ISFL Emissions Reduction (ER) Programme Document (PD) Eastern Province, Zambia

Version 14

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List of Acronyms

AFOLU	Agriculture, Forestry and Other Land Use
AGB	Above ground biomass
BGB	Below ground biomass
BIOCF	BioCarbon Fund
BLS	Better Life Scheme
CCA	Community Conservation Area
CCNRM	Climate Change and Natural Resources Management
CE	Collect Earth
CERPA	Chiefdom Emissions Reduction Performance Agreement
CFMA	Community Forestry Management Agreement
CFS	Crop Forecast Survey
CH_4	Methane
CRBs	Community Resource Board
CSA	Climate Smart Agriculture
CSO	Civil Society Organisation
DW	Dead Wood
EF	Emission Factor
EOS	Earth Observation Science
EP	Eastern Province
EP-JSLP	Eastern Province Jurisdictional Sustainable Landscape Programme
FAO	Food and Agriculture Organisation of the United Nations
FD	Forestry Department
FGD	Focus Group Discussion
FI	Forest Inventory
FLES	Forest Inventories and Forest Livelihood and Economic Survey
FMNR	Farmer-Managed Natural Tree Regeneration
GCP	Ground Control Point
GHG	Greenhouse Gas
GIS	Geographic Information System
IDA	International Development Association
ILUA	Integrated Land Use Assessment Report
LULC	Land Cover and Land-Use
LULUCF	Land Use, Land Use Change and Forestry
MLNR	Ministry of Lands and Natural Resources

N	Nitrogen
NDC	Nationally Determined Contribution
NFI	National Forest Inventory
NERPA	Nested Emissions Reduction Performance Agreement
N_2O	Nitrous oxide
PA	Protected Area
PHS	Post-harvest Survey
QA/QC	Quality assurance and quality control
SALM	Sustainable Agriculture Land Management
SESA	Strategic Environmental and Social Assessment
SIS	Safeguard Information System
UAV	Unmanned Aerial Vehicle
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency of International Development
UNZA	University of Zambia
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
ZARI	Zambia Agriculture Research Institute
ZIFL-P	Zambia Integrated Forest Landscape Project

Section 1: General Information and Guidance (not used only guidance)

Subject	Description
Name of the Programme	Eastern Province – Jurisdictional Sustainable Landscape Programme
Overall objective	To promote greenhouse gas (GHG) emissions reduction or removal in the Eastern Province, while simultaneously improving rural livelihoods including forest and wildlife conservation and management.
Programme Financing	BioCarbon Fund and other sources
Coordination mechanism	EP-JSLP- Programme Implementation Unit
Area Covered	Eastern Province (except Chama district) – 5,097,587 ha
Programme duration	10 years
Population	2,065,590
GHG baseline (2009-2018)	28,998,310MtCO_2eq
ERs to be achieved Annually	2,899,831MtCO_2eq
Type of Programme	Jurisdictional
Justification for Jurisdictional approach	• Government's intention is to develop the Eastern Province Jurisdictional Programme. • In accordance with SI No.66 of 2021, a Jurisdictional programme is developed by Government for the recognition of activities aimed at greenhouse gas emission reduction or removal for carbon trading. • The Jurisdictional programme will ensure tracking and measurement of change in reducing deforestation and forest degradation. • The Jurisdictional programme will enhance transparency in the methodology and allocation of

	benefits to all stakeholders including the local communities. • The Jurisdictional programme will promote landscape approach to biodiversity management in the province.
Nesting Arrangement	Centralised Nesting
ER Allocation	Performance Based for both Nested projects and the rest of the landscape.
Proposed Benefit Sharing	Communities – 55% Nested Projects and Non-nested Areas – 30% ER Programme Operational costs – 15%
Benefits criteria	Performance based (direct and indirect)
Proposed options for payments	• Cash payments • ER payments (existing carbon Projects)
Proposed Monitoring period	Annual
ERPA Start Date	June 2023

Section 2: Executive Summary

2.1 ISFL ER Programme Description

2.1.1 Programme Area information

Table 1. Programme Area information

Name of the ISFL ER Programme	Eastern Province Jurisdictional Sustainable Landscape Programme (EP-JSLP)
Name of the Programme Area	Eastern Province of Zambia
Geographic area of the Programme Area (hectares)	5,097,587
Population of the Programme Area	2.065 million
Ex-ante estimates of emission reductions (ERs) for the ISFL ER Programme (tons of CO_2e)	**28,998,310** ERs covering a period of 10 vintage years (2021-2030) with an average of **2,899,831** ERs (before deduction of non-permanence risk buffer)

The Eastern Province Jurisdictional Sustainable Landscape Programme (EP-JSLP) is a Results-Based Climate Finance (RBCF) follow up programme to the Zambia Integrated Forest Landscape Project (ZIFLP), an initiative supported by Government with funding from the Biocarbon Fund (BIOCF), Global Environment Facility (GEF) and International Development Association (IDA)[1]. The EP-JSLP is being developed as a long-term results-based payment programme that takes over where the implementation phase of the ZIFLP ends. The government has developed the Eastern Province Jurisdictional Sustainable Landscape Programme as a programmatic umbrella for climate-positive interventions in the Eastern Province. The Programme is Jurisdictional in terms of approach and performance-based in nature. The EP-JSLP's aim is to promote Greenhouse Gas (GHG) emissions reduction or removal from the land sector in the Eastern Province, while simultaneously improving rural livelihoods including wildlife conservation and habitat management. The EP-JSLP envisages to achieve emission reductions by promoting interventions that prevent

[1] See World Bank Project Appraisal Document Report no PAD:2220, April 13, 2017

deforestation and forest degradation as well as reducing emissions from agriculture. This includes improved land-use planning, Climate Smart Agriculture (CSA) development, Sustainable Forest Management, rural energy generation, and Laws and Policies that protect Forests and Wildlife.

The EP-JSLP is located in the Eastern Province of Zambia and covers an area of 5,097,587 hectares. The Programme will operate in fourteen (14) of the fifteen (15) Districts of the Province. Chama District was recently reverted to Eastern Province following a delimitation exercise undertaken by the Government and will initially not be a part of the Jurisdictional Programme at this stage because doing so, will entail redoing most of the GHG baseline work; it will however, be considered for inclusion under the Improvement Plan. The 14 districts of the province include: Chipata - the provincial capital, Nyimba, Petauke, Sinda, Katete, Lundazi; Mambwe, Chadiza, Vubwi, Kasenengwa, Chipangali, Lumezi, Chasefu and Lusangazi. The province has a total of 57 Chiefdoms. The total population of the province in 2020 was estimated at 2,065,590 of which 1,022,467 (49.5%) were males and 1,043,123 (50.5%) females. The rural population was estimated at 1,652,472.

The EP-JSLP's key beneficiaries are poor rural communities, especially those which directly depend on agriculture and forest resources for their livelihoods and therefore, most vulnerable to climate change. The EP-JSLP will engage communities throughout the province, but with a particular focus on those living around and adjacent to forests including Game Management Areas and Forest Reserves. The targeted communities are expected to engage in activities that reduce deforestation through Community Forestry and collaborative management, adopt technologies to reduce wood-use that causes degradation and improved agricultural practices. This will include communities that are adjacent to wildlife Protected Areas, especially around the globally important biodiversity area of Lukusuzi National Park. The benefits of reduced carbon emissions, under this EP-JSLP, will have a global impact and help the Country meet its Nationally Determined Contributions (NDCs) under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). It will further support the Presidential declaration on Forests and Land Use at COP26 Glasgow in 2021, which commits to working collectively to halt and reverse forest loss and land degradation by 2030 while delivering sustainable development and promoting an inclusive rural transformation.

2.1.2 Selection of the Programme Area

Most communities in the Eastern Province are locked into a cycle of poverty and resource degradation. The World Bank's Mapping Subnational Poverty report indicates that the province is one of three poorest provinces in Zambia with 70 percent of the population being classified as poor. The majority of Eastern

Province's 2.065 million people live in rural areas with their livelihoods heavily dependent on agriculture and natural resources.

In view of this, deforestation and degradation are expected to accelerate due to agricultural expansion and increased fuel wood use (firewood and charcoal) with the growing population and internal migration dynamics (in-migration) if the business-as-usual approaches continues. Further, declining crop and livestock productivity is expected to contribute significantly to food insecurity and therefore, increase pressure on natural resources. With much of the Eastern Province's population dependent on forests and the productivity of agricultural land, without funding the activities needed to protect forests and increase smallholder agricultural productivity, the poor rural communities could become more vulnerable leading to loss of natural ecosystems as the communities strive to sustain their livelihoods. The end result will be significant GHG emissions, encroachment of Protected Areas, habitat fragmentation and land degradation.

2.1.3 Description of ISFL ER Programme vision, design, and expected outcomes

The baseline assessment of greenhouse gas emissions from the Eastern Province indicates that more than 46% of emissions are coming from the degradation of standing forests and 16% from conversion of forest to agriculture land (forest loss), with 14% from poorly managed agricultural soils. Statistics also show that the key drivers of emissions relate to deforestation and degradation due to fuel wood use for household firewood, charcoal production and tobacco as well as degradation due to fires, deforestation for small scale (shifting) agricultural expansion due to low productivity and poor land tenure systems, and loss of soil carbon from poor agricultural practices.

In order to tackle the noted challenges, the long-term EP-JSLP development objective is:

- To improve landscape (forest and agriculture) management and increase environmental and economic benefits for rural communities in the Eastern Province.

This is in line with the vision of the National Strategy to Reduce Deforestation and Forest Degradation in Zambia, *to attain a prosperous climate resilient economy by 2030 achieved upon sustainable management of Zambia's natural resources towards improved livelihoods*.

The Programme design is based on the work conducted over the past 5 years under ZIFLP, initiated in 2018 to support rural communities in the province to better manage the resources of their landscapes in order to reduce deforestation and unsustainable agricultural expansion; enhance benefits they receive from Forestry, Agriculture, and Wildlife; and reduce their vulnerability to climate

change. The Project also invested in creating the enabling conditions for the changes to happen—including tenure security, planning at different spatial scales and capacity building. Importantly, the Project created the enabling environment for ER purchases through the EP-JSLP.

The EP-JSLP interventions will directly address emissions reductions through promotion of Sustainable Forest Management which centres around expansion of Community Forestry and strengthening collaboration in the management of Protected Areas; Climate Smart Agriculture approaches that will increase productivity, thus reducing pressures on forests and building better soil carbon; as well as provision of fuel efficient cookstoves and promotion of sustainable charcoal production to reduce, and where possible, eliminate wood energy use across the Province.

Core to the Programme is the involvement of stakeholders and communities in the sustainable management of natural resources such as Community Forest Management Groups (CFMGs), Community Resource Boards (CRBs), farmers' groups and cooperatives as well as key focus on the Traditional leadership structures where local land use management decision making, land allocation and control takes place. The Chiefdom will, therefore, be the key unit of land management focus to identify the key ER issues and drivers of deforestation and forest degradation and other unsustainable land management and cultivation practices which contribute to GHG emissions in the Chiefdom and across the province. This level will form the basis of negotiation of performance criteria and responsibilities which will be core to the benefit sharing mechanism and commitment of the EP-JSLP to deliver capacity building and ER services with related livelihoods support measures. Therefore, the expected outcomes of the EP-JSLP will be to reduce emissions in the Eastern Province, while strengthening sustainable land and forest management practices, creating increased incomes and resilience of local communities.

Conforming to national strategies to reduce the effects of climate change through mitigation and adaptation as well as aligning with international concerns and conventions, the EP-JSLP is expected to attract interest, investment and access to climate financing and voluntary markets including the private sector to ensure the sustained support to indicated emission reduction interventions and results based performance payments through the benefit sharing mechanism beyond the current planning horizon.

2.1.4 Summary of ISFL ER Programme financial plan and financing gap

Table 2. Summary of ISFL ER Programme financial plan and financing gap

Estimate of costs and revenues of planned actions and interventions, including institutional, implementation and transaction costs	5 years (2023-2027) = **$1,032,897** **Total costs = $30,554,571** **Benefit sharing $98,253,361** **Expected Financing = $5,000,000** **Estimated Revenue = $124,840,329**
Amount of financing identified/secured financing for planned actions and interventions	**Year 1-3 (2023/24/25) = $5,000,000** The EP-JSLP will be operating in 2023 utilising US$ 1.5 million in funding from the ZIFLP funding partners (IDA, BioCF, GEF) through the current extension period of the implementation phase of ZIFLP to finance operations, management and MRV development costs. A commitment has been made for US$2 million grant from GEF for mitigation activities and up to US$ 1.5 million from ISFL towards programme management and MRV cost. However, during the first monitoring period, some further operations will require funding in advance of trading, until such time as the programme breaks even on cumulative cash flow in year 3 (2026).
Financing surplus or gap amount	**Years 1-3 (2023 - 2025) = ($6,327,833)** As a results-based programme, it is important to note that Carbon Revenue is fully dependent on verification. Therefore, accruing post investment period highlighting cash flow implications for JSLP. Revenue is only received following verification through the monitoring, reporting and verification (MRV) system and external audit. Therefore, the first revenue may only be realised by end year 3 should there be a two year monitoring period. The Government is seeking to fill the financing gap in the early years of the programme, through securing allocation of funds from the funding partners to cover implementation (mitigation) and management costs until year 3 when carbon revenue is expected to make the EP-JSLP (ER phase) financially viable. This may be covered if an initial 12 month monitoring period was agreed and revenue from sales realised in late 2024.

2.2 ISFL ER Programme Implementation Arrangements

2.2.1 Programme entity that is authorised to negotiate/sign the ERPA with the ISFL:

Name of entity: Ministry of Green Economy and Environment (MGEE)

Type and description of organisation:

The GRZ, through the Ministry of Green Economy and Environment will be the signatory of the ERPA. The Ministry is responsible for Climate Change Policy, Environmental Policy, Environmental Protection and control, Forestry Policy, extension and development, Carbon Credit Policy and Green Economy. The Ministry includes the Departments of Forestry, Green Economy and Climate Change, Environment and Meteorology; itis responsible for the following Statutory Bodies and Institutions: Environmental Protection Fund, the National Biosafety Authority, and Zambia Environmental Management Agency (ZEMA).

Website: https://www.mgee.gov.zm/

Main contact person:

Name: Dr. Douty Chibamba

Title: Permanent Secretary

Address: Corner John Mbita & Nationalist Roads, P.O. Box 30147, Lusaka, Zambia

Telephone: +260211252395/252394

Email: doutypaula@gmail.com

2.2.2 Organisation(s) responsible for managing/implementing the ISFL ER Programme

The EP-JSLP will be implemented as a government programme under the Ministry responsible for the environment (Ministry of Green Economy and Environment of Zambia), managed by a dedicated Provincial ER Jurisdictional Implementation Unit. The Implementation Unit will be based in the Eastern Province, accountable to the Provincial Permanent Secretary who will chair the Steering Committee for the Programme. The Implementation Unit will also report to the Forestry Department, under the Ministry of Green Economy and Environment.

The EP-JSLP Implementation Unit will work in close collaboration with the Forestry Department supported by the other line Ministries, Statutory Agencies and other relevant key sectors within the context of implementation and

reporting responsibilities in line with the National REDD+ Strategy[2], Chapter 5.3 on Implementation and Monitoring, Reporting and Verification (MRV), Chapter 5.5, to be consistent with reporting to the National GHG Inventory System, including onward reporting to the UNFCCC.

Implementation of activities will be operationalised at the district level through District Focal Points under the PIU working with the existing sub-committee of the District Development Coordinating Committee responsible for natural resources. These are existing planning and service delivery structures at district level. Oversight in the Province will be provided by the Provincial Steering Committee chaired by the Provincial Permanent Secretary and comprising Provincial Heads of Departments and invited development organisations. The Provincial Steering Committee will report to the Provincial Development Coordinating Committee, an already existing and functioning structure. The functions of the PDCC are outlined in the National Planning and Budgeting Act, 2020[3] . Therefore, the implementation, coordination, planning and reporting of sector related interventions within EP-JSLP (Forestry, Agriculture, Wildlife, Local Government etc.) will take place through the said structures at District and Provincial levels and through formal reporting lines at National level as earlier highlighted.

Figure 1 presents reporting arrangements for the EP-JSLP emissions reduction programme in line with Government decentralisation policy as well as the national arrangements for climate change as set out in section 8 of the National Climate Change Policy, 2016[4]. The major investments of the EP-JSLP project are intended to be decentralised, to the lowest level possible in order to achieve community participation and beneficiation. It is worth noting that apart from the JSIP Implementation Unit, all other structures are currently formed and functioning as per the National Planning and Budgeting Act, 2020.

The management structure is as follows:

[2] See Zambia National Strategy to Reduce Deforestation and Forest Degradation, 2016

[3] See the National Planning and Budgeting Act, 2020

[4] See Zambia National Climate Change Policy, 2016

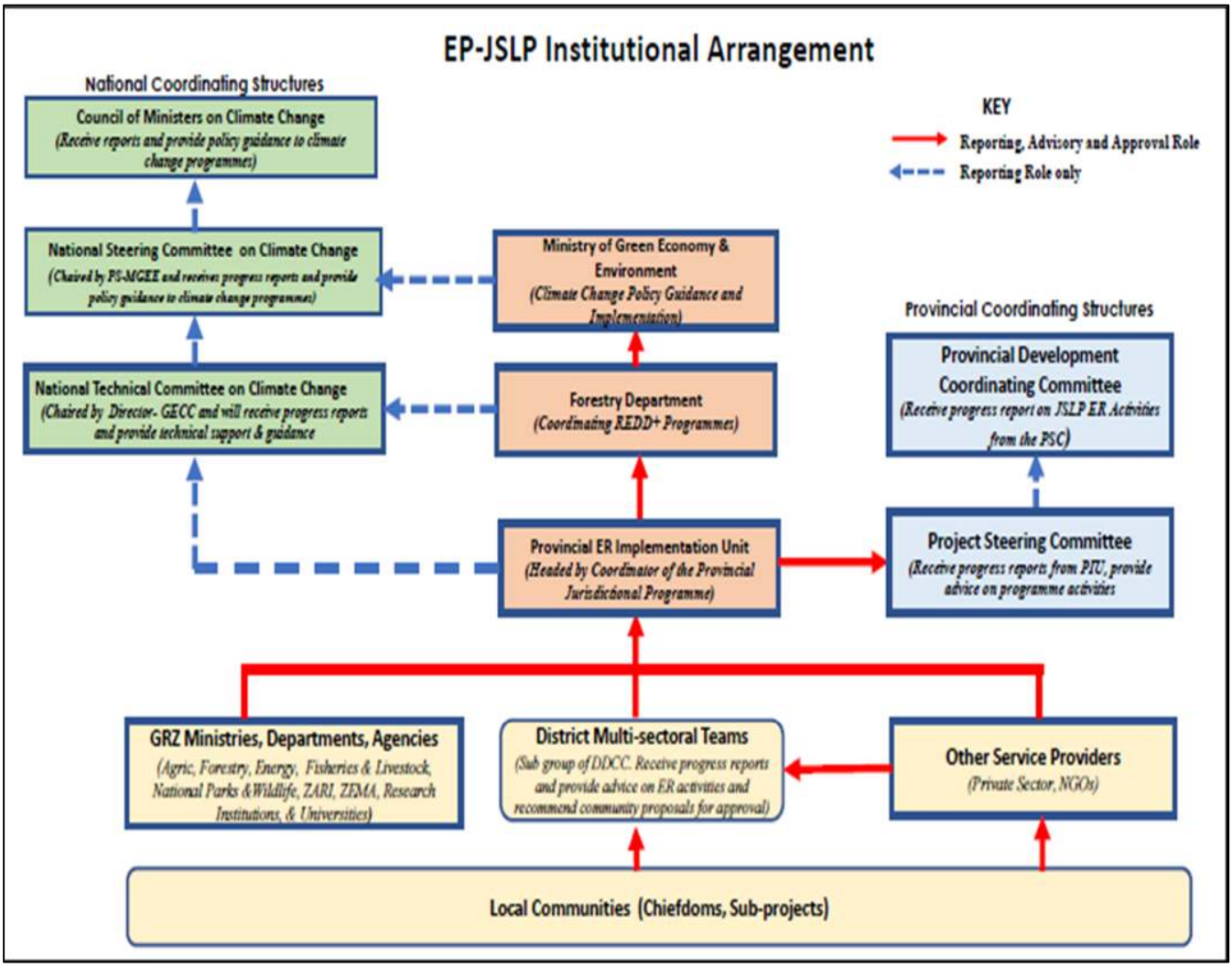


Figure 1. EP-JSLP Implementation and Governance Arrangements

Table 3.: The Eastern Province - Jurisdictional Sustainable Landscape Programme Implementation Unit (EP-JSLPIU)

Name of entity:	The Eastern Province - Jurisdictional Sustainable Landscape Programme Implementation Unit (EP-JSLPIU)
Type and description of organisation:	(EP-JSLPIU) is the dedicated unit that will manage the implementation of the EP-JSLP. At provincial level, the Unit will be accountable for implementing the Jurisdictional Programme Programme through existing Government structures and Institutions as per their mandates as provided by the National Planning and Budgeting Act, 2020. To ensure effective linkage to the national level accounting both national and international, the Programme Implementation Unit will work with the Provincial Offices of the Forestry Department supported by the Zambia Environmental Management Agency (ZEMA) and other Relevant Key Sectors with the objective of reducing emissions in line with the National REDD+ Strategy, Chapter 5.3 on Implementation and Monitoring, Reporting and Verification (MRV), Chapter 5.5.
Organisational or contractual relationship between the organisation and the ISFL ER Programme Entity identified above:	As an Emissions Reduction Programme, the JSLP PIU will report to the Technical Committee on Climate Change, which will is chaired by the Director, Department of Green Economy and Climate Change under Ministry of Green Economy and Environment, the Programme Entity. Further, Forestry Department will report directly to the Permanent Secretary, Ministry of Green Economy and Environment. Note: the ZIFL Implementation Phase PIU will cover the role of the EP JSL-PIU as an interim measure in the transition period until the signing of the ERPA and commencement of start-up of the ER phase of ZIFLP.
Website:	No website has been established as yet. Interim: www.ziflp.org.zm
Main contact person:	Mr. Noel Muchimba
Title:	ZIFLP National Project Manager
Address:	ZIFLP PIU, Opposite High Court, Chipata, EP
Telephone: Office:	+260977402661
Email:	muchimbanoel@gmail.com

2.2.3 Partner organisations involved in the ISFL ER Programme

The main Government and non-government Implementing Partners are included in this section.

Table 4. Government Agency Implementing Partner organisations involved in the ISFL ER Programme

Provincial Office of the Forestry Department, Ministry of Green Economy and Environment	Chabu Sumba Principal Forest Officer chabusumba@yahoo.co.uk	The Department of Forestry (FD) through its provincial offices will support an increase in Sustainable Forest Management in community forests and Forest Reserves through the following main activities: ● Control, manage and administer Forest Reserves/ Protected Areas including development of Forest Management Plans based on participatory planning approaches; ● Promote Community Forestry based on participatory planning processes; ● Promote fire management directly and through community fire management and prevention; ● Promote tree nursery establishment and plantation management and woodlot establishment; ● Promote Community Forestry enterprises; and ● Support capacity building of FD officers and staff.
Provincial Office of the Ministry of Agriculture	Dr. Adrin Nansunge Provincial Agriculture Coordinator Adrinnansungwe@yahoo.com	Ministry of Agriculture is responsible for implementing Climate Smart Agriculture which includes the following main activities: ● Promoting conservation agriculture and soil fertility management practices; ● Providing agricultural extension and advisory services; ● Supporting integrated agricultural and agroforestry research; ● Identifying training needs between extension workers, lead farmers and farmers;

		● Conduct trainings for extension staff and support their training of farmers across the targeted area (EP); ● Promoting agroforestry models through the establishment of seed multiplication and tree nurseries, promotion of sustainable tree species; ● Scaling up Farmer-Managed Natural Tree Regeneration (FMNR); ● Promoting market access and private sector engagement to support farmers; and ● Promoting development of community enterprises.
Dept of National Parks and Wildlife	Erastus Kancheya Warden C/O Private Bag 1 Kafue Road Chilanga, Lusaka Zambia <erastus2008@gmail.com>	DNPW will support strengthening the protection of forests and biodiversity conservation in National Parks and GMAs. The main activities include: ● Wildlife and habitat management; ● Promoting protection for Protected Areas (PA) through co-management; ● Promote Community Management of Wildlife in Game Management Areas; and ● Information dissemination.
Ministry of Fisheries and Livestock	Michael Muhango Provincial Fisheries and Livestock Coordinator mercosus@gmail.com	The Ministry of Fisheries and Livestock is included in their role to support livelihood activities that increase household incomes with the aim to reduce pressures on the forest areas. The Ministry of Fisheries and Livestock will implement the following main activities: ● Demonstration of livestock-fisheries-crop technologies to increase and mitigate negative impacts of climate change; ● Promoting increased rural production and productivity of livestock and fish; and ● Promoting control and management of diseases in livestock and fish to increase resilience and mitigate climate change.
Department of Energy,	Anna Banda-Chandipo	Ministry of Energy is responsible for the implementation of technologies that reduce

Ministry of Energy	Principal Energy Officer-Energy Management <chandipobanda.ac@gmail.com>	unsustainable use of fuel wood which includes the following main activities: ● Dissemination of information regarding improved cookstoves, including assessing potential of new stoves, identify gaps in design, identify incentive mechanisms, oversee distribution to households, record and monitor use; and ● Promoting Fuel Alternatives.
Ministry of Local Government	Patson Phiri Assistant Director, Dept. of Physical Planning patson.kafue@gmail.com	The Ministry of Local Government will continue to support Local Authorities with implementing key enabling conditions to support the EP-JISP which include: ● Providing targeted support to the development, implementation and monitoring of Integrated District Plans in the Province; ● Support Local Authorities with development of Participatory Land Use Plans and their implementation; and ● Promoting effective community participation in local level planning in accordance with the Urban and Regional Planning Act, 2015.
Zambia Environmental Management Agency (ZEMA)	Charity Nalweya Climate Change and GHG Manager Email: charityst.2013@gmail.com ZEMA, Plot No. 6975 Corner Church and Suez Roads, Lusaka, Lusaka, 10101, Lusaka, ZM Web site: www.zema.org.zm	ZEMA, through their mandate will support a number of key activities for building Zambia's national REDD+ programme which will be promoted as provincial REDD+ programmes in Eastern Province. Their role will include: ● Enhancing Zambia's capacity to achieve and account for emission reductions; ● Emission Reduction Quantification and ongoing monitoring against the emissions baseline which future verified payments of emissions reductions would have been made; ● Support for further analytical work to improve data on land use and land use changes, avoiding double counting of ERs and interim roadmap for moving towards comprehensive accounting in the province; ● Develop and maintain an MRV system-including repeated measurements of land use

		and land use change and carbon stock changes; ● Establish a functional system for accounting of emissions reduction from adoption of sustainable land practices; ● Identify and address gaps that exist in the MRV system and develop and implement a work programme to improve data collection and overall reporting/accounting capacity, both at the national and decentralised levels; ● Safeguards - Address key environmental and social issues associated with the analysis and preparation of REDD+ strategy options; and ● Support the development of a national Safeguard Information System (SIS) to serve as the main repository and information source for all safeguards-related information across the National REDD+ Programmes.

Table 5. Non-Government Implementing Partner organisations involved in the ISFL ER Programme

Biocarbon Partners	Nicholas Mudalyinfo@biocarbonpartners.com	Role in the ISFL ER Programme: REDD+ Service Provider. BCP´s mission is to make conservation of wildlife habitat valuable to people. They develop forest carbon offset projects in areas of global biodiversity significance, to conserve Africa's wildlife strongholds and deliver powerful community impacts. The Luangwa Community Forestry Project was developed under the support of the United States Agency of International Development (USAID). This will fall under the Jurisdictional Programme area. They have expertise in Community Forestry, Geographic Information Systems (GIS) and project management.
COMACO	Dale Lewis dlewis@itswild.org https://itswild.org/about-us/	Role in the ISFL ER Programme: REDD+, CSA and Marketing Service Provider. COMACO is a social Enterprise that supports wildlife conservation and 179,000 small-scale farmers in Eastern Zambia. COMACO designed a system that rewards local people for conserving their natural resources. Community level farmers take a Conservation Pledge, agreeing to abide by a set of community-decided principles designed to safeguard

		the health of their soils, forests, and wildlife. In exchange, COMACO offer extensive trainings, support, and the means to secure a substantial, reliable income through farming. COMACO has an extensive presence across the province providing technical support and a market outlet for sustainable products. Their Sustainable Landscapes Project funded by ISFL was a pilot for ZIFLP.
C-Quest Capital LLC	Brent Moser Director of Operations – Africa Region Phone +1 407.491.0368 Skype moser. brent E-mail bmoser@cquestcapital.com Website www.cquestcapital.com	Role in the ISFL ER Programme: Energy efficient stoves service provider C-Quest Capital LLC (CQC) is a social impact project developer whose purpose is to transform the lives of families in poor communities around the world. CQC do this by providing access to sustainable energy services and clean energy technologies that reduce greenhouse gas emissions, combat global climate change, and improve the health of those in need. CQC was founded in 2008 and is headquartered in Washington D.C., USA, with subsidiaries in India, Malaysia, Singapore and Cambodia and on-ground teams in Malawi and Zambia. CQC develop high impact carbon finance projects under three operational platforms: Cleaner Cooking, Efficient Lighting and Sustainable Energy. We develop and implement our Transformation Carbon projects directly with our own subsidiaries or through our diverse array of field-based partners for maximum investment impact.
Local Communities	Available upon request	Local Communities: 1. Ensure successful implementation of sub-projects and other community-based initiatives promoted within the jurisdictional scheme, covering both carbon and non-carbon benefits. 2. Ensure delivery of their commitments towards the sub-projects (land, labour, raw materials, as indicated in the sub-project proposals and other legal agreements such as the Community Forest Management agreements. 3. Ensure that the governance structures are in place and functional at all times (fiduciary, safeguards, benefit-sharing according to constitutions). 4. Use traditional systems to ensure potential conflicts around the ERP activities are resolved.

2.2.4 Description of coordination between entities involved in ISFL ER Programmes

Coordination across the Government Agencies for implementation of the activities for EP-JSLP will be performed by the Eastern Province ER Implementation Unit. This will be supported through the national level by the REDD+ Coordination Unit. The EP-JSLP will be implemented as a government programme operating through existing planning and coordinating structures at both Provincial and District level as outlined in the National Planning and Budgeting Act, 2020. It is envisaged that the said structure will be meeting regularly to plan, monitor and report on development activities at both District and Provincial levels, and feed into the National Development Planning Processes. Their composition also includes representation from: (i) civil society; (ii) faith-based organisations; (iii) parastatals; and (iv) the private sector. The reporting structure at National level is accordance with section 8 of the National Climate Change Policy, 2016, covering technical committees, Policy review committees and ultimately, the Council of Ministers (see Figure 1. EP-JSLP Implementation and Governance Arrangements).

Section 3: ISFL ER Programme Design

3.1 Planned Actions and Interventions in the Programme Area, Including Financing

3.1.1 Drivers of AFOLU emissions and removals

The major sources of emissions in the Eastern Province are from degradation in forest land remaining forest land (46.7%), forest land converted to cropland (16%), grassland (14%) and settlements (8.5%). Fuelwood extraction, forest fires and agricultural expansion were identified as the primary output and degradation across the whole Eastern Province related to these categories, with fuelwood extraction and forest fires corresponding to AFOLU category forest land remaining forest land and agricultural expansion relating to AFOLU category forest land converted to cropland (Gilbert Wathum et al, 2016). About 156,000 ha of forests were estimated to have been lost in the Eastern Province between 2000 and 2014 – primarily due to agricultural expansion. Fuelwood extraction was estimated to affect 16,000 ha/year in 2016; while fires burnt about 678,000 ha of forests per year on average between 2000 and 2014 (Gilbert Wathum et al, 2016). Forest fires and other types of biomass and crop residue burning, including unsustainable agricultural practices are also identified as the main drivers of cropland remaining cropland. A comprehensive analysis of the drivers of emissions and removals is provided in Annex 1: Drivers of AFOLU Emissions and Removals

Emissions from forest land remaining forest land are caused primarily by communities that are reliant on fuelwood and charcoal production for their livelihood. This includes unsustainable fuelwood extractions, inefficient use of fuelwood, the ease of access for fuelwood production in the Eastern Province (EP), and weak regulatory and institutional structures. While some of the fuelwood is consumed within the EP, much of the charcoal produced is transported to Lusaka for sale. Households in, and around the EP and charcoal producers are both agents of emissions generation, with fuelwood dependency and weak regulations having a high impact on the outcome. Forest fires are identified as another driver in this inventory category of forest land remaining forest land and is greatly impacted by climate change.

Conversion of forest land to cropland due to agricultural expansion is driven by unsustainable farming practices and is widely occurring across the EP landscape. The Drivers of Deforestation Study (Gilbert Wathum et al, 2016) identifies agriculture as the primary livelihood option for communities in the province, primarily due to lack of other reliable and sustainable options. Rapid

growth in population, low productivity in soils, and inadequate support to improve capacity in agriculture production have all contributed to this driver.

Emissions from cropland remaining cropland in the Eastern Province include those from crop residual burning and changes in soil organic matter due to unsustainable agricultural practices including lack of soil amendment practices, and forest fires. Nitrous oxide (N_2O) emissions from managed soils and Methane (CH_4) emissions from enteric fermentation in domestic livestock (non-dairy cattle) are the next drivers identified by the GHG Report in Annex 6. This relates to the application of fertiliser on agricultural soils and cattle, respectively.

Mitigation includes implementing activities that provide clear institutional arrangements, land tenure and forest governance in the overall management of forest and land. With agricultural expansion, forest fires, and unsustainable fuelwood use and extraction as the main causes of the drivers identified, the EP-JSLP ER Programme will emphasise Sustainable Forestry Management, Climate Smart Agriculture and more efficient energy sector engagement to support the planned activities of the programme.

3.1.2 Description and justification of the ISFL ER Programme's planned actions and interventions

The overall objective of EP-JSLP is in line with the National Climate Change Policy, which aims to reduce emissions and increase removals through coordinated efforts by the Government departments of Agriculture, Forestry, Energy and Wildlife and Parks to improve the management of forests and livelihoods. The EP-JSLP, through the baseline survey has identified the key drivers of land use change that contributes to GHG emissions and removals associated with AFOLU in the programme area. This is described in Section 3.1.1 Drivers of AFOLU emissions and removals. This is fully cognizant of the two main sources of GHG emissions in Eastern Province from degradation of forests (46%) and forest loss through conversion to crop land (16%).

Through the implementation phase of ZIFLP, activities including the adoption of sustainable landscape management practices, covering Climate Smart Agriculture and Sustainable Forest Management have been promoted. Community empowerment, strengthening local and traditional governance structures, and land use planning tools have been key to integrating and optimising multiple land use scenarios within the Eastern Province. There are opportunities to strengthen the connection of the planned activities to the drivers in the region, improving on the foundation that ZIFLP has built for implementation of the Emissions Reduction Phase. Existing Regulations and Policies that are in place that support the ISFL ER Programme are described in

more detail in Section 3.1.4 Analysis of Laws, Statutes, and Other Regulatory Frameworks.

The existing ZIFLP efforts are reflected in the main emission reduction interventions selected whose objectives are to:

1. **Reduce uncontrolled forest loss and degradation while increasing net forest cover through community participation in Sustainable Forest Management.** This will be achieved through interventions in support of Objective 1 of the National REDD+ Strategy: to reduce emissions from Protected Areas and Objective 2: effective management of forests in open areas, with emphasis on promoting the Government Policy of Community Forestry.
2. **Sustainably increase smallholder farmer agricultural productivity, income and welfare, through Climate Smart Agriculture.** This will be achieved through interventions in support of Objective 4 of the National REDD+ Strategy: good agricultural practices that mitigate carbon emissions are adopted.
3. **Reduce firewood and charcoal consumption, through improved utilisation of Wood fuel** through promotion of energy efficient wood fuel utilisation technologies in support of Objective 5 of the National REDD+ Strategy: By 2030 regulated production of wood fuel (charcoal & firewood) and its improved

   utilisation is in place
4. **Improve sustainable production of wood fuel** also in support of Objective 5 of the National REDD Strategy: Regulated Production of Wood fuel (charcoal and firewood). This includes sustainable woodlots.

Based on the analysis provided in Annex 1: Drivers of AFOLU Emissions and Removals, the Eastern Province JSLP ER Programme will support activities that are aimed to reduce AFOLU emissions and removals based on these four key components. These are described as follows:

Sustainable Forest Management: Sub Objective 1 of the Long-Term Implementation Workplan is centred on Sustainable Forest Management practices in the EP. The focus of this sub-objective includes sustainable forest management in Protected Forest Areas and community forests managed by communities, as well as support resources for wildlife habitat management in national Protected Areas. This sub-objective will include activities related to capacity building of the Forestry Department and Department of National Parks and Wildlife, enhancing Protected Area management and monitoring including

biodiversity monitoring, nursery establishment and plantation establishment & management, environmental protection and control functions. Key will be promoting community participation in forest management, forest-based livelihoods and enterprise development, with emphasis on non-timber forest products. These activities are directly linked to the underlying causes of the main drivers of forest fires, and unsustainable fuelwood extraction. Further support to capacity development, strengthening community institutions to sustainably manage natural resources as well as manage and share carbon monetary benefits equitably within their communities. Initial steps have been undertaken through the implementation phase of the ZIFLP. The emissions reduction phase (EP-JSLP) will provide the vehicle for replication and expansion across the Province. The outcome will be reduced emissions from sustainably managed forests and more sustainable forest-based livelihoods.

Climate Smart Agriculture: Sub Objective 2 of the Long-Term Implementation Workplan relates to the agricultural sector and the activities they will carry out. Activities related to this sub-objective include support for conservation agriculture, soil fertility and management practices aligning to farmers' indigenous knowledge, technical assistance to increase biomass and carbon, strengthening of agricultural extension services, increased support for integrated agricultural and agroforestry research, development of community enterprises, implementation of agroforestry support for sustainable livestock and fisheries practices, capacity building on climate change, and diversification of livelihoods. This sub-objective will include increasing the use of improved planting and enrichment inputs, incentives for crop value chains with consideration for premium prices for specific crops grown by farmers who must commit to agroforestry standards. The incentives will be targeted at farmers who address the various techniques of intercropping with farmer selected multipurpose trees/shrubs, and improved livestock management, especially for ruminants where improving veterinary services and productivity of existing stock of livestock will be emphasised. Initial steps have been undertaken through the ZIFLP with promising results and the EP-JSLP will provide the vehicle for replication and expansion across the province. Outcomes include reduced emissions from agricultural soils and increased yields supporting improved livelihoods and wellbeing.

Improved Utilisation of Wood Fuel: Sub Objective 3 is centred on the Energy sector promoting fuel efficient technologies to improve the utilisation of wood fuel. This sub-objective will include activities that promote the establishment of woodlots, distribute improved cookstoves, conduct research and development on improved fuel sources, training on new fuel sources, and monitoring of implementation of new sources. Initial steps have been undertaken through the ZIFLP and the EP-JSLP will provide the vehicle for replication and expansion across the Province. Consideration for alternative energy sources/fuels such as

solar and biomass briquettes for industrial fuelwood will be considered. Envisaged outcomes include reduced emissions through better utilisation of wood energy.

Regulated Production of Wood Fuel: Sub Objective 4 considers regulated production of wood fuel and sustainable charcoal production systems within the EP. Activities related to this sub-objective include awareness activities with communities, training of local charcoal production groups on new technologies, piloting identified charcoal production technologies within the EP, and assessing the impact of the new technologies identified. This intervention will be a new activity in Eastern Province. Envisaged outcomes include reduced emissions through better production and management of wood energy.

Details on implementing partners is provided in Section 2.2.23 Organisation(S) Responsible for Managing/Implementing the ISFL ER Programme.

Timeline of Planned Activities

The Long-term Implementation Work Plan for the Eastern Province JSLP ER Programme, provided in Annex 13: Long-term Implementation Work Plan was developed by the Forestry Department, the Department of National Parks and Wildlife, the Ministries of Agriculture, Livestock and Fisheries, Local Government, and Energy in a collaborative process. The long-term Implementation Work Plan prioritises activities based on available funds and their impact on reducing emissions and increasing removals in the Eastern Province. The column in the workplan called “Implementation Years” is assigned for each Project Activity to demonstrate years of implementation which is tied to the budget.

The EP-JSLP clearly indicates the years of required investments to deliver technical services and support to beneficiaries showing many of these are to occur in the early years in order to generate the changes in land management through Climate Smart Agriculture and Sustainable Forest Management and Community Forestry that will result in required ERs to trade and generate the revenue for the performance and direct allocations under the Programme. This may require greater emphasis on provision of carbon non-monetary benefits to targeted beneficiaries in the first period followed by performance-based payments based on the adoption and protection interventions required for the generation of ER revenue, i.e., results-based finance in the latter part. An analogy might be lead farmers adopting demo plots for CSA/Agroforestry will be encouraged through the provision of extension services through the direct budget allocations. Once the farmer expands the demo plot to the rest of the household farm holding and there is replication and adoption within the group,

then the group and its members can be recipients of performance-based payments.

In the long-term performance payments provided under the benefits sharing plan will both reward and encourage replication and adoption within and outside the initial groups that are engaged early on as well as increase the livelihood activities as ER mitigation strategies. Capital works to improve infrastructure for service delivery will be supported once results-based payments are sustained.

3.1.3 Financing plan for implementing the planned actions and interventions of the ISFL ER Programme

Implementation Costs

The implementation budgets were created on an "incremental basis" implying that only the additional costs not already covered by government or other sources were budgeted for[5]. The said budgets were prepared by each of the government agencies leading the implementation of each result area.

The following agencies prepared budgets for each main activity by result area which was mapped to the long-term implementation workplan. Budgets and implementation years were provided for main activities such that the annual budgets reflect the expected pattern costs over a 5-year period.

Result Area – Implementation Budget	Agency
Climate Smart Agriculture (and Livestock)	Department of Agriculture under the Ministry of Agriculture Ministry of Fisheries & Livestock
Improved Utilisation of Wood Fuel (Stoves)	Department of Energy
Regulated Production of Wood Fuel (Sustainable Charcoal Production	Forestry Department, Department of Energy
Sustainable Forest Management	Forestry Department Dept of National Park and Wildlife
Grants Facility and Other Incentives, etc	EP-JSLPIU in consultation with Provincial & District Technical Groups
MRV	ZEMA, Forestry, Agriculture, Livestock, Energy & Local Government

[5] GRZ Budgets are published annually in the Yellow Book.

Table 6. EP-JSLP Implementation Cost Budget by Recipient (5 years)

Planned action/intervention and timing for implementation	Financing required (US$)	Financing identified/ secured (US$)	Sources of financing	Surplus or gap (US$)	Proposed financing/ measures to address gap
Climate Smart Agriculture (and Livestock)	4,396,495	1,150,000	ZIFLP & GEF grant	3,246,495	Multi-lateral funding Agencies / Sales of VERs
Improved Utilization of Wood Fuel (Stoves)	839,132	200,000	ZIFLP & GEF grant	639,132	Multi-lateral funding Agencies/ Sales of VERs
Regulated Production of Wood fuel (Sustainable Charcoal Production	501,667	50,000	ZIFLP & GEF grant	451,667	Multi-lateral funding Agencies/ Sales of VERs
Sustainable Forest Management	8,924,193	1,100,000	ZIFLP & GEF grant	7,824,193	Multi-lateral funding Agencies/ Sales of VERs
Grants Facility and other Incentives, etc	6,062,076	100,000	ZIFLP	5,962,076	Multi-lateral funding Agencies/ Sales of VERs
Programme Mgt & Admin Costs	6,596,968	1,300,000	ZIFLP & ISFL grant	5,296,968	Multi-lateral funding Agencies/ Sales of VERs
Policy, Legal & Enforcement	407,831	100,000	ZIFLP	307,831	Multi-lateral funding Agencies/ Sales of VERs
Costs of MRV	2,426,211	800,000	ZIFLP & ISFL grant	1,626,211	Multi-lateral funding Agencies/ Sales of VERs
Management of safeguards	400,000	200,000	ZIFLP & ISFL grant	200,000	Multi-lateral funding Agencies/ Sales of VERs
Total	**30,554,573**	**5000,000**	**N/A**	**25,554,573**	**N/A**

Financial and economic analysis, Sensitivity analysis and Proposed fund flow arrangements

The EP-JSLP Financing Plan reflects the main mitigation interventions selected whose objectives are to: 1) Reduce uncontrolled forest loss and degradation while increasing net forest cover through community participation in Sustainable Forest Management, 2) Climate Smart Agriculture, 3) reducing firewood and charcoal consumption through promotion of energy efficient technologies, as well as 4) improve sustainable production of wood fuel. The compilation process included interviews with each implementing partner (agriculture, forestry, wildlife, fisheries and livestock) for the key mitigation strategies, Local Government for enabling environment and ZEMA for the MRV. A table of targets was developed as framework for costing (and for estimating the ex-ante ERs). The Financing plan covers the whole jurisdiction. The costings are based on services and works through ZIFLP (implementation phase) workplans with a mix of operational costs and investments, service contracts and grants. Implementation budgets do not cover the costs of implementing activities that are in the nested (existing REDD+) programme areas. It is expected that sales from ERs the projects will generate prior to declaration of the jurisdiction will

fund their operations and benefit share to beneficiaries within the nested projects in 2023 to 2025. Thereafter, as nested projects they would receive a share of the revenue from sales of ISFL ERs or allocated of VERs in accordance with their nested emissions reduction performance agreements under the Benefit Sharing Plan. The ER revenue estimate which would fund the BSP was based on the ex-ante ER estimates developed by the consultant CEEEZ. It has been communicated that ISFL will cover third party verification costs – external audit and therefore these are not included. Further it is assumed this is for the full ERPA term. Some investments are scheduled to reflect Cashflow with respect to revenue flows during monitoring period – particularly investments and indirect carbon – non monetary benefits. MRV reflects sector roles in data collection, processing and reporting.

