-02-11**
2009-10-12	2010-02-25
2009-10-20	2010-12-03
2009-11-06	2010-12-17
2009-11-07	2011-01-18
2009-10-11	2011-02-19

Conclusions
We concluded that the amount of estimated deforestation between 2009 and 2011 is likely artificial, due to phenologic differences associated with seasonality. The exact same methodology of change detection has been applied for all images, and therefore it is assumed that the change could be explained by the Landsat images. Deforestation seems to occur everywhere in the study area, so it is not explained by mistakes in pre-processing or shadows.

Even though Landsat images undergo the same processing and are from the same phenological period, it does not cancel out the yearly changes within the reference period. Checked against the Google Earth Timeline which embeds the entire Landsat database since 1972, it is evident that dry years alternate with wet years and the difference is visible even during the rain season. In Google Earth Timeline the deforestation 2011 (blue) areas can be viewed against images from rain season 2009 / 2011 (these are not the same images that were used in ERPD document).

Figure 26: December 2009

Figure 27: December 2011

In addition, in time series analysis 2009 – 2011, images for ERPD are collected from the end of the rain season in 2010/2011, i.e. end of February. In 2009 the images are instead from October – November. Comparing somewhat more dry months in 2011 than in 2009, the sensor could have captured more leave-off time in 2011 and leave-on in 2009, causing the false impression that deforestation has occurred. The inherent drawback with optical imagery without any height information is that the image might be correctly interpreted to non-forest, because there is no green vegetation present, while in reality the forest just undergoes a dry period and the sensor is recording reflectance from soil.

ANNEX 13: MONTE CARLO ANALYSIS OF THE EMISSION FACTORS PREDICTION ERRORS

Monte Carlo analysis of the Emission Factors prediction errors

A Monte Carlo analysis was used to produce a distribution of estimations for above-ground biomass, in order to detect the range of all possible outcomes and to quantify the error that comes from various sources within LAMP process. In general, Monte Carlo simulation can be used for risk analysis by building models of possible results. It works by substituting a range of values – a probability distribution – for any factor that has inherent uncertainty. It then calculates results over and over, each time using a different set of random values from the probability functions. This can involve thousands or tens of thousands of recalculations before the simulation is complete.

A Monte Carlo analysis was applied to run a joint error validation of field sample measurement error, plot location error, sampling error and model error. The assumption is that the first four error sources (listed above) can be estimated by simulating sub-samples from field measurements, creating a LiDAR-to-AGB model using them, and then cross-validating the results with the remaining field plots.

This process was implemented by randomly dividing the 738 LiDAR field plots in two sets for 1,000 times. A new model was created each time. A sub-set of 538 distinct random plots (no replacement) from the 738 candidate plots, were iteratively sampled as the training data. The LiDAR features and field measurements of training data were used to estimate the model parameters. Then the AGB values of the remaining 200 plots left out from the training set were predicted using the model. Thus, 1000 × 200 predicted plots were obtained, from which the plot level residual distribution could be estimated (see Figure 28). The mean statistics from simulations are presented in Table 72

Since a new model was created during each iteration, a median number of explanatory variables was used to calculate the adjusted R^2 value. The average number of variables for prediction was 9.6, median 10, minimum 6 and maximum 15. The results from Monte Carlo analysis (statistics extracted from the distribution of estimates) could also be used in analyzing the stratification error in forest condition.

Figure 28 AGB predictions versus field measurements (left) and residual histogram (right) of Nsim = 1000 simulations with random training set of N − 200 = 538 plots

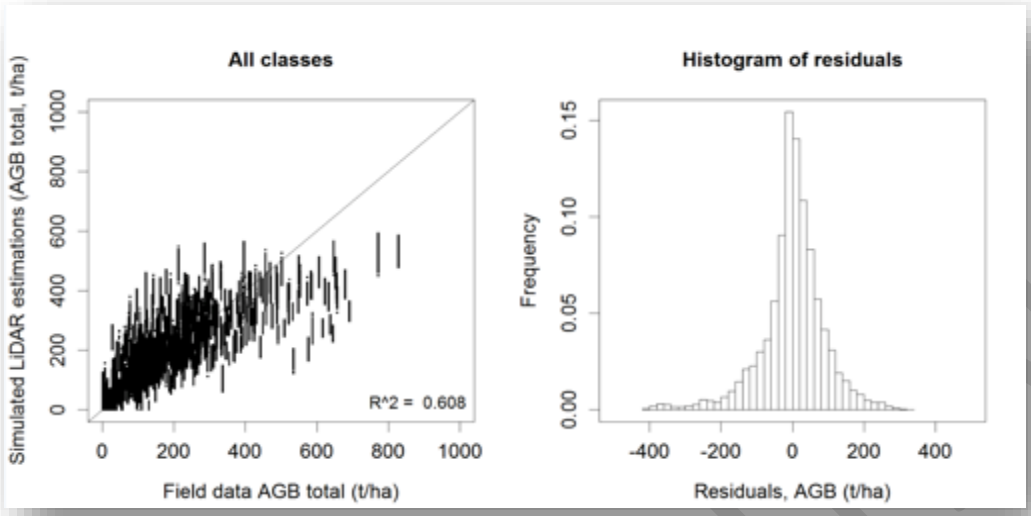


Table 72 Mean statistics for the simulated LiDAR estimates of aboveground biomass. The results are validated with iterative cross-validation

Total AGB (t/ha)	LiDAR (Phase 1)
Standard deviation of estimates	113.08
Standard deviation of reference plots	143.0
Mean of estimates	189.8
Mean of reference plots	188.98
RMSE	89.5
Relative RMSE (%)	0.47
Bias	0.82
Relative bias (%)	0.00
R2	0.61
Adj. R2	0.61