The sensitivity analysis highlights those small changes in costs as well as a drop in revenue, could have significant costs implication for the financial viability of the programme. A transition funding for the PIU and some MRV costs will be provided through the ISFL grant. This will be clearer once validation is complete and ERPA negotiations are done. Secondly, support to delivery of ER mitigation interventions through sectors will be supported by the GEF grant, estimated at $2million.

In terms of funds flow, the legal entity is a Ministry of the GRZ, thus the EP-JSLP will fall within the terms of the Public Finance Management Act, 2018 that specifies controls for managing public funds. Furthermore, the governance arrangements for the Benefit Sharing Plan draws from existing responsibilities at provincial and district levels as outlined in the National Planning and Budgeting Act, 2020.

GRZ service delivery and oversight costs – in kind contribution

The EP-JSLP will be implemented as a government programme involving the key sectors of Forestry, Agriculture, Wildlife and Local Government. As key implementers, the emissions reductions service provision, oversight and MRV will be primarily conducted by GRZ personnel from the highlighted sectors and departments. Therefore, the costs of this service delivery and oversight provided by Government are not directly included in the cost calculations. Therefore, these can be considered as the GRZ (in kind) contribution to implementation of the EP-JSLP. A calculation was made in terms of sector costs – personnel emoluments and salaries as well as sector operational budgets taken from the national budget (Yellow Book) for Eastern Province. The justification is structured in such a way that all sector activities will either directly or indirectly contribute to emissions reductions or support to livelihoods as mitigation measures. The estimated value of this in-kind contribution is $6.8m per year in 2023 rising to $10.5m per year in 2031.

Revenue Estimates

The ex-ante carbon estimates are currently based on the methods defined in Section 4.4.2. However, they will require to be updated with any changes made during the audit process to the ISFL crediting baseline. It is assumed that validation and signing of the purchase agreement will take place in June 2023, with verification in 2025 and delivered for ISFL for payments in late 2025 and then verified annually thereafter. The price for jurisdictional quality ISFL purchases is assumed to be US$ 15/t floor price and for all VERs over the 6 million tonnes that is expected to be purchased under the ISFL ERPA (assuming no optionality is exercised) will be sold to other buyers.

Results-based Benefits Payments

In view of the fact that the Benefits Sharing Plan is yet to be finalised with final beneficiary consultation, there are "placeholders" for illustrative purposes. These are based on the government's goal of providing a majority of benefits in the form of results-based payments to proactive initiatives and community efforts. The aim is to ensure that the communities participating in the production of ERs receive reward, while ensuring that mitigation services are funded and delivered to those parts of the province where emission levels are of concern and need to be reduced.

For the current financial plan, the following assumptions were made for allocation of results-based benefits. Below are the percentages of the projected ex-ante gross carbon revenue that is paid to different stockholder groups based on the area of agreed responsibility, either through the Chiefdom Emissions Reduction Performance Agreement (CERPA), Community Forest Management Agreement or Nested Emissions Reduction Performance Agreement (NERPA) under the centralised nested approach of the Jurisdiction.

The percentage share is the value of the Verified Emissions Reductions attributed to their agreed and delimited area of responsibility using the monitoring tools and remote sensing data available, as tabulated below.

- Community Groups (nested & non-nested Areas) 55%
- ER Programme Operational costs (EP-JSLPIU) 15%
- Existing (nested) REDD+ projects and ER Service Providers 30%
  - LCFP (BCP and Communities)
  - SALM (COMACO and Communities)
- **Total** **100%**

The sharing within the nested projects is based on gross revenues, the Community will get: 55%, Existing REDD+ Projects and ER Service Providers: 30% of the total revenue in their respective areas of operations, and

Government: 15% to cover PIU and MRV costs. Further details are provided in the Draft Benefit Sharing Plan (Annex 4).

Note: Performance based payments will be made following deductions of the performance buffer and determined based on eligibility criteria and performance-based payment criteria.

Cash Flow and Funding Gap

Delays in the implementation of ZIFLP field activities as well as development of the products for the EP-JSLP ERPD caused by the COVID 19 global pandemic, have hindered securing the scale of sustainably managed land from which to generate the initial ERs for the EP-JSLP. Without any other sources of funding besides carbon revenue to cover all the new activities that are planned under the EP-JSLP (ERP of the ZIFLP), the Programme has a financing gap, particularly in the early years prior to validation and payment. While a no cost extension to the implementation phase of ZIFLP was approved in August 2022 for 18 months, the Government is seeking to fill the financing gap in through securing additional funds from the partners supporting the implementation phase of ZIFLP (ISFL, GEF). So far commitments of US$ 3.5 million to cover some of the implementation and management costs of the emissions reduction phase (year 2) until year 3 when carbon revenue is expected to make the ER Programme financially viable. However, there is currently a projected shortfall of $6,327,833 mainly due to the first ISFL 2-year monitoring period.

3.1.4 Analysis of laws, statutes, and other regulatory frameworks

The assessment primarily highlights the current tenure based on two comprehensive studies supported by USAID which assessed land tenure in EP and collected data from interviews with 134 villages across Chipata District in 2014 and the baseline data collection findings from an impact report. **Section 3.2** of the ERPD discusses the stakeholder and beneficiary consultation that was carried out by the BSP consultant.

The following provides a summary of laws, statutes, regulatory frameworks that impact issues of natural resource management, forest management and land use related to the Programme's activities:

The Lands Act 1995

The formal recognition of tenure rights in rural areas (individuals and groups) as specified under the Zambian Constitution and Lands Act. All land in Zambia is subject to this Act, but no land can be alienated for a term longer than 99 years. The Lands Act of 1995 provides for the continuation of leaseholds and leasehold tenure as well as for the continued vesting of all lands in the President who has

the power of alienation (land held under customary tenure is subject to certain conditions) (sect. 3). It also provides for the statutory recognition and continuation of customary tenure (sect. 7), for the conversion of customary tenure into leasehold tenure (sect. 8) and establishes a Land Development Fund and Lands Tribunal (Parts III and IV), (Republic of Zambia, 2006).

The Statutory Instrument of 2006 updates the procedure on conversion of customary tenure into leasehold tenure. A person: (a) who has a right to the use and occupation of land under customary tenure; or (b) using and occupying land in a customary area with the intention of settling there for a period of not less than five years; may apply for conversion to the Chief of the area where the land is situated.

Land in Zambia is administered through various statutes by established institutions in the country. One of such institutions that plays a significant role in land alienation is the Ministry of Lands. The Commissioner of Lands on behalf of the President of Zambia performs delegated functions. Institutions that play a role in the process of land alienation are local authorities (i.e., city, municipal or district councils). In the Eastern Province there are eight local authorities[6], which have delegated authority to discharge land alienation functions (on behalf of the Commissioner of Lands) on both State land and customary land.

Councils are local planning authorities with the statutory and other planning and development, functions which include:

1) regulate, control and plan for the development and use of land and buildings within its area;
2) prepare and implement integrated development plans, local area plans and sectoral plans (these have been completed as part of the enabling conditions of the EP-JSLP; and
3) receive and process applications for planning permission for the development of land;

In relation to customary land, the Lands Act places emphasis on the Republican President to consult local authorities whenever the President alienates land in a Customary area. Local authorities have no authority over customary land matters except where there is conversion of customary tenure to leasehold, and their involvement is justified based on the procedure on conversion of tenure into leasehold which include (Moombe, 2017):

[6] For the Districts of Chadiza, Chipata, Katete, Lundazi, Mambwe, Nyimba, Petauke and Vubwi

- Any person who has a right to the use and occupation of land under customary tenure may apply to the Chief of the area where the land is situated, for the conversion of such holding into leasehold tenure;
- The local authority receives a form from the Chief indicating that the Chief has consented to the conversion;
- The local authority considers whether there is a conflict between customary law of that area and the Lands Act before making a recommendation to the Commissioner of Lands; and
- It is the duty of the council to ascertain any family or communal interests or rights relating to the parcel of land to be converted and specify any interests or rights subject to which a grant of leasehold tenure will be made before making a recommendation to the Commissioner of Lands

Forests Act, 2015

This Act provides for the establishment and declaration of National Forests, Local Forests, Joint Forest Management Areas, Botanical Reserves, Private Forests and Community forests; provide for the participation of local communities, local authorities, traditional institutions, non-governmental organisations and other stakeholders in Sustainable Forest Management. It provides for the conservation and use of forests and trees for the sustainable management of forests ecosystems and biological diversity; implementation of international conventions including the United Nations Framework Convention on Climate Change, Convention on International Trade in Endangered Species of Wild Flora and Fauna, the Convention on Wetlands of International Importance, especially as Water Fowl Habitat, the Convention on Biological Diversity, the Convention to Combat Desertification and any other relevant International Agreements to which Zambia is a party. It repealed and replaced the Forests Act, 1999.

The law states that "The ownership of all trees standing on, and all forest produce derived from, customary areas, National Forests, Local Forests, State Land, botanical reserves and open areas is vested in the President, on behalf of the Republic, until lawfully transferred or assigned under this Act or any other written law."

The law includes carbon in the definition of a "major forest produce - means a tree, part of a tree or derivative product such as timber, charcoal and carbon, other than leaves, flowers, fruits and seeds". It further requires a person who intends to fell, cut, work or remove any major forest produce from any State Land, land under leasehold tenure vested in any person or customary area or sell, offer for sale, barter or deal in any major forest produce to apply for a license or permit under Part (PART VI (50 (2)) of the Forest Act.

Under the Forestry Act, there are key components that will be leveraged for the EP-JSLP, Community Forestry Management and potentially Joint Forest Management.

Forests (Community Forest Management) Regulations, 2018 (S.I. No. 11 of 2018)

This Regulation (Statutory Instrument to the Forest Act 2015) concerns management of specific forest areas by local communities and related matters. Community Forest Management may be applied in (a) open areas; (b) local Forests; and (c) Game Management Areas. The Director of Forestry, in consultation with the Minister, may consider Community Forest Management in any other type of forest (Republic of Zambia, 2018).

To establish Community Forest Management (CFM) areas, a group of persons living in the vicinity of a forest may apply to the Department for recognition as a Community Forest Management group with the consent of the Chief of the area in which the forest is located. The group can then enter into a Community Forest Management Agreement (CFMA) with the Department in respect of an area or forest for which the Community Forest Management group (CFMG) is formed (Moombe, 2017). Three principal establishment stages for community forests involves:

1. Formation of community forest group
2. Application for recognition as CFM group
3. Application for a CFM Agreement

With the 2018 Community Forest Regulations, which states in Section 4 (1) that Community Forest Management may be applied in GMAs, provides a significant opportunity for the Eastern Province. There are key components of this law that impact the implementation of the EP-JSLP, which include the CFM group application step, the requirement to conduct consultation of local users and rights holders, consent of the Chief, and designate the intended usage that indicates the balance between forest protection and management, development, utilisation and forest enterprise development. In addition, for completing the CFM agreement it requires a Community Forest Management plan (covering at least 5 years) that provides details on all types of use including uses, and it grants “The right to issue community permits and collect revenue for those products and uses provided for in the Agreement.” The Luangwa Community Forestry Project ability to trade in the VCS markets is based on the transfer of rights under this Statutory Instrument.

The EP-JSLP has a considerable focus in strengthening and expanding Community Forestry areas led by the Forestry entities.

Wildlife Act of 2015

This Act repeals the Zambia Wildlife Act, of 1998; and provides for matters connected with, or incidental to, the foregoing including the establishing the Department of National Parks and Wildlife in the Ministry of Tourism. The Act covers the establishment, control and management of National Parks, bird and wildlife sanctuaries. It provides for the promotion of opportunities for the equitable and sustainable use of the special qualities of public wildlife estates and the establishment, control and co-management of Community Partnership Parks.

In terms of community issues, it provides for the sustainable use of wildlife and the effective management of the wildlife habitat in Game Management Areas with local communities as beneficiaries, including the involvement of local communities in the management of Game Management Areas through Community Resource Boards (CRBs).

In addition, it provides for the development and implementation of management plans; the regulation of game ranching; the licensing of hunting and control of the processing, sale, import and export of wild animals and trophies. It covers aspects of implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Wetlands of International Importance especially as Waterfowl Habitat, the Convention on Biological Diversity, the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora and other international instruments to which Zambia is party. It repeals the Zambia Wildlife Act, 1998.

Chiefs Act, 1994

The Chiefs Act provides for a Chief to discharge:

a) Traditional functions of his/her office under African customary law in so far as the discharge of such functions is not contrary to the Constitution or any written law and is not repugnant to natural justice or morality.

b) Such functions as may be conferred or imposed upon him/her by this Act or by or under any other written law.[7]

However, it should be noted that the chiefs have conditional discharge of functions, whereby their role is restricted to performance of functions under customary law in so far as such is not contrary to the Constitution or any other written law.

[7] The Chiefs Act, Cap. 287. Section 10(1)(a)

On customary lands the Chiefs play a key role in land administration and alienation of land. As most Game Management Reserves are under customary tenure, the Chief plays a key role in alienating land for leasehold through the following procedure (Moombe, 2017):

- Any person who has a right to the use and occupation of land under customary tenure may apply to the Chief of the area where the land is situated, for the conversion of such holding into leasehold tenure;
- The Local Authority receives a form from the Chief indicating that the Chief has consented to the conversion;
- The local authority considers whether there is a conflict between customary law of that area and the Act before making a recommendation to the Commissioner of Lands; and
- It is the duty of the Council to ascertain any family or communal interests or rights relating to the parcel of land to be converted and specify any interests or rights subject to which a grant of leasehold tenure will be made before making a recommendation to the Commissioner of Lands[8].

In cases where the President seeks to alienate customary land, the Lands Act places emphases that the President to consult local authorities. This means that the state has the overall power to alienate land in the Eastern Province and Zambia as a whole.

The Forest (Carbon Stock Management) Regulations, 2021 (Statutory Instrument #66 of 2021)

Forest carbon is a major forest product as defined by the Forests Act, 2015, as such ownership is vested in the President on behalf of the Republic until lawfully transferred or assigned under the Act. The regulation of forest products is a responsibility and function of the Forestry Department. This has been set out in the Forest (Carbon Stock Management) Regulations, 2021. The statutory instrument covers all of Zambia but has significant relevance for EP-JSLP because it is the first province to be developing a Jurisdictional Sustainable Landscape Programme and will be selling Emission Reductions and removals to the Biocarbon ISFL results-based payment programme. The Statutory Instrument (see Annex 12) sets out the application and approval processes for projects and programmes engaged in forest carbon stock management covering generation of Greenhouse Gas Emission reductions or removals. The Statutory Instrument allows for regulation, monitoring and control of carbon related

[8] Section 3(4)(b) and (d) of the Lands Act, chapter 184 of the Laws of Zambia

project or programme activities, in order to protect forests and communities depending on forests for their livelihoods from unsustainable practices.

A summary of the main requirements and processes are as follows:

- A permit holder is authorised to engage in forest carbon management (defined as "engaging in the generation of GHG emission reduction or removals.")
- Permits may be granted on land under virtually any tenure and management type.
- Permits can be for projects within Jurisdiction and Jurisdictional Programmes are also required to get a permit for them to operate.
- Activities eligible for a permit include:
    - Deforestation reduction,
    - Forest degradation reduction,
    - Forest conservation,
    - Sustainable management of forest and
    - Enhancement of carbon stocks
- A permit holder must show proof of transfer of user rights of forest and land, which includes various requirements on customary land, and follow compliance with other regulatory frameworks including environmental management (section 7).
- Rules regarding nesting of projects and programmes, including that projects in areas within a Jurisdictional Programme cannot sell carbon independently as they must sell through the Jurisdictional Programme approval is given under 18 (3).
- Rules regarding nesting are covered in section 18 (1) such that an approved Jurisdictional Programme shall take precedence over a project that is encompassed within the Jurisdiction.
- The SI provides for a "grand parenting" period for projects (with permits) that are selling carbon within a Jurisdictional Programme where the project may be granted approval to continue independent selling for a period not exceeding 3 three years from the date of approval of the Jurisdictional Programme by the Director of before it is obligated to trade through the Jurisdictional Programme permission to do so, see 18(3).
- The SI contains rules relating to double counting of Emissions Reductions.

See Section 3.5.1 for more discussion on carbon tenure and title.

Implications for the EP-JSLP: In accordance with the Forest (Carbon Stock Management) Regulations, sections 6, the EP-JSLP as well as other entities require to apply for a Forest Carbon Stock Management (FCSM) Permit. The EP-JSLP would have to comply with the conditions of a FCSM Permit. Through the process of developing the EP-JSLP conforming to ISFL requirements, many of the FCSM Permit application requirements are at an advanced stage and form part of the ERPD which is currently under review by parties.

The step wise process is for the existing projects to apply for a FCSM Permit as described in the Regulations. This starts with an Expression of Interest (section 8 of the Regulations). Secondly, following approval of the EOI, the project may apply for a permit with required supporting information (section 11).

Existing REDD+ carbon trading projects such as managed by BCP and COMACO are required by the Regulations to apply for a FCSM permit. This is a requirement of the Regulations irrespective of the Jurisdiction being declared.

Registration of the Jurisdictional Programme: In accordance with the FCSM Regulations, section 18.1, the Jurisdictional Programme would need to be approved by the Director of Forestry.

United Nations Framework Convention on Climate Change (UNFCCC)

Zambia is party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris agreement. Under the Paris agreement, countries are required to submit (NDCs) every five years. Zambia submitted its first NDC on 9th December 2016 which consisted of both mitigation and adaptation components based on the country's national circumstances. The NDC was submitted with a conditional pledge of reducing Greenhouse Gas (GHG) emissions by 25% by 2030 against a base year of 2010 under the Business as Usual (BAU) scenario with limited international support or by 47% with substantial international support.

On 31st December 2020 Zambia through the Ministry of Lands and Natural Resources, submitted a Provisional Updated NDC reserving the right to further update the NDC by 31st July 2021. With consultations from various stakeholders ranging from line Ministries, Civil society Organisations, Private Sector, Provincial stakeholders and Cooperating Partners, Zambia finalised, submitted its revised, and updated NDC to the UNFCCC secretariat on 30th July 2021. By this submission Zambia enhances its NDC by broadening the scope of sectors under mitigation and elaborating the adaptation component of the NDC by developing indicators that will enable the country track progress on building resilience in both the human and physical systems and on adaptation actions.

This NDC was submitted with a conditional pledge of reducing Greenhouse Gas (GHG) emissions by 25% (20,000 Gg CO_2 eq.) by 2030 against a base year of 2010 under the Business as Usual (BAU) scenario with limited international support or by 47% (38,000 Gg CO_2 eq.) with substantial international support. The mitigation actions were focused on three programmes and closely match the proposed components of the EP-JSLP:

(1) Sustainable Forest Management;

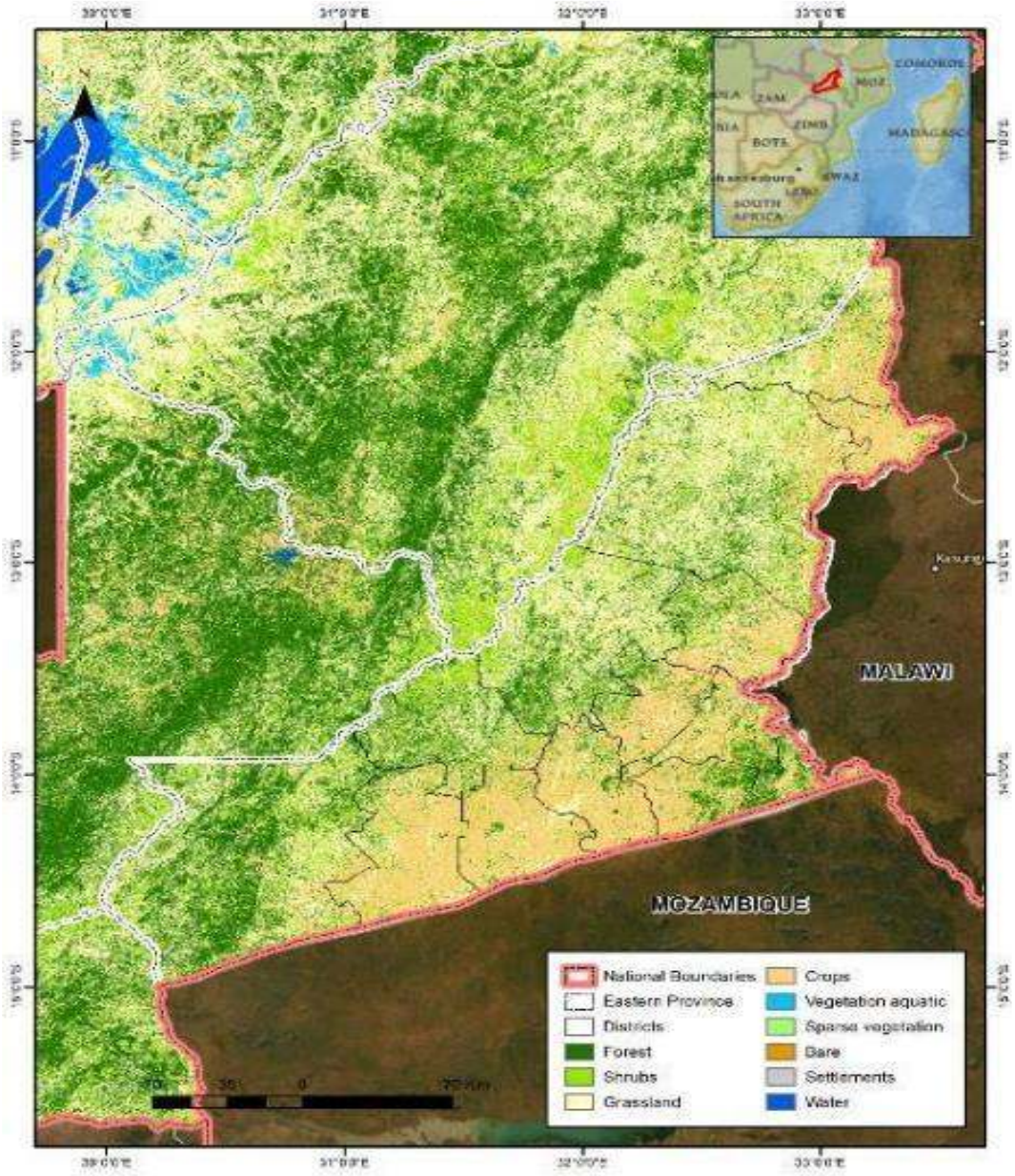
(2) Sustainable Agriculture; and

(3) Renewable Energy and energy efficiency.

Adaptation actions in the revised NDC were focused on strategic productive systems (agriculture, wildlife, and water), strategic infrastructure and health systems and enhanced capacity building, research, technology transfer and finance for adaptation. The country requires substantial resources to meet the means of implementation of the said interventions. The ISFL purchases through the EP-JSLP is envisaged to partly address the identified resource need.

3.1.5 Risk for displacement

The main risk of displacement of emissions for the EP-JSLP, is activity shifting leakage, that would come from addressing the key drivers of deforestation and degradation which include shifting cultivation, fuelwood extraction and charcoal production. For the drivers which might cause displacement, the mobility of the agents of deforestation and degradation will determine how much and whether they would shift their forest use to areas outside the Eastern Province. The geospatial location of Eastern Province has more than half of its borders with Malawi and Mozambique on the East and South and this does not require measuring international leakage (Map 1).



Map 1 Eastern Province's International Border with Malawi and Mozambique including 2016 LULC for the Eastern Province[9]

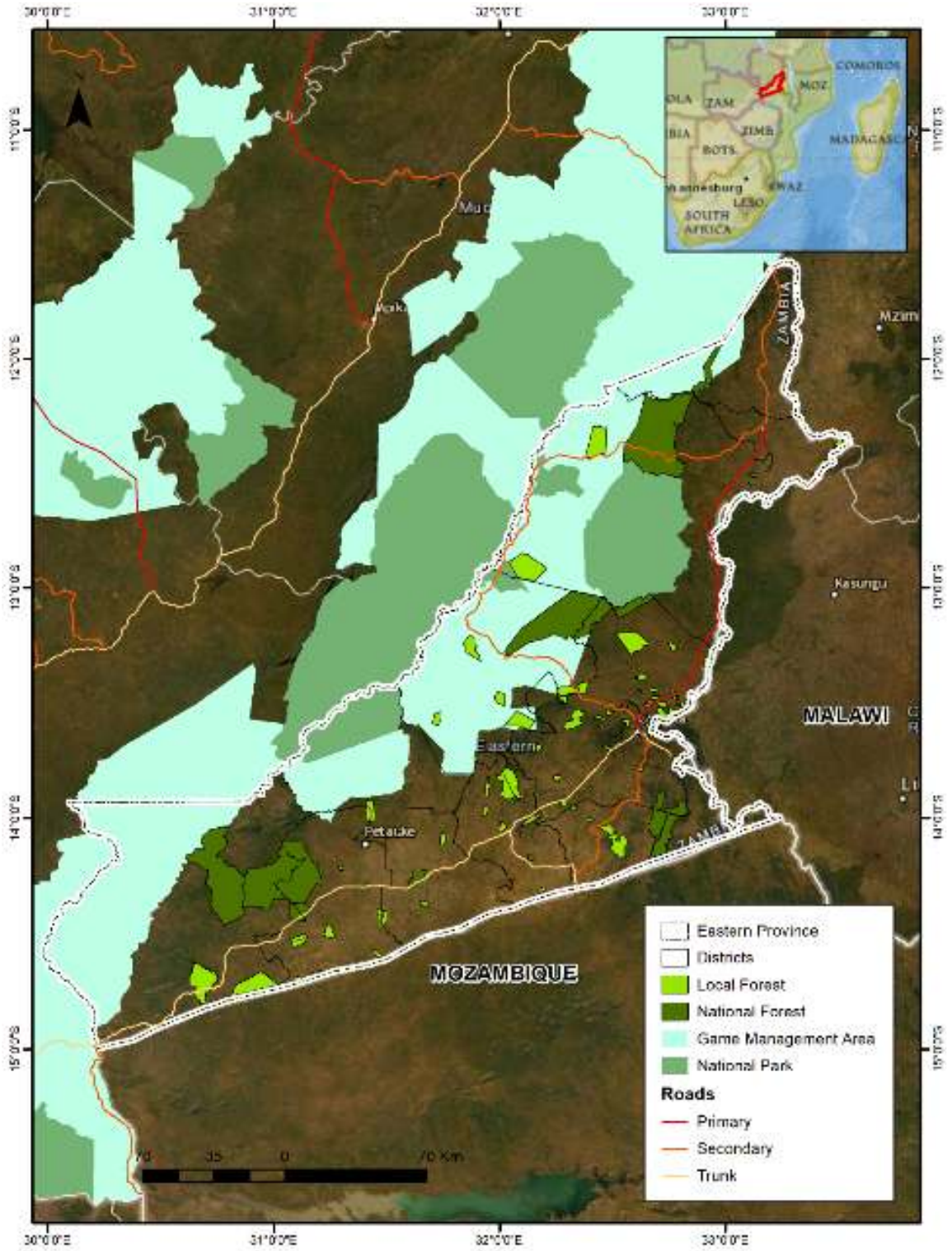
According to the coverage map for 2016 indicated in Map 1, most of the forests are located in the southwest of the province, while the main crop areas are on the border with Mozambique and Malawi, as a consequence of the National Parks and the GMAs in the northwest of the province. The drivers and core activities of

[9] http://geoportal.rcmrd.org/layers/servir%3Azambia_sentinel2_lulc2016

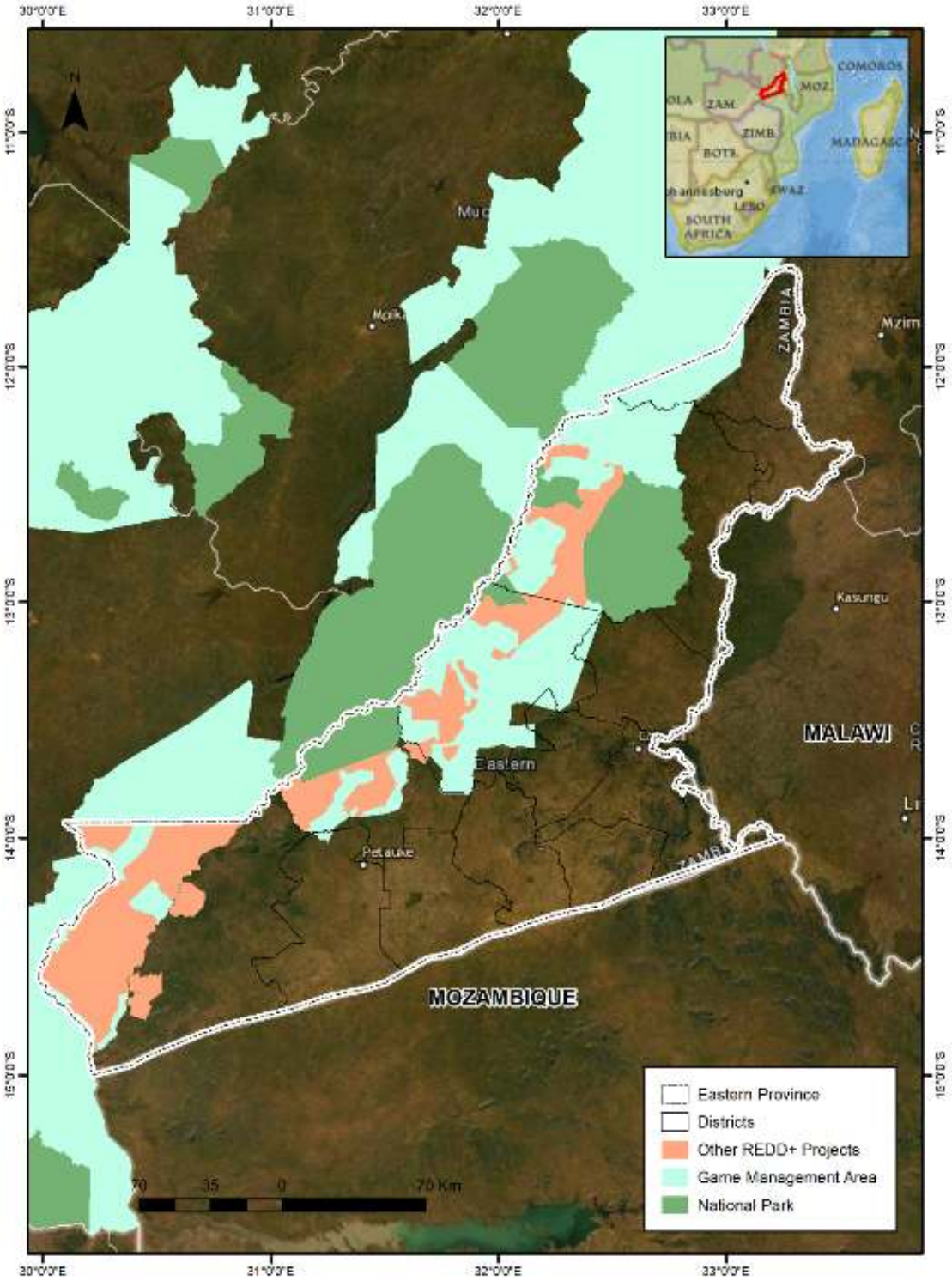
the EP-JSLP will not cause market leakage due to reducing production of commercial scale commodities such as timber or large-scale crops.

The Programme activities that seek to address these drivers include increased protection in National Parks and Game Management Reserves through collaborative management, promotion of Community Forestry, establishment of woodlots, introduction of fuel-efficient woodstoves, a sustainable charcoal programme and climate smart agriculture to address productivity and build resilience. The mobility of these agents is expected to be relatively low (except charcoal producers) as their drivers are local subsistence-based drivers where mobility depends on a cost-distance function based on mode of transportation, their local transport networks (major road, minor road, track, etc.), and the terrain around their villages. Given the limited road network near the province borders (Map 2), the risk of activity shifting leakage outside the province is relatively low. The government of Zambia is developing a set of regulations covering the production and trade in charcoal.

Beyond the limited road network that could facilitate agents' displacement along the Northern and Western boundaries, there may be agents very close to the provincial border who could still shift their forest use to areas outside of the Eastern Province due to improved protection of forests in the Eastern Province. However, in practicality, the Eastern Province's domestic border is almost fully covered with contiguous GMAs and National Parks which are managed generally as a wholistic unit across the province border. In addition, there is an existing carbon project managed by Biocarbon Partners that span the western border, thus protecting areas outside of the Eastern Province against displacement. These management units that will reduce displacement are shown in Map 2.



Map 2 Roads in Eastern Provence and Management Units implementing activities for the ISFL Programme



Map 3 Game Management Areas, National Parks and BioCarbon Partners along northern border

If there was a concern about the need to measure ex-post any displacement outside of the Eastern Province into the neighbouring provinces, a simple cost distance analysis could be used to define a leakage area and the deforestation would be measured ex-post against a baseline rate pre-programme.

3.2 Description of stakeholder consultation process

The first set of stakeholder consultations for the Eastern Province EP-JSLP ER Programme took place in February and March of 2020 in Lusaka and Eastern Province with national, provincial, district and local stakeholders. The Stakeholder consultations were structured as Focus Group Discussions (FGDs) and Informational Interviews, and included government representatives, Civil Society Organisations (CSOs), the private sector, traditional authorities and local community groups including Lead Farmers, Community Resource Boards (CRBs), and Community Forest Management Groups (CFMGs). This information gathering and sharing process informed the programme design and provided input into the initial draft of the benefit sharing plan (BSP) including:

- The role and proposed activities that each of the potential beneficiary groups will have in implementation of the programme activities that produce ERs and livelihood benefits;
- Types of benefits that could incentivise each of the said groups to make changes in land use practices and/or to invest in the protection of forests;
- The existing institutions and processes through which the identified groups receive benefits and establish forest management programmes (i.e., CFMGs); and
- Benefit sharing models that are currently being used that could inform the design of the BSP.

The outcomes of the consultations are described in more detail in Annex 5: Design Process for Benefit Sharing Arrangements for the ISFL ER Programme.

Additional Stakeholder Consultations were conducted from November 23rd – December 1st, 2020, throughout Eastern Province. The consultations were aimed at collecting a wide range of views from more stakeholders for the development of a robust BSP in line with national safeguards provisions and ISFL guidelines. The process was driven by GRZ and involved consulting with communities, traditional authorities, CRBs, CFMGs, CSOs, government institutions and private sector at national, provincial, district and chiefdom levels. GRZ teams conducted Focus Group Discussions and Informational Interviews with each of the categories of beneficiaries identified to review feedback on the initial design of the BSP.

The detailed Stakeholder Consultation Plan and feedback received from the said consultations is presented in Annex 4: Current Version of the Benefit Sharing Plan for the ISFL ER Programme. The Annex includes issues raised by stakeholders and how the issues were addressed in the BSP.

Validation Workshops of this Draft BSP took place during early 2023 where a summary, translated, version of BSP, was presented to a range of stakeholders and beneficiaries including community representatives (in clusters) throughout Eastern Province. Additional feedback received will be used to prepare the Advanced Draft of the BSP, which will be sent to the BioCF ISFL for final review.

3.3 Non-carbon benefits

In addition to carbon benefits, the success of the ER Programme depends in large part on the non-carbon benefits of the programme, such as increased yields from Climate Smart Agriculture (CSA), lower costs of production of crops, less labour/time for fuel wood collection, health benefits from improved cooking conditions, and increased knowledge for farmers participating in the programme. Other benefits might include increased knowledge and improved land tenure and security system. It should be noted that through stakeholder consultations, programme beneficiaries recognised various non-carbon benefits as important incentives. See Annex IV: Approach to Designing the BSP (Stakeholder Consultations).

The following were proposed as indicators for non-carbon benefits of the programme:

- Land users who would have received training for improving land management (% women);
- Land users who would have received training for agricultural productivity (% women);
- Government officials who would have received technical training on ISFL interventions;
- Number of government institutions who would have been provided with capacity building to improve land-use management;
- Time saving for household fuel wood collection;
- # Households that would have improved cooking conditions;
- Diversification of incomes; and
- Increased incomes from crops and NTFP

3.4 Description of the Feedback and Grievance Redress Mechanism (FGRM)

The ZIFLP is anticipated to have a positive impact on the lives of the rural communities and on the environment in the project areas. Some project activities might however, impact negatively on the environment and the livelihoods of the implementing communities. To ensure that the negative impacts are avoided or minimised, the ZIFLP is implementing environmental and social safeguards in line with the World Bank Policies and in country legislation. Project activities and impacts might, however, give rise to grievances which might be felt and expressed by a variety of parties including individuals, groups, or entities. The ZIFLP has put in place the Feedback and Grievance Redress Mechanism (FGRM) which has therefore, been prepared to ensure that the potential grievances arising from the implementation of the project activities are adequately addressed.

The FGRM has uptake channels which the Project has put in place which include:

1. At community level; there is a grievance redress committee which is made up of community members selected or appointed from the CFMGs, the Cooperative societies, Village Action Groups and Community Resources Board. This is the first point of grievance registration. The committees have grievance registers where the grievances are recorded. This stage represents the first attempt to address the grievance after which it is reported to the district if the is not addressed at community level.

2. At the district level; there is a Social Safeguards Committee made up of District Environmental and Social Development Officers with the guidance of the District Focal Point Person who is under the District Commissioner. This is the second level of conflict and grievance resolution and redress.

3. At Project level; there is the office of the Environmental and Social Inclusion Officer on the Project Implementation Team. This office has a dedicated line for grievances (+260767756129) where grievances can be reported to trigger redress processes.

4. The office of the National Project Manager is also open to take grievances and chime in the Environmental and Social Inclusion Officer and escalate grievances depending on scale to Provincial or National offices for action.

The community or individuals are free to tender in grievances at all these 4 levels depending on which level they feel free to air out their grievance. Confidentiality is at all levels ensured and individual are asked for consent if their names can be mentioned.

Staffing for FGRM has been noted to be critical by the project. At community level individuals are identified based on their ability to voice out and speak on issues objectively. At district level a team of environmental, health and social development team has been put in place with a capacity building strategy in place to enhance community engagement. The project safeguards specialist works with the community and District Multisectoral team members of the safeguards focal point team.

On transparency of the complaints and their resolution, the FGRM has a built-in feedback process which after resolution there is a communication channel created to report back to the aggrieved and ascertain if they are satisfied with the manner in which the grievance has been resolved. In addition, the process ensures proper documentation in the grievance register of the resolution and clear communication to the individual or communities involved.

There is a monitoring system to record number of grievances, similar or repeated grievances and resolutions. The system allows for a clear feedback mechanism and ascertaining whether the aggrieved are satisfied with the solutions. Primary monitoring responsibility lies with the Environmental and Social Inclusion Officer who reports to the National Project Manager, who in turn reports to the Provincial Project Steering Committee, chaired by the Permanent Secretary of the Provincial Administration.

Accessibility of the FGRM: This document has been made accessible through disclosure on the ZIFLP, ZEMA and the World Bank Websites. The document has also been operationalised through community radio stations and commercial radio stations and community engagement during ZIFLP public fora and grievance awareness talks. The effectiveness of the FGRM can be seen in the resolution of grievances at community and district level. Most of the grievances are resolved and noted as misunderstandings. Since the operationalisation of the FGRM, beneficiaries and community members have taken keen interest on how the Project is operating. As the implementation phase of ZIFLP ends, the Emissions Reduction Phase (EP-JSLP) will take over management of the FGRM.

Full details of the FGRM policy and responsibilities are provided in Annex 11: Feedback, Grievance and Redress Mechanism.

3.5 Assessment of land and resource tenure in the Programme Area

3.5.1 Description of land and resource tenure regimes in the Programme Area

The land and resource tenure assessments were conducted based on both desk review and stakeholder validation. The validation was done on the ground assessing customary land tenure across the province, although this was

restricted due to the global COVID 19 pandemic at the time. Beneficiaries and stakeholders who were consulted were the Traditional Leaders - Chiefs and council of elders in 11 selected chiefdoms as well as sampled community members. What was assessed was the methods of customary tenure. The process was consultative, transparent, and was conducted in a participatory manner. Input from relevant stakeholders informed the customary land documentation manual being developed and validated to feed into the planned National Land Policy.

The land tenure analysis drew primarily on three comprehensive land use studies which include (1) A Focus on Law and Practice in the Eastern Province (Moombe, 2017), (2) USAID Land Tenure and Property Rights (USAID, 2017) and (3) USAID Community Based Natural Resource Management in Zambia. The study by Moombe was conducted in 2020, and was based on literature analysis, key informant interviews and focus group discussions for the Eastern Province. The USAID CBNRM study from Jan 2020 synthesises the changing institutional environment with new developments and lessons learned at the local and field levels through a set of field-level case studies on both Community Forest Management and Wildlife conservation. The USAID Land Tenure Study is based primarily on literature reviews.

These two comprehensive studies done by USAID which assessed land tenure in EP were based on field data collected from interviews with 134 villages across Chipata District in 2014 and the baseline data collection findings from an impact report. Section 3.2 of the ERPD discusses the stakeholder and beneficiary consultation that was carried out. Further, validation was conducted during the filed validation of the SESA.

Zambia has a dual tenure system comprising on one part Statutory or Legal Tenure and on the other part Customary Tenure. Legally, there are three types of land tenure in Zambia 1) Customary, 2) Leasehold, and 3) Public, where most of the land is customary.

Customary

Under customary law, individuals, families, clans, or communities hold land from generation to generation, without temporal limitation. Customary tenure applies to individual plots, forest land, common land within a village, and communal grazing land. Most smallholder subsistence farmers cultivate customary land that may or may not be held in common ownership with the community/family, although the rights of farmers are individualized. The land often does not have formal documentation (e.g., certificates, titles) and the landholders do not pay land tax. Data from the Rural Agricultural Livelihoods Survey show that 6 percent of households in over 30 percent of chiefdoms

indicated having some form of documentation to their right to land. Some of these represent farm permits or village land registers and none are known to be spatially explicit (USAID, 2017).

Within customary lands, communities may establish and register Community Forest Management (CFM) areas, as a group of persons living in the vicinity of a forest which apply to the Department for recognition as a Community Forest Management group with the consent of the Chief of the area in which the forest is located. The group enters into a Community Forestry Management Agreement (CFMA) with the Director of Forestry in respect of an area or forest for which the Community Forest Management group (CFMG) is formed (Moombe, 2017). There are 48 CFMGs in Eastern Province with at least 6 under application. Almost all have entered into CFM Agreements. Figure 2: Is taken out of a report from Moombe (2017) prior to CFM being implemented in EP. The remaining land extent could be considered unclassified customary land. All CFM plans include for forest protection and management including fire management. All these contribute to ER results in EP.

In the Eastern Province the main land management types are Game Management Areas (29.2%) and Community Conservation Areas (CCAs, 10.7%) (Moombe, 2017). Note that this designation of "CCA" on the graph are customary lands which communities have put aside as conservation areas. According to Section 28 of Zambia Wildlife Act of 2015 a Game Management Area is one which is declared by the President after consultation with the local community for the sustainable utilisation of wildlife. A GMA may have a Game Management Plan approved by the Minister which provides for zoning areas within the GMA for different purposes and may restrict certain uses. A Chiefdom area within a GMA may have a Community Resources Board (CRB) elected from Village Action Groups to assist management of the GMA. The CRB may engage community scouts to assist DNPW with protection activities. In accordance with the Forests Act, a CRB may apply to the Director of Forestry to be recognised as a CFMG and enter into an agreement to manage areas of forest within the GMA with associated rights. Community Conservation Areas are primarily declared and managed at Chiefdom level but have little legal recognition. In EP there is a process to convert forests within CCAs into CFM areas as per the Forests Act and subsidiary legislation.

Leasehold

The state grants four types of leases: (1) a 10-year Land Record Card; (2) a 14-year lease for un- surveyed land; (3) a 25- to 30-year Land Occupancy License for residential settlements (issued by Local Government under the URP); and (4) a 99-year leasehold for surveyed land.

The Chief allocates customary land to all subjects. This land continues to subsist as customary until an application is made to convert it to leasehold and the chief must give consent for such conversion. Families that have been residents in an area can allocate forest land for agricultural expansion to other family members with little or no interaction with headpersons or the chief. However, if individuals are settling from outside of the chiefdom, they must pass through the Chief's office with a letter of recommendation or transfer from their previous chiefdom (USAID, 2017).

Public Land

Public land is constituted through Acts of Parliament and published through government gazette notices, which include the written descriptions of boundaries. Public land can be found on either state and or customary areas. Public land may include a) Forest reserves and b) National Parks and Game Management Areas (GMAs). All National and Local forests are declared through Statutory Instrument published in the Government Gazette including a boundary description. For areas declared on customary land, the process involves consultation and consent from the relevant traditional leader(s).

With reference to public land, the Lands Act, Cap 184, section 4 (2), stipulates "public purpose" to include land for the exclusive use of Government or for the general benefit of the people of Zambia, for public infrastructure and for preservation or control of natural resources i.e., forest, fauna and flora.

In Figure 2, note that the figures do not add to 100% as some protected forests lie within GMAs.

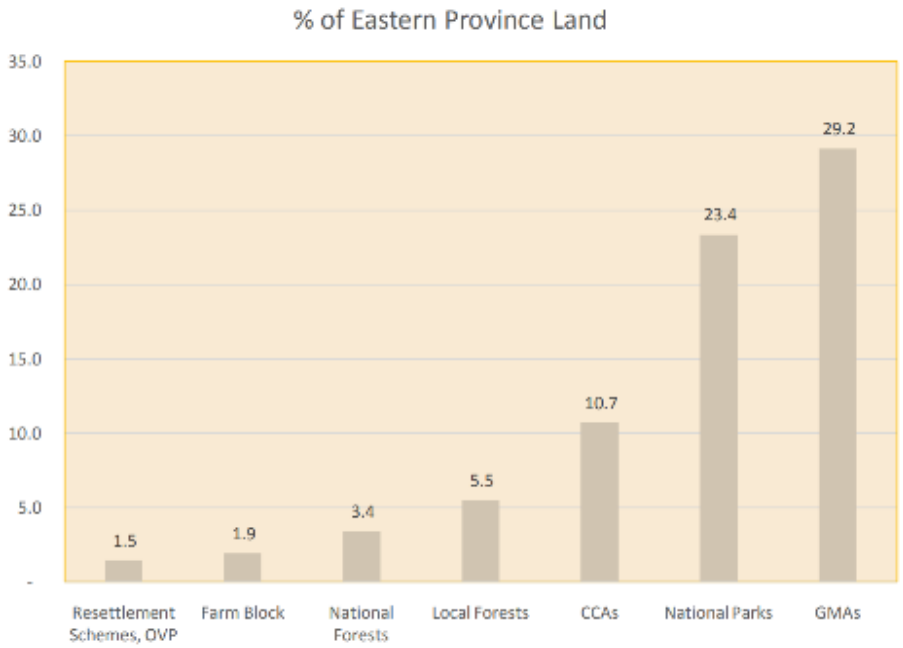


Figure 2 Characterisation of land by sectors (percent of total land for Eastern Province)[10]

Conditions that may Create Land Tenure Ambiguity and Potential Overlapping Claims

The nature of rights over land and forests which are situated on them have a bearing on Eastern Province's emission reduction programme design and on the effectiveness of producing payment for results as well as the details related to benefits allocation and required safeguards. For this, it is important that land tenure be both equitable and secure.

Zambia is of interest to global debates on forest tenure and condition as a result of both the continued dominance of customary tenure systems in rural areas and its high annual rate of deforestation (Honig & Mulenga, 2015) (Stickler, 2017). Clear ownership and tenure security have increasingly been recognised as essential pre-conditions for successful REDD+ implementation. In addition, central to alleviating conflicts over land in Zambia is clearer information on the availability and status of land. Forest reserves are included in the state land category (Mulolwa et al., 2016). As long as the forest is gazetted as National or Local Forest, it is part of the realm of state control, not customary control, although the Policy is to engage with local communities and Traditional Leaders in their management. However, unlike other categories of state land, forest reserves have in the past reverted to their initial (i.e., customary) land tenure

[10] Moombe K.B. (2017). Land Tenure Assessment: Law and Practice. Eastern Province. Note some Local and National Forests fall within declared GMAs.

type (Mulolwa et al., 2016) through a legal process of declaration through statutory instrument in accordance with the legislation.

By the very nature of a dual tenure system, the Eastern Province will be subject to implementation risks associated with unclear and overlapping claims that may impact the effectiveness of the Programme. The 2018 National Parks and Wildlife Policy provides strong language on the importance of devolved community management and empowerment which is supported under the most recent Wildlife Act and implemented through Community Resource Boards (CRBs). The wildlife policy specifies how revenues should support and sustain the on-going protection and management, but it is high level and focuses primarily on tourism/wildlife related and revenues with no mention of ecosystems or emissions results-based payments. This translates to benefits without clear responsibilities and how these might be shared with communities. Game Management Plans where these are in place, relate to larger areas of the GMAs, than the area of control of the CRBs. In contrast, the Regulations relating to Community Forestry make clear connection of rights (benefits) with obligations of control use and management. However, where these are established within GMAs, these obligations have been poorly understood and/or applied. Conflicts of control over resources which have a new revenue (carbon) value are emerging across the Province.

There are also local uncertainties regarding the boundaries of State land, customary land and GMAs. Such challenges exist e.g., in Mambwe District that lies entirely in a GMA bordering Luangwa National Park which is managed by the DNPW. There are six Chiefs in the area who administer the same land and contend that the land in this area is customary land. The District Council is also expected to alienate the same land to applicants. The Chiefs complain that the DNPW / FD have been encroaching in their areas. As a result of these misunderstandings, land alienation is slow, and development is hindered (Moombe, 2017).

The strategies to address this involve promoting Community Forestry under the Regulations SI #11 of 2018, which transfers rights to forest resources in return for obligations to manage and protect. The process requires consent from the Chief (Forests Act, section 30(1)) as well as consultation process with other stakeholders including government departments and local authorities (31) before rights are transferred through the Community Forest Management Agreement. The process outlined in the CFM Regulations (2018), places additional requirements to consult other rightsholders (section 6 & 10). The verification process to be conducted prior to recognition requires checking the application has the no objection of neighbouring communities and rightsholders to mitigate potential conflicts. This involving process aims to resolve conflicting claims to land and resources which can result in environmental degradation.

The benefit sharing mechanism at Chiefdom level through the Chiefdom Emissions Reduction Performance Agreement (CERPA), described in the BSP annex IV, seeks to differentiate land management systems and reward with clear obligations to protect and manage such as through the Community Forestry process. Further, all activities will be subject to the Process Framework and Resettlement Process Policy Framework developed under the implementation phase of ZIFLP.

These existing Verified Carbon Standard registered projects in the province have for years been generating and selling Verified Carbon Units (VCUs) to private sector voluntary buyers. The projects have been successfully issuing at scale and selling VCUs.[11,12]

Programme Areas with Conflicts

Main challenges are faced in land governance issues in the protected area system, Local and National Forests, some National Parks and Game Management Areas. This is because many of these PAs such as Local Forest and Game Management Areas are situated in the customary areas and therefore, conflicts between the local people, Chiefs and the FD and DNPW often arise. Local authorities also face difficulties in performing the land alienation functions in these areas because the governing statutes clearly state that the management of the Game Management Areas is a prerogative of the DNPW and Local and National Forests with the Forestry Department.

The second category of conflicts arises in boundaries between Chiefdoms as these are not always clearly defined or locally agreed. Such areas of conflict are hot spots for environmental degradation as moving people in as subjects is a method to increase patronage and Chiefdom influence.

A number of GRZ resettlement scheme areas exist in Eastern Province which have been promoted over many years by GRZ for a variety of purposes including increased agricultural production.

Table 7. GRZ Resettlement schemes in Eastern Provence, Zambia

Scheme	Constituency	Ward	Chiefdom	Area (Ha)
Msanzala	Msanzala	Chisangu	Kalindawalo	260
Mlolo	Chadiza	Chadiza	Mlolo	350
Munukwa				450

[11] Luangwa Community Forests Project, https://registry.verra.org/app/projectDetail/VCS/1775

[12] COMACO Landscape Management Project, https://registry.verra.org/app/projectDetail/VCS/1532

Misholo				1,000
Chipangali	Chipangali	Chipangali	Sairi II	1,058
Madziatuba			Chinunda	20,000
Mtilizi	Nyimba Central		Ndake	21,000
Ukwimi	Msanzala	Mawanda	Nsandwe	31,000
Total area				**75,118**

COMACO has promoted their Better Life Scheme (BLS) in Chamilala area of Nyalugwe chiefdom. COMACO initiated the process to relocate the community (involving 55 households) from where they had been living before to Chamilala based on its Landscape Management Project as the activities undertaken by the villagers were assessed as being incompatible with the sustainable land use. Specifically, the relocation/displacement of the people occurred to reduce the destruction of trees for charcoal production that the people had been engaged in along the Great East Road starting from the Luangwa River Bridge. Efforts to relocate and establish the scheme started in 2012, but some meaningful progress was made in 2013 when some people accepted to move voluntarily even though the actual movement occurred in June 2015. At the time of the study, 69% (38/55) of the total households had been resettled.

3.5.2 Implications of land and resource tenure assessment for programme design

The land and resource tenure challenges in the Eastern Province are addressed through the following activities:

Table 8. Land and Resource tenure challenges in Eastern Province

Tenure/Management Areas	**Activities**	**Expected impact on strengthen tenure and improving land/forest management**
Open areas	Promotion of Community Forestry	Secure rights to resources to control, protect and benefit
Local Forests	Promotion of stakeholder engagement through Community Forestry	Secure rights to resources to control, protect and benefit

Game Management Areas	Development of Game Management Plans, promotion of Community Forestry	Designated responsibilities to resources to control, protect and benefit
National Forests / National Parks	Promotion of benefit sharing and non-carbon benefits (livelihoods support) with boundary communities	Incentive to protect through benefit sharing and responsibility sharing

The issues/challenges that impact sustainable land-use management in EP are addressed in part as follows:

1) Conflict arising out of a dual tenure system which operates in GMAs. This calls for strengthening the operationalisation of Game Management Plans as per the Wildlife Act as well as following through the implementation of CFM in these areas.
2) In customary land administration, it is proposed that chiefdom boundaries must be ratified through the house of chiefs based on the 1958 boundaries. This will reduce the conflict around the resources that are found in any chiefdom.
3) Allocation of virgin forest land for subsistence agricultural production, in many instances on unsuitable soils. This should be addressed by expansion of the participatory land use planning process by local authorities with close involvement of Traditional Leaders to guide the land allocation processes. This may also guide the proposed Chiefdom Emissions Reduction Performance Agreements under the Benefit Sharing Plan.

3.6 Benefit Sharing Arrangements

3.6.1 Summary of benefit sharing arrangements

The EP-JSLP BSP makes a distinction between stakeholders and beneficiaries in the ER programme; that is, while some stakeholders will receive financial support through the Programme for their role in decision-making and implementation of the ER Programme/ delivery of ER services, beneficiaries are those who will require support to carry out their respective roles in implementing the ER Programme's planned activities that produce ERs and livelihood benefits and must be incentivised in order to make changes to land use and natural resource use practices.

General principles of the BSP

The design and application of the Benefit Sharing Mechanism for the EP-JSLP follows the Guiding Principles of the National Strategy to Reduce Deforestation and Forest Degradation, covering effectiveness, efficiency, equity, transparency, accountability, inclusiveness, and sustainability. In brief:

- Monetary benefits are determined based on performance as a Jurisdiction in reducing emissions of GHG in relation to the ISFL key categories against the agreed baseline.
- Monetary Benefits are shared based on performance in delivery of ERs. As such:
    - Local communities and their Traditional Leaders as key actors in protection and management of natural resources and therefore important in regulating the emissions of greenhouse gases, will be incentivized, and rewarded in their role in emissions reduction, locally and across the Jurisdiction.
    - Under a centralized nested approach, ER related projects will be recognized and incentivized to deliver ERs based on performance.
    - Support to the delivery of ER services through direct budget allocations will be targeted to service providers in support of the identified mitigation measures and will be reviewed periodically for effectiveness and efficiency.
- The EP-JSLP Benefit Sharing Mechanism will apply an adaptive management approach of monitoring and evaluating results to inform periodic review and updating the BSP based on lessons learnt and verified ER achieved through the MRV system.

Beneficiaries

The identification of beneficiaries was based on work conducted through the ER programme design including SESA and BSP consultations to identify and assess specific interventions that address specific drivers and agents of deforestation and forest degradation in EP according to sector. Beneficiary groups include Traditional authorities, farmers, community resource groups and community members. Since most land in Eastern Province is in traditional/customary ownership, therefore, most of the activities to produce ER will be undertaken by these groups. Strategic interventions were identified as priorities in line with government development priorities, to deliver livelihood benefits as well as significant ERs.

For each of the beneficiaries' groups, eligibility criteria were established referring to what each category of Beneficiary is required to do (role) to receive benefits as well as the types of benefits that may be available. The primary focus will be on those groups who have a direct impact on GHG emissions and therefore, agents for ER mitigation incentive payments as well as the indirect non-monetary

benefits, primarily through the ER projects of SFM & CSA, as well as the indirect livelihood support measures. This will include recognized Emissions Reduction Projects operating within the Jurisdiction of the Eastern Province.

Table 9. Eligibility Criteria for Beneficiaries

Beneficiary	● **Eligibility Criteria (summarised)**
Landscape Level Implementers	
Traditional Authorities (Chiefs, Headmen, *Indunas*)	● Signatory to the Chiefdom Emissions Reduction Performance Agreement (CERPA) with the EP JSL PIU to participate in creation of ERs that include: o Commitment of the Chiefdom to produce ER. o Type of activities that will be undertaken. o Roles & Responsibilities of each of the Parties o How the Funds will be managed at a community level o Commitment to social and environmental safeguards ● For monetary benefits: reference to inclusion in existing agreements with CRBs, CFMGs. and any other relevant organisation
Registered Farmers (Lead Farmers, District Farmer Associations)	● Included in Chiefdom agreement (CERPA) with the PIU committing to activities that produce ERs (e.g., CSA) ● Registered as a Farmer Group with the Ministry of Agriculture
Registered Community Groups – CFMGs	● Included in Chiefdom agreement (CERPA) with the PIU committing to activities that produce ERs (e.g., land use planning, forest management, etc.) ● Registered as a CFMG with the Department of Forestry, commit to activities that produce ERs. ● Submit annual workplan and budget including livelihood benefits.
Registered Community Resource Boards Groups - CRBs	● Included in Chiefdom agreement (CERPA) with the PIU committing to activities that produce ERs (e.g., land use planning, forest management, control within GMP etc.) ● Registered as a CRB with the Department of National Parks and Wildlife (DNPW)

	● Submit annual workplan and budget including livelihood benefits.
Village Action Groups (for public goods and on behalf of Community groups)	● Registered as a Village Action Group under the umbrella of the CRB. ● Submit plan to the CRB or CFMG for projects that have public benefit to the community and are aligned with larger development objectives (i.e., support provision of clean water, education, health, etc.) ● Focus on protection/provision of benefits to vulnerable & marginalised community members (widows, children, elderly, chronically ill, disabled, orphans etc.)
Households & Individuals	● Demonstrated participation / contribution to ERs within their Chiefdom. Qualifying activities include. o Own small plots and are willing to set aside these areas as protected forests. o Engaged in tree planting and/or Agroforestry activities. o Utilising improved cook stoves. o Practicing Climate Smart Agriculture (out of a registered Farmer Groups); and o Are involved in law enforcement to prevent illegal activities or activities that contradict agreements under the ER Programme. ● Benefits provided through membership of recognised community institution indicated in the respective CERPA.
ER Related Projects, CSOs and Private Sector	
CSOs	● Proposal to the fund to provide technical support to communities to include ER performance based deliverable criteria; Legally registered in Zambia.
Private Companies	● Propose to the Fund along with demonstration of matching requirement (20%) ● Must be classified as Forestry, agriculture, or livestock and / or implementing activities in the landscape that could result in ERs (i.e., improved charcoal, alternative energy, support value chains, investments into CSA, etc.) ● To include ER performance based deliverable criteria. ● Legally registered in Zambia

Emissions Reduction related projects	• Signatory to a Nested ER Performance Agreement in the context of a centralized nested arrangement • Includes commitment to environmental and social safeguards including FPIC and FGRM.

The BSP includes a description of the flow of funds under the EP-JSLP to beneficiaries as well as the general governance arrangements and decision and monitoring processes and responsibilities. This indicates categories of performance-based allocations through carbon (monetary) payments to beneficiaries as well as the direct budget allocations to cover the provision of ER services as carbon (non-monetary) benefits. Direct budget allocations will also cover support services through non-governmental groupings and GRZ programme related institutions and processes.

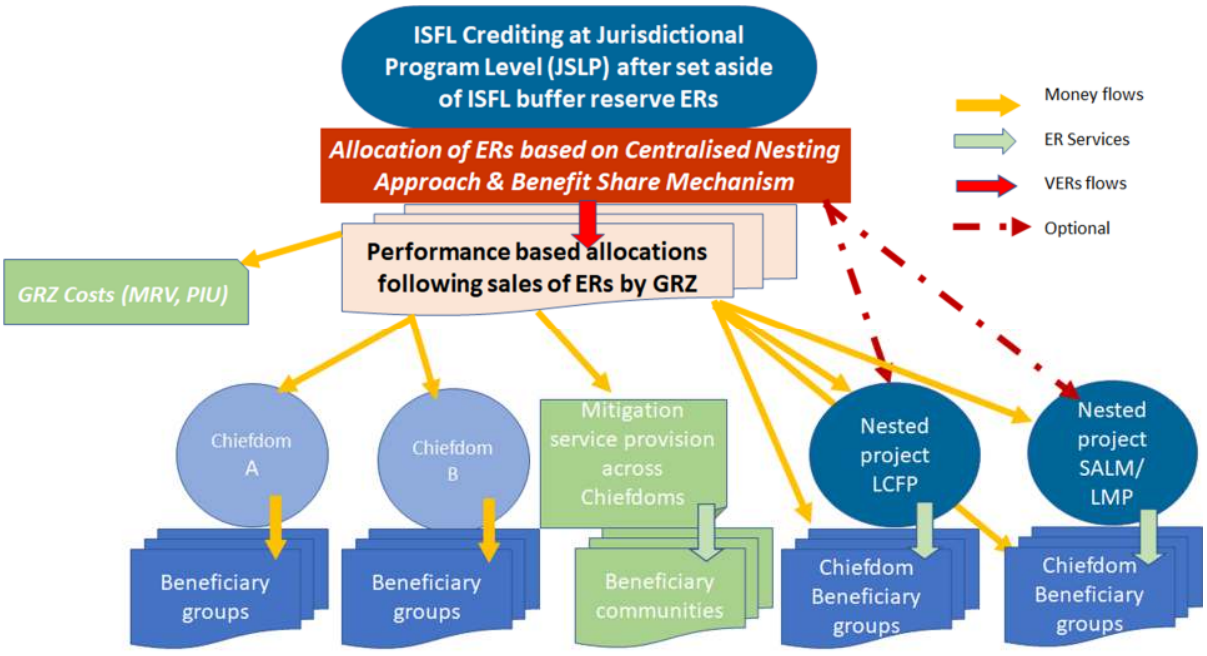


Figure 3 Detailed flow of funds

Allocations following deduction of the ISFL performance buffer and fixed costs will be determined based on eligibility criteria and performance-based payment criteria and considered by the EP-JSLP Benefit Share Committee. At the initiation of the EP-JSLP, the PIU along with the representatives of the relevant DMT will engage all the stakeholders' groups and intended ER beneficiaries in

each Chiefdom and negotiate the **Chiefdom Emissions Reduction Performance Agreement** (CERPA). This agreement will set out the profile of the Chiefdom, identify the key ER issues and drivers of deforestation and forest degradation and other unsustainable land management and cultivation practices. It will identify the key forest assets and allocate responsibilities including permitted and non-permitted practices which contribute to GHG emissions in the Chiefdom. The Agreement will form the basis of assigning performance criteria and responsibilities as well as the benefit sharing mechanism. The CERPA Agreement will also include commitment of the EP-JSLP to deliver capacity building and ER services and related livelihoods support measures. The CERPA will be developed using lessons from the Chiefdom Conservation Agreements piloted through the Landscape Management Project implemented by COMACO through the support of the World Bank. The CERPA will identify any existing land management agreements and contracts in force within the Chiefdom such as the Community Forest Management Agreements, General Management Plans for GMAs or other designations generated through the Participatory Land Use Plans which form part of the district level Integrated Land Use Plans.

Key will be the locally agreed benefit sharing mechanism between beneficiaries and beneficiary groups within the Chiefdom. These will be locally agreed through a process facilitated by the DMTs with PIU support, based on the outcomes from the stakeholder consultation conducted in November 2020. The CERPA will include accountability and reporting requirements to ensure transparent use of the EP-JSLP support measures, the monetary benefits in particular. This process is key to ensure benefits are distributed equitably within their constituent groups, households, gender grouping including vulnerable and marginalised groups in their local area. This is considered as key to the sustainability of the community-based ER approach promoted by the EP-JSLP.

Nested projects

In accordance with the regulatory framework for forest carbon stock management and operation of a Jurisdictional Programme in Eastern Province, Government has determined that in terms of encouraging and supporting private sector involvement in reducing GHG emissions, a Centralized Nested Approach will be applied for the EP-JSLP. This is in line with the National REDD+ strategy and 8th National Development Plan. In this approach, ERs are accounted for at the Jurisdictional scale. However, because the Government wishes to encourage projects through incentives that are linked to performance, approved projects may receive either payments or ERs from the government in accordance with the agreed benefit-sharing arrangements following trade of verified ERs by the EP-JSLP. This necessitates an ER allocation system and a benefit sharing agreement

with the nested project, a **Nested Emissions Reduction Performance Agreement** (NERPA). The ER performance of the nested project would require to be measured and agreed to receive a share of the ERs generated by the Jurisdiction. This approach implies that rewards for independent results are dependent on jurisdictional performance.

The following Figure 4 presents the governance arrangements which draws heavily on existing responsibilities at Provincial and District levels as outlined in the National Planning and Budgeting Act, 2020.

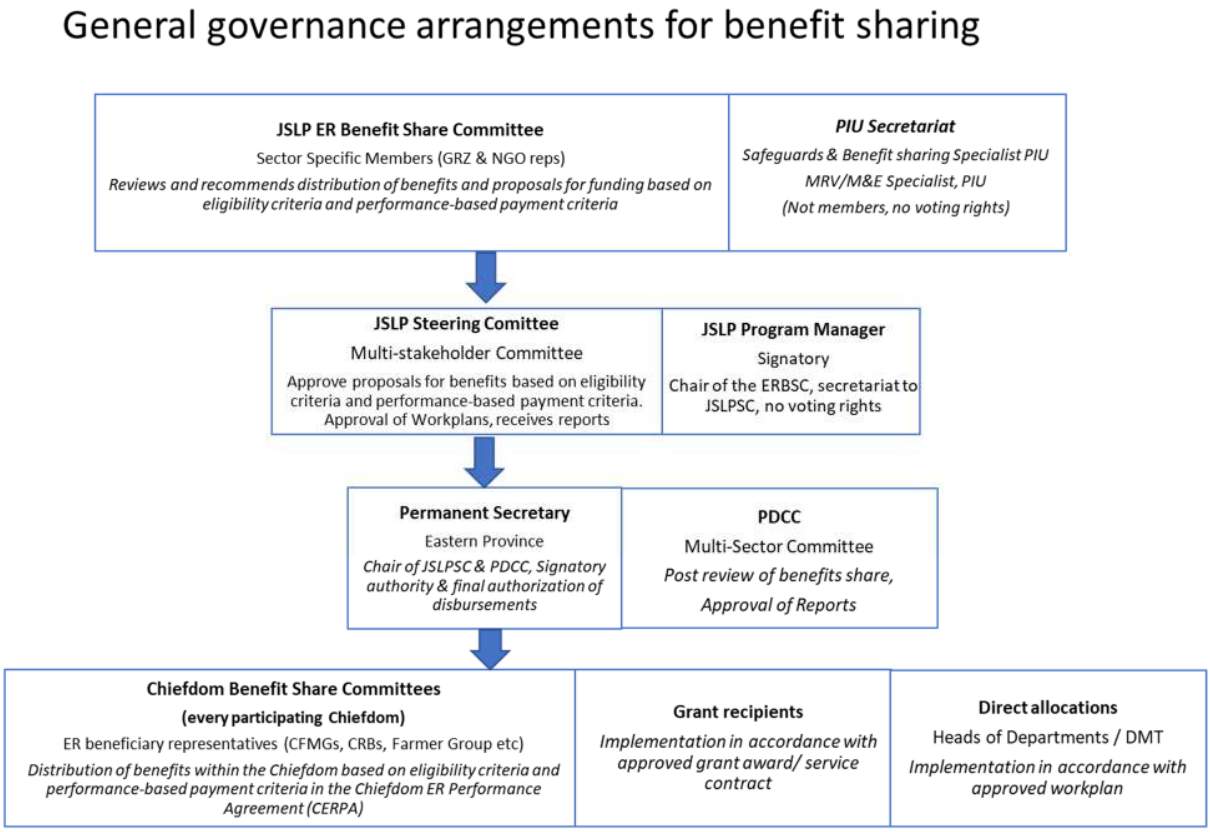


Figure 4 General Governance Structure of the benefit sharing process.

Monitoring provisions for the implementation of the Benefit Sharing Plan, including, as appropriate, will include participation by the beneficiaries themselves. Self-reporting by the EP-JSLPIU and through the reporting structure described in Section 2.2.2 would be complemented through third party monitoring and audits of a sample of ER programme activities or as required by market standards as appropriate.

Fiduciary risk review

The Emissions Reduction Programme will fall within the terms of the Public Finance Management Act, 2018 that specifies controls for managing public funds. Furthermore, the governance arrangements for the Benefit Sharing Plan draws from existing responsibilities at provincial and district levels as outlined in the National Planning and Budgeting Act, 2020. Responsibilities of entities within the structure previously elaborated (see section 2.2.2).

Fiduciary risk can arise from the possibilities that carbon revenues are not used for their intended purposes, or not properly accounted for once disbursed. The JLSP approach for managing fiduciary risk will be to ensure that there is proper understanding of the operating environment as it evolves, that there is proper mitigation of the risks to ensure proper use of the funds, and that there is proper monitoring of the risks, and performance on an on-going basis. Some of the risk management measures include: preparation of financial plans and budgets which will be approved by the ER Benefit Sharing Committee; efficient management and timely disbursement of funds to recipients, ensuring that activities at the community level speak to the objectives of the JLSP thereby eliminating the risk of misapplication of the funds; proper procurement procedures in place to ensure transparency and competition; the Grievance Redress Mechanism for the project fully applied; production of financial statements in accordance with the internationally recognised accounting standards, and regular audits to ensure financial audits have been presented fairly and in accordance with the applicable accounting framework.

3.6.2 Summary of the design process for benefit sharing arrangements

The BSP is designed to take into account the ER programme design work including strategic Interventions and policy measures and incentives that will drive action to address the drivers of emissions in Eastern Province. Importantly, that work is built upon other work, specifically, the Strategic Environmental and Social Assessment (SESA), as part of Zambia's REDD+ readiness activities, that examined the drivers, agents and underlying causes of deforestation and forest degradation in Eastern Province. It prioritised interventions that addressed drivers—including an assessment of their potential scales, costs and their potential for increasing carbon stocks.[13]

[13] Wathum et. al. Drivers of Deforestation and Forest Degradation in Eastern Province, Zambia. Unique Forestry and Land Use.

Stakeholder Consultations

The BSP was developed based on broad stakeholder consultations. The first set of stakeholder consultations took place in February and March 2020 in Lusaka and Eastern Province with national, provincial, district and local stakeholders.

The said Stakeholder consultations were structured as Focus Group Discussions (FGDs) and Informational Interviews, and included government representatives, Civil Society Organisations (CSOs), the private sector, traditional authorities and local community groups including Lead Farmers, Community Resource Boards (CRBs), and Community Forest Management Groups (CFMGs). A total of 147 stakeholders and beneficiaries were met (40 females and 87 males).

This information gathering process informed the initial draft of the BSP through exploring:

- The role that each of these potential beneficiary groups will have in implementation of the programme activities that produce ERs and livelihood benefits.
- Types of benefits that could incentivise each of these groups to make changes in land use practices and/or to invest in the protection of forests.
- The existing institutions and processes through which these groups receive benefits and establish forest management programmes (i.e., CFMGs); and
- Benefit sharing models that are currently being used that could inform the design of the BSP.

Results of Consultations

The outcomes of these consultations are described in more detail in Annex 5: Design Process for Benefit Sharing Arrangements for the ISFL ER Programme.

Additional Stakeholder Consultations were conducted from November 23rd – December 1st, 2020, throughout Eastern Province. The goals of these consultations were to consult widely with stakeholders for the development of a robust BSP in line with the national and ISFL guidelines. The process was driven by GRZ and involved consulting with communities, traditional authorities, CRBs, CFMGs, CSOs, government and private sector at national, provincial, district and chiefdom levels. GRZ teams conducted Focus Group Discussions and Informational Interviews with each of the categories of beneficiaries identified to review feedback on the initial design of the BSP.

The detailed Stakeholder Consultation Plan and feedback received from these consultations is presented in Annex 4: Current Version of the Benefit Sharing Plan for the ISFL ER Programme. The Annex includes any issues raised by

stakeholders and how the issues were addressed in the BSP. In broad terms, the beneficiaries consulted welcomed both carbon and non-monetary benefits expected through the EP-JSLP. As expected, the monetary aspect drew greatest interest. The mechanism for sharing the monetary benefits varied across beneficiary groups and community institutions participating in the consultation. In summary the following was observed across the chiefdoms visited:

Where community development committees had been set up in villages across the chiefdoms with responsibilities for natural resources protection, there was a view that these committees could also guide on benefit sharing. The initial community preference was to use the community resource boards (CRBs – established through the Wildlife Act, 2015) as the boards manage hunting fees and carbon revenues (where they participate in REDD+ projects). The rationale was that the CRBs are already in place and administering similar funds for protection and development in the chiefdoms, and their composition was inclusive at village level.

However, upon further reflection some community members expressed serious misgivings about the earlier submission of CRB to be the fund manager. They disclosed that this monetary benefit has had some challenges such as divisions in chiefdoms. These performance-based payments will raise conflicts and therefore there is need to put in place measures that will address conflict and promote change. In this regard, the second submission was to put in place an independent board as they felt benefits should reach the community members for them to be motivated to engage in sustainable behaviour.

Validation Workshops on this Draft BSP are anticipated to take place during 2022 where a summary, translated, version of BSP, will be presented to communities (in clusters COVID mitigation measures allowing) throughout Eastern Province. Any additional feedback received will be used to prepare the Advanced Draft of the BSP, which will be considered by GRZ and sent to the BioCF ISFL for final review.

3.6.3 Description of the legal context of the benefit sharing arrangements

The system of land tenure in Zambia is based on statutory and customary laws, where the former consists of rules and regulations, written and codified, while the latter consists of rules and regulations that are well known to members of communities but not written.[14] Customary tenure is fundamentally based on tribal law. Under the current law, all land in Zambia is vested in the President on behalf of all the people Zambia.[15]

[14] Moombe, Kaala B. 2017. Land Tenure Assessment: Law and Practice Eastern Province.

[15] The Lands Act, 1995, Chapter 184 of the Laws of Zambia.

While a number of Policies and National Strategies provide guidance and direction on climate change issues and reducing deforestation and forest degradation, core legal provisions regarding forest management, control and user rights are contained within the Forests Act, 2015, with specific transfers of rights and authority in the Forests (Community Forest Management) Regulations, 2018 and more recently the Forests (Carbon Stock management) Regulations, 2021. The 2018 Regulations provide for the transfer of management authority of forest resources for the purpose of communal control, use and management of a defined area of forest. User rights include for carbon as a major forest product as defined in the Forests Act, 2015. The process requires for prior consultation with existing rightsholders of the proposed forest area, combined with consent of the Chief of the area to recognise the applicants as a Community Forest Management group through endorsement of the application, map and Community Forest Management Agreement. Further verification and consultation of stakeholders for the application is required before approval by the Director of Forestry. The Agreement provides for the rights to issue permits and collect revenue for those products and uses provided for in the Agreement. The BSP acknowledges the particular legal arrangements between the CFMGs and the Forestry Department including obligations for control measures and forest protection as well as the role of the Traditional Leaders in supporting the enforcement of local rules, mediation of disputes and conflict resolution measures as well as oversight of the affairs of the CFMGs and monitor accountability of elected officials in the community groups.

The BSP further acknowledges the community-based approach contained with the Wildlife Act, 2015, the formation of chiefdom level Community Resources Boards with Game Management Areas, the recognition of the Chief as Patron and the benefit sharing arrangements including for revenues collected and shared by Government.

This BSP also complies with:

- All multilateral agreements that Zambia is party to, including: the UN Convention on Biological Diversity Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation; and
- All relevant national and subnational laws and regulations including both statutory and customary land tenure arrangements in Eastern Province.

Monitoring the BSP

The Benefit Sharing Plan includes information on monitoring provisions throughout its implementation. While these provisions will take various forms, all Programme Entities in the institutional framework will be required to report

on the implementation of their Benefit Share Progress and ER Monitoring Reports. This will also need to be done through third-party monitoring of the ER Programme. The Benefit Sharing Plan notes these provisions as part of the monitoring approach. Programme Entities under the benefit sharing plan will also be encouraged to consider opportunities for participatory monitoring by Beneficiaries, and the EP-JSLP ER Programme has a FGRM that stakeholders will access throughout the implementation of the ER Programme. This FGRM will be utilised for feedback on the implementation of the Benefit Sharing Plan. Regardless of the FGRM being utilised in relation to Benefit Sharing, the FGRM is identified in the Benefit Sharing Plan, including any links to relevant documentation. With respect to the Benefit Sharing Plan the EP-JSLP will confirm that the agreed safeguards process and the Benefit Sharing Arrangement (as specified in the Benefit Sharing Plan) are functional and effective and verify that every Monetary and Non-Monetary Benefit was distributed to each and every category of Beneficiaries or that individual activities funded by Monetary and Non-Monetary Benefits (Benefit Sharing Plan activities) have complied with World Bank safeguards. As with the EP-JSLP ER Programme itself, safeguards will be applied in a manner proportional to the activities proposed.

Third party monitoring, as well as self-monitoring and the FGRM will be used to assess the proper implementation of the Benefit Sharing Plan and application of relevant social and environmental safeguards to the Benefit Sharing Plan activities. Third party monitoring will take various forms but typically it will involve a combination of independent verification of self-reporting data provided by the EP-JSLP ER programme and annual audits of a sample of ER programme activities.

3.7 ISFL ER Programme Transactions

3.7.1 Ability to transfer title to ERs.

The ability to transfer title to ERs may be demonstrated through various means, including reference to existing legal and regulatory frameworks, sub-arrangements with potential land and resource tenure rights-holders (including those holding legal and customary rights, as identified by the assessment described in Section 3.4.1), and benefit sharing arrangements under the Benefit Sharing Plan (as referenced under Section 3.5).

The Forests Act, 2015 is the main legal instrument that covers carbon tenure in Zambia. Carbon in the Forests Act, 2015, is defined as ‘major forest produce’ (Part I, section 2) which means part of a tree or derivative product such as timber, charcoal and carbon, or other than leaves, flowers, fruits and seeds. While the issue of carbon as a major forest product is subject to the provisions of the

Forests Act, 2105, and the Forest (Carbon Stock Management) Regulations, 2021, all other carbon ERs traded in Zambia will be dealt with through administrative actions as required by the relevant authority with the mandate for such aspects.

Given that the Forests Act, 2015 section 3, states that "The ownership of all trees standing on, and all forest produce derived from, customary areas, National Forests, Local Forests, State Land, botanical reserves and open areas is vested in the President, on behalf of the Republic, until lawfully transferred or assigned under this Act or any other written law".

One example of legal transfer is provided for in the Forests (Community Forest Management) Regulations, 2018 where community groups with consent of their Chief may be recognised by the Director of Forestry and enter into a Community Forest Management Agreement which transfers management authority of forest resources for the purposes of communal control, use and management of a designated area of forest. These agreements specify rights to harvest and trade in forest products, including, collection of medicinal herbs; harvesting of honey, grass and grazing of animals; collection of forest produce for community-based industries; operating eco-tourism and recreational activities; establishing plantations; harvesting of timber or fuel wood; and many others as set out in the Agreement. Carbon may be one of these rights. Thus, for areas which will be registered as Community forests in the future under the EP-JSLP Programme, the Community Forest Management Agreement between the CFM group and Director of Forestry may include carbon. However, for the existing agreements, these may need to be amended to specifically include carbon.

The Forest (Carbon Stock Management) Regulations, 2021 SI and Implied ER Tenure

The Forest (Carbon Stock Management) Regulation, 2021, provides for the process and conditions for the issuance of Forest Carbon Stock Management permits. This Statutory Instrument (SI) provides for the declaration of jurisdictional projects or programmes and the direction on independent trading within the jurisdiction.

Within the SI, there is a requirement that a permit holder/applicant shows proof of rights to forest which is the way that carbon rights are demonstrated as follows:

5. An applicant for a Permit proposing to engage in a forest carbon management project shall be required to show proof of user rights of the forest and land where the project will be located.

(b) In case of Customary Land, a Community Forest Agreement is required, as provided for in the Forests (Community Forest Management) Regulations, 2018.

11 (2) The application for a permit shall be accompanied by:

(a) a joint forest management or Community Forest Management agreement with the Director.

(b) Proof of transfer of user rights from the Joint Forest Management Area and the Community Forest Management Group in the case of a joint forest management area or a community management area.

(c) Proof of ownership in case of State land.

(d) A consent letter from the Director of National Parks and Wildlife in the case of National Parks, Game Management Areas, Community Partnership Parks and Bird and Wildlife Sanctuaries; and

(e) Decision letter issued to the applicant by the Environmental Management Agency regarding the environmental assessment undertaken by the applicant in respect of the proposed carbon stock management area.

The EP-JSLP has submitted an application for a permit under the Forest Carbon Stock Management Regulations to the Director of Forestry as per requirement under the law. Meeting the requirements will be used as a basis for consideration of the Director of Forestry before, approval of the Jurisdiction Programme in accordance with the Regulation. In doing so the province will secure specific legal use rights as well as have Legal Agreements that clearly allow for the carbon to be sold on behalf of the underlying rights holder including the State. These agreements will be put in place as part of the implementation of the programme to secure participating and confirm rights.

- Community Forest Areas – Included in amended Community Forest Management Agreement or included in the new CFM agreements.
- National Parks managed by DNPW – Intergovernmental Agreement put in place that the areas under DNPW will be part of the EP-JSLP including the carbon.
- GMA area covered under proposed participating agreements.
- Participants such as small farmers and charcoal producers the transfer of ER titles under other sub-categories such as Agriculture and energy of the EP-JSLP will be carried out within the CERPA between the Chiefdom stakeholder and the EP-JSLP.

- Where no legal framework is in place, administrative orders will be made by the competent authority for the category in question. An Administrative Order for Agricultural Carbon is under Judicial review.

A schematic illustration of the Forest carbon rights transfer and trade flow is provided as follows:

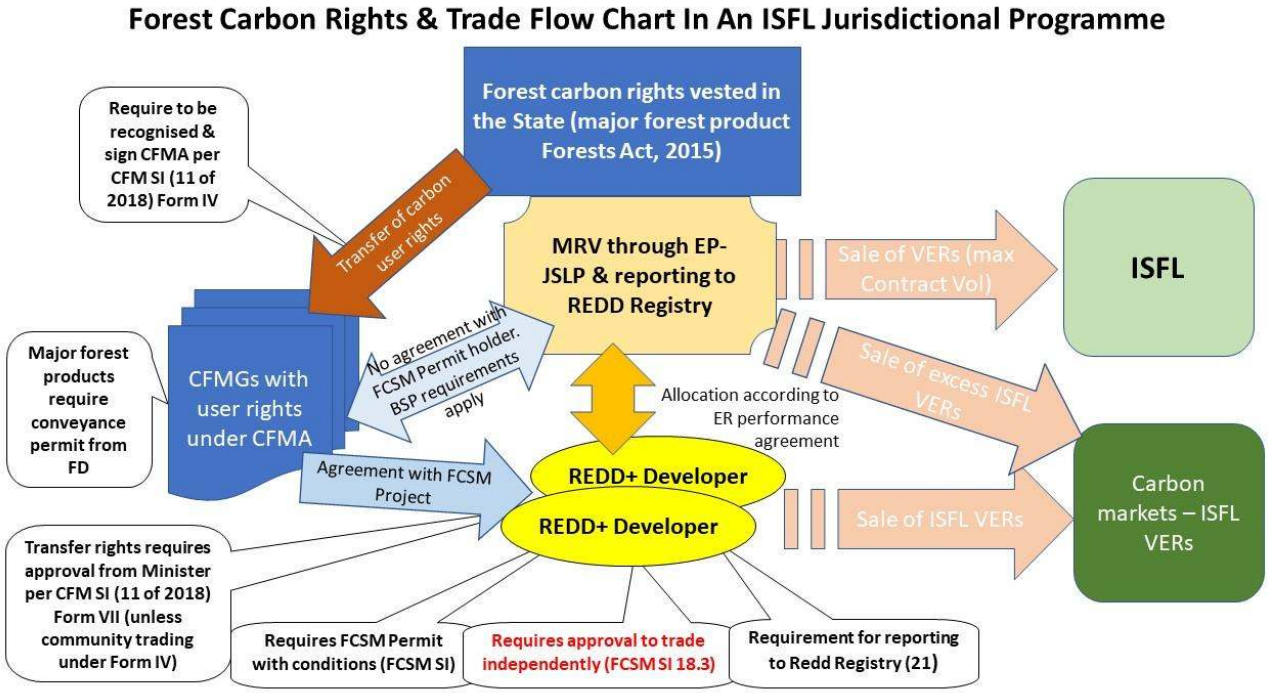


Figure 5 Forest carbon rights & trade flow chart

3.7.2 Participation under other greenhouse gas (GHG) initiatives

Within the Eastern Province, there are two REDD+ projects that are participating in other GHG programmes under the Verified Carbon Standard. These include the COMACO Landscape Management Project [16] and the Biocarbon Partners (BCP) Luangwa Community Forests Project[17]. Each of these projects registered under the VERRA Standard is issuing and selling credits to private sector buyers, and at least one has a pre-existing long-term carbon offtake agreement of more than USD $150 million. The COMACO projects uses the VCS methodology VM0015 for the avoided unplanned deforestation (no degradation) component and VM0017 for the sustainable agricultural land management component which includes soil carbon increases from CSA practices like the ones promoted under the ZIFLP. BCP is using VCS VM0009 and accounts for avoided unplanned

[16] https://registry.verra.org/app/projectDetail/VCS/1532

[17] https://registry.verra.org/app/projectDetail/VCS/1775

deforestation (no degradation). These project's on-going effective operations are subject to the recent Forest (Carbon Stock Management) Regulations.

The regulations state that projects can apply for a permit to claim the emission reductions and removals, however, where a Jurisdictional FCSM project or programme has been approved by the Director of Forestry, that project or programme shall take precedence over a project that is encompassed within the jurisdiction (section 18 (1)). Further it specifies that FCSM permit holders may only trade carbon through the Jurisdictional entity (section 18 (2)). However, a FCSM permit holder shall not be allowed to trade carbon independently unless with the approval of the Director (section 18 (3)). These Verified Carbon Standard (VCS) projects in the Eastern Province may be granted specific permission by the Director to continue independent trading, for a period not exceeding three years from the date of approval by the Director of the Jurisdictional Programme (section 18 (4)). However, trading under 2 different standards is not possible under an ISFL Jurisdictional programme and therefore these are expected to become part of the jurisdictional project upon signing of the Eastern Province programme's registration.

3.7.3 Data management and registry systems to avoid multiple claims to ERs.

For the Forestry sector, a draft REDD+ Registry (Figure 6) is being developed that includes data from REDD+ projects generating and selling Emission Reductions (ER). This Registry will be part of or function as *Programme and Projects Data Management System* for the Forestry Department. The Forestry Department is required to keep a register of all Community Forest Agreements (Forests Act, 2015, section 35) and permits issued under the Forests (Carbon Stock Management) Regulation, 2021, the latter being open for public inspection. Further the Forests (Carbon Stock Management) Regulation, 2021, provides for monitoring, reporting and verification requirements for permit holders as well as for double counting of emissions reductions. These will inform the REDD+ Registry and allow for cross checking areas and rights transferred in the case of carbon.

All projects, including interventions under EP-JSLP, will also be required to submit shapefiles of the areas of ER generation, which should consist of an up-to-date shapefile of the Eastern Province. Areas where COMACO and BCP projects are active will need to be cut out of the provincial project area for ER generation, until and unless these project areas become more integrated with the jurisdictional project in accordance with the Forest (Carbon Stock Management) Regulations, 2021.

COMACO and BCP projects make use of an ER Transactional Registry system provided by VERRA, while ER generated by other areas in the province are planned to be processed through the World Bank/Biocarbon Fund Transactional Registry. This may change in accordance with the permit system of the Forest (Carbon Stock Management) Regulations, 2021.

Please note that the REDD+ Registry is a Data Management System only, and not a Transactional Registry. URL: https://forestry.mlnr.gov.zm/redd

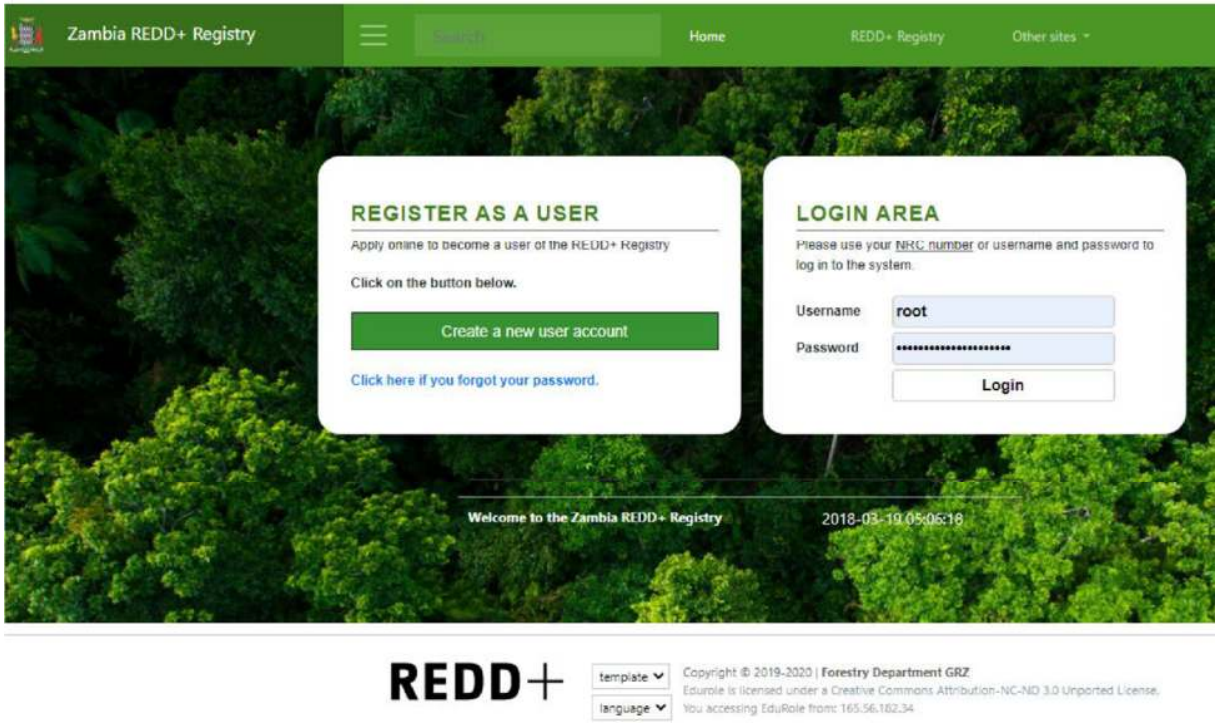


Figure 6 REDD+ Registry Dashboard

Section 4: GHG Reporting and Accounting

4.1 Programme GHG Inventory

4.1.1 Short description of the Programme GHG Inventory

GHG Inventory of the AFOLU categories, subcategories, gases and pools which are prevalent in Eastern Province was compiled using best available methods and approaches that were consistent with the most recent IPCC guidance and guidelines. In accordance with the IPCC guidance and guidelines, Eastern Province GHG Inventory had applied as far as possible the basic principles of Transparency, Accuracy, Completeness, Consistency over time and

Comparability as defined by the IPCC. The Eastern Province GHG Inventory is comparable in its use of definitions, categories and subcategories with national processes such as the national GHG inventory and the Biennial Update Reports.

Eastern Province GHG Inventory is elaborated with the use of 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Calculations for AFOLU GHG inventory were undertaken with the use of a combination of IPCC Software and Excel spreadsheets using equations contained in the IPCC 2006. The IPCC Inventory software was used to implement Tier 1 and Tier 2 methodologies in the 2006 IPCC Guidelines for the Sub – National Greenhouse Gas Inventory for Eastern Province. The basic approach of the IPCC inventory software was to enable filling out the 2006 IPCC Guidelines category worksheets with the activity and emission factor data. In addition, it also supported many other functions related to database administration, Quality Control, data export/import as well as data reporting.

In addition, also higher IPCC Tier values (Tier 2) have been used from either directly measured data within the Programme area or modelled values from Tier 3 activity data from different survey systems with the area.

To account for specific CSA practices defined by the Programme, an additional CSA soil organic carbon baseline was developed for cropland remaining cropland using a Tier 2/3 soil modelling approach in line with the logic of the IPCC Steady-State Method of the 2019 Refinement to the 2006 IPCC Guidelines. This IPCC Tier 2 steady-state method provides an optional alternative method for estimating soil C stock changes in the 0-30 cm layer of mineral soils in Cropland remaining Cropland related to CSA practices. Methodologically the VCS SALM Methodology (VM0017 as applied also by the COMACO project referred to above) is followed which requires to model a baseline soil carbon equilibrium factor which is applied during ex-post accounting of CSA benefits. Baseline carbon stock changes are set to zero for agricultural landscapes which are degrading as shown for the Eastern Province. Inventory compilation was done by the CEEEZ, and archiving was done at ZEMA, where an IT Platform was established. Data and documentation files are stored and held in separate and unique folders. The folders include, Data Documentation Summary Report, GHGi Technical Reports, GHGi Database, GHGi Raw Data, and Data Documentation Sheets/Tables.

Activity Data for estimating GHG inventory for Eastern Province was collected and analysed from April to June 2020. The consultancy team took the lead in data collection and analysis. The activity data for estimating GHG inventory for Eastern Province was undertaken in collaboration with ZEMA and the Forestry Department (FD) at district and provincial levels.

Activity data related to Land use was provided by the Forestry Department. Emission factors mainly for agriculture were collected from IPCC Database and those for Land from ILUA I and II. Under the ZIFLP Project, there was a formal

institutional arrangement for data collection. In this regard each of the three major Ministries namely: Agriculture, Livestock, and Natural Resources (Forest Department) are involved in data collection relevant to their respective activities under ZIFLP. For instance, the Ministry of Agriculture collects GHG data such as hectares planted by crop, and fertiliser application under Farmer Input Support Programme (FISP).

On the other hand, the Forestry Department was involved in data collection and processing at national level for the submission of the Forest Reference Emission Level (FREL) to the UNFCCC under REDD+. This data was collected using the Collect Earth tool for determining Land Use and supplemented by the integrated Land Use Assessment II (ILUA) report. The same Collect Earth tool was used to generate land use data for Eastern Province using technical staff from Eastern Province with support from ZIFLP.

At Provincial and District levels, data collected included loss of carbon in biomass from wood removals from indigenous forest (charcoal production, timber harvest, firewood collected) and Forest Plantation (Plantation poles, sawn timber and plantation trees).

The Forestry Department is responsible for forestry statistics but works very closely ZEMA and National Remote Sensing Centre in monitoring biomass disturbances such as forest fires. The Ministry of Fisheries and Livestock at Provincial and District level collected animal-based population data by livestock type.

The categories and subcategories applied in the GHG Inventory were the same as the 2006 IPCC Guidelines. However, some subcategories were not included in the Programme either because they did not occur in the Eastern Province: Grassland converted to Forest land, and Lime application; or because there was insufficient data to conduct the analysis: harvested wood products. On the other hand, the Carbon Pools considered in this assessment were: Above-Ground Biomass, Below-Ground Biomass and Dead organic matter (only Deadwood), Soils and Litter.

The definition of the categories considered for the assessment are presented in Table 10.[18]

[18] *ILUA II Final Report, 2016*

Table 10. Description of Land Cover Categories

Land Cover Categories	**National Land Cover Descriptions**
Settlements	Land covered mainly by densely populated and organised or irregular settlement patterns surrounding cities, towns, chiefdoms and rural centres commonly referred to as urban and rural built-up areas.
Cropland	Land actively used to grow agriculture (annual and perennial) crops which may be irrigated or rain feed for commercial, peasant and small-scale farms around urban and rural settlements
Grassland	Land that includes wooded rangeland that may be covered mainly by grassland, plains, bamboos, and pans found along major river basins and water channels.
Forest land	This is land covered both by natural and planted forest meeting the threshold of 10% canopy cover growing over a minimum area of 0.5 ha with trees growing above 5m height and includes young stands that have not yet reached, but are expected to reach, a crown density of ten (10%) percent and tree height of five (5) meters that are temporarily under stocked areas (Forest Act No. 5 of 2015, page 7).
Wetlands	Land, which is waterlogged, may be wooded such as marshland, perennial flooded plains and swampy areas (*surface water bodies included*).
Other land	Barren land covered by natural bare earth / soil such as sandy dunes, beach sand, rocky outcrops and may include old open quarry sites for mines and related infrastructure outside settlements.

Summary of AFOLU categories and subcategories are given in Annex 6 which presents (i) description of the subcategory; (ii) list of AFOLU categories/sub-categories, gases, and pools; (iii) dates of data coverage; (iv) the Method used; (v) the source of Activity Data; and (vi) source of Emission Factor).

4.1.1.1 Summary of the Programme GHG Inventory

Table 11 shows the average net emissions and removals per subcategory (positive values mean emissions while negative values are removals) for 2009-2018 AFOLU. The relative and cumulative contribution to the absolute level of the total GHG emissions and removals are also included in the Programme GHG Inventory. It is important to note that:

- Grassland converted to Forest land is Non-Occurring in Eastern Province.
- Lime application is also non-Occurring.
- Harvested wood products were not calculated because of insufficient data.
- Tier 1 was used for determining GHG Emissions from Enteric fermentation due to unavailability of enhanced characterisation of livestock data

according to species types, age, feeding situation, hence, Tier 2 method could not be used. The only best available Activity Data was on annual Livestock population data (Non-Dairy cattle (Other Cattle), Goat, Sheep, Pigs and Poultry. Equally GHG from Manure Management was based on Tier 1.

- For soil organic carbon, Tier 3 approach was applied using a SOC measurement-system to derive SOC values for relevant AFOLU classes and to estimate soil organic C stock changes for land use categories converted. SOC change within remaining land use categories was always considered zero.

Table 11. Summary of the Programme GHG Inventory for Eastern Province

Inventory Categories (Associated carbon pools and gases)	Net Emissions and Removals (tCO_2eq)	Relative contribution to the absolute level of the total GHG emissions and removals in the Programme GHG Inventory (%)	Associated carbon pools and gases
3B1a: CO_2 from Forest Land remaining Forest Land	9,164,186.67	82.76	CO_2 in aboveground biomass (AGB), belowground biomass (BGB), Soil organic carbon (SOC) and deadwood (DW)
3B2bi: CO_2 from Forest Land converted to Cropland	1,041,847.43	9.41	CO_2 in AGB, BGB, SOC and DW
3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	282,541.03	2.55	CH_4
3C4: N_2O Emissions (Direct) from managed soils	216,719.35	1.96	N_2O
3C5: N_2O Emissions (indirect) from managed soils	68,768.61	0.62	N_2O
3B5bi: CO_2 from Forest Land converted to Settlements	46,988.53	0.42	CO_2 in AGB, BGB, SOC and DW
CO2 from Cropland converted to Forest Land	(40,107.16)	0.36	CO_2 in AGB, BGB, SOC and DW
3A2a: N_2O Emissions from Manure in Domestic Livestock (Non - Dairy Cattle)	38,371.16	0.35	N_2O

Inventory Categories (Associated carbon pools and gases)	Net Emissions and Removals (tCO_2eq)	Relative contribution to the absolute level of the total GHG emissions and removals in the Programme GHG Inventory (%)	Associated carbon pools and gases
3C1c: N_2O from Grassland remaining Grassland (Biomass Burning in Grasslands)	30,351.26	0.27	N_2O
3A1d: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Goats)	27,659.56	0.25	CH_4
3C1c: CH_4 from Grassland remaining Grassland (Biomass Burning in Grasslands)	22,518.68	0.20	CH_4
N_2O Emissions (indirect) from Manure Management	18,546.26	0.17	N_2O
3C3: Urea Application	16,578.25	0.15	CO_2
N_2O Emissions from Manure in Domestic Livestock (Pigs)	9,544.79	0.09	N_2O
CH_4 Emissions from Manure in Domestic Livestock (Non - Dairy Cattle)	9,114.23	0.08	CH_4
N_2O Emissions from Manure in Domestic Livestock (Goats)	8,575.32	0.08	N_2O
CH_4 Emissions from Manure in Domestic Livestock (Pigs)	5,936.32	0.05	CH_4

Inventory Categories (Associated carbon pools and gases)	Net Emissions and Removals (tCO_2eq)	Relative contribution to the absolute level of the total GHG emissions and removals in the Programme GHG Inventory (%)	Associated carbon pools and gases
CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Pigs)	5,936.32	0.05	CH_4
CH_4 from Cropland remaining Cropland (Biomass Burning in Cropland)	4,613.31	0.04	CH_4
3C7: CH_4 Emissions from Rice Cultivation	3,426.11	0.03	CH_4
3B2bii: CO_2 from Grassland converted to Cropland	3,302.44	0.03	CO_2
3A1c: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Sheep)	2,246.06	0.02	CH_4
N_2O from Cropland remaining Cropland (Biomass Burning in Cropland)	1,765.59	0.02	N_2O
CH_4 Emissions from Manure in Domestic Livestock (Goats)	1,217.02	0.01	CH_4
3B5bii: CO_2 from Cropland converted to Settlements	(973.88)	0.01	CO_2 in AGB, BGB, SOC and DW

Inventory Categories (Associated carbon pools and gases)	Net Emissions and Removals (tCO_2eq)	Relative contribution to the absolute level of the total GHG emissions and removals in the Programme GHG Inventory (%)	Associated carbon pools and gases
N_2O Emissions from Manure in Domestic Livestock (Sheep)	555.05	0.01	N_2O
3B3bii: CO_2 from Cropland converted to Grasslands	(524.34)	0.00	CO_2 in AGB, BGB, SOC and DW
N_2O Emissions from Manure in Domestic Livestock (Poultry)	198.16	0.00	N_2O
CH_4 Emissions from Manure in Domestic Livestock (Poultry)	92.28	0.00	CH_4
CH_4 Emissions from Manure in Domestic Livestock (Sheep)	89.84	0.00	CH_4
Biomass burning in other land (N_2O) tonnes	66.37	0.00	N_2O
Flooded Land remaining Flooded Land (CH_4)	54.03	0.00	CH_4
Biomass burning in other land (CH_4) tonnes	35.21	0.00	CH_4
CO_2 from Grassland remaining Grassland	-	-	CO_2 in AGB, BGB, SOC and DW
CO_2 from Cropland remaining Cropland	-	-	CO_2 in AGB, BGB, SOC and DW

Inventory Categories (Associated carbon pools and gases)	Net Emissions and Removals (tCO_2eq)	Relative contribution to the absolute level of the total GHG emissions and removals in the Programme GHG Inventory (%)	Associated carbon pools and gases
3.B.6.b: CO_2 from Land converted to Other Land	-	-	CO_2
CO_2 from Settlements converted to Forest Land	-	-	CO_2 in AGB, BGB, SOC and DW
3.B.6.a: CO_2 from Other Land remaining Other Land	-	-	CO_2
3B2bi: CO_2 from Forest land converted to Grassland	-	-	CO_2 in AGB, BGB, SOC and DW
Total	**10,990,240**	**100.00**	

4.2 Identification of subcategories that are eligible for ISFL Accounting

4.2.1 Step 1: Initial selection of subcategories

A key category analysis was undertaken and formed a basis for initial selection of subcategories eligible for ISFL accounting. The key source categories that had a >90% significant contribution to the overall emissions were from (i) 3B1a: CO_2 from Forest Land remaining Forest Land; (ii) 3B2bi: CO_2 from Forest land converted to Cropland; (iii) 3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non – Dairy Cattle) and (iv) 3C4: N_2O Emissions (Direct) from managed soils.

Analysis of subcategories involving conversions between land-use categories

Table 12 shows the initial selection of subcategories which are conversions between land-use categories.

Table 12. Subcategories involving conversions between land-use categories.

Subcategory involving conversions between land-use categories	Net emissions and removals (t CO_2eq) [19]	Relative contribution to the total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory	Cumulative contribution to the total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory
3B2bi: CO_2 from Forest Land converted to Cropland	1,041,847	91.9 %	91.9 %
3B5bi: CO_2 from Forest Land converted to Settlements	46,989	4.1 %	96.04 %

[19] When the subcategories has net emissions, please use a positive value. If the subcategory has net removals, use a negative value. However, please ensure that that relative contribution is based on the absolute value, meaning that the total of emissions is the sum of the absolute values of emissions and removals.

CO_2 from Cropland converted to Forest Land	(40,107)	3.5 %	99.58 %
3B2bii: CO_2 from Grassland converted to Cropland	3,302	0.3 %	99.87 %
3B5bii: CO_2 from Cropland converted to Settlements	(974)	0.1 %	99.95 %
3B3bii: CO_2 from Cropland converted to Grasslands	(524)	0.0 %	100 %
Total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory	**1,050,533**		

List of subcategories included in the initial selection

Table 13 presents the list of all subcategories included in the initial selection.

Table 13. Initial selection of subcategories

Condition	Subcategory Conversion Between Land Use Categories	Net Emissions and Removals Tco_2eq)
i. Any subcategories involving conversions from or to forest land	3B2bi: CO_2 from Forest Land converted to Cropland	1,041,847
	3B5bi CO_2 from Forest Land converted to Settlement	46,989

Condition	Subcategory Conversion Between Land Use Categories	Net Emissions and Removals Tco_2eq)
	CO_2 from Cropland converted to Forest Land	(40,107)
	3B2bi: CO_2 from Forest land converted to Grassland	0
	CO_2 from Settlements converted to Forest Land	0
ii. Forest land remaining forest land	3B1a: CO_2 from Forest Land remaining Forest Land	9,164,187
iii. Any subcategories involving conversions between land-use categories other than forest land that, cumulatively with the conversions from or to forest land, amount to 90% of the absolute level of the total GHG Emissions and Removals associated with all land use conversions in the Programme GHG Inventory	N/A	N/A
iv. The single most significant of the remaining subcategories in order of the relative magnitude of contribution of these subcategories to the absolute level of the total GHG Emissions and Removals in the Programme GHG Inventory	3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	282,541
v. Additional non-forest related subcategories may	CO_2 Cropland remaining Cropland	0

Condition	Subcategory Conversion Between Land Use Categories	Net Emissions and Removals Tco_2eq)
be included at the discretion of the ISFL ER Programme if the quality requirements in Section 4.2 are met, provided there is a clear rationale for including these subcategories in terms of improving ISFL ER Programme mitigation performance	3B2bii: CO_2 from Grassland converted to Cropland	3,302
	3C4: N_2O Emissions (Direct) from managed soils	216,719

Table 14 provides a rationale for including additional non-forest related subcategories at the discretion of the EP-JSLP.

Table 14. Non-forest related subcategories.

Subcategory	Justification for initial selection
Cropland remaining Cropland	Cropland remaining cropland has been retained as ISFL category in anticipation of implementation of Climate Smart Agriculture by the farmers.
3B2bii: CO_2 from Grassland converted to Cropland	Grassland areas in the Eastern Province context is generally wooded grassland. Wooded grasslands (including pans and shrubs with some trees) and has biomass, deadwood & litter, and soil carbon per hectare which when converted to cropland results in considerable amount of carbon loss.
3C4: N_2O Emissions (Direct) from managed soils	N_2O Emissions (Direct) from managed soils is one of the most significant of the remaining subcategories in order of the relative magnitude of contribution in the Programme GHG Inventory, contributing 1.96%. The capacity to monitor improvements in ERs from this category will be enhanced and therefore, may be considered eligible to receive result-based payments under the ISFL in the future.

4.2.2 Step 2: Summary of the review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

Table 15 presents the summary of the review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting.

Table 15. Summary of the review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

Subcategory	**Forest land remaining Forest land**
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Emissions and removals in Forest land remaining Forest land were estimated for the 2009-2018 period. The gain-loss method was applied to estimate Net Carbon Stock Change and CO_2 Emissions. Activity Data on Land use change which was used for determining annual increase in biomass carbon stocks due biomass growth for Forest land remaining Forest land Subcategories were obtained using Collect Earth Tool. Activity Data on timber harvest was obtained from Forestry Department annual Reports, fuelwood for firewood and charcoal production from National Woodfuel Study, and area affected by disturbances from Fires and Fraction of biomass burnt from disturbance from Chidumayo, 2013 and Hollingsworth et al, 2015, data for estimating annual decrease in biomass carbon stocks due to losses for Forest land remaining Forest land was obtained from Forestry Department Provincial Annual Reports (2009 – 2018) and Environment Statistics Compendium (2015) Report. Finally, activity data for carbon stocks change in mineral soils was obtained from ZARI Report on Soils in Eastern Province representing forested landscapes in the area of interest.
Summary of the main sources of data for determining emission or removal factors	The country specific emission factors provided and are used to determine annual increase in biomass carbon stocks due to biomass increment in Forest land remaining Forest land Subcategories. Country specific emission factors for estimating annual carbon loss due to biomass removals from timber harvesting and carbon loss due to fuelwood removals and Country specific emission factors to determine annual other losses of carbon mainly

Subcategory	Forest land remaining Forest land
	attributed to fire disturbances were all obtained from Forestry Compendium (2013) and Integrated Forest Land Use Assessment Report (2015), Hollingsworth 2015, Chidumayo 2013 and the National Woodfuel Study. Country specific emission factors used for estimating carbon stocks in mineral soils were obtained from the ZARI Report on forest soils in Eastern Province.
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Quality requirement set in ISFL Requirement 4.2.2 states that minimum IPCC Tier 2 methods and data must be used for significant pools and gases for a subcategory-Exception is made for forest land-remaining-forest land, where activity data proxies can be used (ISFL Requirement 4.3.8). Activity data was country specific and qualifies as Tier 2 and was obtained using the Collect Earth Tool, while that of wood removal timber, fuelwood for firewood and wood for charcoal production was obtained from the National Woodfuel Study. Emission Factors were obtained from Forestry Compendium (2013 and Integrated Land Use Assessment Report (ILLUA II and equally qualifies as Tier 2. Activity Data for area burnt was obtained from Chidumayo 2013 and Hollingsworth et al 2015equally qualifies as Tier 2. Soil Carbon data was obtained from the Soils Report (Tier 2) for Eastern Province.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in quality assurance and quality control (QA/QC) system, and it operates at high resolution. Therefore, it qualifies for approach 3

Subcategory	Forest land converted to Cropland and Settlements
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Emissions and removals in Forest land converted to cropland and Settlements are estimated for the 2009-2018 period. The annual change in carbon stocks in biomass (tonnes C/yr) (Annual Biomass carbon loss) was estimated using country specific data of annual area of forest land converted to cropland, and settlement in (ha), respectively, obtained from the Collect Earth Tool.

Subcategory	Forest land converted to Cropland and Settlements
	Activity data used in estimating annual change stocks in dead organic matter due to conversion from Forest land to Cropland and Settlement is provided in Annex 6. Activity data used in estimating annual change in carbon stocks in mineral soils were derived from soil measurements as outlined in the ZARI Report on forest soils and soils representing cropland and settlements in Eastern Province. In the GIS analysis the land use maps were not interfaced with soils and climate maps. Hence area for land use change was not by soil and climate.
Summary of the main sources of data for determining emission or removal factors	Country specific EF for annual increase in carbon stocks in biomass for Forest land Converted to Cropland and Settlement were obtained from Forestry Compendium Report (2015) and ILUA II (2015). IPCC Default EF for annual change stocks in dead organic matter due to conversion for Forest land converted to Cropland and Settlement were obtained from IPCC Software. For mineral soils, annual soil C change factors were derived from differences of these measured (Tier 2) soil data applying the IPCC default SOC equilibrium period of 20 years.
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Activity data for estimating annual change in carbon stocks in biomass for Forest land converted to Cropland and Settlements respectively, were country specific and qualifies as Tier 2 and were obtained using the Collect Earth Tool. Emission Factors (EF) were obtained from the Integrated Land Use Assessment Report (ILUA II) and Forest Compendium and qualify for IPCC Tier 2 . Soil measured data for different land use categories were used to derive annual change in carbon in mineral soils which also qualifies as Tier 2.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in QA/QC system, and it operates at high resolution. Therefore, it qualifies for approach 3.

Subcategory	Cropland converted to forest land
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Emissions and removals for Cropland converted to Forest land were estimated for the 2009-2018 period. The annual change in carbon stocks in biomass (tons C/yr) (Annual Biomass carbon Gain) was estimated using country specific data of annual area of Cropland converted to Forest land (ha), obtained using the Collect Earth Tool. Activity data used in estimating annual change stocks in dead organic matter for Cropland converted to Forest land due to conversion was the area undergoing conversion from old to new land use category and time period of the transition from old to new land use category(yr). Default value of 2.1 tons C/ha was applied. Activity data used in estimating annual change in carbon stocks in mineral soils for Cropland converted to Forest land is area for land use change by climate and soil, and time dependence of stock change factors (D) (T) (yr) – Default value is 20.
Summary of the main sources of data for determining emission or removal factors	The Emission Factors used to estimate the annual changes in carbon stocks in biomass from Cropland converted to Forest land are provided in Annex 6, and were obtained from Forestry Compendium Report (2015) and ILUA II (2015). Default emission factors used to estimate the annual change stocks in dead organic matter due to conversion in Cropland to Forest land were IPPC default values. IPCC Default emission factors used to estimate annual change in carbon stocks in mineral soils in Cropland converted to Forest land are in Annex 6.
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Activity data for Cropland converted to Forest land was country specific and qualifies as Tier 2 and was obtained using the Collect Earth Tool. Emission Factors were obtained from the Integrated Land Use Assessment Report (ILUA II) and Forest Compendium and qualify for Tier 2 IPCC Tier.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in QA/QC system and it operates at high resolution. Therefore, it qualifies for approach 3.

Subcategory	N_2O Emissions (Direct) from managed soils
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Anthropogenic N- inputs activity data to estimate annual direct N_2O emissions produced from managed soils are (i) synthetic fertilisers, (ii) animal manure and compost, (iii) crop Residue are given in the GHG Report in Annex 6 and (iv) N in mineral soils that mineralised in association with loss of soil C from soil organic matter as a result of changes to land use management. The synthetic fertilisers statistics (2008 – 2018) were obtained from the Ministry of Agriculture and Zambia Statistical Agency through the crop forecast surveys that are annually undertaken. The amount of N contained in synthetic fertilisers was calculated for each of the fertilisers in the GHG Report in Annex 6. The amount of N in crop residues was determined in studies carried out at University of Zambia(UNZA), Zambia Agriculture Research Institute (ZARI) and Golden Valley Agricultural Research Trust (GART) and through expert judgement from experts in the agriculture sector.
Summary of the main sources of data for determining emission or removal factors	The choice of using default emission factors (Tier 1) were based on non-availability of country specific emission factors for N_2O emissions from anthropogenic N – inputs from N synthetic fertilisers, N animals and compost manure, N in crop residues and N in mineral soils that is mineralized.
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Although Activity Data used is country specific and qualifies as Tier 2, Emission Factors used for this subcategory does not follow IPCC Tier 2 methods and data. According to the decision tree presented in chapter 10 of Volume 4, 2006 IPCC Guidelines, this category should be estimated with a Tier 2 method given that it is a key category which represents a large portion of the Eastern Province's total emissions. An improvement plan will be put in place to migrate to Tier 2.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	N/A

Subcategory	**CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)**
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Emissions from enteric fermentation in non-dairy cattle were estimated for the 2009-2018 period. Due to unavailability of enhanced characterisation of livestock data according to species types, age, feeding situation, Tier 2 method was not used. The best available Activity Data was annual Livestock population data for Eastern Province which was extracted from the Livestock Report[8] and Livestock Census Report, 2018[9] and used to estimate CH_4 emissions from enteric fermentation. The annual livestock population data was used for the estimation of CH_4 emission for the year 2009– 2018.
Summary of the main sources of data for determining emission or removal factors	Default emission factors for enteric fermentation, for all livestock species was obtained from the 2006 IPCC Guidelines (Table 10.10 and Table 10.11 of the IPCC 2006 Guidelines) because country-specific emission factors to estimate CH_4 emission from enteric fermentation is not available.
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Data used for this subcategory does not follow IPCC tier 2 methods and data. Tier 1 method was used for estimating GHG emissions from enteric fermentation due to unavailability of country specific livestock characterisation data. The only country specific activity data available was livestock population data. Methane emissions from enteric fermentation were calculated using a Tier 1 method according to the 2006 IPCC Guidelines using Equation 10.19 and Equation 10.20 for the time series 2009 to 2018. This category should be estimated with a Tier 2 method given that it is a key category which represents a large portion of the Eastern Province's total emissions. An improvement plan will be put in place to migrate to Tier 2.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land	N/A

Subcategory	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)
use categories and land use conversions	

Subcategory	Cropland remaining Cropland
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Emissions and removals in Cropland remaining Crop were estimated for the 2009-2018 period. Activity Data which was used for determining areas in Cropland remaining Crop were obtained using the Collect Earth Tool.
Summary of the main sources of data for determining emission or removal factors	Carbon stocks from mineral soils for Cropland remaining Cropland were obtained from Zambia Agriculture Research Institute through research and measurements that has been supported by the Zambia Integrated Forestry Landscape Project. The SOC stock represents a Tier 2 SOC equilibrium value for cropland. No change in carbon stocks in mineral soils is conservatively assumed for this category. There were no emissions from Dead Wood and Biomass under cropland remaining cropland. To account for specific CSA practices defined by the Programme, an additional CSA soil organic carbon baseline was developed for cropland remaining cropland using a Tier 2/3 soil modelling approach in line with the logic of the IPCC Steady-State Method of the 2019 Refinement to the 2006 IPCC Guidelines. This IPCC Tier 2 steady-state method provides an optional alternative method for estimating soil C stock changes in the 0-30 cm layer of mineral soils in Cropland remaining Cropland related to CSA practices. Methodologically the VCS SALM Methodology (VM0017) is followed which requires to model a baseline soil carbon equilibrium factor which is applied during ex-post accounting of CSA benefits. Baseline carbon stock changes are set to zero for agricultural landscapes which are degrading as shown for the Eastern Province.
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Quality requirement set in ISFL Requirement 4.2.2 states that minimum IPCC Tier 2 methods and data must be used for significant pools and gases for a subcategory-Exception is made for forest land-remaining-forest land, where activity data proxies can be used (ISFL Requirement 4.3.8).

Subcategory	Cropland remaining Cropland
	Data used for this subcategory complies with IPCC tier 2 or higher methods and data. Activity data was country specific and qualifies as Tier 2 and was obtained using the Collect Earth Tool. Emission Factors were obtained from research study undertaken by ZARI and supported by the World Bank through the ZIFL Project. CSA baseline equilibrium factor was obtained from Tier 3 farm-based survey data and Tier 2 soil modelling approach following VCS SALM Methodology VM0017 and in line with IPCC SOC equilibrium approach.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in QA/QC system, and it operates at high resolution. Therefore, it qualifies for approach 3.

Subcategory	CO_2 from Grassland converted to Cropland
Summary of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Emissions and removals in grassland converted to cropland are estimated for the period 2009-2018. Annual change in carbon stocks from mineral soils was estimated using country specific activity data of reference soil organic carbon (SOC ref). The source of data on Reference Soil Organic Carbon from Forestry, Agriculture and Wildlife landscapes for Eastern Province was obtained from Zambia Agriculture Research Institute through research that was supported by the Zambia Integrated Forest Landscape project to conduct a soil survey. Activity data to determine the non-CO_2 emissions, CH_4 and N_2O Emissions from Biomass Burning in cropland were estimated by using country specific activity data (Tier 2) on burnt areas from Fires on Burnt areas from Hollingsworth et al, 2015 and IPCC default emission factors (Tier 1).
Summary of the main sources of data for	Country specific emission factors used for estimating carbon stocks in mineral soils were obtained from the Soils Report for Eastern Province.

Subcategory	CO_2 from Grassland converted to Cropland
determining emission or removal factors	
Summary of assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Data used for some of the subcategories complies with IPCC Tier 2 or higher methods and data. Activity Data for area burnt was obtained from Hollingsworth et al, 2015 and equally qualifies as Tier 2. Country specific emission factors used for estimating carbon stocks in mineral soils were obtained from the ZARI Report on Soils in Eastern Province. Emission Factors were obtained from the Integrated Land Use Assessment Report (ILUA II) and Forest Compendium and qualify for Tier 2 IPCC Tier.
Summary of assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has built in quality assurance and quality control (QA/QC) and it operates at high resolution. Therefore, it qualifies for approach 3

4.2.3 Step 3: Final selection of the subcategories eligible for ISFL Accounting

Step 3: Final selection of the subcategories eligible for ISFL Accounting ‘

Table 16 lists all subcategories from step 1 and identifies those subcategories for which step 2 has shown that the historic activity data, the emission factors available and the methods used to collect these activity data meet the quality and baseline setting requirements for ISFL Accounting.

Table 16. Final selection of the subcategories eligible for ISFL Accounting

Subcategory from step 1	Emissions Baseline setting requirement(s) met? (Yes/No)	Methods and data requirement (s) met? (Yes/No)	Spatial information requirement(s) met? (Yes/No)	Eligible for ISFL Accounting? (Yes/No)
Forest Land remaining Forest land	Y	Y	Y	Y
Forest land converted to Cropland	Y	Y	Y	Y
Forest land converted to Settlement	Y	Y	Y	Y
Cropland converted to Forest Land	Y	Y	Y	Y
Direct N_2O Emissions from managed soils	Y	N	N/A	N
CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	Y	N	N/A	N
Cropland remaining cropland	Y	Y	Y	Y
Grassland converted to cropland	Y	Y	Y	Y

The main economic activity of rural communities in the programme area is predominantly farming. It is for this reason that Cropland remaining cropland has been retained an ISFL category in anticipation of implementation of Climate Smart Agriculture by the farmers.

The EP-JSLP will monitor Direct N_2O Emissions from managed soils. Government with support from the World Bank has made investment in the soil testing facilities at the Zambia Agricultural Research Institute in Eastern Province. The Government considers that the capacity to monitor improvements

in ERs from this category will be enhanced and therefore, may be considered eligible to receive result-based payments under the ISFL in the future, should the relative magnitude of contribution of this subcategory to the absolute level of the total GHG Emissions and Removals in the Programme GHG Inventory increases significantly.

Mitigation measures from Enteric Fermentation combined with local cultural practices relating to domestic livestock management are expected to achieve emission reductions in the initial period of the ERPA. Therefore, a plan to improve the data and methods for this subcategory in order to increase the quality of estimation (from Tier 1 to Tier 2 or 3) has been put in place.

4.3 Summary of time bound plan to increase the completeness of the scope of accounting and improve data and methods for the subsequent ERPA Phases during the ERPA Term

ISFL requirements also establish that, if a subcategory selected in step 1 has historic data available to construct an Emission Baseline over a Baseline Period of approximately 10 years but these data do not meet the other quality requirements of Section 4.2, it can only be included for accounting in the ERPA Phase if all the quality requirements can be met through the application of improved methods and data. The EP-JSLP intends to include Direct N_2O Emissions from managed soils and CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle) in this ERPA phase, because even when the quality of the data is not in compliance with the requirements, there is enough data to construct emissions baseline for a period of 10 years. This is in accordance with requirement 4.3.14 of the ISFL Programme Requirements. The EP-JSLP will ensure that the quality requirements will be met, the latest being at the end of the ERPA Phase.

The following table shows a time bound plan to improve the data and methods for these subcategories in order to increase the level of estimation (from Tier 1 to Tier 2 or 3).

Table 17. Priority Areas for Improvements of data and methods

Sector	Source Category	Describe Problem	Potential Improvement	Institutions to undertake improvements
Agriculture	Direct N_2O from managed soils	There are no country specific emission factors for N_2O emissions from anthropogenic N – inputs from N synthetic fertilisers, N animals and compost manure, N in crop residues and N in mineral soils that is mineralized.	• Develop country specific emission factor for N_2O emissions from urine and dung N deposited on pasture range and paddock by grazing animals • Determine the fraction of managed manure used for feed, • fraction of managed manure used for fuel, • fraction of managed manure used for feed, • fraction of N from organic additions applied to flooded rice, N in mineral soils that is mineralized in association with loss of soil carbon from soil organic matter as a result of changes to land use, and annual area of managed organic soils03. • Develop country specific emission factor for N_2O emissions from drained / managed organic soils (kg N_2O – N/ha*yr)	Ministry of Agriculture (MOA) ZARI UNZA Golden Valley Trust
		Lack of data: Managed manure N available for application to managed soils.	Determine manure management systems for different livestock.	Ministry of Fisheries and Livestock (MFL) ZARI UNZA
		Organic N applied to managed soils	• Determine the fraction of manure N that is lost in the Manure management system for the different livestock, • N in organic bedding (solid storage and deep bedding) for different livestock, • Compost applied (kg N/yr). • Determine sewage sludge applied (kg N/yr), and • Other organics amendments applied (kg N/yr. (survey)	ZARI/UNZA

Sector	Source Category	Describe Problem	Potential Improvement	Institutions to undertake improvements
		Lack of data: Direct N_2O emissions from managed soils (urine and dung inputs to soils)	Develop country specific emission factor forN_2O emissions from urine and dung N deposited on pasture range and paddock by grazing animals	UNZA
		Lack of data: Direct N_2O emissions from managed organic soils	• Determine the fraction of managed manure used for feed, • fraction of managed manure used for fuel, • fraction of managed manure used for feed, • fraction of N from organic additions applied to flooded rice, N in mineral soils that is mineralized in association with loss of soil carbon from soil organic matter as a result of changes to land use, and annual area of managed organic soils. • Develop country specific emission factor for N_2O emissions from drained / managed organic soils (kg N_2O – N/ha*yr)	UNZA
Livestock	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	No country specific data on livestock type, weight, feeding situation and feed digestibility	• Livestock Type (mature females, draught bull locks, mature females grazing, bulls grazing and young) • Average weight gain per day • Mature weight of livestock by type • Feeding situation • Feed digestibility	MFL/UNZA

4.4 Emissions Baseline for ISFL Accounting

4.4.1 Approach for estimating Emissions Baseline

The construction of the Emissions Baseline in current ERPA phase follows the ISFL requirements. The first step is the preparation of the GHG Inventory for Agriculture, Forestry and Other Land Use (AFOLU) sector, applying the methodology, categories and subcategories from the 2006 IPCC Guidelines (short description in Section 4.1.1). The best available data was used to provide the historical emissions in the sector. For the case of Land Use, Land Use Change and Forestry), emissions and removals were estimated with activity data for Livestock collected from Livestock Annual Reports[20] and Livestock Census Report[21] for Land, activity data was collected using the Collect Earth Tool[22] by the Forestry Department, Environment Statistics Compendium (2015)[23] and Forestry Department Provincial Annual Reports (2009 – 2018)[24] and activity data for Aggregate Sources and Non CO_2, activity data was collected from Fires on Burnt areas Database from Hollingsworth et al, 2015 and National published data from Crop Forecasting Survey, Ministry of Agriculture[25] and Livestock Annual Reports. Emission Factors were obtained from Integrated Land Use Assessment Report II (ILUA II)[26], IPCC default factors, Zambia Agriculture Research Institute (SOC), and in case for the additional CSA SOC component the ZIFLP Socio-economic Baseline Survey[27], Crop Forecasting Surveys, Post Harvest Surveys[28], Lead Farmers Register (LFR), and global available climate and soil databases[29].

ISFL requirements were applied to finally select the subcategories that are eligible for ISFL accounting at this first ERPA phase, meeting the quality and baseline setting requirements for ISFL accounting: historic data available, at minimum Tier 2 method for estimation of emissions and removals and approach 2 or 3 for spatial information. An exception is made for CH_4 emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle) and Direct N_2O emissions from managed soils because although they do not comply with all quality requirements, they can be included in the baseline as per requirement 4.13.14 of the ISFL Requirements. A time bound plan is prepared, to improve

[20] Ministry of Fisheries and Livestock, Livestock Report
[21] Summary Report - The 2017/2018 Livestock and Aquaculture Census, Ministry of Fisheries and Livestock and Central Statistical Office Lusaka, 2018
[22] Saiku Data, Collect Earth http://openforis.org
[23] CSO Environment Statistics Compendium (2015)
[24] Forestry Department Provincial Annual Reports (2009 – 2018)
[25] Crop Forecasting Survey, Ministry of Agriculture
[26] Integrated Land Use Assessment II. Forestry Department 2016.
[27] Zambia Integrated Forest Landscape Project. Socio-economic Baseline Survey 2019. Ministry of National Development Planning & Central Statistical Office
[28] Post Harvest Survey, Ministry of Agriculture
[29] Climate toolbox (https://climatetoolbox.org/tool/data-download) download date: 11/29/2022; & SOILGRIDS.ORG

quality of estimations at least before the end of the first ERPA phase. The activities considered at this ERPA phase are Forest Land remaining Forest land, Forest land converted to Cropland, Forest land converted to Settlements, Cropland converted to Forest land, Cropland remaining Cropland including CSA, Grassland converted to cropland, Direct N_2O emissions from managed soils, and CH_4 emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle).

The Uncertainty Analysis for the AFOLU sector was estimated using approach 1. Approach 1 is based upon error propagation and is used to estimate uncertainty in individual categories, in the inventory as a whole, and in trends between a year of interest and a base year. In Approach 1 uncertainty in emissions or removals can be propagated from uncertainties in the activity data, emission factor and other estimation parameters through the error propagation equation and computed using the IPCC 2006 software.

The baseline period considered is of 10 years, starting year is 2009 and ending year is 2018. Once the initial selection of categories is complete and the baseline period selected, the baseline is estimated with the sum of the average values of emissions and removals for the 2009-2018 period for the selected categories.

4.4.2 Emissions Baseline estimate

According to the ISFL Programme requirement, Table 18 shows the emissions baseline for the final selection of the subcategories eligible for ISFL Accounting. The emissions correspond to the average value of the categories for the period 2009-2018.

Table 18. Historical Emissions baseline for the final selection of the subcategories eligible for ISFL Accounting

Year	Forestland Remaining Forestland (tCO_{2e})	Forestland converted to Cropland (tCO_{2e})	Forestland converted Settlements (tCO_{2e})	Cropland converted to Forestland (tCO_{2e})	N_2O Emissions (Direct) from Agricultural Managed Soils (tCO_{2e})	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle) (tonnes CO_2 equivalent) (tCO_{2e})	Cropland remaining cropland (tCO_{2e})	Grassland converted to Cropland (tCO_{2e})	Total (tCO_{2e})
2009	8,180,965.9	1,014,582.6	45,326.0	-7,292.2	126,292.6	221,152.1	0.0	3,228.4	9,584,255.4
2010	8,275,441.4	1,020,641.4	45,695.5	-14,584.4	232,621.4	221,904.3	0.0	3,244.9	9,784,964.4
2011	8,347,625.8	1,026,700.3	46,064.9	-21,876.6	197,285.4	223,164.2	0.0	3,261.3	9,822,225.3
2012	8,491,060.5	1,032,759.1	46,434.4	-29,168.8	216,160.6	224,424.2	0.0	3,277.8	9,984,947.7
2013	8,596,196.6	1,038,818.0	46,803.8	-36,461.1	122,586.9	236,148.3	0.0	3,294.2	10,007,386.7
2014	8,839,279.4	1,044,876.9	47,173.3	-43,753.3	167,044.0	314,282.6	0.0	3,310.7	10,372,213.5
2015	9,323,376.1	1,050,935.7	47,542.7	-51,045.5	229,514.9	334,897.2	0.0	3,327.1	10,938,548.3
2016	9,776,814.7	1,056,994.6	47,912.1	-58,337.7	312,898.6	355,511.8	0.0	3,343.6	11,495,137.6
2017	10,406,800.9	1,063,053.4	48,281.6	-65,629.9	257,203.0	391,850.6	0.0	3,360.0	12,104,919.5
2018	11,404,305.6	1,069,112.3	48,651.0	-72,922.1	305,586.2	302,075.1	0.0	3,376.5	13,060,184.5
Average	**9,164,186.7**	**1,041,847.4**	**46,988.5**	**-40,107.2**	**216,719.4**	**282,541.0**	**0.0**	**3,302.4**	**10,715,478.3**

Provided in Figure 7 are historical emissions for Subcategories eligible for ISFL accounting.

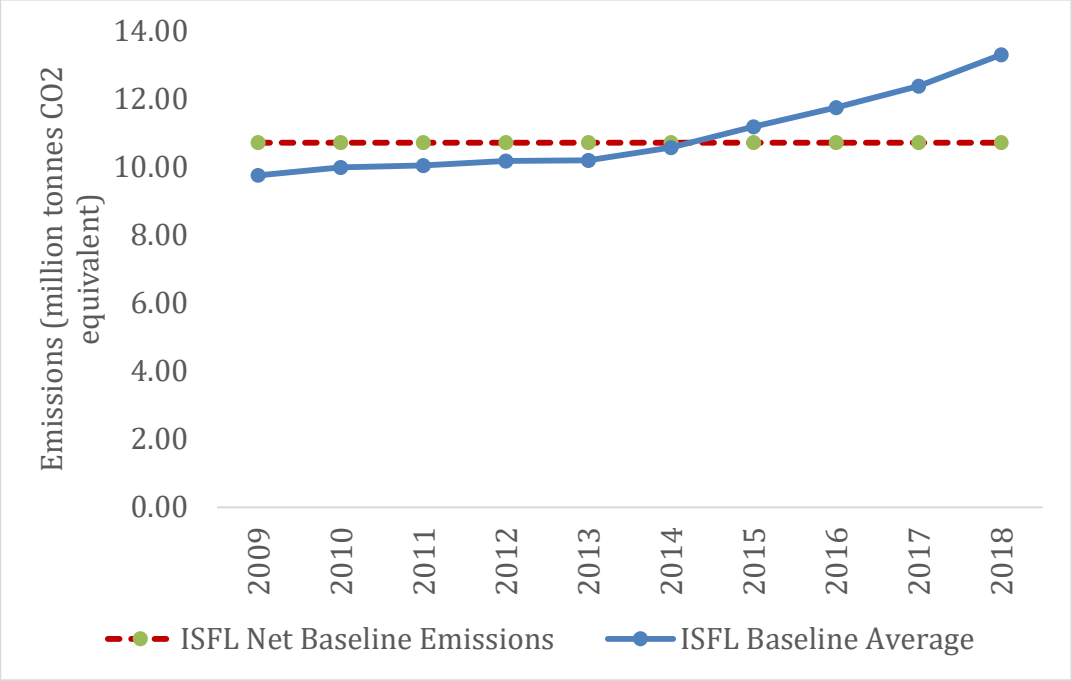


Figure 7 Historical emissions Subcategories eligible for ISFL

The following subcategories are eligible for ISFL in the first phase: Forest land remaining Forest land, Forest land converted to Cropland, and Forest land Converted Settlement, Cropland converted to Forest land, Cropland remaining Cropland including CSA, Grassland converted to Cropland, Direct N_2O emissions from managed soils, and CH_4 emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle).

Summary emissions baseline estimate is presented in Table 19.

Table 19. Emissions Baseline estimate.

ERPA Phase	Emissions Baseline (tCO_2e)
1	10,715,478.3
2	10,715,478.3
3	10,715,478.3
4	10,715,478.3
5	10,715,478.3
6	10,715,478.3
7	10,715,478.3
8	10,715,478.3
9	10,715,478.3
10	10,715,478.3

4.5 Monitoring and determination of emission reductions for ISFL Accounting

4.5.1 Description of the monitoring approach

As part of the national REDD+ programme, the EP-JSLP has been selected to implement the first pilot jurisdictional REDD+ programme in the country. The approach for monitoring various categories under SFM, Activity Data- Land Use Change (ha)-Carbon Stock Change under Forest land remaining Forest land, Cropland and Settlements converted to Cropland, and Forest land converted Cropland, Settlements and Grassland will be collected by the Collect Earth Tool. The same methodology for data analysis explained in section 4.2.2 will be used. Further data quality will be enhanced by using different remote sensing products as well as ground surveys as detailed below.

Data Collection:

- Data collection under forestry will measure change of land use (deforestation) and selective removal of trees in an area (forest degradation). The loss of forests to crop land, Grassland and settlements is deforestation, while under forest land remaining forest land forest degradation (Timber, firewood, Charcoal harvesting) will be monitored. Deforestation will be measured by undertaking landcover assessment using remote sensing and GIS tools. Measurement of forest degradation

will be undertaken by assessing the legally harvested forest produce, using sample plots and checking on illegal activities especially harvests.

- Using Collect Earth (CE) sampling over very high-resolution satellite images/photos to detect possible net reductions from intervention combating the gross forest loss over the areas of interest under Community Forest Management (CFM) and some Protected Forest Areas (PFA).
- Using unmanned aerial vehicles (UAV)/Drones to collect images showing activities related to the Project Interventions. A selected network of some Collect Earth points can be used as ground control points (GCPs) for collecting activity data over the target project sites. From which computed NDVIs can be produces to show where and how much net reductions are realised from different interventions.
- Produce the latest (more recent), one-off LU/LC map showing the resource distribution which highlights where the net reductions have been realised and to map areas requiring implementation of future interventions by the project. The "base map" for such LU/LC maps would be the NDVI thematic images from designated areas of intervention by the project.
- Later, applying regression analysis to physically look back in time and make future predictions (focusing ahead of time) and reviewing any possible changes (+ve and –ve) in between different periods of observation to inform midterm indicators on possible historical deforestations and forest degradation activities using the same Collect Earth (permanent sample) points.
- The ISFL will also explore the use of the World Resources Institute Data for enhancing estimations for above ground biomass.

The different entities responsible for generating, recording, storing, aggregating, collating and reporting data are presented in Figure 8. The description of each process can be found in section 4.5.2.

Overall, the responsibility for data collection is the District Forest Officers under the supervision of the Lead Officer for National Forest Monitoring Systems (NFMS) at Forestry Department Headquarters, who through Provincial Forest Officer shall coordinate and supervise the monitoring activities of this indicator in the area of interests (AOI).

Table 20 includes the main types of data collection techniques used by the Programme along with the frequency and responsible for monitoring specific variables:

Table 20. Data collection tools used for monitoring.

Data Collection	Frequency of data collection	Responsibilities for data collection	Unit of measure	Activity Data
Ground Measurements	Annually	Forestry Department	Tons/Hectares	• Fire Disturbances • Land use data • Wood fuel usage • Timber harvesting
Remote Sensing	Annually	ZEMA	Hectares	Annual Change in dead organic matter-Area undergoing
Remote Sensing and Ground Measurement	Every 2 years with soil surveys	Forestry Department	Hectares	Annual Change in carbon stocks in mineral soils-SOC
Farm activity-based monitoring	Annually	Ministry of Agriculture	Farm based	Activity data on variety of crops, crop yields, fertiliser types and applications, land management systems, crop residues use,
Soil sampling through Soil surveys and land evaluation	Every 2 years.	ZARI	%	SOC

4.5.2 Organisational structure for monitoring and reporting

ZEMA has the delegated authority to prepare GHG Inventory in the country and has established institutional arrangements for National GHG Management System. ZEMA is responsible for conducting MRV through the Inventory Coordinator in collaboration with the relevant sectors. The Eastern Province JSLP will operate under the same institutional arrangements.

Several Government agencies, non-governmental organisations and community stakeholders will be involved in the monitoring and evaluation of Emission Reduction of GHG in the subcategories eligible for ISFL in the first phase (Figure

8). Clearly designated roles and responsibilities for managing and monitoring emissions and removals will help avoid confusion and assist in efficient delivery of information nationally and internationally.

Three main MRV functional levels of institutional arrangements will be at National, Provincial (and their respective specialised units), and the districts. The national level shall provide a coordination role and backstopping in the implementation of the MRV system, whilst actual monitoring activities will be conducted at Provincial and District levels.

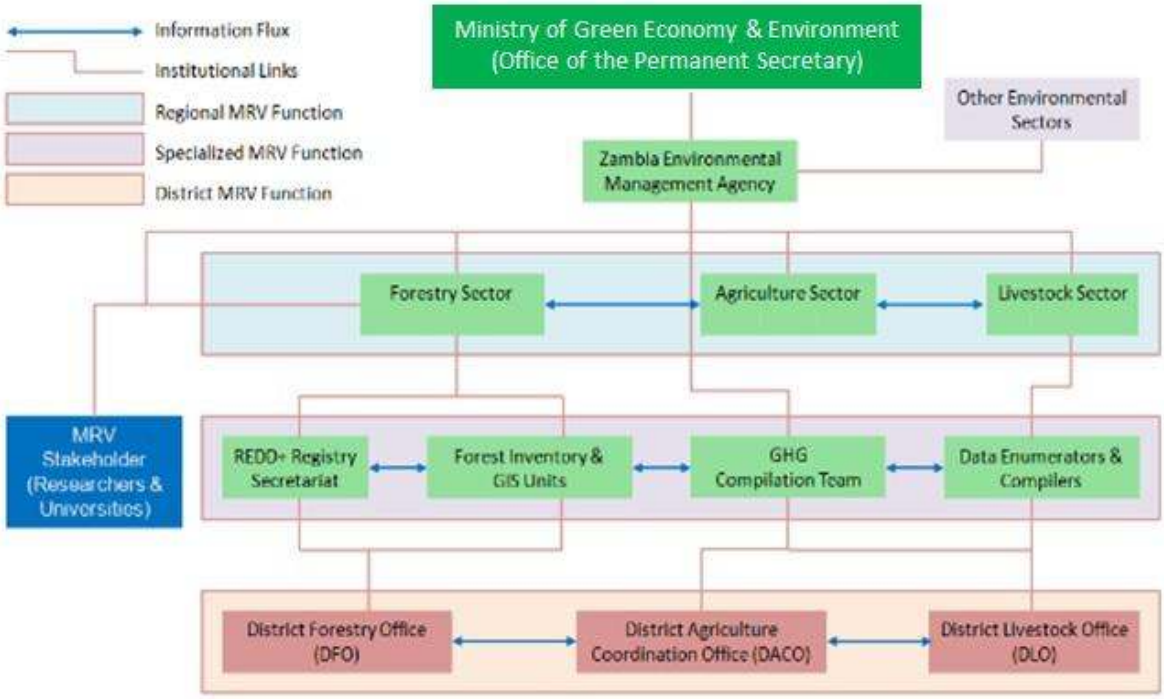


Figure 8 Designed for the GHG Baseline Survey for Eastern Province

Ministry of Green Economy and Environment (Office of the Permanent Secretary)

The UNFCCC decisions suggest that a national focal point i.e., an officer under the department of Climate Change and Green Economy could have overall responsibility for coordinating the MRV function. The national focal point through the office of the Permanent Secretary – MLNR shall coordinate all responsibilities to avoid ambiguity among stakeholders concerning their roles and responsibility of this lead position.

Zambia Environmental Management Agency (ZEMA)

ZEMA as an Environmental Regulator and Coordinator of GHG inventory compilations, submission of national communications, biennial transparency reporting shall lead the process in supporting all sectors in capacity building, quality control and assurance. ZEMA shall lead the development process of MRV of GHG Inventory in the province. Therefore, the GHG compilation team comprising of technical representatives from all the Environmental sectors led by ZEMA shall be responsible for capturing and processing sector-based data and information coming from an established MRV system.

MRV Stakeholders (Researchers & Experts)

Different MRV stakeholders shall support the process of validating the MRV system to be developed and established based on the best practices and well researched and peer reviewed empirical data/information products. Researchers will add value to the MRV system by providing checks and balances on evolving methods of measuring, reporting and verifications (MRV).

Forestry Sector (FD)

Forestry activity data requirements demands for various data dimensions and variables. They range from biophysical data collected from national forest inventories (NFI) to data on land use, land use change in forestry. Requirements for such datasets should be repeatable, consistent, of good quality and comparable over time. The outputs from forest inventories are used to derive emission factors required as important elements for MRV system to calculate the emission from LULUCF.

The scale of data collection can be at local, sub-national and national levels, and should include data on major land use activities such as deforestation and forest degradation; the NFI data should provide estimates for above ground biomass (AGB), below ground biomass (BGB), dead wood (DW), and litre and soil biomass as the main carbon pools for estimating carbon emissions from LULUCF. Additional and useful data for the Forestry subsector includes data on wood removals: firewood, wood for charcoal, wood for timber including data on fire occurrence and or data on forest disturbances. The classification of all this data can be presented according to vegetation types to enhance the reporting of emission estimates from the forestry sector.

Specifically, the Forestry Department will be responsible and supervise the Provincial Office in the collection of activity data on Land use change using the Collect Method. They will also be responsible for collection on data in the

province for Wood Removal for Timber harvest and fuelwood for firewood and wood for charcoal production.

REDD+ Registry / Secretariat

The Forestry sector shall manage the REDD+ registry hence responsible for the National Forest Monitoring Systems (NFMS). However, several actors need to be involved in the different components of the system, such as data collection and management, monitoring and measuring GHG emissions as well as reporting and verifying emissions reductions. Consequently, responsibilities for the different elements of the NFMS may lie with various institutions, or divisions and departments within them.

Forest Inventory & Integrated GIS unit

There are several technical methods that should be upheld to ensure that quality and consistent data for the AFOLU sub-sectors is collected for the MRV of emissions. For instance, intensive Forest Inventories (FI) and Forest Livelihood and Economic Surveys (FLES) would be ideal during biophysical and social Forestry assessments under the Forestry sector while Crop Focus Surveys (CFS) and Post-harvest Surveys (PHS) are useful methods of data collection for the crop agriculture sector before and after harvesting so that planted areas are assessed against the crop yields. Conducting Livestock Census is an effective way recommended for this MRV plan. The Livestock sector should endeavour to consistently carry out livestock census to collect animal data at district level.

Digital image processing (DIP) for producing land cover and land-use (LULC) wall-to-wall maps is a common method for most MRV systems developed. However, this remote sensing technique for producing wall-to-wall change maps and subsequently producing change statistics requires highly skilled Remote Sensing and GIS experts that are able to work with time sinks (batch image processing); and should be able to use Python and or R scripts for clouding processing. The experts should also be knowledgeable with adjusted area estimates as a good practice in accuracy assessments to remove bias (false positives) errors in thematic (classified) image layers.

However, there are latest, advanced and cost-effective photo mapping / imaging techniques and GIS applications that are more robust, interactive and intuitive in collecting activity data for the AFOLU sector. One such remote sensing application is the use of unmanned aerial vehicles (UAVs)/Drones which has the capability for continuous monitoring and assessment of forests, crops and livestock populations. This method can help monitor and detect forest net

reductions, mitigation actions and interventions; it can account accurately and monitor with very high precision the grazing lands for animal populations.

Further, in place of wall-to-wall map production there is a direct data collection using earth observation science (EOS) technique that produces reliable and good quality LULUCF statistics with reduced uncertainty. This method employs the use of several observation units in a sampling frame designed to capture field data from very high spatial image resolutions. The technique does not require highly skilled remote sensing experts; it is easy to use and can be adapted to collecting the AFOLU activity. It may not produce a map as an output but produces land use change matrix with reliable overall user accuracy, producer and user accuracies including the kappa coefficients. This methodology (Collect Earth tool) and the use of UAVs are the appropriate remote sensing applications / methods recommended for this MRV plan for Eastern province.

Agriculture Sector (MOA)

Forestry and agriculture are inter-twinned in terms of cross cutting issues that impact on each other. For instance, agriculture expansion affects forests in terms LULUCF, and agriculture development depends on availability of land where forests stand. Activity data needed from agriculture is mainly on variety of crops, land cleared and planted, crop yields, fertiliser types and applications, land management systems, soil type information (i.e.), quantified information on crop residues and burning in crop land; etc.

Food Security and Agriculture face major challenges under climate change, in terms of expected negative impacts on productivity as well as implementation of sector actions to limit global warming. Agriculture's greenhouse gas emissions continue to rise – although not as fast as emissions from other human activities. Better national data on emissions from farming, livestock-raising, fisheries and Forestry can help countries identify opportunities for reducing emissions while addressing their food security, resilience and rural development goals – and gain access to global funding to pursue them.

Specifically, the Ministry of Agriculture in the province will be responsible for collection of activity data –synthetic fertiliser, crop residues, and manure used as in conservation agriculture. ZARI under the Ministry of Agriculture will be responsible for measurement of SOC through soil sampling every 5 years.

The District Level MRV functions

The district offices for each of the sectors discussed above shall be responsible for field data collection / monitoring, processing, analysis and reporting, unless otherwise some specialised functions are needed. The data collected at this level

shall be conveyed and passed on to the provincial level where it shall be aggregated to reflect the provincial level information base.

Other Environmental Sectors

In addition to collection of data on fire disturbances, ZEMA will be responsible for compilation of the GHG estimates and following up with emission reduction**.** As the MRV system expands beyond the AFOLU sector, other environmental sectors shall play a role in enhancing measurements, reporting and verification (MRV) for the province by including other disciplines of the environmental sectors.

Details of the parameters to be monitored can be found in Annex 10 but also in section 6.3 of the Final Draft GHG Inventory Baseline Report prepared by Ministry of National Development Planning.

4.5.3 Uncertainty

The Uncertainty Analysis (UA) for AFOLU sector was estimated using approach 1. Approach 1 is based on error propagation and is used to estimate uncertainty in individual categories, in the inventory as a whole, and in trends between a year of interest and a base year. In Approach 1 uncertainty in emissions or removals can be propagated from uncertainties in the activity data, emission factor and combined factor through the error propagation equation.

The subcategories eligible for ISFL fall into the Land category. For example, Forest land remaining Forest land, where most of emissions arise, the uncertainty is low with a combined factor of 5.83 %(See Table 85). The total GHG emissions from Forest land converted Cropland, Cropland remaining Cropland, Other conversion subcategories, Forest land Converted Grassland, and Settlements have a respective combined uncertainty of 5.83%.

Method of reducing errors for activity data under the Collect Earth Tool will involve, instead of installing samples systematically, a stratified sampling method should be applied, installing proportionally samples in land use and land use classes with reduced area or in area of land-use change.

The Emission factor for Land Use Subcategories is mainly provided by ILUA and the uncertainty is from the field work and process of data collected on field. Systematic errors (bias) can be avoided by good measurement practices. It is essential to prepare for the ILUA, a Standard Operational Procedure to summarise the work done and establish guidance for future measurement. The procedure should have a description of the sampling design, land use/cover classification and organisational structure and responsibilities. See Annex 10 for details.

4.6 Estimation of the Emission Reductions

The EP-JSLP will promote the following interventions aimed at reducing emission which have been identified in the Baseline Study: Sustainable agriculture, Community Forest Management, Improved Stoves, and Sustainable Charcoal Production. The planned interventions will be implemented within the Eastern Province jurisdiction inclusive of areas covered by BCP and COMACO projects. The overall objective of the EP-JSLP is in line with the Mission of the National Strategy to Reduce Deforestation and Forest Degradation, that is to: coordinate efforts aimed at reducing deforestation and forest degradation through improved management of forests and livelihoods. This is fully cognisant with the 2 main sources of GHG emissions in Eastern Province from degradation of forests and forest loss through conversion to crop land.

The 'efforts' are reflected in the main emission reduction projects selected whose objectives are to:

i) Reduce uncontrolled forest loss and degradation while increasing net forest cover through community participation in Sustainable Forest Management. This will be achieved through interventions in support of Objective 1 of the National REDD Strategy to reduce emissions from Protected Areas and its Objective 2: effective management of forests in open areas, with emphasis on promoting the Government Policy of Community Forestry.
ii) Sustainably increase smallholder farmer agricultural productivity, income and welfare, through Climate Smart Agriculture. This will be achieved through interventions in support of Objective 4 of the National REDD Strategy: adoption of good agricultural practices that mitigate carbon emissions.
iii) Reduce firewood and charcoal consumption, through Improved Utilisation of Wood fuel through promotion of energy efficient wood fuel utilisation technologies in support of Objective 5 of the National REDD Strategy: Regulated Production of Wood fuel (charcoal and firewood).
iv) Improve sustainable production of wood fuel also in support of Objective 5 of the National REDD Strategy.

Further efforts will focus on the enabling environment for the EP-JSLP through interventions which support Objective 9 of the National REDD Strategy: Integrated land use planning and Objective 10: Strengthening capacity of relevant institutions.

The Jurisdictional Sustainable Landscape Programme will promote the following 'ER projects' aimed at reducing emissions in the subcategories which have been identified in the Baseline Study:

- **Sustainable Forest Management** (SFM)- The methodology applied is avoided unplanned deforestation and degradation. VCS -approved Methodology VM0009 – Avoidance of ecosystem conversion.

- **Climate Smart Agriculture (CSA)** - The methodology applied to the Sustainable Agriculture component is VCS-approved Methodology VM0017 - Adoption of Sustainable Agricultural Land Management. Relevant practices to be accounted for soil carbon benefits under the Programme include organic amendments to the soil from compost/ manure, improved residue management and planting of soil fertility trees. In order to use the proposed VM0017 Methodology a CSA baseline soil carbon equilibrium factor has been developed for these particular CSA practices.
- **Sustainable Charcoal Production**- The methodology applied is AMS-III.BG Small-scale Methodology: erosion 02.0.
- **Improved Biomass Stoves-**The methodology applied is AMS-II.G. Small-scale Methodology-Energy efficiency measures in thermal applications of non-renewable biomass-Version 11.1.

Sustainable Forest Management

Sustainable Forest Management (SFM) aims to encourage participation of local communities in forest management through identifying and declaring forests in their landscape as Community Forest Management Areas (CFMAs) under their direct control. Secondly promoting community involvement in the management of existing protected lands such as Local and National Forests in partnership with the Forestry Department providing them access and other user rights to forest resources in return for obligations for protection and management there-in reducing forest loss, conserving biodiversity and ultimately expanding the area under sustainable management in Eastern Province. This is achieved primarily through the Community Forestry approach as well as creation of Community Conservation Areas (CCAs) targeting forests in an agricultural landscape. Promotion of non-extractive forest use, e.g., honey production and mushrooms growing as well as related forest-based community enterprises aims to incentivise sustainable forest management.

Sustainable Agriculture

Sustainable Agriculture which aims to promote widespread adoption of agricultural practices including conservation agriculture that increase food production per unit area and farmers' income. The interventions include: (i) promotion and implementation of minimum tillage, (ii) promotion and development of improved crop varieties with biotic and abiotic stress tolerance, (iii) reduction in the use of mineral fertilisers (in-organic) through use of inorganic fertilisers with higher plant nutrient use efficiencies, (iv) promotion of organic fertilisers, such as compost, manures, (v) improved crop management

practices (crop rotations, cover crops), (vi) promotion of appropriate mechanization.

Improved Stoves

This project involves promotion of the use of improved cook stoves aimed at reducing energy losses thereby contributing to reduction in deforestation and GHG emissions. The use of energy-saving stoves will transform the way women cook in rural communities. It will also help cut forest loss, save lives, improve livelihoods, and protect the environment at the same time.

Sustainable Charcoal Production

This Programme involves promotion of sustainable wood harvesting through introduction, and promotion of coupe system in selected customary areas; (ii) promoting sustainable charcoal production through introduction and promotion of charcoal retort kilns in selected customary areas.

4.6.1 Assumptions on Emissions Reduction Estimations from Climate Smart Agriculture

The project geographic boundary has been defined as the physical boundaries of the fourteen Districts in Eastern Province. The EP-JSLP will be implemented within this geographic area.

The dominant land use and livelihood activity at household level is agriculture. There is less sustainable agriculture practices occurring such as use of compost, residue management, intercropping, and alley cropping. Expansion of agricultural land use has continued due to increasing population, and limited alternative livelihoods options. Agricultural land increased by 133,811.66 ha between 2008 and 2018. The farming system is typically low-input small-holder subsistence, with a low level crop diversification. The baseline fertiliser utilisation is pegged at 200 Kg Urea and 200 kg Compound D, per hectare and their corresponding N contents are 46% and 10%, respectively. The project is located in a typical rural area where subsistence farmers use hand tools and animal draught power for agricultural production and no mechanised equipment is used to undertake agricultural activities. Therefore, emissions from use of fossil fuels in agricultural management are conservatively excluded.

Baseline emissions due to use of fossil fuels in agricultural management and biomass burning, baseline removals due to changes in woody perennials, and changes in soil organic carbon are not included. The project promotes the adoption of sustainable agriculture practices, which would improve soil fertility

and, therefore, reduce the need for fertiliser application. Hence, inorganic fertiliser application rates are expected to decline. Under this scenario, the use of inorganic fertiliser is estimated at 140 Kg Compound D fertiliser per hectare, 120 Kg Urea per hectare, and 4,000 Kg of manure.

The baseline scenario is that the soils are degraded in rural Eastern Province due to poor agricultural practices. Therefore, the project will introduce the growing of *Gliricidia sepium* to provide the needed Nitrogen to the soil. At the same, *Faidherbia Albida* will be grown and after 5 years they will mature and be able to provide the required Nitrogen contained in the leaves. The average annual biomass yield of *Gliricidia* is estimated to be 5 kg dry mass per tree. It is assumed that 10% of cropland area is used for growing *Gliricidia sepium* and *Faidherbia Albida* in the first year, with an increase of 2% every 2 years. The ratio of above ground to below ground mass is 2. According to studies conducted by the University of Zambia, the amount of Nitrogen in *Gliricidia sepium* for above and below ground biomass is 5% and 1.7%, respectively. Since *Gliricidia sepium* is coppicing species, there is reduced contribution from below ground biomass. Therefore, the assumption is that there is less mineralisation from organic matter from decomposing matter from *Gliricidia sepium* and hence the mineralisation rate is assumed to be 1%.

The project is promoting residue management including mulching and composting – as opposed to the common baseline practice of burning crop residues. Hence, it is expected to counter biomass burning, and emissions due to this practice are expected to reduce drastically in the project. According to baseline and monitoring surveys, the percentage of agricultural lands with no-burning practice was 3.4 % in the baseline; this increased during the project to 11% and 48% of agricultural lands in 2021 and 2022, respectively. Hence, it is expected that project emissions due to the burning of biomass will decline rapidly due to the rapid adoption of no-burning practices by farmers.

Removals from woody perennials will be accounted for when planting woody perennials (Cashew nuts) is considered among the main project activities in the future. The project is promoting alley cropping with *Gliricidia* species, which is accounted for in terms of soil carbon sequestration.

The activities promote increase soil fertility by compost manuring and residue management. This will in turn result in changes in soil organic carbon. To predict project removals due to changes in soil organic carbon, the assumptions made were that the area where composting and application of *Gliricidia sepium* is happening, is similar to the area converted for growing of *Gliricidia sepium*.

The potential source of leakage is increase in the use of fuel wood and/or fossil fuels from non-renewable sources for cooking and heating purposes due to the decrease in the use of manure and/or residues as an energy source. In rural

Eastern Province the predominant fuel for households is fuelwood and rarely do the households use cow manure as a cooking fuel.

4.6.2 Assumptions on Emissions Reduction Estimations from Sustainable Forest Management

The Government through Forestry Department has authorised to turn encroached forest reserves into CFMAs and ultimately an area of 350,000 hectares will be achieved by 2030.

The baseline scenarios are characterised by:

(i) Logging of woody species for charcoal production
(ii) Forest being converted to cropland for subsistence farming
(iii) Declines in soil fertility due to unsustainable subsistence farming which leads to repeated clearing of new forest areas

From the study, it was found that the deforestation is caused by charcoal production and subsistence agriculture. Without intervention of the project activities, deforestation will continue into the foreseeable future. It is assumed that the average historical baseline GHG emissions obtained for the sub categories which met the quality and baseline requirements are (i) Forest land remaining Forest land, (ii) Forest land converted to Cropland, (iii) Forest Land Converted to Settlement (iv) Cropland remaining Cropland and (v) Grassland converted to Cropland. Therefore, GHG Emissions of 9,244,102.9 in 2021 and 12,525,445.4 in 2030 was divided by the ratio of the corresponding area earmarked for Community Forest Management and the total area of Eastern Province (5,097,587 hectares).

All the selected Community Forest Management project areas are to be managed in such a way that communities commit to; avoiding activities that directly cause deforestation and forest degradation, e.g., cultivation, timber harvesting, and charcoal burning. Such practices will enhance regeneration to occur without any disturbance. Income generating activities such as bee keeping and harvesting of non-wood forest products such as mushrooms will encouraged. These project activities will potentially result in increases in carbon stock. Sustainable agriculture will be encouraged around these project areas. Non-CO_2 emissions from biomass burning has been included in the baseline, and therefore, it is also included in the project scenario.

The effectiveness index (EI) of avoiding deforestation/forest degradation means that the implementation of project activities is expected to halt expansion of small-scale agriculture for the most part. However, some deforestation may still unavoidably occur in the project case. Hence, the EI of 69% was conservatively selected and avoided deforestation/forest degradation is expected to be achieved by the sixth year of the project (2026).

Two sources of leakage are considered, namely; decrease in carbon stocks and increase in GHG emissions associated with leakage prevention measures; and decrease in carbon stocks and increase in GHG emissions associated with activity displacement leakage. Agricultural lands, which in the baseline typically have very low carbon stock levels, would not increase emissions or decrease carbon stocks.

4.6.3 Assumptions on Emissions Reduction Estimations from Sustainable Charcoal Production

The project boundary includes the following:

(i) Areas where biomass is used;
(ii) The carbonization units included in the project;
(iii) The areas for storage, processing, bagging and weighting of inputs (biomass) and outputs (charcoal and/or charcoal briquettes);
(iv) The use of charcoal or charcoal products.

For the charcoal portion produced from non-renewable biomass in the baseline, it is assumed that in the absence of the project activity, the baseline scenario would be the future use of fossil fuels for meeting similar thermal energy needs. For the charcoal portion produced from renewable biomass in the baseline, traditional open-ended methods resulting in methane emitted to the atmosphere forms the baseline scenario.

Under this project, the baseline is continued use of traditional charcoal kilns which are inefficient. The Project will assist in the formation of one cooperative for charcoal producers. The business model will entail formation of 1 Cooperative to occupy 100 hectares per strip and there will be 10 working members of the Cooperative on a pilot basis. Once the first coupe strip is exhausted, the Cooperatives will move to the next coupe strip until the last coupe strip system is reached within the period of five years, after which the Cooperative will return to the first alternate shelterbelt strip until the last shelterbelt strip is reached within the period of another five years. The wood harvesting cycle in the alternate coupe and shelterbelt strip system will last for 10 years. The Cooperative will have two retorts which will be placed in the middle of the total area provided. The retort will be replaced every 5 years. Therefore, creating a retort kiln with this capacity of 1500kg load of biomass per retort per run yielding (1500kg x 35%) = 525kg x 8 runs per month = 4200kg of charcoal per retort per month and about 50 tonnes per year. The production of charcoal from the 2 Modified Adam Kilns) which will be installed will be 100 tonnes per year. The charcoal production using two retorts is approximately 2,222 of 50 Kg bags.

Coupe production output for 80% utilisation of the potential biomass available for charcoal production through selective cutting of trees based on size and type

of species under the coupe system will translate into 800 hectares per year per each District. The mitigation scenario under this Project assumes that charcoal is produced more efficiently.

4.6.4 Assumptions on Emissions Reduction Estimations from Improved Biomass Stoves

Interventions will comprise efficiency improvements in thermal applications of non-renewable biomass. Examples of applicable technologies and measures include the introduction of high efficiency biomass fired project devices (cook stoves). The project boundary is the physical location site of the efficient devices that utilise biomass in rural Eastern Province. The baseline scenario involves continued use of three stone traditional stoves in rural Eastern Province which have a low efficiency of 10%. The project intends to distribute 200,000 improved Rocket firewood stoves in Eastern Province with an efficiency of 25%. The lifespan of the Rocket stove is estimated to be 5 years. The traditional three stone stove has an efficiency of 10%. Based on a survey undertaken for a similar project, the quantity of baseline consumption of the three stone stoves was estimated at 3,500 kg per year.

Overall Total Emissions Reduction from the four Interventions

The overall GHG Emission Reductions from the four Projects namely: Sustainable Forest Management, Climate Smart Agriculture, Sustainable Charcoal Production, and Improved Biomass Stoves in the Eastern Province is summarised in Table 21.

Table 21. Overall Total Emission Reductions from the four Interventions

Year	SFM (Tonnes) non nested	SFM-BCP (nested)	SFM- SALM, (nested_	Total SFM	CSA (Tonnes)	CSA-SALM	Total CSA	Improved Charcoal-ZIFLP	Improved Stove	Total Emission
2021	42,412.14	-	-	42,412.14	78,584	-	78,584	-	9,589.21	**130,585.35**
2022	195,926.34	-	-	195,926.34	104,704	-	104,704	-	47,946.04	**348,576.38**
2023	307,754.26	2,030,774	380,903	2,719,431.26	137,730	11,977	149,707	-	86,302.87	**2,955,441.13**
2024	463,020.86	2,030,774	380,903	2,874,697.86	203,848	11,977	215,825	43,054.98	124,659.70	**3,258,237.54**
2025	564,481.47	2,030,774	380,903	2,976,158.47	261,784	11,977	273,761	43,054.98	163,016.53	**3,455,990.98**
2026	651,154.21	2,030,774	380,903	3,062,831.21	334,195	11,977	346,172	43,054.98	201,373.36	**3,653,431.55**
2027	733,541.02	2,030,774	380,903	3,145,218.02	352,573	11,977	364,550	43,064.98	239,730.19	**3,792,563.19**
2028	794,810.46	2,030,774	380,903	3,206,487.46	371,951	11,977	383,928	43,064.98	278,087.02	**3,911,567.46**
2029	887,446.69	2,030,774	380,903	3,299,123.69	392,530	11,977	404,507	43,064.98	354,800.68	**4,101,496.35**
2030	1,032,046.34	2,030,774	380,903	3,443,723.34	414,531	11,977	426,508	43,064.98	373,979.10	**4,287,275.42**
Total	**5,672,593.79**	**16,246,192**	**3,047,224**	**24,966,009.79**	**2,652,430**	**95,816**	**2,748,246**	**301,424.86**	**1,879,484.70**	**29,895,165.35**

The overall GHG Emissions Reduction from the EP-JSLP projects is estimated at 28,998,310.39 t CO_2 eq. over a 10-year period to 2030. The largest contribution is coming from SFM followed by CSA. Considering the overall uncertainty in LULUCF sector of 15%, the uncertainty set aside factor equals 3%. Considering the overall uncertainty in Forest land remaining Forest Land (where most of the emissions are emanating), of 2.92%, Forest land converted to Cropland 18.61% and Cropland remaining cropland 50.2%, the uncertainty set aside factor equals 3% being the aggregate uncertainty of emission reductions between 15% and 30%. Table 22 presents the estimated Emission Reduction which takes account of uncertainty.

Table 22. Estimation of Emission Reductions

ERPA year t	Emissions Baseline (tCO_2-e/yr)	Estimation of expected emissions under the ISFL ER Programme (tCO_2-e/yr)	Estimation of expected set-aside to reflect the level of uncertainty associated with the estimation of ERs during the Term of the ERPA (tCO_2-e/yr) (3%)	Estimated Emission Reductions (tCO_2-e/yr)
1	10,715,478.3	10,584,893	3,917.56	126,667.79
2	10,715,478.3	10,366,902	10,457.29	338,119.09
3	10,715,478.3	7,760,037	88,663.23	2,866,777.90
4	10,715,478.3	7,457,241	97,747.13	3,160,490.41
5	10,715,478.3	7,259,487	103,679.73	3,352,311.25
6	10,715,478.3	7,062,047	109,602.95	3,543,828.60
7	10,715,478.3	6,922,915	113,776.90	3,678,786.29
8	10,715,478.3	6,803,911	117,347.02	3,794,220.44
9	10,715,478.3	6,613,982	123,044.89	3,978,451.46
10	10,715,478.3	6,428,203	128,618.26	4,158,657.16
Total	**107,154,783**	**77,259,618**	**896,854.96**	**28,998,310.39**

4.7 Reversals

4.7.1 Assessment of the anthropogenic and natural risk of Reversals

The programme design has involved many stakeholders at different levels of government, communities, and other stakeholders through a series of consultation and awareness raising events. The programme is all-encompassing across the Eastern Province, and especially engaged with forested areas at a landscape level. Communities at the grassroots level are also aware of the direct and indirect benefits of the programme and are familiar with the intended programme interventions and outcomes from their experiences of implementation of other programmes such as COMACO and BCP initiatives with similar activities on sustainable forest management and conversation agriculture. As this programme is a landscape approach to natural resource management, the goal is to create sustainable communities that will be successful in engaging in sustainable natural resource use and extraction beyond the life of the programme. Anthropogenic risk is associated with project failure, if the needs of the agents of deforestation are not met with programme implementation.

The programme area does not experience significant risks due to natural events such as pests, extreme weather events and other natural risks, except possible medium risk of forest fires. Most forest fires originate from areas with proximity to settlements for agriculture and pasture, where fire is used as a land-clearing tool. As fire is the most significant natural risk, this Programme support activities to revive and enforce village-level fire ordinances. These activities were functional and effective in the past for fire management and prevention, and they are expected to be successful again if supported by the Programme. In addition, if these specific fire protocols are set up and functional at the community-level they are expected to continue past the life of the Programme as the communities see the continued benefit.

4.7.2 Assessment of the level of risk of Reversals

Reversals occur if one or more disturbance event(s) result in the aggregate number of ERs measured and verified within the ISFL ER Programme Accounting Area for one Reporting Period, is less than the aggregate number of ERs measured and verified within the ISFL ER Programme Accounting Area for the previous Reporting Period.

Reversals can be caused both by natural disturbances and by human activities as listed above, which may be driven by a range of factors both internal and

external to an ISFL ER Programme. The assessment of the level of risk of Reversals has been elaborated with the use the most updated version of the Reversals Risk Assessment in the "ISFL Buffer requirements." The assessment is done with no distinction of subcategories, covering forest-related and non-forest-related categories. Table 23 presents the results of the assessment of the level of risks of reversal for Eastern Province ZIFL Programme.

Table 23. Results from the assessment of the level of risks of reversal for Eastern Province ZIFL project.

Risk factors	Risk indicators	Level of risk	Reversal set-aside percentage
Lack of long-term effectiveness in addressing the key drivers of AFOLU emissions and removals.	***Lack of broad and sustained stakeholder support (indicated by a lack of awareness programme, applicable to all eligible sub-categories)*** The ZIFL is an integrated programme which incorporates several sectors such as Forestry, Agriculture and Land Use (AFOLU). The principal stakeholders are the people living in the project area and are aware of the benefits through a well elaborated Citizens and Communications Engagement Strategy. ZIFLP also has social media outlets such as the Website, LinkedIn, Twitter and Facebook all which act as engagement platforms for the project activities. [LOW]	Low	5% Reversal Risk is considered low for most indicators
	Significant occurrences of conflicts over land and resources in the programme area (applicable to all eligible sub-categories). There has not been any conflict detected over land in the Eastern Province. Beneficiary communities of the ZIFLP live on customary land which is inherited along the family lines in the long-term. Additionally, ZIFL Project, the 2015 Forests Act and its subsidiary legislation create a strong legal foundation for Community Forestry Management (CFM). The Act and the regulations devolve significant rights to community forest groups to manage forests and engage in forestry value chain development. The process has the potential to bring forests under sustainable management, generate income and improve livelihoods in rural communities. The communities obtain permission from the Chiefs to administer the CFM and the Director of Forestry signs user rights for use of CFM.	Low	
	Lack of institutional capacities and/or ineffective vertical/cross sectoral coordination indicated by for example a weak track record of	Low	

Risk factors	Risk indicators	Level of risk	Reversal set-aside percentage
	cross-sectoral cooperation and key institutions working together within the landscape. The first component of the project involved the creation of enabling environment, including a component for district and local planning. This sub-component has been instrumental in strengthening the capacity of various institutions as well as the creation of the District Multi-Sectoral Teams across the entire landscape. Integrated District Plans have been developed and local communities have been engaged in participatory land use planning. Specific to the Forestry sector, ZIFL project has been involved in capacity building in seven stages of forest management of entrepreneur development in non-timber products to enable the communities manage forest resources sustainably, for livelihood diversification and poverty reduction		
	Lack of long-term incentives beyond climate finance to decouple deforestation and degradation from increases in agricultural production and other economic activities. Agriculture in Zambia is market driven and deforestation resulting from agriculture expansion was originally identified to be the major driver of deforestation in Eastern Province. Cash crops grown such as Maize, Groundnuts and Tobacco are market driven and often lead to opening more land which results in deforestation. Favourable agricultural policies are attracting foreign direct investments and boosting domestic investments increasing the demand for large tracts of land. This can trigger clearing of forests in high forest and woodland areas. The ZIFLP project has been implementing Climate Smart Agriculture which has led to the tripling of yields for select crops such as Maize, Sunflower and Soyabeans. This has led to improved food security and improved small holder farmer income while improving the soil fertility. The ZIFLP project has constructed a soil fertility laboratory in the province and has intentions to construct a fertiliser blending plant which will lead to further soil fertility improvement.	Low	

Risk factors	Risk indicators	Level of risk	Reversal set-aside percentage
	Other interventions such as the Farmer-Led irrigation Schemes are critical incentives which will keep farmers incentivised during the dry season when on-farm activities are dormant. Community/ producer group sub-grants for value addition and agriculture enterprise development are another added incentive to keep the farmers incentivised beyond climate finance.		
	Lack of relevant legal and regulatory environment conducive to addressing key drivers of AFOLU emissions and removal or lack of progress in the implementation of the policy and legal framework The ZIFL Project is being implement under solid legal and regulatory framework such as: (1) The forest Act of 2015, (2) the Community Forest Regulations of 2018, (3) the Forest (Carbon Stock Management) Regulation of 2021, (4) the Wildlife Act of 15, (5) The Lands Act of 1995, (6) the Chiefs Act of 1994. All these have provided a conducive environment for the implementation of the project activities that address the drivers of AFOLU emissions and removals.	Low	
Exposure and vulnerability to natural disturbances	***Vulnerability of the ISFL ER Programme Accounting Area to fire, storms, droughts, etc.*** The ZIFL areas for CFM and Conservation agriculture are vulnerable to natural and anthropogenic disturbances such as fire. The other natural drivers of deforestation are climate change, droughts, pests and diseases, and floods in some areas. One of the most direct ways in which natural disasters such as fires, and droughts etc., affect conservation agriculture is reduced crop production. This results in direct economic loss to farmers, which can cascade along the entire value chain, affecting agricultural growth and rural livelihoods. The ZIFLP project is being implemented with recommendations out of the National REDD+ Strategy for Reducing Emissions from Deforestation and Forest Degradation, 2015 and the Climate Change Policy, 2016, both of which are aimed at reducing the impacts to vulnerable communities. Specific interventions that as fire management and boundary clearing of the conservation areas such as	Medium	10% Reversal Risk is considered medium for both indicators

Risk factors	Risk indicators	Level of risk	Reversal set-aside percentage
	forest reserves, Community Forest Management areas, national parks are contributing to reduced loss of standing biomass which improves microclimatic conditions in many areas. On-farm, smallholder farmers are being encouraged to include agroforestry species on their land. The Project has provided more than 3 million agroforestry seedlings to the farmers to help improve soil fertility as well as increase both soil and above ground biomass.		
	Capacity and experience in effectively responding to natural disturbances or mitigation of their impacts. Potential risks found in in the ZIFL project area are both floods in the valley and drought in the plateau. The ZIFLP project during its implementation has prepares a CERC to help mitigate any impacts of natural disasters that may occur in the project area. The ZIFLP CERC is based on the 2018-2019 National Contingency Plan under the Disaster Management and Mitigation Unit led by the Office of the Vice President	Medium	
	Actual reversal risk set-aside percentage		**15%**

Annex 1: Drivers of AFOLU Emissions and Removals

The amount of forest cover loss in Zambia is expected to shift between different simulation periods within the deforestation hotspots. According to Vinya et al. (2011), between the baseline year 2000 and 2010, the amount of forest cover loss was almost 900,000 ha and is expected to increase between 2020 and 2030. The report indicates that agriculture and settlements were identified as the main drivers of forest cover loss, particularly during the period between 1989 and 2002, which corresponds to the structural adjustment programme era, during which many of Zambia's mines made substantial cuts to their workforce.

However, specific underlying drivers that were identified include high poverty, low economic opportunity, insecure land tenure rights, low institutional capacity and monitoring and lack of collaboration among various policies implemented in the Eastern Province (Vinya, 2011).

According to the GHG Inventory Baseline Report, Table 86 Level Assessment Results provides the key drivers of Agriculture, Forest, and Other Land Use (AFOLU) emissions and removals. These key drivers are a result of activities related to Agriculture, Forestry, Energy, Mining, and Land Use (infrastructure development) in the Eastern Province.

CO_2 from forest land remaining forest land has the highest total contribution (82.76%), followed by forest land converted to crop land (9.41%), CH_4 emissions from enteric fermentation in Domestic Livestock (Non - Dairy Cattle) (2.55%) and N_2O (direct) emissions from managed soils (1.96%) and these key driver categories contribute 96.68% of emissions and removals in the Eastern Province. Agricultural expansion, fuelwood extraction and forest fires are identified as the main drivers of deforestation and forest degradation across the Eastern Province. Below, sectors and their contributions to deforestation and degradation are outlined in more detail.

Agriculture Sector

The agriculture drivers are comprised of two broad categories: livestock and crop production/land. Livestock is a subcategory of the AFOLU sector and estimates GHG emissions from enteric fermentation and manure management. Land is a subcategory of the AFOLU sector and estimates GHG emission from land conversion. The six land-use categories in the 2006 IPCC Guidelines namely: Forest land, cropland, grassland, wetlands, settlements, and other land. Each land-use category is further subdivided into land remaining in that category and converted from one category to another (e.g., Forest Land converted to Cropland). Therefore, in the context of the agriculture sector in the Eastern Province, the drivers of GHG emissions include:

- Extensive and unsustainable crop production practices
- Poor livestock management practices
- Agro-processing reliance on wood fuel
- Lack of incentives for agricultural intensification
- Use of fire for land preparation
- Agricultural expansion

This is mainly a result of primarily small-scale farmers who cultivate some farm plots, averaging about 2 hectares, who practice cut and burn cultivation/ simply to secure ownership, some local migration, other in the local land "rush grab". Agricultural expansion has been adopted as a strategy to cope with low crop yield among smallholder farmers in Zambia.

Forestry Sector

In the Forestry sector, the drivers of GHG emissions and removals are mainly a result of forest fires. Forest fires are a common occurrence in the Eastern Province. Forest fires are used for a variety of reasons such as hunting, clearing land for agricultural expansion, stimulating fresh grass/herbaceous growth for livestock grazing, and harvesting NTFPs such as honey. The main agents of forest fires are hunters. Uncontrolled forest fires represent a considerable threat to the forest and biodiversity conservation. These drivers are fuelled by the following issues:

- Uncontrolled harvesting and encroachment of the Protected Areas
- Overexploitation and unsustainable harvesting methods of forest in concession areas
- Overexploitation and unsustainable use of forests in open areas
- Uncontrolled forest fires
- Inadequate capacity of fire control programmes

Energy Sector

Fuelwood extraction (both firewood and charcoal) and are identified by many communities as the main driver of deforestation in the province. This includes households who collect fuelwood for subsistence use and occasionally for sale, and individuals who regularly produce fuel wood for sale, or seasoned charcoal producers. Smallholders produce firewood and charcoal in the dry season, as a

strategy to mitigate income losses after crop failures. For many seasoned charcoal producers, fuelwood sale is their primary source of income. Often charcoal production is focused in areas with high rates of poverty and fewer employment opportunities. The high rates of deforestation from the energy sector are a result of the following:

Charcoal production

- Small-scale farmers who engage in charcoal as additional means of income,
- Those who are permanent (long-term) producers- depend almost entirely on charcoal sales to meet their daily needs.

Firewood

- Almost all household use firewood in the rural areas.
- Many lodges serving tourists.
- Breweries.

Land use Sector

Unplanned land use that has no regard for forest integrity and biodiversity conservation is related to key categories forest land converted to crop land, forest land converted to settlements, and forest land converted to grassland.

Mining Sector

Mining is related to key category of CO_2 from forest land converted to settlements and N_2O emissions from managed soils. This includes the following:

- Felling of trees to create space for mining site and settlements for labour.
- Harvesting of timber for mining infrastructure.
- Clearing of forests and pollution of the environment from my effluents.
- detrimental to biodiversity integrity.

Underlying Causes of Deforestation and Degradation in the Eastern Province

The behaviour and decisions of deforestation agents are influenced by a variety of underlying causes. Many of these underlying causes can be directly linked to a specific driver, but there is complexity in what drives deforestation and forest degradation. There may be many causes to one driver, and the dynamic of their

interaction is what can cause the rapid deforestation and degradation. Based on the 2016 Drivers of deforestation and forest degradation in the Eastern Province, Zambia (Gilbert Wathum et al, 2016) the following underlying causes were identified.

- Deep rooted and widespread poverty
- Lack of alternative livelihoods
- A high youth dependency ratio which stands at about 90% for the country
- Low yields on existing crop fields
    - The low-input small-scale agricultural systems have equally low output due to low productivity per unit area especially for crop production.
- Rapid population growth- relative to job creation and other economic opportunities
- Weak tenure and land use planning especially with respect to customary land.
    - There is a strong feeling among some members of the communities that forests and trees in the wild in general do not belong to anybody.
- The high level of "energy poverty" is responsible for the population's heavy dependence on fuel wood and charcoal.
    - Alternative energy sources are unaffordable and extensively unavailable.
- Lack of motivation or will to conserve forests including protection from fires, and continued forest clearance and tree cutting for charcoal.
    - Revenues that the Forest Department (FD) collects from forest products goes to the government; none is shared with the communities, which disincentivises communities
- Low monitoring capacity and weak law enforcement
    - The Forestry department issue harvesting licenses but does not have capacity to monitor. Furthermore, Chiefdoms have no capacity / interest to monitor harvesting even from customary land.
- Weak tenure and leadership conflict

    - People cut trees with little or no regard for repercussions, in terms of both reprimand from authorities, and detrimental effects on their own livelihoods in the long term.
- Weak enforcement of forest property rights
    - Inadequate resources for forest management available to the responsible government agencies (in particular the FD).
    - Lack of incentives for local people to manage forests due to non-existent benefit sharing mechanisms.
    - Due to poor land management, uncontrolled fires affect large areas of forests each year.

Underlying cause of increasing forest fires:

- Breakdown in the authority of Traditional Leaders who, historically, enforced forest fire management rules among their subjects.
- Inadequate capacity of fire control programmes.
- Climate change,
- Inadequate knowledge and appreciation of fire impacts and weak tenure.

Zambia's deforestation rate in 2011 was estimated at around 1.5 percent per year and is ranked one of the countries with the highest rates of deforestation in the world. In 1996, the Food and Agriculture Organisation of the United Nations (FAO) indicated that the average annual deforestation rate for Zambia was 250,000 ha per year, while in 1999, FAO reported an average of 300,000 ha per year, indicating that the pace at which Zambia's forests were cleared was an upward trend (Vinya, 2011).

Removals

Categories for which emissions or removals have changed significantly over the base period include loss of woody perennials due to charcoal production and firewood harvesting for cooking. Annual carbon loss due to fuelwood removals was mainly attributed to charcoal production and firewood harvesting mainly for cooking by rural households. The GHG report shows an increase in annual carbon loss due to fuelwood removals from 1,366,203 tons C in 2009 to 2,283,896 tons C in 2018 representing an annual growth rate of 6.72% and 67.17% over the 10-year base period. The GHG Report documents that since the soils are constantly degraded/degrading due to unsustainable agricultural practices in rural Zambia, it can be conservatively assumed that the baseline

removals due to changes in SOC is 0. Therefore, baseline removals due to changes in SOC are conservatively accounted for is 0. These categories of fuelwood removals of charcoal production and firewood harvesting subcategories are likely to show an increase of emissions in the future without project interventions.

Removals from woody perennials is going to be accounted for when planting woody perennials (Cashew nuts) is considered among the main project activities in future years. The project is promoting alley cropping with *Gliricidia* species, which is accounted for in terms of soil carbon sequestration in the CSA component. For the time being, therefore, ex-ante project removals from existing woody perennials are accounted for is 0.

The project activities which cause project removal and hence increase soil fertility by changes in soil carbon are:

- *Compost manuring* – inputs of carbon from manure, applied and incorporated into the soil.
- *Residue management* – inputs of carbon from crop residues, and biomass from *Gliricidia sepium*, applied as mulch and incorporated into the soil

Annex 2: Financing Plan for ISFL ER Programme

The Financing Plan provides the budget, non-revenue financing sources, revenue sources (based on a draft BSP and ex ante emissions reduction estimate for volume of sales) and net cash flows. The Plan is provided as an Excel workbook to this document.

This budget years will start in July 2023

S.no	Item	Sub-item	Activity	Finance category (grant/ loan /equity)	Year 1	Year 2	Year 3	Year 4	Year 5	Total (5 Years)
1	**Costs**	**1(a) Implementation costs**								
			CLIMATE SMART AGRICULTURE (and Livestock)		(456,387)	(947,746)	(1,370,051)	(1,078,744)	(543,566)	($4,396,495)
			IMPROVED UTILIZATION OF WOOD FUEL (STOVES)		(128,500)	(194,316)	(245,316)	(132,500)	(138,500)	($839,132)
			REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION		(33,333)	(36,667)	(200,000)	(96,667)	(135,000)	($501,667)
			SUSTAINABLE FOREST MANAGEMENT		(1,090,354)	(1,540,101)	(1,828,712)	(1,881,181)	(2,583,844)	($8,924,193)
			GRANTS FACILITY and OTHER INCENTIVES, ETC		(1,212,415)	(1,212,415)	(1,212,415)	(1,212,415)	(1,212,415)	($6,062,076)
			Results based payments in line with BSP		**(250,000)**	**(350,000)**	**(23,689,261)**	**(34,064,873)**	**(39,899,226)**	($98,253,361)
		Subtotal	*Sub-total – Implementation costs*		*(3,170,989.0)*	*(4,281,245.6)*	*(28,545,756.4)*	*(38,466,380.4)*	*(44,512,551.4)*	($118,976,923)
		1(b) Institutional costs	Program mgt & admin costs		($1,319,394)	($1,319,394)	($1,319,394)	($1,319,394)	($1,319,394)	($6,596,968)
			Policy, legal & enforcement		($68,289)	($52,959)	($143,676)	($139,207)	($3,700)	($407,831)
			Training & capacity building (incl in implementation)							$0
			Stakeholder consultation & grievance redressal		($30,000)	($30,000)	($30,000)	($30,000)	($30,000)	($150,000)
			SESA, ESMF, Benefit sharing		($50,000)	($50,000)	($50,000)	($50,000)	($50,000)	($250,000)
			Sub-total – Institutional costs		*($1,467,682)*	*($1,452,353)*	*($1,543,069)*	*($1,538,601)*	*($1,403,094)*	*($7,404,799)*
		1(c) Transaction costs	Costs to design REL/ RL		$0	$0	$0	$0	$0	$0
			Costs of MRV		($583,889)	($371,675)	($455,648)	($476,993)	($538,006)	($2,426,211)
			Legal and contractual costs (covered by GRZ)							$0
			Costs related to registry (covered by ISFL)							$0
			Sub-total: Transaction costs		*($583,889)*	*($371,675)*	*($455,648)*	*($476,993)*	*($538,006)*	*($2,426,211)*
	Costs	**Total costs: 1(a)+ 1(b) + 1(c)**			**($5,222,560)**	**($6,105,273)**	**($30,544,473)**	**($40,481,974)**	**($46,453,651)**	**($128,807,932)**
2	**Sources of finance**	**2(a) National**	National budget (not included, but budgets are incremental costs)		$0	$0	$0	$0	$0	$0
			Provincial budget (not included, but budgets are incremental costs)		$0	$0	$0	$0	$0	$0
			Other public							$0
			Private							$0
			Sub-total - national		$0	$0	$0	$0	$0	$0
		2 (b) International	Bilateral	source 1 (grant/ loan)						$0
			Multilateral (ZIFLP 2023) ISFL /GEF	Source 1 (grant/ loan)	$3,500,000	$1,500,000				$5,000,000
			Private	Source 1 (grant/ loan)						$0
				Source 2 (grant/ loan)						$0
			Private							$0
			Sub-total -international		$3,500,000	$1,500,000	$0	$0	$0	$5,000,000
		Total non-revenue financing sources: 2(a)+2(b)			$3,500,000	$1,500,000	$0	$0	$0	$5,000,000

		2 (c) Revenue from products & services	None included							$0
			Activity 2							$0
			Activity 3							$0
			…							$0
			Activity n							$0
			Sub-total: Revenue from products & services		$0	$0	$0	$0	$0	$0
		2(d) Revenue from emission reductions	Revenue from emission reductions -contracted once ERPA signed (@ **US$15/ton flat**)		$0	$0	$27,869,719	$40,076,322	$22,053,959	$90,000,000
			Revenue from emission reductions - yet to be contracted, but interested buyers (US$ 21/ton with 4% growth)		$0	$0	$0	$0	$34,840,829	$34,840,829
		Total financing sources: 2(a)+2(b)+2(c) +2(d)			$3,500,000	$1,500,000	$27,869,719	$40,076,322	$56,894,788	$129,840,829
3	**Surplus/ gap**	**Total financing source – total costs (USD) Net Cash Flow**			**($1,722,560)**	**($4,605,273)**	**($2,674,754)**	**($405,653)**	**$10,441,137**	**$1,032,897**
		Cumulative (USD) Net Cash Flow			($1,722,560)	($6,327,833)	($9,002,587)	($9,408,240)	$1,032,897	
4	**Options to reduce gap**	**4(a) Traditional sources – grants/ loans**	Option 1 ISFL Grant		$1,700,000					$1,700,000
			Option 2 ISFL advance on revenue		$0	$4,600,000				$4,600,000
		4(a) Alternative sources - (e.g. guarantees/PES)	Option 1							$0
			Option 2							$0
		Total options for financing gap $(a) + 4(b)			$1,700,000	$4,600,000				$6,300,000
5	**Sensitivity**	+ 10% costs			($2,244,816)	($5,215,801)	($5,729,201)	($4,453,850)	$5,795,772	($11,847,896)
		- 10% in financing			($2,072,560)	($4,755,273)	($2,674,754)	($405,653)	$10,441,137	$532,897
		-10% revenue			($1,722,560)	($4,605,273)	($5,461,726)	($4,413,285)	$4,751,658	($11,451,186)
		+ 20% costs			($2,767,072)	($5,215,801)	($5,729,201)	($4,453,850)	$1,150,407	($17,015,517)
		- 20% in financing			($1,722,560)	($4,605,273)	($2,674,754)	($405,653)	$10,441,137	$1,032,897
		-20% revenue			($1,722,560)	($4,605,273)	($5,461,726)	($4,413,285)	($937,821)	($17,140,665)
		+ 30% costs			($3,289,328)	($6,436,855)	($11,838,096)	($12,550,245)	($3,494,958)	($37,609,483)
		- 30% in financing			($2,772,560)	($5,055,273)	($2,674,754)	($405,653)	$10,441,137	($467,103)
		-30% revenue			($1,722,560)	($4,605,273)	($11,035,670)	($12,428,549)	$25,878,908	($3,913,144)
		- 2 % discount rate			$3,430,000	$1,470,000	$27,312,325	$39,274,795	$55,756,892	$127,244,012
		+ 2% discount rate			$3,570,000	$1,530,000	$28,427,114	$40,877,848	$58,032,684	$132,437,646
6.	**Identification of financing risks**	Key risks impacting costs, revenues, financing etc.	see ERPD							$0
7	**Proposed measures**	Measures to address financing gap/risks	ISFL Grant, GEF Grant, advance on sales VERs							$0

Annex 3: Assessment of Land and Resource Tenure in the Programme Area

Zambia has a dual tenure system comprising Statutory and Customary Tenure. Under customary law, individuals, families, clans, or communities hold land from generation to generation, without time limitation. Customary tenure applies to individual plots, forest land, common land within a village, and communal grazing land. Most smallholder subsistence farmers cultivate in customary land that may or may not be held in common ownership with the community/family, although the rights of farmers are individualised. The land often does not have formal documentation (e.g., certificates, titles) and the landholders do not pay land tax.

Within customary lands, communities may establish and register Community Forest Management (CFM) areas, as a group of persons living in the vicinity of a forest which apply to the Department for recognition as a Community Forest Management group with the consent of the Chief of the area in which the forest is located. The group enters into a Community Forestry Management Agreement (CFMA) with the Director of Forestry in respect of an area or forest for which the Community Forest Management group (CFMG) is formed. There are 48 CFMGs in Eastern Province with at least 6 under application. Families that have been residents in an area can allocate forest land for agricultural expansion to other family members with little or no interaction with headpersons or the chief. Customary land can be converted to state land. The Chief allocates customary land to all subjects. This land continues to subsist as customary until an application is made to convert it to leasehold and the chief must give consent for such conversion.

The state grants four types of leases: (1) a 10-year Land Record Card; (2) a 14-year lease for un- surveyed land; (3) a 25- to 30-year Land Occupancy License for residential settlements; and (4) a 99-year leasehold for surveyed land.

Public land can be found on either state and or customary areas. Public land may include a) Forest reserves and b) National Parks and Game Management Areas (GMAs). All National and Local forests are declared through Statutory Instrument published in the Government Gazette including a boundary description. For areas declared on customary land, the process involves consultation and consent from the relevant traditional leader(s).

In the Eastern Province the main public land use types are GMAs and Community Conservation Areas (CCAs). A GMA may have a Game Management Plan approved by the Minister which provides for zoning areas within the GMA for different purposes and may restrict certain uses. A Chiefdom area within a GMA may have a Community Resource Board (CRB) elected from Village Action

Groups to assist management of the GMA. The CRB may engage community scouts to assist DNPW with protection activities. In accordance with the Forests Act, a CRB may apply to the Director of Forestry to be recognised as a CFMG and enter into an agreement to manage areas of forest within the GMA with associated rights. Community Conservation Areas are primarily declared and managed at Chiefdom level but have little legal recognition. Currently in EP, there arrangements in place to convert forests within CCAs into CFM areas as per the Forests Act and subsidiary legislation.

The nature of rights over land and forests have a bearing on Eastern Province's emission reduction programme design and on the effectiveness of producing payment for results as well as the details related to benefits allocation and required safeguards. Clear ownership and security of tenure have increasingly been recognised as essential pre-conditions for successful REDD+ implementation. Forest reserves are included in the state land category. As long as the forest is gazetted as National or Local Forest, it is part of the realm of state control, not customary control, although the Policy is to engage with local communities and Traditional Leaders in their management. However, unlike other categories of state land, forest reserves have in the past reverted to their initial (i.e., customary) land tenure type through a legal process of declaration through statutory instrument in accordance with the legislation.

By the very nature of a dual tenure system, the Eastern Province will be subject to implementation risks associated with unclear and overlapping claims that may impact the effectiveness of the Programme. The 2018 National Parks and Wildlife Policy provides for the importance of devolved community management and empowerment which is supported under the most recent Wildlife Act and implemented through Community Resource Boards (CRBs). The Regulations relating to Community Forestry make clear connection of rights (benefits) with obligations of control, use and management. Conflicts of control over resources which have a new revenue (carbon) value are emerging across the Province.

There are challenges faced in land governance issues in the protected area system, Local and National Forests, National Parks and Game Management Areas and customary land. This is because many of these PAs such as Local Forest and Game Management Areas are situated in the customary areas and therefore, conflicts between the local people, Chiefs and the FD and DNPW often arise. Local authorities also face difficulties in performing the land alienation functions in these areas because the governing statutes clearly state that the management of the Game Management Areas is a prerogative of the DNPW and Local and National Forests with the Forestry Department.

The second category of conflicts arises in boundaries between Chiefdoms as these are not always clearly defined or locally agreed. Such areas of conflict are hot spots for environmental degradation as moving people in as subjects is a method to increase patronage and Chiefdom influence.

The strategies to address this involve promoting community forest management provided for in SI #11 of 2018, which transfers rights to forest resources in return for obligations to manage and protect. The process requires consent from the Chief as well as consultation process with other stakeholders including government departments and local authorities before rights are transferred through the Community Forest Management Agreement. The process outlined in the CFM Regulations (2018), places additional requirements to consult other rightsholders. The verification process to be conducted prior to recognition requires checking the application has the no objection of neighbouring communities and rightsholders to mitigate potential conflicts. This involving process aims to resolve conflicting claims to land and resources which can result in environmental degradation. The benefit sharing mechanism at Chiefdom level through the Chiefdom Emissions Reduction Performance Agreement (CERPA), described in the BSP annex IV, seeks to differentiate land management systems and reward with clear obligations to protect and manage such as through the Community Forestry process. There are existing Verified Carbon Standard registered projects in the province have for years been generating and selling Verified Carbon Units (VCUs) to private sector voluntary buyers. The projects have been successfully issuing at scale and selling VCUs.[30,31]

Further, land and resource tenure challenges in the Eastern Province are addressed as follows:

1) Strengthening the operationalisation of GMPs as per the Wildlife Act as well as following through the implementation of CFM in the areas to resolve conflicts related to a dual tenure system.
2) Ratification of chiefdom boundaries through the house of chiefs based on the 1958 boundaries. This will reduce the conflict around the resources that are found in any chiefdom.
3) Promoting participatory land use planning process by local authorities with close involvement of Traditional Leaders to guide the land allocation processes.

[30] Luangwa Community Forests Project, https://registry.verra.org/app/projectDetail/VCS/1775

[31] COMACO Landscape Management Project, https://registry.verra.org/app/projectDetail/VCS/1532

The full assessment of the Land and Resource Tenure are included in Sections 3.1.4, 3.5, and 3.7.1.

Annex 4: Current Version of the Benefit Sharing Plan for the ISFL ER Programme

A current version of the Benefit-Sharing Plan is attached as a separate document.

Annex 4Draft Benefit Sharing Plan

EATERN PROVINCE – JURISDICTIONAL SUSTAINABLE LANDSCAPE PROGRAM, ZAMBIA

DRAFT Benefit Sharing Plan

GRZ - Ministry of Green Economy and Environment

Abridged Version 13, April 2023

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ACRONYMS AND ABBREVIATIONS

ACC	Anti-Corruption Commission
AFOLU	Agriculture, Forestry and Land Use Change
BDM	Benefit Distribution Mechanism
BioCF ISFL	BioCarbon Fund Initiative for Sustainable Forest Landscapes
BSM	Benefit Sharing Mechanism
BSP	Benefit Sharing Plan
BSPAC	Benefit Sharing Plan Arbitration Committee
CBNRM	Community-Based Natural Resource Management
CBNRMF	Community-Based Natural Resource Management Forum
CERPA	Chiefdom Emissions Reduction Purchase Agreement
CDM	Clean Development Mechanism
CFM	Community Forest Management
CFMG	Community Forest Management Group
CRB	Community Resource Board
CSA	Climate-Smart Agriculture
CSO	Civil Society Organization
DEC	Drug Enforcement Commission
DFA	District Farmers' Association
DFPP	District Focal Point Person
DMT	District Monitoring Team
DPNW	Department of National Parks and Wildlife
EP-JSLP	Eastern Province Jurisdictional Sustainable Landscape Program
ER	Emissions Reduction
ERBSC	Emissions Reduction Benefit Sharing Committee
ERPA	Emissions Reduction Purchase Agreement
ERPD	Emissions Reduction Project Document
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
FGRM	Feedback and Grievance Redress Mechanism
FMP	Forest Management Plan
GHG	Greenhouse Gas
GIR	Grievance Investigation Report
GMA	Game Management Area
GMP	General Management Plan
GRF	Grievance Registration Form
GRS	Grievance Redress System
GRZ	Government of the Republic of Zambia
ICs	Information Centers
JSLPSC	Jurisdictional Sustainable Landscape Program Steering Committee
LUCF	Land use Change and Forestry
MGEE	Ministry of Green Economy and Environment
MLGRD	Ministry of Local Government and Rural Development
MoA	Ministry of Agriculture
MRV	Monitoring, Reporting and Verification
NDA	Nationally Designated Authority

NDC	Nationally Determined Contributions
NERPA	Nested Emissions Reductions Purchase Agreement
NFMS	National Forest Monitoring System
NGO	Non-Governmental Organization
NRM	Natural Resource Management
NTFP	Non-Timber Forest Products
PDCC	Provincial Development Coordinating Committee
PFPP	Provincial Focal Point Person
PDO	Project Development Objective
PIM	Project Implementation Manual
PIU	Program Management Unit
RBF	Results-Based Finance
REDD	Reduction of Emissions from Deforestation and Forest Degradation
SFM	Sustainable Forest Management
UNFCCC	United Nations Framework Convention on Climate Change
VAG	Village Action Group
WDC	Ward Development Committee
ZEMA	Zambia Environmental Management Agency
ZIFLP	Zambia Integrated Forest Landscape Project

1.0. INTRODUCTION

Climate-induced hazards in Zambia are being experienced through the increased frequency and intensity of droughts and floods over the years. The impacts have adversely affected food and water security, water quality, energy generation, and livelihoods of people, especially in rural communities.[1]

In addition to the country's climate vulnerability, Zambia contributes to global GHG emissions to a tune of 120 million tCO_2e in 2011, which is an increase of 3 percent over 1990 levels. The largest contribution to these emissions in 2011 was LUCF which accounted for 73.7 percent and energy at 22.75 percent.[2]

The GRZ has adapted Zambia's Vision 2030 (2006-2030) which aims to transform Zambia into a prosperous middle-income nation by the year 2030. Proper management of the country's natural resource base is one of the crucial pillars of this vision given that Zambia's economy is profoundly natural resource-based. Climate change will compound the challenges associated with achievement of this vision. As such, the Vision 2030 expressly aspires for sustainable development, sustainable and responsible environmental and natural resources management.[3]

In December 2015, the GRZ submitted to the UNFCCC its NDC with a national ER goal of achieving a 25 percent emissions reduction by 2030 under domestic efforts and with limited international financial support. The ambition to achieve this goal could increase to 47 percent conditional to substantial international climate finance support (roughly defined as USD35 billion) in addition to provision of domestic resources. For both scenarios, the GRZ plans to achieve the vast majority of its emissions reductions from sustainable land use and forestry management by implementing four programs including: SFM, CSA, and renewable energy and energy efficiency.

In January 2016, GRZ finalized its National Strategy to Reduce Deforestation and Forest Degradation with the aim of, among others, reducing GHG emissions through improving forest and land management, ensuring equitable sharing of both carbon and non-carbon benefits among local communities and other stakeholders. The strategy is guided by seven core principles: effectiveness, efficiency, fairness, transparency, accountability, inclusiveness and sustainability. The key objectives of the Strategy cover; (i) promoting effective management of forests in protected areas (objective 1) as well as forests in open areas (objective 2), (ii) improving governance through participatory approaches in the former and enhancing the role of traditional authorities in the latter (Objective 3), (iii), and (iv) promoting good agricultural practices that mitigate carbon emissions (Objective 4).

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[1] The World Bank. April 2017. Project Appraisal Document for A Zambia Integrated Forest Landscape Project.

[2] USAID. November 2015. Greenhouse Gas Emissions in Zambia. Found here: https://www.climatelinks.org/sites/default/files/asset/document/GHG%20Emissions%20Factsheet%20Zambia_final%20for%20PDF_11-09-15_edited_rev08-18-2016.pdf

[3] Wathum, et. al. *Strategic Interventions to Address Deforestation and Forest Degradation in Eastern Province*, Zambia. Unique Forestry and Land Use.

The foregoing objectives are premised on the need for performance-based rewards and incentives, results-based payments and cost-benefit distribution and sharing mechanisms to reduce GHG emissions. Aligned to Zambia's long-term development vision in the Vision 2030, the National Strategy to Reduce Deforestation and Forest Degradation is set to realize a prosperous climate-resilient economy by 2030 anchored upon sustainable management and utilization of natural resources for improved livelihoods.

1.1. Overview of the Zambia's ER Program

To achieve the goals stated in its NDC and National REDD+ Strategy, GRZ created the ZIFL-P as a pilot phase for an eventual jurisdictional program for ERs in the entire Eastern Province between 2021 and 2030. The ER Program covers a total geographic area of 5,097,587 hectares populated by an estimated 2.065 million people [49.5% males and 50.5% females]. Out of this population, the number of people living in rural areas forms the majority of the population distribution, i.e. about 1.7 million people directly living off natural resource extraction (agriculture and forestry). In general, poverty levels in Zambia are highest in rural areas, and it is the Provincial Administrations' highest priority to address this challenge.

Therefore, fitting within GRZ's Vision 2030, the National REDD+ Strategy and the country's NDC, the overarching PDO of ZIFL-P was to improve landscape management and increase environmental and socioeconomic benefits for rural communities in the Eastern Province, and to improve the landscape's institutional capacity to respond promptly and effectively to climate change hazards.

In preparation for the jurisdictional sustainable landscape ER program, ZIFL-P has been supporting rural communities in the EP to better manage land and natural resources across the entire EP landscape, to reduce deforestation and forest degradation, to reduce unsustainable practices and land use through agricultural expansion; to enhance benefits received from sustainable forestry, agriculture, and wildlife conservation, and to reduce community vulnerability to climate change impacts. The project has also been investing in building enabling conditions for these changes through enhancement of land and resource tenure security, integrated land-use planning at different spatial scales, and capacity building in law and regulatory monitoring and compliance. Ultimately, the project has been creating the enabling environment for reduction of emissions and ER purchases under the World Bank through the subsequent EP-JSLP.

The EP-JSLP is intended to be decentralized to local communities as core beneficiaries assuming primary responsibilities for executing most of the ER activities in the EP. The program is to be achieved through RBF for ERs under the World Bank's BioCF ISFL after an ERPA has been negotiated and signed between the GRZ and the World Bank. One of the major prerequisites for the ERPA is the preparation of a BSP in tandem with BioCF ISFL requirements.

1.2. Design and structure of the BSP

The BSP requirements detail the program elements countries need to have put in place to receive RBF from the BioCF ISFL for ERs. Specifically, the ISFL aims to reduce GHG emissions while also addressing poverty and unsustainable land use, through four key design elements:

I. **Working at scale -** focusing on an entire jurisdiction (state, province, or region) within a country in order to provide ER programs with the opportunity to engage

with multiple sectors affecting land use and increase positive impact over a relatively larger area.

II. **Leveraging partnerships –** to create partnerships with other public sector initiatives and private sector enterprises.

III. **Incentivizing results -** to incentivize countries to reduce GHG emissions through RBF for a period of about 10 years, and by purchasing verified GHG ERs and removals from the ISFL ER Program accounting area (Program Area) under ERPAs, and;

IV. **Building on experience -** experiences and lessons learned by the BioCarbon Fund's initial work piloting land use projects, REDD+ initiatives, and other sustainable forest and land use programs at scale.[4]

The ISFL ER Program additionally requires that a BSP provides the description of a BSM that should be designed in a consultative, transparent and participatory manner appropriate to the country context and that reflects inputs and broad community support by relevant stakeholders. As such, the BSP should contain the following:

- The categories of potential beneficiaries including all eligibility criteria;
- Types of benefits that each category of beneficiaries will receive;
- BDM describing how funds will flow including performance-based calculations;
- BSM including how funds will be managed and distributed;
- Implementation and institutional arrangements including the roles and responsibilities of different institutions entities in decision-making, funds flow and monitoring/reporting, and;
- Safeguards instruments reflecting all the other work that has been done including the ESMF and the FGRM[5]

This BSP is contextualized to all of the above-mentioned BioCF ISFL program requirements and the plan is designed to fit the specific jurisdictional contexts of the EP. Specifically, the BSP is designed in consideration of the ER Program design in response to strategic policy interventions and measures to incentivize actions that address the drivers of emissions in the entire EP. The BSP also complies with all the relevant multilateral agreements that Zambia is party to, including: the UN Convention on Biological Diversity Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization; and

The Constitution of the Republic of Zambia, all relevant national laws and regulations including both statutory and customary land tenure arrangements in Eastern Province; particularly, the Lands Act Cap 184 of the Laws of Zambia, the Local Government Act, 2019, the Forests Act, 2015, the Environmental Management Act, 2011, the Community Forests Management Regulations of 2018 and the Forest Carbon Management Regulations of 2021.

[4] BioCarbon Fund Initiative for Sustainable Forest Landscapes. September 2017. *ISFL Emission Reductions (ER) Program Requirements. Version 1.*

[5] BioCarbon Fund Initiative for Sustainable Forest Landscapes. September 2017. *ISFL Emission Reductions (ER) Program Requirements. Version 1.*

1.3. General Principles of the EP-JSLP BSP

More than half of emissions in the EP come from degradation of standing forests followed by forest loss due to conversion of forest land to agriculture compounded by poorly managed agricultural soils. Fuel wood for household firewood, charcoal production and tobacco curing are also important drivers of deforestation and forest degradation alongside degradation due to wild fires. At the bottom of this degradation is low agricultural productivity, poor land use and insecure land tenure systems.

Foregoing, the design and application of the BSP for the EP-JSLP follows the guiding principles of the National Strategy to Reduce Deforestation and Forest Degradation, i.e. effectiveness, efficiency, equity, transparency, accountability, inclusiveness and sustainability;

o Monetary benefits are determined based on jurisdictional performance in reducing GHG emissions in relation to the ISFL key categories against the agreed baseline

o Monetary benefits are shared based on performance in delivery of ERs - as such:

• Local communities and their traditional leaders will be the key actors in protection and management of natural resources, they will be crucial in the regulation of emission reductions, and they will be incentivized and rewarded in their role in ERs, locally and across the Jurisdiction;

• Under the centralized nested approach, all ER projects, i.e. the nested legacy projects under BCP and COMACO, and any other projects which may emerge to engage in emissions reduction activities under the centralized jurisdictional approach, will be recognized, rewarded and incentivized to continue delivering their ERs under the jurisdictional arrangement.

Support in form of direct allocations will be provided to service providers operating in the Province. Service providers are stakeholder institutions that play a facilitative role in enhancing the implementation of ER activities. Service providers include government regulatory agencies, local authorities, CSOs, NGOs and private sector players. Support to service providers will be provided through direct budgetary allocations targeting measurable and verifiable mitigation measures to be reviewed periodically for their effectiveness and efficiency;

The BSP will apply an adaptive management approach of monitoring and evaluating results to inform periodic review and updating beneficiation modalities based on lessons to be learned through the MRV system.

1.4. Stakeholder Consultations

The BSP is a product of broad stakeholder engagement processes in complying with BioCF ISFL program requirements on stakeholder consultation, and the World Bank Environmental and Social Standard 10 (ESS 10). Constitutional principles and rights of the people of Zambia, environmental management principles in the Environmental Management Act, 2011, and principles of SFM as provided in the Forests Act, 2015, have also been fundamental in informing the consultation process.

Annex 1 [Stakeholder Engagement Process] details the range of stakeholder consultation processes undertaken in the development of the BSP. The stakeholder consultation process covers various government departments in the line ministries, local authorities across the Province, Provisional and District planners, CSOs and NGOs in the Province and at District level, the private sector and particularly legacy projects within the Province. Stakeholders and potential beneficiaries at Chiefdom level have been engaged and consulted, i.e. Chiefs and traditional authorities, local communities and community producer groups such as farmer groups, CFMGs, CRBs and VAGs.

The consultation process also served as an information gathering and feed-back mechanism which informed the initial BSP draft. Through this process, the BSP has benefited from important information regarding;

- The different roles and responsibilities which potential beneficiary groups will play in implementation of the program in general, and in the reduction of emissions in particular;
- The levels of vulnerability and needs among the beneficiaries at different levels across the Province;
- The types of benefits appropriate to incentivize and reward the different categories of beneficiaries;
- The key drivers of land use change, deforestation, forest degradation and unsustainable agriculture, and the need to incentivise alternative livelihoods that should yield rewardable ERs;
- Potential safeguard issues and risks which may arise out of the beneficiation process and the most appropriate ways of averting such issues and risks;
- The existing national and local institutional arrangements appropriate for benefit distribution mechanisms in a manner that significantly reduces risks of benefit-related conflicts, and;
- Bench marking of different benefit sharing models currently in use by different actors within the landscape, merits and demerits of the different benefit sharing models as well as lessons derived from these models.

1.5. Legal Underpinnings

Both the consultative process through which the BSP was developed, and the subsequent operationalization of the document to guide overall beneficiation in the EP-JSLP are premised on applicable laws of Zambia. The legal framework that forms the legal underpinnings of the BSP is detailed in Annex II and categorized in summary as follows;

- The legal framework that enhances collaborative stakeholder engagement, mandates consultative engagements and wider stakeholder participation;
- The legal framework that enhances stakeholder beneficiation by mandating safeguards to ensure that the vulnerability of the members of local communities is not worsened;
- The legal framework that enhances conflict and dispute redress mechanisms, and;
- The legal framework that enhances institutional frameworks.

The legal underpinnings also include elaboration on the ownership and transfer of carbon rights under the Forests Act, 2015 and particularly, the Community Forest Management Regulations of 2018 as well as the Forest Carbon Stock Management Regulations of 2021 [See Annex II].

1.6. Structure of the BSP

The BSP is structured as follows:

- **Section II** identifies the key stakeholders and beneficiaries in the ER Program, the eligibility criteria, roles and responsibilities of the beneficiaries in implementing ER activities;
- **Section III** outlines the ER performance at Chiefdom level being the fundamental operational unit of geographical area for the ER Program as will be guided by the CERPA
- **Section IV** defines benefits in the context of the EP-JSPL, and clarifies the types of benefits covered under the BSP;
- **Section V** describes the BDM with respect to flow of benefits to the beneficiaries under a performance-based allocation system;
- **Section VI** presents the BSM, the governance and decision-making processes that will be used to manage the distribution of benefits (i.e. monetary and non-monetary benefits);
- **Section VII** covers safeguards including the application of the FGRM to benefit-related grievances, complains, concerns and fears, and;
- **Section VIII** presents institutional arrangements for MRV and the administration of the beneficiation process;
- **ANNEXES**

2.0. STAKEHOLDERS AND BENEFICIARIES

The BSP defines beneficiaries as a subset of the ER Program's stakeholders who are expected to; (i) implement program ER activities, (ii) receive monetary and non-monetary benefits arising from ER activities, and (iii) receive incentives for their different roles and responsibilities in the reduction of emissions and generation of ER credits. Beneficiaries will include communities, community groups and farmers, CSOs, NGOs and the private sector while government will retain a certain amount of results-based finance to cover their costs for implementing and managing the ER Program as part of the program design requirements.

At its core, the ER Program is based on the concept of CBNRM. This makes local communities at the Chiefdom level the fundamental functional unit of ER activities, and communities as the targeted primary beneficiaries. It also necessitates a decentralized implementation approach that emphasizes beneficiation of local communities as a primary objective, reduction of emissions through community-based ER activities, and improvement of community livelihoods through a system of incentives and rewards.

For the avoidance of doubt and confusion, the BSP makes a distinction between stakeholders and beneficiaries in the ER Program area as outlined in Annex III. Stakeholders are government institutions, CSOs, NGOs and/or private sector companies who will provide technical services and capacity building to enhance reduction of emissions among the local level implementors of ER activities. For their facilitative roles, stakeholders will receive financial support in form of direct allocations to enhance implementation of the ER activities. Beneficiaries, on the other hand, are the local-level implementors of ER activities at Chiefdom level. Beneficiaries will receive performance-based allocations as rewards for their direct involvement with ER activities and livelihood improvements at community level.

2.1. Roles, Responsibilities and Criteria for inclusion in the ER Program

Roles and responsibilities refer to the activities and services (direct or indirect) which the stakeholders and beneficiaries will actually engage in to reduce emissions and generate ER credits as outlined in Annex III. At community level, beneficiaries' activities will include the adoption of CSA, reforestation, the use of improved cook stoves, agroforestry and protection of standing forests. For stakeholders as service providers, their roles and responsibilities will include provision of technical assistance and capacity building to facilitate adoption of sustainable land use practices, SFM, provision of organic fertilizers or training of farmers in CSA, provision of efficient cookstoves and training local users in their application

On the other hand, the criteria for inclusion in the ER Program refer to the basic conditions which each stakeholder and beneficiary must satisfy to enable them participate in ER activities under the CERPA or NERPA. The rationale behind the Chiefdom Emissions Reduction Performance Agreements (CERPAs) is to enter into an agreement with the Chiefdoms for the EP-JSLP and the Nested Emissions Reduction Performance Agreements (NERPAs) is to enter into an agreement with existing carbon projects in the Eastern Province Landscape. The EP-JSLP will operate in accordance with the regulatory framework for forest carbon stock management and operation of a jurisdictional Programme in Eastern Province. Under a centralised nested approach, agreements (CERPAs and CERPAs) will be entered into between the communities and ER related projects already operating in the province. The beneficiaries will be recognised and incentivised to deliver ERs based on performance

indicators as defined the Chiefdom Emission Reduction Performance Agreement (CERPA) and Nested Emission Reduction Performance Agreement (NERPA) respectively. A Chiefdom Emissions Reduction Performance Agreement (CERPA) negotiated, will set out the profile of the Chiefdom, identify the key ER issues and drivers of deforestation and forest degradation and other unsustainable land management and cultivation practices. It will identify the key forest assets and allocate responsibilities including permitted and non-permitted practices which contribute to GHG emissions in the Chiefdom. The Agreement will form the basis of assigning performance criteria and responsibilities as well as the benefit sharing mechanism. The BSP Performance Based Payments will, therefore, only be paid to beneficiaries for delimited geographic areas within the Province under a NERPA or CERPA. Nested Projects with a NERPA may receive either a cash payment or an allocation of VERs once monitoring and verification has taken place and the agreed number of VERs are deposited in the buyer's Registry. The agreed ER allocation will be placed in a specific individual Nested Project account from where the Nested project can assess the ERs and use them as they deem appropriate. Full documents of CERPA and NERPA will be provided in the project implementation manual.

For all the stakeholders and beneficiaries in a Chiefdom, it is a mandatory requirement for them to operate under a CERPA in the Chiefdom where they are located. But for Nested legacy projects operating under the jurisdictional arrangement, each ER proponent, i.e. COMACO and BCP will sign a NERPA with the PIU. As such, the NERPA will be the key governance instrument for not only benefit sharing purposes but for harmonization of legacy project activities under the centralized nesting approach in the jurisdictional landscape.

3.0. EMISSIONS REDUCTION PERFORMANCE AT CHIEFDOM LEVEL

The performance-based benefit sharing mechanism at Chiefdom level will be guided by the eligible activities under ISFL categories of GHG emissions from the GHG baseline. Because the bulk of emissions in the Eastern Province are in Chiefdoms, the required ER activities are to be concentrated at Chiefdom level. Therefore, SFM, sustainable land use and management, CSA and an increase in the adoption of improved cookstoves at Chiefdom level will be the core of generating ERs in the Province.

As such, the focus of benefit sharing at Chiefdom level will be the recognition and allocation of responsibilities to reduce emissions based on the GHG baseline of each Chiefdom area, and guided by the provisions of a CERPA. The CERPA in a non-nested area will have three signatories; (i) the Chief (ii) Government and (iii) the PIU. The CERPA in a nested area will include the nested legacy projects as signatories. In this case, the CERPA in the Nested legacy areas will be signed by (i) the Chief (ii) legacy projects – COMACO/BCP and (iii) Government and the PIU as one signatory [**See Annex VI**].

For these agreed and defined geographic areas, a measure of the performance and ability to deliver ERs will be agreed and monitored for effectiveness through the monitoring system. The PIU managing the EP-JSLP and the DMT under which respective Chiefdoms fall, will engage all the relevant stakeholder groups and beneficiaries in each Chiefdom to negotiate a CERPA. The CERPA will set out the profile of the Chiefdom, identify the key drivers of emissions particularly deforestation and forest degradation, unsustainable land use and management, unsustainable agriculture and cultivation practices as well as the ER issues

related to these drivers. It will also identify the key forest assets in the Chiefdom area and allocate roles and responsibilities to different Chiefdom actors and players. The roles and responsibilities will include permitted and non-permitted practices which directly contribute to emissions in the Chiefdom.

In this way, the CERPA will form the basis of assigning performance criteria for performance-based benefit sharing. The CERPA will take cognizance of any existing land management agreements and contracts in force among different parties within the Chiefdom such as the CFM Agreements, GMPs in GMAs or other designations generated through the Participatory Land Use Plans forming part of the District level Integrated Development and Land Use Plans. It will also recognize locally agreed BSMs between and among beneficiaries, beneficiary groups and private sector operating within the Chiefdoms.

The CERPA will include accountability and reporting requirements to ensure transparent use of the EP-JSLP support measures, the monetary benefits in particular. This process is key to ensuring that benefits are distributed equitably among the targeted constituent beneficiary groups, households, gender groupings including vulnerable and marginalized people in a given their local area.

The eligible ISFL categories of GHG emissions from the GHG baseline include the following key sources of emissions:

- **Forest remaining Forest -** Emissions resulting from fires and carbon removals;
- **Forest loss to cropland -** Emissions from forest loss through land use change and encroachments, and;
- **Cropland remaining cropland:** Emissions through poor soil and crop residue management in agriculture.

As such, the Performance Effectiveness Index will relate to ISFL subcategories as follows:

- **Forest remaining Forest -** Reduced incidences from late seasonal fires and improved control and protection of forests, efficient cookstoves and restoration of previously degraded areas;
- **Forest loss to cropland -** Reduced area of forest loss through land use change and encroachments against a baseline projection, plus restoration of previously cleared areas or new planting at scale, and;
- **Cropland remaining cropland:** based on increase in the use of the 5 categories of CSA with weighting to the key ones of agroforestry and management of crop residues.

3.1. Chiefdom level Performance

ER at Chiefdom level will be a contribution from ER activities undertaken within the Chiefdom on CSA, CFM, efficient cookstoves and management of National and Local forests. Essentially, ER performance of a Chiefdom will be based on the aggregate emissions from the said activities, i.e. CSA, CFM, efficient cookstoves and the integrity of National and Local forests. These interventions may be done through the following avenues;

3.1.1. Protected Areas: National Parks, National and Local Forests

ER interventions and performance for protected areas that fall within the Chiefdom boundaries will include SFM in National forests, Local Forests and National Parks, to be assessed through carbon uptake through avoided deforestation, reduced fire disturbances, removals for commercial wood and use of fuel wood.

3.1.2. Community level

ER interventions at community level will incorporate CFM to promote sustainable use of forest products, fuel wood, to reduce conversion of forests to other land uses, to prevent and manage wild fires. ER performance at community forest level will be assessed through carbon uptake, avoided deforestation and degradation, and reduced fire disturbances. Reduced removals for commercial wood and fuel wood consumption will also be considered.

3.1.3. Household Emissions reduction

At household level, ER interventions will incorporate the use of efficient cookstoves whose performance will be measured through stove efficiency and consistent use. Overall adoption rates in a community, Chiefdom and District as a whole will be an essential factor in assessing performance. Oversight of the cookstove program within a Chiefdom will be managed by a designated community institution such as CFMG, CRB or a Cooperative to be determined by the community and the DMT.

3.1.4. Farm Level

At farm level, ER interventions will incorporate the adoption of CSA and use of CSA technologies such as conservation farming, agro-forestry and the use of organic manure. These practices are designed to reduce emissions through soil carbon sequestration and a reduced application of inorganic fertilizers.

Farm level performance will be assessed through adherence to conservation farming and agro-forestry practices, use of organic fertilizers and overall adoption rates of CSA technologies at farm level, in the community, at Chiefdom level and in the District as a whole.

3.2. Performance Effectiveness

Performance effectiveness at Chiefdom level will cover the following aspects:

- **Good governance –** to incorporate efficiency, equity, transparency, accountability, inclusiveness and financial benefit sharing within projects and between institutions and beneficiary groups, and;
- **Environmental and Social Safeguards**
  - Social – livelihood support, beneficiary participation and satisfaction
  - Environmental – measures to promote the integrity of the natural environment and ecosystems, conservation of biodiversity and enhancement of ecosystem services
  - FGRM – an effective and efficient roll out and awareness of the FGRM in addressing stakeholders and beneficiaries' concerns, fears, worries, anxieties, complaints or grievances; this includes a timely provision of feedback to these concerns, and how satisfied stakeholders are with the feedback.

Therefore, the performance-based allocation of payments will comprise a 2-part monitoring system:

- Measurement of performance against the ISFL subcategories within their defined geographic area of responsibility through remote sensing methodologies by the EP-JSLP MRV system. The current land use change assessment using collect earth will be refined to provide future assessment of vegetative cover quality as opposed to land use change only. This is important in respect of the fact that the major emissions come from the sub-category of forests remaining forest, and;
- Measurement of performance against the ISFL subcategories following agreed proxy indicators set out in the Performance Effectiveness Index for each Chiefdom as part of the negotiated CERPA. This will include an assessment of performance on environmental and social safeguards.

Annex VI illustrates how the roles and responsibilities of different stakeholders and beneficiaries may overlap in relation to ER activities and performance at Chiefdom level.

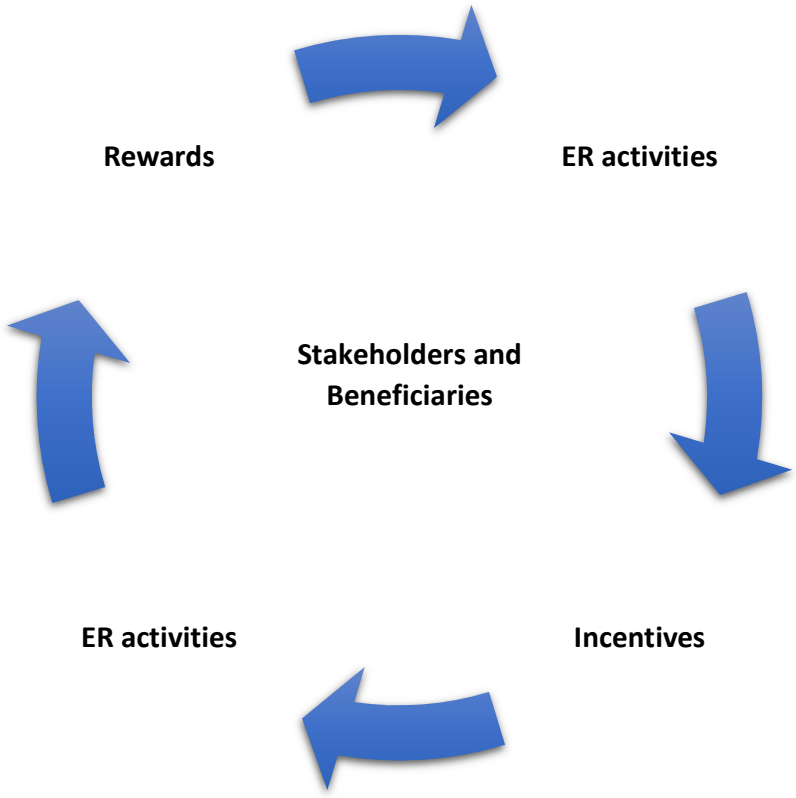
4.0. BENEFITS

The EP-JSLP is an RBF Program designed to provide monetary and non-monetary incentives and rewards for emissions reduction. Therefore, the BSP defines a benefit as an incentive and/or a reward which must be provided based on measurable, verifiable and reportable results. The system of incentives and rewards aims at; (i) enhancing ER activities at Chiefdom level, (ii) improving the livelihoods of local communities, and (iii) improve the effectiveness, efficiency, transparency and accountability of service providers operating at Chiefdom level.

Essentially, monetary and non-monetary benefits paid to stakeholders and beneficiaries should not be used to; (i) undermine ER activities by increasing emissions, (ii) worsen the socioeconomic vulnerability of local communities especially women, children and persons with disabilities, and (iii) undermine the effectiveness, efficiency, transparency and accountability of service providers operating in the Chiefdoms.

The beneficiation system is designed to be a mutually reinforcing system where incentives and rewards reinforce each other as follows;

Fig 1: The interaction between rewards, incentives and ER activities



4.1. Types of Benefits

The BSP deals with two forms of carbon benefits, i.e. benefits deriving from the sale of measurable, verifiable and reportable ER credits generated as a result of effective implementation of ER activities at Chiefdom level. Carbon benefits are either monetary or non-monetary.

- **Monetary carbon benefits** are defined as cash payments received by beneficiaries under the ERPA. Monetary benefits will be available to all landscape level implementors of ER activities in the Chiefdoms.
- **Non-monetary carbon benefits** are defined as goods and services which beneficiaries will receive for their ER performance under the ERPA. Like monetary carbon benefits, non-monetary carbon benefits will also be available to all landscape level implementors in the Chiefdom.

The determination of carbon beneficiaries is based upon the identification of stakeholder groups that play a direct role creating ERs and that have the legal right, including under statutory and/or customary law to determine land use practices.

Fig 2: Types of Benefits covered under the BSP

BENEFITS

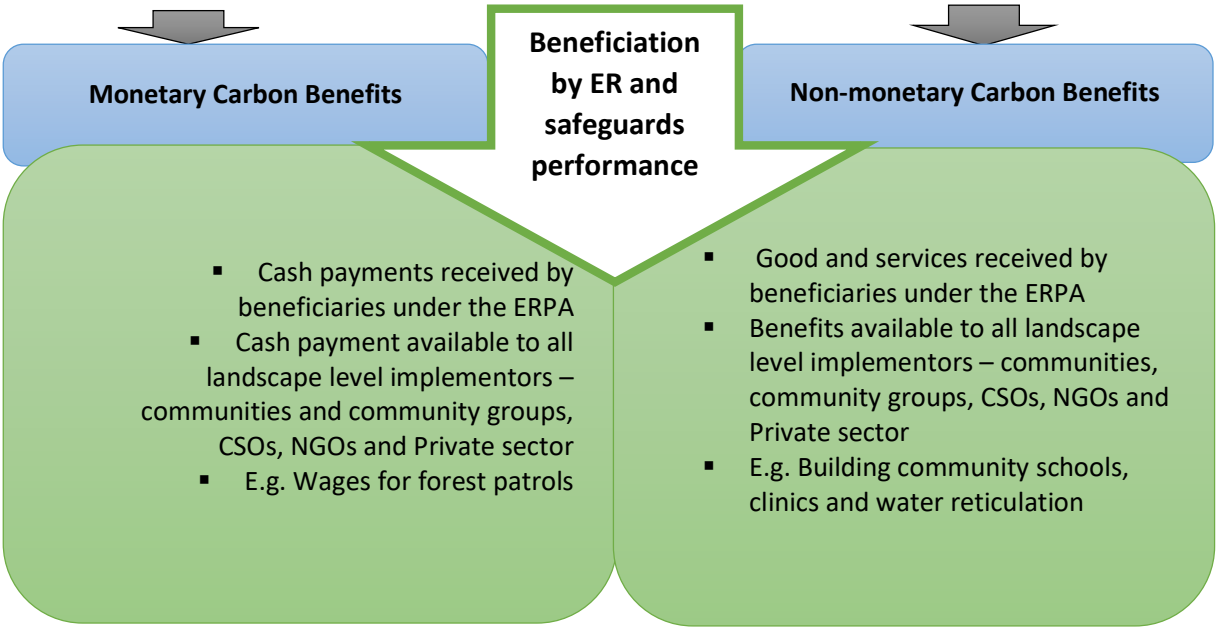


Table 2: Beneficiaries and their Potential Benefits

Categories	Recipients of Monetary Carbon Benefits	Recipients of non-monetary Carbon Benefits
Beneficiaries: Landscape Implementers		
Traditional Authorities	✓ Performance-based allocations	✓ Performance-based allocations
Farmer Groups	✓ Performance-based allocations	✓ Performance-based allocations
Resource Management Groups	✓ Performance-based allocations	✓ Performance-based allocations
Village Action Groups	✓ Performance-based allocations	✓ Performance-based allocations
Private sector in Nested areas [BCP/COMACO]	✓ Performance-based allocations	
Stakeholders: Service providers		
CSOs and NGOs	✓ Direct allocations	

Potential/anticipated Private sector companies in non-nested areas	✓ Direct allocations	
Government institutions	✓ Direct allocations	

In aiming to avoid worsening the socioeconomic vulnerability of local communities especially women, children and persons with disabilities, this Benefit Sharing Plan directly targets these groups of people with benefits through low carbon community investments (Subgrants). One criterion for community groups eligibility to receive community grants from the carbon monetary benefits will be participation of women, children and persons with disabilities in the community groups applying for grants. The Gender Based Violence Action Plan under the Environmental and Social Framework (ESF) is in place and protects these venerable groups and helps to reduce social economic vulnerability.

The performance-based payments given to Farmer groups, Village Action Groups and Resource Management Groups directly targets Women, Children and persons with disabilities. Women group for example are targeted and prioritized. The program has also a Gender Strategy and Gender integration tool which can be accessed on www.ziflp.org.zm . through this benefit sharing plan distribution of benefits to women will be both direct and indirect.

Community investments will be and are according to land use plans. These investments shall and will be put up in already settled areas and no new areas are opened up for community infrastructure investment. As per project environmental and social framework (ESMF) there is an environmental assessment or subproject environmental screening which makes sure that potential environmental and social impacts are identified and addressed before start of any project and alternatives are provided in case of scale negative impact.

5.0. BENEFIT DISTRIBUTION

The overall objective of the JSLP is to distribute benefits to key beneficiaries and stakeholders whose roles and responsibilities in the Program are directly and indirectly linked to reduction of emissions through management of land use, forest loss and degradation, unsustainable agriculture and wildlife. This fits within the vision and mission of the National Strategy to Reduce Deforestation and Forest Degradation to, among others, coordinate efforts aimed at reducing deforestation and forest degradation through improved management of forests and livelihoods. The distribution approach also takes full cognition of the two main sources of GHG emissions in Eastern Province, i.e. 54% from forest degradation and 32% from forest loss through conversion to crop land.

- ER Gross Payments refer to the revenue generated from the sale of the entire volume of ERs that are sold in a given MRV period;
- ER Net Payments refers to revenue that remains after deducting Fixed Costs and Performance Buffer from Gross Payments;
- Fixed Costs refer to the management and transactional costs incurred in managing the ER Program, and;
- Performance Buffer refers to the amount of money set aside from the gross ERPA payments to offset under-performance or non-performance at Chiefdom level.

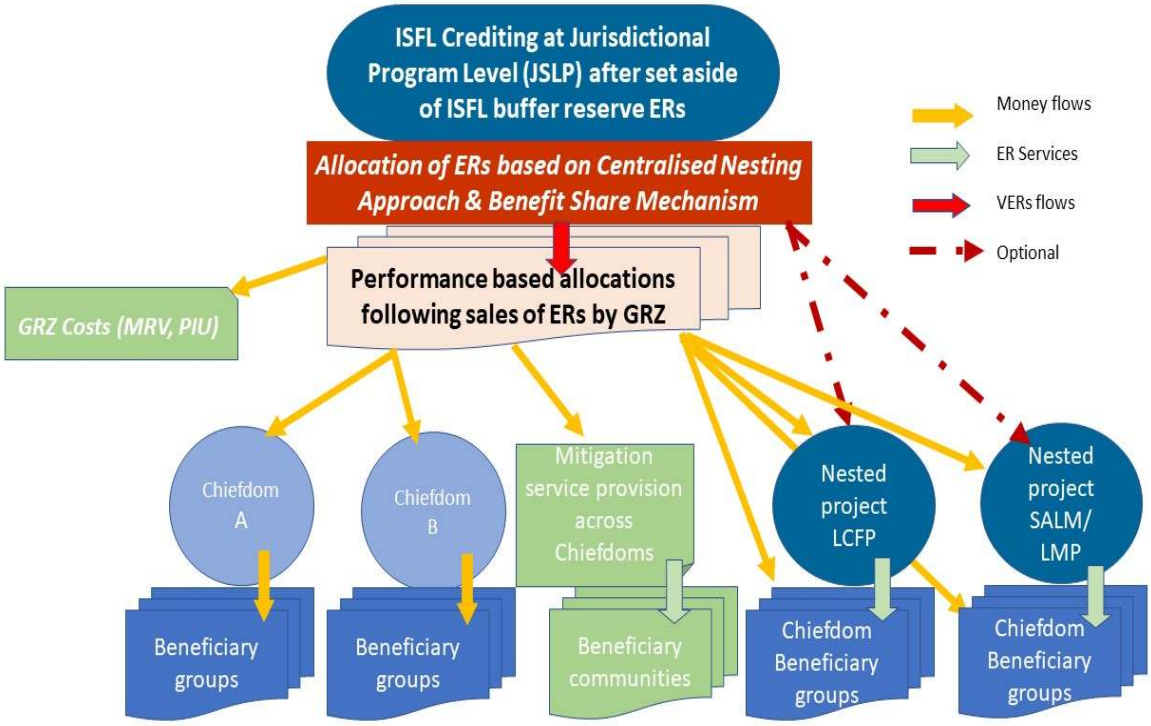
These payments are calculated as indicated below;

Fig 3: Equation 1. Calculation of Net ER Payments

Gross Payments - (Fixed Costs + Performance Buffer) = Net Payments

These payments will be triggered once reductions in deforestation and forest degradation are validated and verified, and tons off ER credits are issued. The payment will also be triggered upon the verification of performance on safeguards in accordance with environmental and social safeguard instruments developed for the Program. The following diagram illustrates how the funds will flow to the beneficiaries;

Fig 4: Flow of Funds



5.1. Benefit Allocation

After concerted stakeholder engagement and consultation processes outlined in the BSP Annex I, the agreed system of benefit allocation shares is outlined in table 2 below;

Table 2: Benefit Allocation of Percentage shares

Stakeholder/Consultation	Rationale	% allocation
GRZ and the PIU	Allocation for; ▪ Program implementation and Management of day-to-day activities according to the PIM ▪ MRV ▪ Performance buffer ▪ Provision of policy and legal regulation ▪ Facilitation of conflict and grievance redress	**15%**
Private sector in nested areas [COMACO and BCP] and GRZ, NGOs or CSO Services in Non-nested areas	Allocation for; ▪ The Nested Private sector legacy projects to continue their operations as service providers under a centralized jurisdictional arrangement; ▪ Focus on the priorities as allocated by the nested projects in line with the NERPA	**30%**

	▪ Provision and facilitation of mitigation services through SFM, CSA and improved cookstoves ▪ Mobilization of communities for NRM and expansion of protection activities and land use planning ▪ Capacity building and knowledge transfer to enhance communities' roles in ER through AFOLU-related activities ▪ Provide extension support services to farmers and farmer groups for the adoption and acceleration of CSA ▪ Build Capacity in communities to innovate synergies and solutions to climate change ▪ Provide support to community groups in developing the NTFP value chain and related community forest enterprises ▪ Facilitate Grievance Redress at community level and report accordingly ▪ Meeting their management costs including payment to company shareholders, payment of salaries and other statutory obligations for staff, facilitation of MRV in Nested Chiefdoms, data collection and sharing to enhance MRV processes	
Chiefdoms [Local communities and Chiefs	Allocations subdivided for the following;	**55%**
▪ The Chief as an individual	Allocations paid to the Chiefs as traditional royalty for being custodians and administrators of traditional land in their Chiefdoms, for their role in facilitating CERPAs, and for providing leadership in the enforcement of CERPAs and protection of natural resources in the Chiefdom	5% of 55%
▪ The Chief as an institution	Allocation paid to a local institution such as a Chiefdom Development Trust under the supervision of the Chief; comprising traditional leaders, community members, local authority, NGOs and CSOs operating within the community. The allocation is to provide transport needed for addressing drivers of deforestation and degradation and to attend to the issues that may arise therefrom; facilitate in the Chiefdom Enforcement of compliance with CSA Practice and land uses, as well as follow up on the utilisation of funds as stipulate below;	5% of 55%
▪ Community construction	Allocation for the construction of community infrastructure such as schools, clinics, bridges and other development needs the community may choose. Caution is given to ensure that construction works should not increase emissions at community level	32% of 55%

▪ Conservation	Allocation for enhancing the Chiefdom AFOLU sector through NRM and CFM (payment of village scouts and support to honorary forest officers, resolution of, and support to, human and animal conflict, fire management, development and updating of FMPs, procurement of vehicles and servicing of the vehicles for NRM through patrols); promoting and enhancing the adoption of CSA and expansion of community forests and CSA practices.	30% of 55%
▪ Community livelihood support	Allocation for Chiefdom low carbon investments at both Chiefdom and household levels; to support increased household incomes and contribute to improvements in social safety nets; increase household and Chiefdom resilience as well as reduce vulnerability to climate change impacts (guided Community subgrants, Procurement of small-scale processing equipment and development of community value addition center to add value and develop value chains for CSA Produce), and to increase the procurement of small livestock (Chickens, Goats and Pigs) for the pass-on scheme, to promote alternative livelihoods such as aquaculture for the purpose of increasing household disposable income. The allocation will also seek to address local livelihoods needs based on assessed community socioeconomic vulnerabilities and any shocks that may arise from natural or man-made disasters, especially women, children and persons with disabilities this will be done through direct grants to these groups	20% of 55%
▪ Traditional activities	Allocation towards support for preservation and promotion of cultural heritage through, for instance, funding towards annual traditional ceremonies and the maintenance of scared shrines.	5% of 55%
▪ CRBs/CFMGs/Farmer Groups	Allocations for supporting the day-to-day management and administrative needs of the CRBs, CFMGs and DFAs ▪ It must be noted that in some areas, the CRB and the CFMG are constituted by the same persons but operate differently according to whether it is a wildlife or forestry matter, respectively.	3% of 55%

5.2. Performance Buffer

The allocation towards performance buffer (of generally 5%) is money set aside as a percentage from the ERPA payment (for the net ERs) to cover potential under-performance of the ER program at Chiefdom level in a given reporting period. This money could be used, for example, to reward potential beneficiaries such as a Chiefdom village groups or

community producers who have effectively reduced deforestation in their respective areas yet the ER program as a whole under-performs.
The buffer also relates to the amount of ERs that would have to be set aside for uncertainty and reversal risks. It refers to the amount of ERs which would be appropriately determined by the ISFL risk rating of the Program. As such, ERs to receive payments will be the net ERs to be established after subtracting the buffer ERs from the gross ERs as an ISFL requirement.[6] This is more akin to risk buffer than performance buffer.

5.3. Benefit Sharing Mechanism

The BSM in this BSP is performance and results-based. The performance of the Chiefdom will be determined periodically according to the MRV process using monitoring tools developed by Zambia's Forestry Department as part of Zambia's NFMS. Performance will be measured in two ways; (i) by monitoring the performance of actions implemented at the Chiefdom level, and (ii) by assessing adherence to environmental and social safeguards in order to ensure that the reduction of emissions does not worsen poverty and the vulnerability of already the already poor and vulnerable people – especially women, children and persons with disability.

The commitments and targets to be used to measure the performance from the Chiefdom will be set in the CERPA as outlined in section III and in the NERPA for the nested areas.

Distribution of the allocated benefit shares outlined in table 2 above will be monitored and administered by the Jurisdictional Benefit Sharing Committee working with all stakeholders and beneficiaries in the Program area. Benefit sharing at Chiefdom level will follow provisions of the CERPA, and for Nested projects operating under a Chiefdom, a NERPA will apply for them. Essentially, both CERPAs and NERPAs will serve as the key governance instrument for benefit sharing at Chiefdom level given that Nested projects will not operate outside of a Chiefdom. As such, the Nested legacy projects will be signatories, together with the Chief, Government and the PIU, to both CERPAs and NERPAs in Nested areas only. Nested legacy projects will not be signatories to CERPAs in non-nested areas.

The CERPAs and NERPAs will set out the profiles of the Chiefdom under which ER activities are implemented, identify the key ER issues and drivers of deforestation and forest degradation and other unsustainable land management and cultivation practices. The CERPAs and NERPAs will identify the key forest assets and allocate specific roles and responsibilities, including permitted and non-permitted practices which contribute to GHG emissions in the Chiefdom. The CERPAs and NERPAs will also form the basis of assigning performance criteria based on the defined roles and responsibilities of stakeholders and beneficiaries operating at Chiefdom level.

Signatories to the CERPAs and NERPAs the signatories to the CERPAs shall be Chiefs on Behalf of the Chiefdom and EP-JSLP on behalf of government with Community Forest

[6] https://biocarbonfund-isfl.org/sites/isfl/files/2020-04/ISFL%20Buffer%20Requirements_2020_Final.pdf, page 3.

Management Groups (CFMG) Witnessing and consenting. The Signatories of the NERPs shall be the Private Sector/Service Provider and EP-JSLP on behalf of government with Chiefs as Community Representative Consenting and Witnessing.

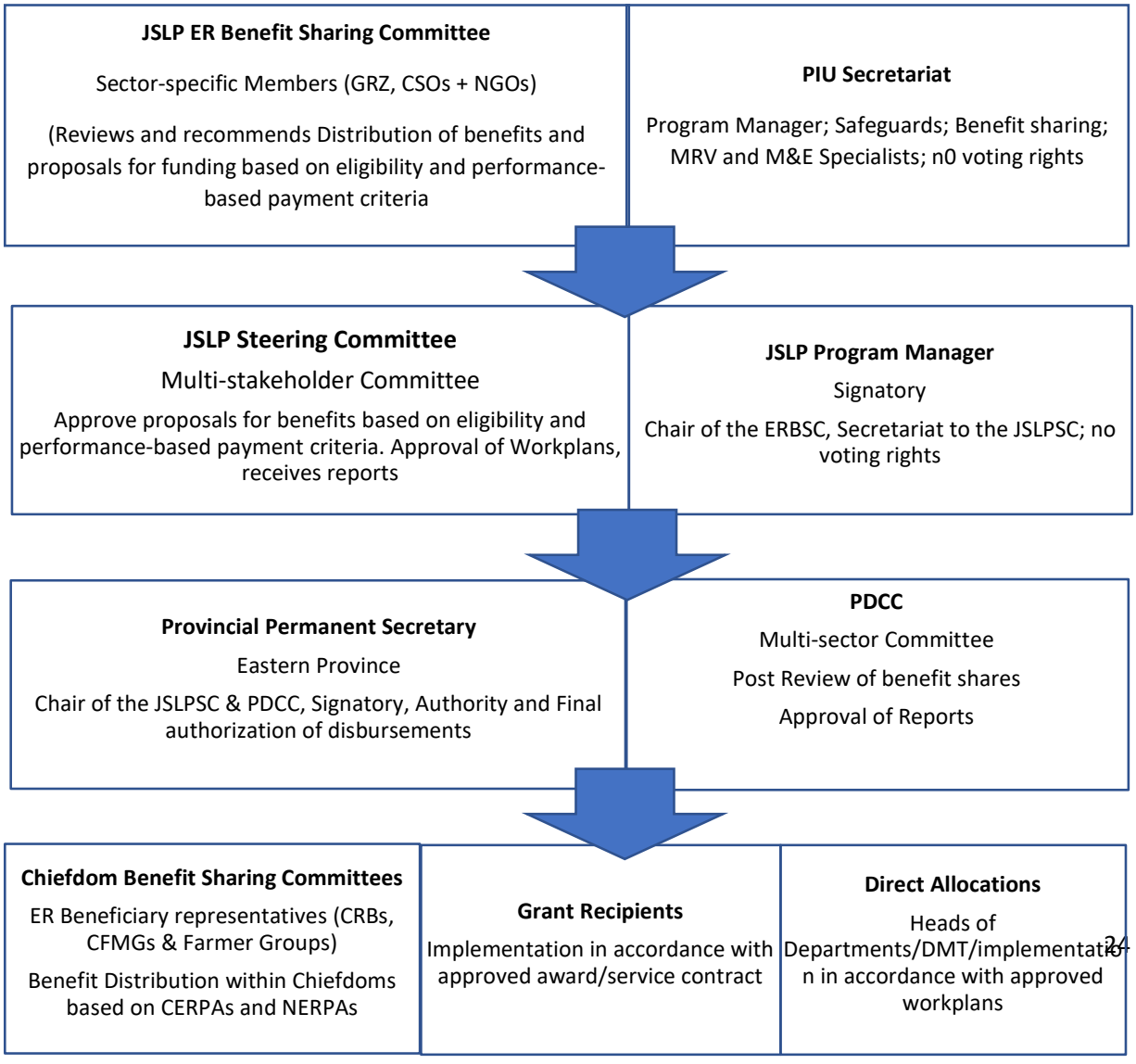
For the purpose of addressing and respecting safeguards, the CERPAs and NERPAs will also include commitment of the JSLP to deliver livelihood improvements, community empowerment, capacity building and enhanced service delivery to livelihood support and related community development programs.

5.4. Governance and Decision-making

Other than the NERPAs and CERPAs which will serve as key governance instruments for the BSM, the process of distributing and sharing benefits will be administered and monitored by BSC with the PIU serving as the Secretariat. The various roles and responsibilities of the BSC and the PSC are outlined in Annex IV which also forms part of the operational manual for the BSP.

The general governance framework for benefit sharing arrangements are illustrated and summarized below;

Fig 5: Governance framework for Benefit Sharing Arrangements



6.0. SAFEGUARDS

The ER Program is designed to have positive impacts on the lives of the rural communities and on the integrity of the environment, i.e. conservation of ecosystems and biodiversity in the Program area. Therefore, the BSP is designed in alignment with the National REDD+ Strategy Framework, the outcomes of the SESA process and the principles the World Bank ESF instruments prepared under this program.[7] The BSP is also aligned with the Safeguards Information System established by the Republic of Zambia to assess the extents to which all REDD+ projects or programs in the country adhere with the UN Cancun safeguards.

The implementation of the BSP will also be monitored using the environmental and social standards under the regulatory framework of ZEMA to ensure that the integration of social and environmental considerations in the implementation of REDD+ interventions is done in full compliance with provisions of the Environmental Management Act, 2011 and the World Bank ESF.

As such, the management of environmental and social impacts of the program is fully integrated in the design of the BSP, identification of benefit sharing issues, grievances and concerns, assessment of benefit sharing risks and conflicts, monitoring, and evaluation of the overall BSP implementation. Essentially, the aim is to ensure that ER activities and the beneficiation therefrom do not negatively impact local communities' livelihoods nor undermine the integrity of the environment.

Consequently, all ER activities in the Program area will be required to comply with the requirements of the World Bank ESF as outlined in the ESCP. Hence, the environmental and social risk management including implementation and monitoring of the FGRM will follow the procedures outlined in the safeguard's documents. The Environmental and Social Safeguards Specialist based in the PIU and the MGEE will be responsible for ensuring the implementation of the agreed environmental and social risk management aspects of the ERPA.

6.1. Feedback and Grievance Redress Mechanism

The FGRM is specifically designed to achieve the following objectives;

- To be responsive to the stakeholder and beneficiary needs insofar as channeling concerns, complaints and grievances is concerned;

[7] A SESA Report, Updated ESMF Report VER06 22Nov21, Updated Process Framework Report Nov 21, Updated Resettlement Policy Framework Report Nov 21, Environmental and Social Commitment Plan – ESCP, Labor Management Plan –LMP, Stakeholder Engagement Plan – SEP, Gender Based Violence Action Plan – GBVAP and a Feedback Grievance Redress Mechanism < http://ziflp.org.zm >

- To be responsive to stakeholder and beneficiary needs insofar as feedback to their concerns, complaints and grievances is concerned;
- To be responsive to stakeholder and beneficiary needs insofar as conflict/dispute redress in concerned; i.e. to provide a fair and objective avenue for dispute resolution and prevent matters from escalating into more serious issues;
- To be a data collection and data analysis avenue that uses collected and collated information to improve Program performance and enhance continuous mitigation risks in the Program area;
- To be responsive to stakeholder and beneficiary needs insofar as facilitation of effective communication between the Program and the affected/interested parties is concerned;
- To enhance the Program's legitimacy among stakeholders by promoting transparency and accountability, and deterring fraud and corruption;
- To provide a platform for ensuring compliance with the provisions of the laws, regulations, and cultural and traditional rules in the project area [See Annex I on legal underpinnings]

Fig 6: Purpose and Objective of the FGRM

The FGRM is designed to provide a timely, responsive and effective system of resolving community or individual grievances in the project areas including those related to implementation of this BSP (e.g. delayed disbursements of funds, concerns of unfairness in the distribution and sharing of benefits, etc.). The mechanism is a multi-stage process that

starts from the Chiefdom level, to the District, Provincial and to the National Level. The detailed operationalization of the FGRM is set in the operational manual as in Annex V.

However, the fact that the BSP will be dealing with money and huge financial transactions, the risk of financial crimes, fraud, corruption and money laundering cannot be underestimated. Therefore, the FGRM committee will refer all matters related to financial crime, money laundering, corruption and fraud to the BSP Arbitration Committee (BSAPAC) for further assessments and investigation. The composition of the BSPAC and the referral system is illustrated as part of Annex V.

The legal mandate and jurisdiction over financial crimes, money laundering, fraud and corruption, as well as the requisite expertise to handle such matters are beyond what is permissible for the FGRM to handle under the laws of the Republic of Zambia.

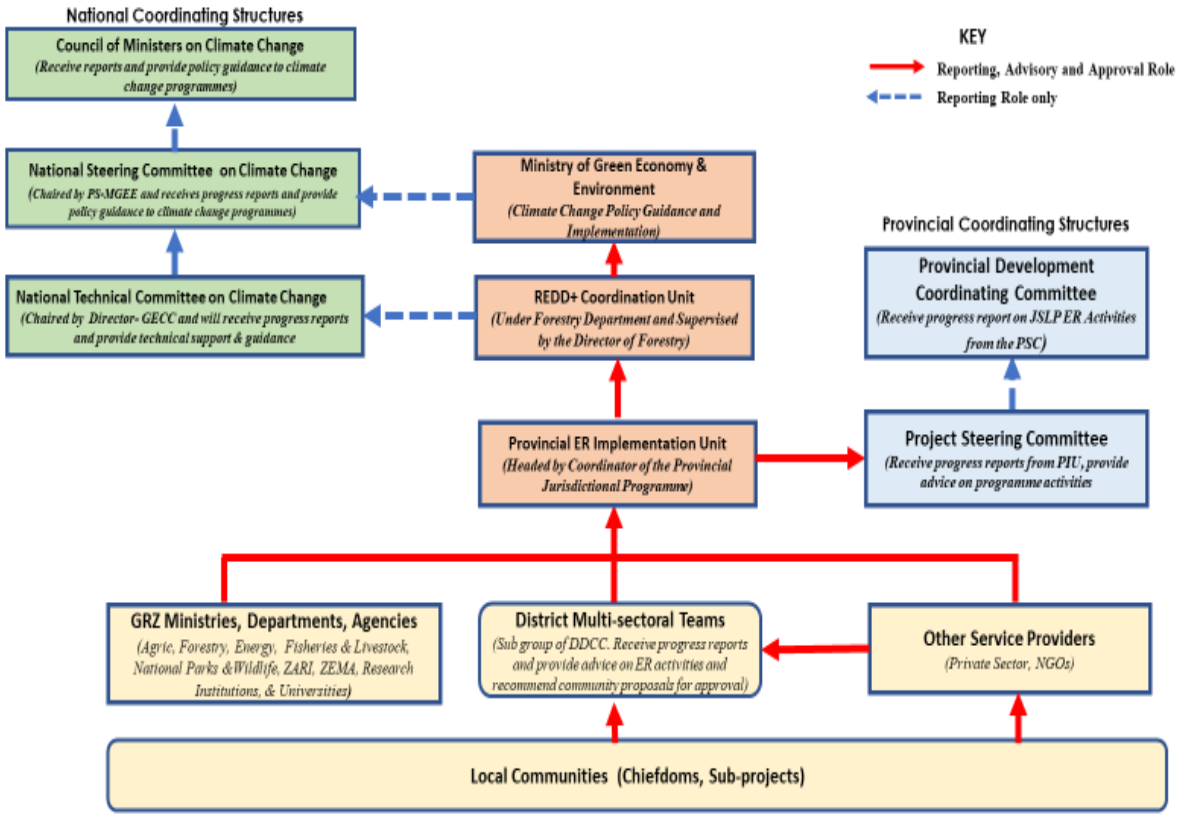
7.0. INSTITUTIONAL ARRANGEMENTS

Institutional arrangements in a jurisdictional approach are crucial because of the many different actors and players operating in the entire Province having different interests and claims, and playing different roles and responsibilities. Therefore, institutional arrangements will be crucial for;

- Enhancing effectiveness of the different actors and players towards the twin goal of reducing emissions and improving livelihoods;
- Preventing and minimizing intra-institutional tensions and stakeholder conflicts;
- Preventing and minimizing misinformation, managing expectations and building consensus among the different actors and players;
- Enhance effective MRV of ER activities across the entire Province;
- Building positive leverages on experiences of the different actors and players, and;
- Expanding the scope and reach of ER activities as effectively and as efficiently as possible through the system of incentives and rewards across the entire jurisdiction.

Foregoing, the effectiveness of the BSP will also be guaranteed by the effectiveness of institutional arrangements from Chiefdom level to the Province.

Fig 6: EP-JSLP Institutional Arrangement



7.1. Operational Outlook of Institutional Arrangements at Chiefdom level

In practice, there are overlapping institutional set-ups such as CRBs, VAGs, CFMGs and DFAs at very lowest operational level. All farmers are community members found in a VAG which is an establishment of the CRB under the Wildlife Act, 2015. CRBs are allowed to register as a CFMG for the purpose of participating in forest carbon ER activities under the Forests Act, 2015. While the Wildlife Act provides for this duo functionality of the institutions, the Forests Act does not. Meanwhile, all community members constituting a CRB and CFMG are active farmers in a VAG by virtue of belonging to a village. Farmer groups like DFAs draw their members from the same pool of VAG participants who also constitute an IC at the lowest structure of the DFA.

From the local government perspective, all these local institutions are found in a Ward which is the lowest political and development institution in the hierarchical set-up of governance in Zambia. Therefore, the WDCs are mostly composed of the same personnel as the people in CRBs, CFMGs, DFAs and government departments operating at Ward level in accordance with the provisions of the Local Government Act, 2019. Chiefdoms are basically a composition of different Wards made up of a number of villages in a particular District. Annex VI illustrates the outlook of this institutional arrangement in practice. Attention must be paid to the different stakeholders' roles and responsibilities outlined in annexes III A and III B when considering this institutional arrangement.

7.2. Monitoring of Performance

Current estimates show that about 96 percent of all land in the Eastern Province is traditional/customary land. Secondly, the largest pool of emission stocks and sinks in the Province is on traditional land. As such, traditional land forms the largest pool of sources of emissions in the entire Province. Therefore, successful implementation and monitoring of the ER Program activities will be determined by the extent to which drivers of deforestation and degradation, land use change and unsustainable agriculture are addressed at Chiefdom level. The institutional arrangement for the BSP is designed to ensure that roles and responsibilities of all players and actors from various institutions across the Province, Districts and Chiefdoms are harmonized into the twin goal of reducing emissions and improving lives at community level.

This also entails that monitoring of performance will be fundamental at Chiefdom level, i.e. monitoring how all the actors and players in the different local, district, provincial and national institutions play their roles and undertake their responsibilities towards ER activities and improvement of livelihoods at Chiefdom level. As such, ER payments for landscape-level implementers will be according to the performance of the Chiefdom in implementing the landscape management activities.

ANNEXES

- BSP Annex I: Stakeholder Engagement
- BSP Annex II: Legal Underpinnings
- BSP Annex III: Stakeholder Analysis
    - Annex III A: Stakeholders and Beneficiaries Roles and Responsibilities
    - Annex III B: Stakeholders and Beneficiaries Criteria for Inclusion in the ER Program
- BSP Annex IV: Roles and Responsibility of the PSC and BSC
- BSP Annex V: FGRM and the BSPAC Referral System
- BSP Annex VI: Outlook of Institutional Arrangements at Chiefdom level

BSP Annex I: Stakeholder Engagement and Consultation Process

1. FIRST ROUND

The first round of stakeholder consultations for the BSP took place in February and March of 2020 with national stakeholders in Lusaka, and with Provincial, District and local stakeholders in Eastern Provinces. The consultations were structured as FGDs and structured interviews which included government representatives, CSOs, the private sector, traditional authorities and local community groups including, i.e. farmers, CRBs and CFMGs. The first round saw a total of 147 stakeholders and beneficiaries consulted [40 females and 87 males.

The first round of consultations was mainly intended to inform the initial draft of the BSP. Information gathered in this round included:

- The roles and responsibilities of the stakeholders and potential beneficiary groups in the implementation of Program activities to reduce emissions, generate ER credits and contribute to improvement of livelihoods;
- The types of benefits that could go into incentivizing and rewarding the stakeholders and beneficiaries to make changes in land use practices and/or to invest in the protection of forests;
- The existing national, provincial, district and local institutions and processes through which benefits could be distributed to the targeted beneficiaries;
- Lessons around positive practices and challenges with the different benefit sharing models currently in use within the EP to bench mark the design of the EP-JSLP BSP, and;
- The potential risks and issues which could ensue from implementation of the BSP, risks and issues would necessarily need to be linked to the safeguard's framework

Table 1 below summarizes the first round of stakeholder consultations;

Table 1: Summary of First Round Consultations

Stakeholder	Type	Location	#*	Date
PDCC and DDCC Meetings	FGD	Chipata District	26 – 26 Male 0 Female	02 March 2020
Chisitu Farm School Lead Farmers	FGD	Chipata District	45 - 17 Male 28 Female	02 March 2020
Banki Community Forest Management Group (CFMG)	FGD	Kasenengwa District	18 - 15 Male 3 Female	02 March 2020
COMACO	Informational Interview	Chipata District	4 – 4 Male 0 Female	03 March 2020
Land Alliance	Informational Interview	Chipata District	4 – 1 male 3 Female	03 March 2020
Meeting with HRH Chief Kazembe	Informational Interview	Kazembe Chiefdom, Lundazi District	1 Male	04 March 2020
Meeting with Kazembe Community Resource Board (CRB)	FGD	Kazembe Chiefdom, Lundazi District	17 – 16 Male 1 Female	04 March 2020
BioCarbon Partners	Information Interview	Lusaka	2 – 2 Male 0 Female	28 February 2020
Meeting with HRH Chief Jumbe and Community Resource Board (CRB)	Informational Interview	Jumbe Chiefdom, Mambwe District	1 Male	05 March 2020
Meeting with Jumbe Community Resource Board (CRB)	FGD	Jumbe Chiefdom, Mambwe District	12 10 Male 2 Female	05 March 2020
Indicates number of participants. Note that attendance was not taken at the meetings with Chiefs; therefore, these are not included in the total # of participants.				

2. SECOND ROUND

Additional stakeholder consultations were conducted from November 23rd – December 1st 2020, throughout Eastern Province. The goals of the second round of consultations were to broaden and consolidate the consultations for the development of an advanced version of the BSP in line with national requirements and ISFL guidelines. The process was driven by GRZ and involved consultations with communities, traditional authorities, CRBs, CFMGs, CSOs, provincial government units and private sector operating at Provincial, District and Chiefdom levels. The second-round consultations were achieved through FGDs and structured interviews with each of the categories of beneficiaries identified to review feedback on the initial design of the BSP.

From this round of consultations, issues, concerns, fears and worries raised by stakeholders were collected for the purpose of determining how they would be addressed in the BSP. In broad terms, the stakeholders and beneficiaries consulted welcomed the idea of having both carbon monetary and carbon non-monetary benefits as they expected to come through the JSLP. But as expected, monetary benefits drew the greatest interest from all stakeholders and beneficiaries. Proposals for sharing monetary benefits varied across beneficiary groups and community institutions participating in the consultation.

In summary the following observations were made across the Chiefdoms:

I. Where community development committees had been set up in villages with responsibilities for natural resources protection, there was a view that these committees could also guide on benefit sharing. The initial community preference was to use CRBs. The rationale was that the CRBs were existing institutions that were doing similar fund administration in the Chiefdoms, and their composition was inclusive at village level;
II. Some community members expressed serious misgiving regarding the role of CRBs to administer benefit distribution at Chiefdom level. It was reiterated that the use of CRBs for such a purpose had previously divided the Chiefdoms with grievances regarding lack of transparency and accountability. Within the CRBs. Therefore, the fear that these performance-based payments made through CRBs would increase already existing conflict in Chiefdoms was daunting. Suggestions were made to this effect; that there was a strong need to put in place measures that will address conflict and promote change in the manner in which CRBs were governed. It was also suggested to put in place an independent board that would ensure that benefits trickle down to the intended community targets in order to motivate them into sustainable behavior.

The second round of consultation was interrupted by the COVID-19 pandemic which restricted travelling and public gatherings under lock-down regulations. Notwithstanding, this round of consultations was geared towards validation of the draft BSP towards the end of 2022.

The second round of consultations is summarized in table 2 below:

Table 2: Summary of Second Round Consultations

Stakeholder	Type of Group	Location	#*	Date
Ngoni Headmen at Epheduken Palace.	Traditional leaders	Epheduken Palace, Chipata	30 – 22 men and 8 Women	23rd November 2020
Gogo Mazimawe	Traditional leaders	Mazimawe Palace, Kasenengwa	1 Male	23rd November 2020
Ngoni Headmen at Mazimawe Palace	Traditional leaders	Mazimawe Palace Kasenengwa	44 – 25 men and 19 Women	23rd November 2020
Senior Chief Luembe, Headmen and CRB Members	CRB and Headmen	Luembe Palace Nyimba	21 – 12 men and 9 women	24th November 2020
HRH Chief Nyalugwe and Headmen	Traditional leaders	Chief Nyalungwe's Palace, Nyimba	1 Male	25th November 2020
Nyalugwe, Nyimba	CRB/CFMG	Chief Nyalungwe's Palace, Nyimba	33 – 20 men and 13 Women	25th November 2020
Her Royal Highness Chieftainess Mwanya	Traditional Leader	Lumezi (part of former Lundazi)	1 Female	28th November 2020
Headmen and Women, and CRB members of Mwanya Chiefdom	Traditional leaders and CRB	Lumezi (part of former Lundazi)	43 – 25 men and 18 Women	28th November 2020
Jumbe and Kakumbi CRBs	CRB	Mkhanya Chiefdom, M'fuwe, Mambwe	9 – 6 men and 3 Women	26th November 2020
Headmen and Headwomen Nsefu Chiefdom	Traditional Leaders	Nsefu Chiefdom, M'fuwe, Mambwe	52 – 30 men and 22 Women	26th November 2020
Headmen of Mwase Lundazi Chiefdom	Traditional Leaders	Lundazi	Men – 26, Women - 0	30th November 2020

Group Headmen, Headmen and Chitungulu CRB	Traditional Leaders and CRB	Chief Chitungulu, Lumezi	Men -21, Women - 2	1st December 2020
Kazembe CRB	Traditional Leader	Lumezi (part of old Lundazi)	1 Male	2nd December 2020

Table 2: Feedback from Government-led consultations in the Second Round

Beneficiaries	Eligibility Criteria	Types of Benefits	Benefits Distribution	Benefit Sharing Mechanism
Ngoni Headmen at Epheduken Palace Feni.				
Individuals with personal forests; Forest guards; Farmer groups; Headmen; Those who would provide technical assistant to the farmers		Monetary: Money Non-Monetary: Inputs: fertilizer and seed Skills training: carpentry, brick laying Capacity building in CSA, fish farming, poultry etc Increased access to clean and safe water through drilling and equipping of boreholes Fish pond construction High crop yield and increased productivity Lowering of production costs	80% to the community 20% to the headmen Each beneficiary village to give 5% out of its share to the Paramount Chief	Carbon credits should be channel through the village committees. Headmen should also be included in these committees. Refused to have middlemen such as board for fear of significant benefits not trickling down to the grassroots Inclusion of government officers in the committees not conclusive
Gogo Mazimawe His Royal Highness alluded to the fact that there was Benefit Sharing in his chiefdom. He welcomed the Program idea since Chiefdom had been earmarked for protection of forests. As such, village committees had been set up in his Chiefdom to spearhead the implementation of forest protection activities. He was of the view that these committees could also guide on benefit sharing in practice. He hoped that guidelines will be developed to mitigate the challenge of mistrust in relation to benefit sharing between communities and the Chiefs.				

	His Royal Highness also indicated that non-monetary benefits such as mushrooms and wildlife are already being realized through the protection of forests in his chiefdoms	As such committees had been set up in villages in his chiefdom to spearhead the implementation of forest protection. He was of the view that these committee could also guide on benefit sharing.	His Royal Highness also indicated that a chiefdom cooperative was created in his chiefdom to spearhead development in his chiefdom. The cooperative already had a bank account through which resources mobilized for the chiefdom was channeled. Moreover, controls have also been put in place to ensure accountability
Ngoni Headmen at Mazimawe Palace			
Individuals with personal forests; Chiefs- for his leadership and designation of a chiefdom forest; Forest guards for guarding the forests; CSA Lead Farmer; Headmen- for their leadership and protection of village forests;	Monetary: Money Non-Monetary: Inputs: fertilizer and seed Skills training: carpentry, brick laying Knowledge in CSA, fish farming, poultry etc Increased access to clean and safe water through drilling and equipping of boreholes Alternative livelihoods- Fish Pond construction,	80% to the community 20% to the chief	

Communities for taking care of forests at different levels (chiefdom and village level) CFMGs (participating villages); Vulnerable and marginalized members of the communities (orphans, disabled, children etc) Those engaged in tree planting; Chiefdom		irrigation schemes through construction of dams High crop yield and increased productivity Lowering of production costs Clean air		
Senior Chief Luembe, Headmen and CRB Members				
Benefit sharing was identified as a key motivating factor to emissions reduction. Senior Chief Luembe pointed out that the Chiefdom has an experience of benefit sharing for DNPW, COMACO and BCP Communities dwelling in areas near the protected forests;	Those directly involved in law enforcement. Those in climate smart Agriculture. In case of communities and individual's eligibility for benefits to be based on their active	Key to benefits the chief said is money and non-monetary benefits are not very recognized and this needs awareness among people to appreciate these. The Actual Cash is the popular benefit He noted that in the chiefdom fields have not changed much meaning people are not cutting to extend their fields and the link of cutting of trees to emissions reduction was	From experience benefits have been distributed through the chief agreeing with the people when the money comes on what to procure. This has been through the CRB.	The idea of the board managing the fund was welcomed. The initial community preference was to use the CRB as the board to manage the fund. The rationale was that the CRB was ideal as it was already in place and its composition was inclusive. However, upon further reflection some community members expressed serious misgiving about the earlier submission of CRB to be the fund manager. In this regard, the second submission was to put in place an independent board.

Individuals practicing activities that help in ER such as those engaged in CSA, protecting forests, involved in agroforestry and using improved cook stoves **Chiefdom Headmen** **Lead farmers** **Implementors on the ground included DNPW, BCP and COMACO who have project-based model** **Fire was identified as a major threat to the forest and sustainable land management** **The key issues expected from private sector was to bring about mindset change in people. He also said it is important for implementors to listen to the people and address their needs and help them focus on performance.**	and verifiable participation/contributions in ER Headmen eligibility to be based on their leadership of promoting ER activities in their communities	not so much in the chiefdom. There is more explanation needed for this to change people's mindset. Inputs (fertilizer and seed) Capacity building Knowledge transfer Skills development (brick laying Alternative livelihoods Seed money for enterprises (capital) Women empowerment Mitigation measures to reduce human-wildlife conflicts (installation of solar fences) Intensification of agricultural practices (agricultural production/cultivation on small parcels of land) Increased productivity and high crop yields Reduction	They also have a group of elders who have been receiving benefits and the have a grinding meal. They also have fishing revenue which is very small but also shared Views were on how benefits from ER should be channeled were varied and included the following: Headmen; The CRB as it was an already existing organized structure which	It was therefore resolved that the communities should do further consultation and submit a written proposal to ZIFLP of the consensus about who should be the fund manager

		was known Forest user groups such as CFMG Government implementing sectors such as agriculture, forestry, DNPW Three existing models being implemented from proceeds from the sale of wildlife, fisheries and carbon funds were highlighted. The preferred model was the one by DNPW for the sale of wildlife which was deemed transparent and fare

		DNPW and Fisheries models: government 50 % and community 45% and chief 5%. The 45% community share was further distributed into Administration-25%, community projects-35% and conservation-40% Carbon fund model: the distribution of the community share after deducting the operational and other fixed costs is distributed as follows: Patron (chief)-

			10%, administration- 5%, community projects- 80%, and conservation- 5%.	
HRH Chief Nyalugwe and Headmen Chief Nyalugwe felt that benefits could come to the community though headmen, CRBs, through forest user groups or through government departments. He emphasized the point that benefit sharing must be guided by the community and that there is no need to form other groups to handle these benefits as it will just bring confusion. Nyalugwe Chiefdom has conserved its resources from time immemorial and their main target has been forest protection which is animal habitat and a livelihood for community members in the Chiefdom. He pointed out the problem of unsustainable charcoal production which has caused deforestation mainly along the Great East Road. The consultation saw a decree being given by Chief Nyalugwe to stop unsustainable charcoal production by 30th of December. By this date there should be no charcoal displayed on the roadside along the great east road from Mchimazi to Luangwa. The Chiefdom has established VAGs to reduce poaching as this is a problem from the neighboring Chiefdoms and not Nyalugwe chiefdom. Benefits need to cascade to the household level to incentivize performance.				
Chief Indunas/ Headmen Community Groups Individual households	Chief- his role as leader, owner of the land, conservation efforts Headmen- their role as leader in facilitation ER in their villages Communities – the actual conservers through engagement of ER activities such as	The idea shared were that there were long-term (Public Infrastructure and Health service provision) and short-term benefits (The money given) and all of them need to be guided to get performance Chicken Rearing General Farming Fish Farming Gardening Employment creation through forest guards Skills training tailoring, carpentry	Below are the proposals of how the benefits should be shared which are given.: For options 1,2, 4 and 5 where administration was not categorically allocated a percentage because it was felt that the communities	Options considered to administer the benefit sharing included the CRB because it comprises many parts; the CFMG because it would help CFMG members appreciate the benefits of ER; community groupings to allow for collective disbursement of benefits to the membership, independent organization, executive committees of the identified community groups, satellite committee. The preference for community grouping was in order to mitigate adverse effects associated with high employee

	conservation efforts, CSA Ceasing undertakings/activities that contribute to emissions Proven record of participation in activities that promote ERs	all these at community level Actual cash/money, Grants Clean air Alternative livelihoods Irrigation schemes through construction of dams Other infrastructure developments such as construction of schools, health facilities, irrigation schemes, fish pond production Improved access to clean and safe water through drilling and equipping of boreholes Behavioral change of those involved in activities that contribute to emissions; Food security Collective benefits through public good such as drilling of boreholes for domestic use and livestock consumption Inputs (seed, fertilizer) Reduction in over dependence on rain-fed agriculture to all-year production through provision of irrigation schemes Increased income at household level Infrastructure Capacity building and knowledge transfer	would cater for it; Option 4 was arrived at through consensus and was the ultimately preferred benefit sharing distribution; HRH informed the meeting that he would surrender his share to the headmen if they perform satisfactorily on ER efforts especially with respect to stopping illegal charcoal production; The rationale for allocating a huge chank to the communities is intended to reflect the fact that improvement of the lives of communities should be the primary purpose of whatever development initiatives that are undertaken	turnover in government institutions due mostly transfers The traditional leaders were of the view that the use of middlemen/agents to administer the fund should not be entertained as it would reduce the benefits that would finally be received by the communities if handlers increase

		Improvement of road network to facilitate access to markets Increased fish and livestock production		
Nyalugwe, Nyimba				
Those engaged in illegal activities like charcoal production (Youth and Adults) **The whole community** **Timber producers** **Poachers** **Chief** **Perpetrators of destructive and illegal activities which contribute to emissions with the view of transforming them by engaging in activities that instead contribute to forest protection and emission reduction.** **Communities- who would benefit from public goods that are provided such as drilling of boreholes which will improve access to safe and**	Those who contribute to ER by undertaking activities which reduce emissions	Actual Money Alternative livelihood such as poultry, beekeeping, fish farming Employment creation such forest guards and scouts Vocational Skills development such as tailoring Knowledge transfer inputs	The rationale for allocating resource protection/conservation significantly higher amount was on the basis that it was the core business of venturing in ERs thus it required sizeable allocation. Additionally, the huge allocation was to curb the challenge of misappropriation of fund as from experience the participants had observed that allocating less resource protect/conservation resulted in misappropriation of funds Remuneration for scouts	The participants were of the view that the CRB should be the fund manager of the ER benefits due to the following reasons: proven record of administering similar funds in the chiefdoms, currently spearheading development activities in communities have in place fiduciary controls to ensure proper utilization of collectively earned resources

clean water to communities. Chief CRB- an already established institution in charge administration	would be catered for under conservation component	
Her Royal Highness Chieftainess Mwanya		
	HRH highlighted the benefit sharing under BCP as follows: Chief- 7%; Community projects- 78%; and CRB Administration 15%. In addition, she also said she received 5% from the Hunting revenues collected by the Department of National Parks and Wildlife. She said being the person to whom the poor and vulnerable people in her chiefdom run to for help, consultations on reviewing her share of	Currently both hunting and funds from BCP were being managed by the local CRB. In her view it could also manage and administer the ER funds

			the carbon credits from BCP were done and it was agreed to increase her share to 10%. In this regard, she was hopeful that consideratio n could be made to allocate her a reasonable share in the benefit sharing Plan being developed by ZIFLP.	
Headmen and Women, and CRB members of Mwanya Chiefdom The community is in partnership with BCP and has already set aside 81,000 hectares of forest for conservation. To enable them continue harvesting some forestry products such as fuel wood, fiber among others, a development zone was set aside for this purpose. An area (whose size was not yet known) which was annually water logged and where no agriculture activities could be undertaken for that reason will be considered for conservation for ER with support from Program Additionally, the CRB was of the view that community efforts in conserving the national parks should be recognized and incentivized.				
Landscape level implementers: **Households** **School going children- bursaries** **Headmen/wo men** **Chief** **Women groups cooperatives**	Proven contribution to ER through CSA, forest protection and conservation	Actual cash teaching/education materials infrastructure development projects such as mothers' shelter provision of transport (e.g. the vehicle and motor cycle donated to DNPW and Ministry of Agriculture extension officers) livelihood projects e.g. poultry	The participants resolved that avoid a situation of double dipping by headmen/w omen and indunas as they were part of the community, they should not be allocated	Two proposals were given regarding the who should manage and administer the ER funds: CRB- the rationale behind this choice was that the CRB was the existing structures which was spearheading and managing development funds in the chiefdom. Moreover, it was organized and was working well through the VAGs at grassroots level Establishment of an independent group: this suggestion was to avoid co-

	Recreation support-supporting the football league to preoccupy people with football instead of engaging in illegal and destructive activities	any share individually. Moreover, there were more than 200 headmen/women thus giving them individual allocations would result in significant reduction in resources for community projects as resources would be thinly spread. Proposals for benefit sharing distribution were first provided by three categories of the participants-women, youth and men. Votes were done to establish the most preferred of the three proposals. The women's proposal was most preferred and was adopted by consensus.	mingling of resources from different sources

Jumbe and Kakumbi CRBs Senior Chief Nsefu pointed out that conservation was key on the Chiefdom agenda. He also pointed out the importance of sensitization on how performance-based payments operate. He stated that in their current benefit sharing arrangement Chiefdoms with small trees are getting more than Chiefdoms with big trees in their forests. He wondered whether benefits were measured on the size of the forest protected or the size of the trees in the protected forest? Communities need to be guided to know what is supposed to be done and how it should be done.				
Landscape level implementers: **Community Members engaged in illegal activities which include charcoal burning, poachers, destructive farming practices, fishermen engaged in unsustainable fishing practices- which contribute to emissions, the idea behind this is that when they begin to see the rewards, they can stop the illegal activities and focus on alternatives provided under the benefits.** **Community Members/Villagers- this can**	Community member who are engagement in illegal activities and practices- which contribute to emissions e.g. charcoal burners, poachers, destructive farming practices, fishermen engaged in unsustainable fishing. The rationale was to facilitate behavioral change of such people upon making then appreciate benefits of conservation /protection Being a community members/villager, this should	Sub-Grants for emissions reduction interventions in the communities Actual money being given out Capacity building in entrepreneurship skills Farming Inputs Livelihood skills development such as beekeeping, gardening Bursaries Increased yields Skills gained by community member in carpentry, gardening, beekeeping and bricklaying Increased rainfall and good weather	The agreed distribution of benefits to the identified beneficiaries was as follows: Chief-5% CRBs- 10% VAGs- 10% Communities- 50% Conservation/protection - 25%	The main focus is the benefits that are given to the communities they have less concern on what happens at other levels. Benefits should reach the community member for them to be motivate to engage in sustainable behavior. They made mention that this monetary benefit has divided chiefdom and brough gradiences. Most chiefdoms after tasting the money given want to extend into other chiefdoms to get more benefits. These performance-based payments will raise conflicts and therefore there is need to put in place measures that will address conflict and promote change.

be done through access to public goods provided through infrastructure projects constructed from proceeds of ER, the only issue raised here was that these rewards also go to those involved in illegal activities. For example, the children who would attend school and health post build will be form both the homes of performers and non-performers, you cannot chose.	inevitably make them access benefits from public goods provided such as infrastructure projects constructed from proceeds of ER in their communities /villages.
Chief- to support the ER efforts in the chiefdom and as custodian of the land	Participation in activities and practices which promote ER A Chief in a chiefdom that is involved in ZIFLP Activities- based on their support for ER efforts in the chiefdom and as custodian of the land
Community Resources Boards- to facilitate and administer benefits sharing in the community	CRBs in Chiefdoms participating in ER- for their role as facilitators and administration of benefits sharing in the community
Village Action Groups- community mobilization	

Farmer Groups, Cooperatives Individual Farmers who are practicing Climate smart Agriculture and performing according to agreement in place Children who perform exceptionally well in school but cannot afford to pay school fees Civil Society & Private Sector **District Multisectoral Teams**	Village Action Groups involved in mobilizing of communities Farmer groups, cooperatives - Participation in activities			
Headmen and Headwomen Nsefu Chiefdom				
Landscape level implementers: **Community members Community members who will plant trees The Senior Chief as guardian of resources being protected. Individual CSA farmers Vulnerable and marginalized members of the communities such as children, the**	Chief- as custodian of the land Participation in activities and practices which promote ER in order to facilitate behavioral change of the perpetrators of illegal activities and destructive practices to mend their ways and start	Actual money given to communities and individuals performing. Increased access to clean and safe water through drilling and equipping of boreholes in communities Infrastructure development to supplement government efforts such as construction of schools, housing units for health workers Improved livelihoods through access to water provided through dam construction for	Proposals for benefit sharing distribution were first provided by three categories of the participants- women, youth and men. Votes were done to establish the most preferred of the three proposals. The men's proposal was most preferred it	Three proposals of who should administer and manage the funds were shared as follows: The VAGs- due to their touch with grassroot The Counselor- based on his track record of being accountable Establishment of independent group which should comprise the chief, headmen/women and the Counselor who will also be the chairperson

aged, chronically ill, Orphans and vulnerable Children Civil Society & Private Sector Technical assistance providers	contributing to ER Compliance to ER guidelines and practices	gardening activities and livestock consumption Farming Inputs	was then adjusted to build consensus.	
Headmen of Mwase Lundazi Chiefdom				
Landscape level implementers: **Chief Headmen Indunas Communities (vulnerable groups such as widows, the aged, orphans among others; small scale farmers etc)**	Proven record of performance of contribution to ER	Actual cash infrastructure development – e.g. irrigation systems with tread pumps due rather fuel pumps, construction of housing units provision of transport (e.g. bicycles to headmen) inputs such as fertilizer and seed livelihood projects e.g. fish farming, beekeeping (provision of beehives) farming implements	Three proposals for benefit sharing distribution were provided Votes were done to establish the most preferred of the three proposals. The participants settled for option 4 which was arrived at through consensus.	The participants preferred the establishment of an independent group to manage and administer the ER funds. The participants were of the view that the Induna being the chief's representative should be included in the group to be established in order to keep the chief informed
Group Headmen, Headmen and Chitungulu CRB The participants were of the view that penalties such as subtraction from benefits were inevitable if the communities were found to have abrogated the ERs agreement by undertaking activities which are forbidden in the agreement. The participants also stressed that the other party to the agreement should also adhere to what is agreed with the communities without taking advantage of the communities e.g. the agreed size of the proposed Community Forest should not be extended thereby disadvantaging the communities The Acting Chief Chitungulu wanted to know the time frame for the ER agreement				
Landscape Level implementers	Proven record of participation	Actual cash/money	The participants agreed to	The participants unanimously resolved that Chitungulu CRB being the group in the

Chief **Group Headmen and Headmen/women** **Communities** **Indunas** **Vulnerable members of the communities such as the disabled** **CRB** **Community Groups/cooperatives**	in activities that promote ER	Infrastructure development projects Improved access to clean and safe water through drilling and equipping of boreholes Food security Inputs (seed and fertilizer) in all the 6 VAGs in the chiefdom Capacity building and knowledge transfer (e.g. CSA)	distribute the benefits as indicated below: Chief: 10% Community development: 30% CRB administration: 20% Resource management: 30% Group headmen: 5% Headmen/women: 5%	chiefdom with works with communities on development projects should administer and manage the ER benefits that will accrue to the chiefdom. Moreover, the participants were of the view that the CRB was credible given the way it has managed community development funds in the past.
Kazembe CRB HRH Chief Kazembe was of the view that monetary benefits should be invested in projects which will provide communities with return on investment in order to achieve sustainable development in the chiefdom				
Chief **CRB** **Communities (individual farmers, livelihoods related clubs** **Cooperatives**	Verifiable record of contribution to ER through various activities such as CSA, forest protection and conservation among others	Actual money Infrastructure development (e.g. construction of health facilities, schools, housing units for teachers, drilling and equipping of boreholes, maintenance and rehabilitation of roads) Construction of bush camp as an income generating venture Supply of inputs (e.g. fertilizer & inputs Production of artifacts, curios	The Benefits sharing distribution were proposed were first received from three categories of groups: the Indunas; CRB; and a community which was recently resettled in the chiefdom. The induna's proposal was most preferred and was	CRB - reason being it was the existing structure that was currently spearheading and managing development funds in the chiefdom. Moreover, it was organized and was working well through the VAGs at grassroots level

	adopted by consensus.

3. THIRD ROUND

3.1. 5-6th December 2022 – The Lusaka Legacy Meeting

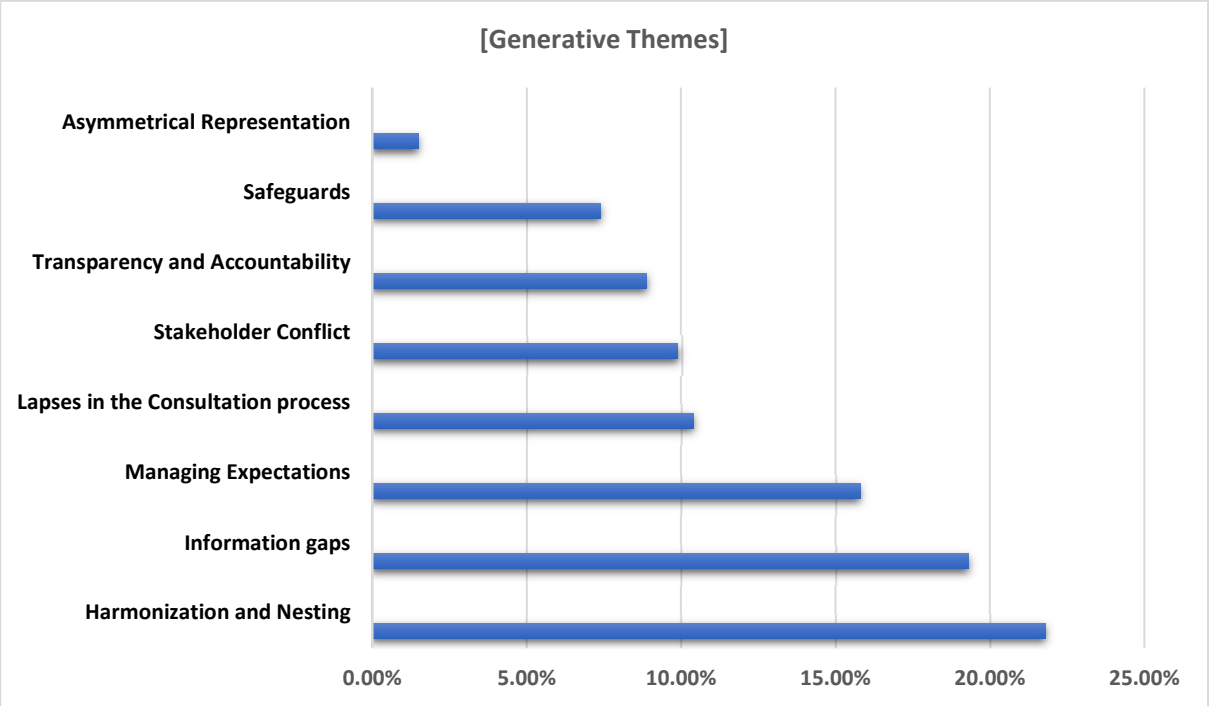
The third round of consultations aimed at concretizing consultations at an advanced stage using a clustered approach to; (i) advance the draft the BSP to validation stage, (ii) iron out any teething issues which the draft BSP could have brought forward thus far, and (iii) galvanize consensus over benefit allocation and percentage shares – which remained, by far, the most contentious issue among stakeholders and beneficiaries.

The third round of consultations commenced with a two-day high-level BSP consultative workshop in Lusaka on 5-6th December, 2022. The workshop attracted a high-power delegation of 37 participants from;

- Government [FD,[8] MoE,[9] MGEE,[10] MoT[11] – DNPW[12] and MoA[13]]
- Regulatory authorities – ZEMA[14]
- CSOs – ZCBNRMF[15] and Chalimbana Head Waters Association
- Community representatives – CFMGs[16] and ZCRBA[17]
- Traditional Authorities – Two Chiefs[18] from EP
- World Bank Consultants [3] and 3 World Bank Staff

From the two-day workshop, outcomes were coded in form of generative themes which the final version of the BSP needed to address. The themes were coded and ranked as follows;

[8] Forestry Department
[9] Ministry of Energy
[10] Ministry of Green Economy and Environment
[11] Ministry of Tourism
[12] Department of National Parks and Wildlife
[13] Ministry of Agriculture
[14] Zambia Environmental Management Agency
[15] Zambia Community Based Natural Resources Management Forum
[16] Community Forest Management Groups
[17] Zambia Community Resource Board Association
[18] Senior Chief Lwembe of Nyimba and Chief Jumbe of Mambwe Districts.



From the workshop, there were still some information gaps among stakeholders which raised misunderstandings. Part of the significant missing information was in regard to the actual harmonization of legacy REDD+ projects and Nesting them into the jurisdictional arrangement using a centralized approach as required by law. This marked the highest-ranking stakeholder concern from the meeting. The gist of the main stakeholder contestations pointed to the crucial role of the Harmonization Technical Working Group (HTWG).

Information gaps among stakeholders also constitute a significant high-ranking issue. This theme consisted of lack of information and misinformation. It was from this gap in information that a lot of anxiety, fears and doubts had been generated and fed into different expectations among stakeholders. As such, the need to manage these expectations ranked third in the order of the coded issues and concerns from the meeting.

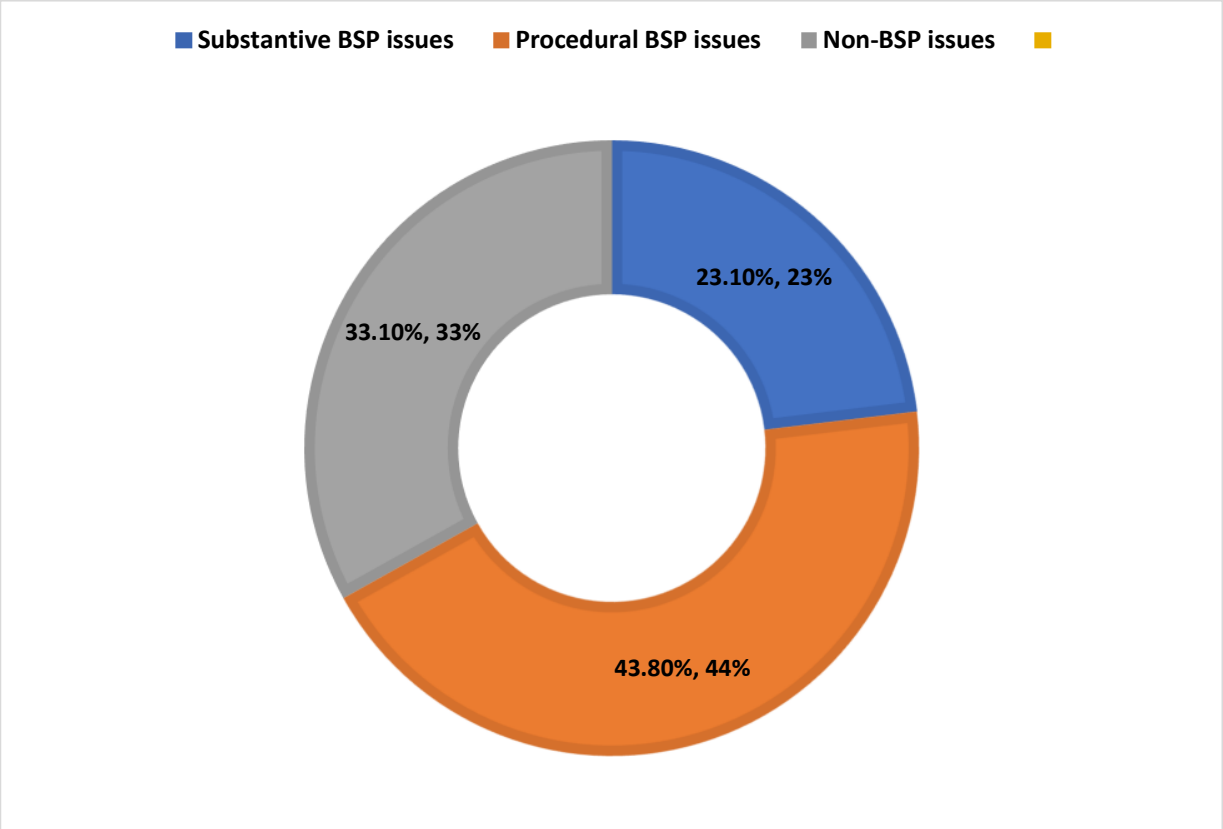
Part of what the meeting revealed were potential conflicts among stakeholders arising from misunderstandings, varied interests and disagreements over harmonization and centralized Nesting, definition of a beneficiary and benefit sharing percentages. It meant that the BSP consultation going forward needed to provide clarity over these issues before the draft BSP could be deemed a final/advanced draft.

Concerns were also raised regarding environmental and social safeguards. But because the BSP was intricately tied to the performance on safeguards, the issue was easily addressed and could not pause a very big risk to the consensus over the final BSP. Therefore, indications from the meeting pointed to the need for reconciling all these issues in order to

establish consensus over the final form of the BSP, a document which appeal to all stakeholders at all levels.

From the meeting, the pie chart below illustrates the following salient conclusions;

- What was the ratio of substantive issues which the draft BSP needed to address directly?
- What was the ratio of procedural issues which the draft BSP needed not to necessarily address, but would be crucial for the purpose of establishing consensus over the final form of the BSP, and;
- What was the ratio of non-BSP issues which the draft BSP needed to ignore?



3.2. 2-3rd February, 2023 – The Petauke Meeting

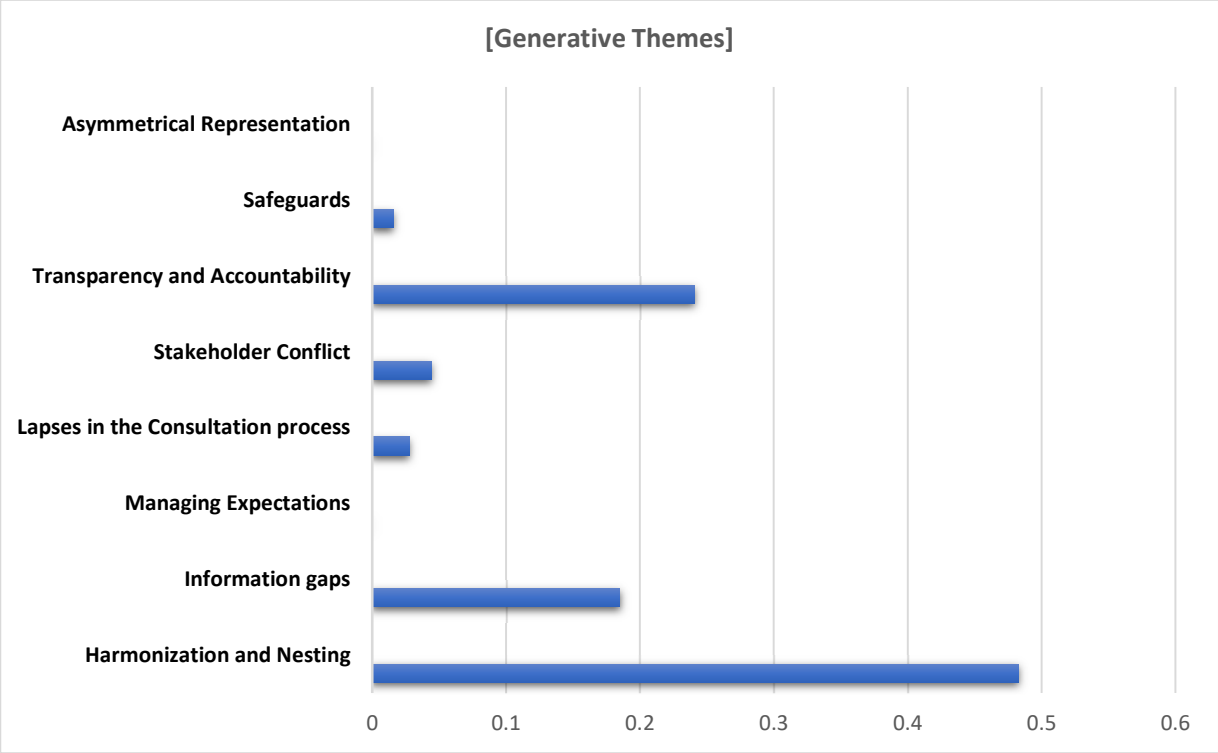
The HTWG met Petauke District, EP, to, among other things, address technical issues of harmonization and centralized Nesting emanating from the Lusaka national meeting; to discuss the elephant in the BSP room, i.e. benefit allocation of percentage shares, and to agree on roadmap for the technical group going forward. The HTWG is a group of multi-sectoral experts appointed by the GRZ to provide technical recommendations to the MGEE regarding the practical issues of harmonization and centralized Nesting. In Petauke, the group consisted of;

- The PIU
- Government [Dept of FD,[19] MoE,[20] MGEE,[21] Dept of Agriculture, Provincial Planning]
- Regulatory authorities – ZEMA[22] [The Chair]
- Representative of the Chiefs from Chief Affairs
- Community representatives, also representing the chiefs in their respective CRBs and CBNRM Forums – CRBA[23] and ZCRBA[24]
- Private sector and Legacy Projects – BCP and COMACO.

Other stakeholders in attendance included;

- World Bank STC-BSP Consultant
- The GhG Emissions Expert
- Snr. Chief Lwembe [by virtual connection]
- FD Hq in Lusaka [by virtual connection]
- Private sector; COMACO and BCP [by virtual connection]

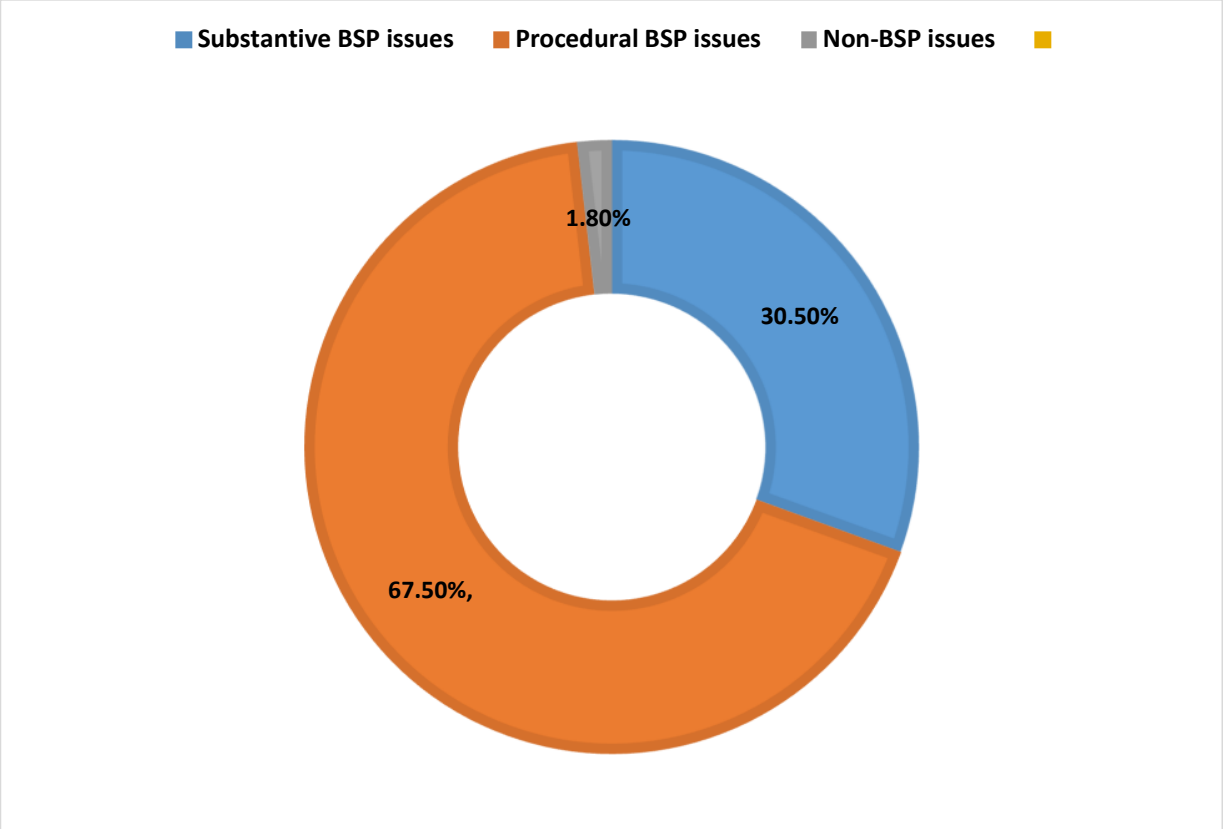
The outcomes of the meeting were coded in a summary of generative themes as follows;



[19] Forestry Department
[20] Ministry of Energy
[21] Ministry of Green Economy and Environment
[22] Zambia Environmental Management Agency
[23] Community Forest Management Groups
[24] Zambia Community Resource Board Association

The Petauke HTWG meeting raised a lot of issues around the need for transparency and accountability not only in the actual implementation of the BSP but in the consultation process as a build-up to the final BSP. Essentially, the lack of transparency and accountability was a picture painted by lack of information (misinformation and information gaps) regarding many aspects, questions and unsettled queries regarding the jurisdictional approach and what it was bringing to the fore. The meeting also highlighted the huge need for the HTWG to expedite its mandate towards working as a committee that was instituted to harmonize all conflicting issues and interests into solutions for the challenge of harmonization.

The meeting had shown concerted positive effort to answer the key question raised from the Lusaka meeting of December 2022, i.e. percentage shares, the matter that had also created more questions towards the rationality behind the proposed percentage shares. The Petauke HTWG meeting simply threw the matter back to further consultations. At the end, the Petauke meeting had the following salient conclusions regarding matters that constituted substantive BSP issues, procedural matters and non-BSP issues;



Foregoing, and just like the picture of the Lusaka meeting in December 2022, there were more of procedural BSP issues that needed to be addressed than substantive issues which the BSP needed to address in the design of its structure. Essentially, there are hurdles to the process of gaining consensus over the BSP which need to be addressed before all parties can

agree to the final form of the BSP. From the Petauke meeting, there are very few non-BSP issues particularly because the meeting was primarily focussed on harmonization and the BSP itself.

3.3. 6-8th February, 2023 – Private Sector Meetings with Legacy Projects; COMACO and BCP in Lusaka

The meetings were meant to be open discussions guided by open-ended questions so the respondent(s) could be free and open to provide as much information as possible. The meeting was only guided by five questions as the agenda:

A. What is your overall impression about the Jurisdictional landscape ER program in EP? The aim of the question was to assess how the two companies feel and/or envision to fit in to the program;
B. How do you see your profitability within the jurisdictional program? Deriving from the above, and knowing how crucial profitability is to the private sector, this question was aimed at further assessing how the two companies envision themselves to fit within the jurisdictional program but specifically from a profit-making perspective;
C. What would you propose as the best approach to doing things in the jurisdictional program? The question was meant to be a follow-up seeing how the companies seemingly resented the jurisdictional approach in the Petauke meeting a few days ago;
D. What would be your ideal BSP, allocation and distribution in the jurisdictional approach? Knowing that beneficiation is a crucial part of the companies' profitability and in their relationships with the communities, the question was aimed at assessing the companies' self-reflection either on their own BSP models or the prospective jurisdictional model presented to them a few days ago in Petauke, and;
E. Is there anything else you would like to add to this discussion? The question was aimed at making the respondent(s) feel free and comfortable to express themselves in all honesty, and to capture as much more information than what was provided in small portions in the Petauke meeting.

The overall objective of these meetings was to gain a clear and independent view of the private sector's legacy projects towards the EP-JSLP. The specific objective was to gain their clear and independent view regarding benefit sharing. Outcomes of the meetings were summarized in the table below;

Table 3: Summary of outcomes from the Private Sector Meetings with Legacy Projects – COMACO and BCP

Company Impressions	COMACO	BCP
1. Clarity of Responses	Unclear and flexible	Clear and firm
2. Areas of agreement with the EP-JSLP	▪ The central focus of the business is the community ▪ Should the EP-JSLP maintain or increase benefits to the communities, it is guaranteed to succeed. But should it reduce benefits to the communities, it is guaranteed to fail.	▪ The central focus of the business is the community ▪ Should the EP-JSLP maintain or increase benefits to the communities, it is guaranteed to succeed. But should it reduce benefits to the communities, it is guaranteed to fail.
3. Common issues between the two companies	▪ The companies are not homogenous. They should not be treated nor seen as the same under the umbrella of private sector. ▪ Separate MoU into individual MoUs ▪ The centralized nesting approach is resented ▪ A lot of time is still needed	▪ The companies are not homogenous. They should not be treated nor seen as the same under the umbrella of private sector. ▪ Separate the MoU into individual MoUs ▪ The centralized nesting approach is resented ▪ A lot of time is still needed.
4. Generative themes	▪ Harmonization and nesting ▪ Transparency and accountability ▪ Information gaps	▪ Harmonization and nesting ▪ Transparency and accountability ▪ Information gaps ▪ Lapses in the consultation process ▪ Stakeholder conflicts
5. Major concerns	▪ Resentment over the centralized nesting approach ▪ Allow COMACO to upscale its model to the entire EP while PIU plays an oversight role ▪ The program is rushed with little information ▪ Proposed BSP percentage shares have no clear rationale ▪ There haven't been enough investments in growing the pie	▪ Resentment over the centralized nesting approach ▪ Vague/meaningless consultations over issues which government has already decided; centralized nesting was never an option from the beginning ▪ There is too much confusion regarding information among decision-makers ▪ The proposed BSP percentage shares do not make commercial sense

	▪ Benefit shares will only be realistic depending on the size of the pie ▪ The company will wait to see how this unfolds.			▪ The program approach is too risky, and the company needs more time to do a thorough risk assessment		
6. Acceptability of the EP-JSLP	High	✓ **Med**	Low	High	Med	✓ **Low**
7. Company's risk perception of the program	High	✓ **Med**	Low	✓ **High**	Med	Low
8. Key proposals	▪ Support the company to upscale its operations using its own model to the entire EP while supervised by the PIU ▪ Create rules to regulate the allocation of monetary benefits to the chiefs as the communities so that communities can receive more money than the chiefs ▪ A lot is still at stake and more time is needed to understand things			▪ Decentralize the nesting approach within a jurisdictional arrangement ▪ Allow the company to continue its 11% portion of enterprise within the jurisdiction using its established model, standards and methodologies ▪ Address and agree on the approach first before anything else, including BSP ▪ The company still needs time to do its own risk assessment of the program.		

3.4. 3rd March, 2023 - Katete Meeting with NCRBA, CBNRMF AND Chiefs

A consultative meeting was held with nine Chiefs and the nine CRBs attached to the nine Chiefdoms where the Chiefs are CRB patrons as provided by the Wildlife Act, 2015. The meeting was also attended by the CBNRMF, the Regional CRB Association and the PIU. The nine Chiefs included Senior Chief Luembe, Chief Nyalugwe, Chief Sandwe, Chief Tembwe, Chief Kazembe, Chieftainess Mwanya, Chief Chitungulu, Chief Jumbe and Chief Munkhanya.

The meeting resolved to welcome the EP-JSLP noting that the Program was promising to bring the much-needed transparency, accountability and sanity to the emissions reduction in the Province as the whole Province. The design of the benefit sharing arrangements was also deemed encouraging to the concerned stakeholders.

The elephant in the meeting was benefit sharing allocations [percentage shares]. The meeting finally settled on one proposal regarding benefit sharing among communities, government and existing private sector carbon projects;

SN	Description	% Share	Rationale
1	Private Sector and Government to share	40%	To be shared in whatever way between Government and exiting Private Sector Carbon Projects may agree
2	The Community	60%	This to be shared as indicated below
2.1	Their Royal Highnesses	10%	Payment to the Chiefs
2.2	Chiefdom Construction Projects	32%	These are infrastructure projects for the Chiefdoms
2.3	Conservation Works	30%	This will go towards Chiefdom AFOLU sector Natural Resource Management and Protection (Community Forest Management and Protection, Climate Smart Agriculture emissions reduction
2.4	Livelihood Support	20%	This was for Chiefdom low carbon investments for household income improvement and social safety nets
2.5	Traditional Activities	5%	This was mainly for support to Traditional Ceremonies and other traditional and culture support activities
2.6	Community Based Natural Resources Management Associations	3%	This was foreseen for the Chiefdom local governance structures that support and administer natural resource management the Regional CRB Association, Chiefdom CRBs, Community Forest Management Groups and Village Action Groups

3.5. 15th March, 2023 – The Chipata Meeting

A Provincial consultative meeting was held for Provincial Planning units from all the Districts of EP. The meeting was attended by the following clusters of 40 participants;

- PPU [25] (District and Provincial Planning Officers), FD[26] (District and Provincial Forestry Officers), MCDSS[27] (District and Provincial Social Welfare Officers, Socio-economic Planners), Local Authorities (District Councils and Town, Urban and Environmental Planners), DNPW,[28] ZIFLP-PIU and MoA[29] (Provincial and District Agricultural Officers).

Meeting Objectives; (1) To share information on the Draft BSP, (2) To gather more information and feedback regarding beneficiation and benefit-sharing in the EP jurisdiction, (3) Consolidate stakeholder consultation around the Draft BSP, and; (4) Improve the Draft BSP with information from Provincial stakeholders.

The jurisdictional arrangement of the EP-JSLP was presented as part of information sharing. The Draft BSP was also presented with an emphasis on the three current benefit allocation proposals, i.e. (i) GRZ[30] proposal – model 1, (ii) NCRBA[31] and CBNRM[32] proposal – model 2 and (iii) NCRBA, CBNRM and Chiefs' Proposal – model 3.

The participants were clustered into three groups, each of which was asked to assess the three models as follows:

- Group 1: Dealing with model 1
- Group 2: Dealing with model 2
- Group 3: Dealing with model 3

Plenary Group presentations

- **Group 1** [Dealing with Model 1; the GRZ Proposal]

GRZ PROPOSAL			**GROUP 1**	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	GRZ and PIU Program costs (MRV)	15%	20%	Justifies the lumping of GRZ together with the PIU roles of MRV and Program

[25] Provincial Planning Unit
[26] Forestry Department
[27] Ministry of Community Development and Social Services
[28] Department of National Parks and Wildlife
[29] Ministry of Agriculture
[30] Government of the Republic of Zambia
[31] National Community Resource Boards Association
[32] Community-based Natural Resource Management Forum

				management. For that reason, the allocation should be increased to 20%
2	Community Groups and Trad. Authority	55%	50%	Justifies the reduction of the allocation by 5% to be added to GRZ and PIU
4	Mitigation activities and safeguards services ▪ Nested REDD+ projects ▪ GRZ services in non-nested areas	30%	30%	There is GRZ involvement here which increases the roles and responsibility of government. For that reason, the group feels that this allocation is justifiable.
5	**Total**	**100 %**	**100%**	

Group 1 was of the view that GRZ had a lot of roles and responsibilities which will be crucial for generating the necessary emission reductions across the entire Province. The group was mindful of the vast areas of the Province not covered by the Nested legacy projects. The group outlined these roles as follows;

- Monitoring and evaluation;
- Insurance and performance buffer for the emissions credits;
- Implementation of the program;
- Capacity building and trainings;
- Addressing and respecting safeguards;
- Conservation and protection of natural resources;
- Conflict resolution, and;
- Climate change adaptation.

Group 2 [Dealing with Model 2; the NCRBA and CBNRM Proposal]

NCRBA/CBNRM PROPOSAL			**GROUP 2 PROPOSAL**	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	Program costs (MRV and PIU)	10%	15%	Justifies increasing the allocation to PIU considering the roles of the PIU in MRV across the whole Province

2	Community Groups and Trad. Authority	55%	55%	Group feels this is a fair and sufficient allocation as long as the Chiefs do not get the lion's share at the expense of the community
3	GRZ	5%	10%	Government has too many roles including to be allocated 5%. Group considers insurance and performance buffer. Therefore, the group suggests GRZ allocation be increased to 10%
4	Mitigation activities and safeguards services: ▪ Nested REDD+ projects ▪ GRZ services in non-nested areas	30%	20%	Group justifies this reduction because government services will still be required both in the Nested project areas and the vast non-nested areas.
5	**Total**	**100 %**	**100%**	

Group 2 was of the view that 55% allocation to the communities was sufficient and fair considering the fact that the large bulk of emissions reduction will be attributed to the communities. The group justified the increase of allocation to the cluster of GRZ but proposed to separate the two owing to the assertion that the local government authorities were normally neglected and overshadowed by the broad categorization of government. As such, there was a group proposal that 10% allocation to GRZ be further sub-divided to delineate the different allocation areas that should constitute the 10%.

- **Group 3** [Dealing with Model 3; the NCRBA, CBNRM and CHIEFS' Proposal]

NCRBA/CBNRM/CHIEFS PROPOSAL			**GROUP 3 PROPOSAL**	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	GRZ and PIU Program costs (MRV)	40%	40%	Justifies the allocation but proposes to separate local authorities from central government
2	Community Groups and Trad. Authority	60%	60%	Justifies the allocation but with different rationality to the breakdown of the 60%
Breakdown of Community 60%				

4	Royal Highnesses	10%	5%	The group proposes that this should be an unquestionable pocket money for the Chief as an individual
			5%	The group proposes that this should allocation to the Chiefdom Development Trust to be administered, monitored and accounted for by the Chief for Chiefdom administrative duties [Chief as an institution]
5	Construction works	32%	30%	The group proposes to renames these works to sustainable works in order to avert the risk of using monetary benefits for works that may increase emissions afterwards
6	Conservation works	30%	30%	Justifies this allocation
7	Livelihoods	20%	20%	Justifies this allocation
8	Traditional activities	5%	5%	Justifies this allocation
9	CBNRM Associations	3%	3%	Justifies this allocation
			2%	The group proposes to consider an added allocation for the administration of CRBs and CFMGs as opposed to the Association. It is suggested that money should go to the CRBs and CFMGs and not the Association
	Total	**100 %**	**100%**	

Group 3 did not dispute the general framework of allocation in the **40/60** approach but was of the view that there was need to separate local authorities from the umbrella of GRZ and to further create a break-down of how the 40% allocation would be shared among;

- The central government
- Local government or local authorities
- The PIU, and;
- Private sector entities within the jurisdiction.

The group also expressed the need to desegregate the 10% allocation to the Chiefs into two equal parts; firstly, a 5% share that should go to the Chief as an individual in the form of pocket money, i.e. money over which the Chief should not be questioned, and secondly,

another 5% that should go to what the group proposed as a Chiefdom Development Trust for the sole purpose of financing the day-to-day administrative duties, roles and responsibilities of the Chief as an institution, and over which the Chief is overseer. This was in order to address ongoing concerns from some communities who were expressing displeasure over the seemingly unfair and disproportional sharing between Chiefs and their community members.

Salient Conclusions

	Community Allocation	**GRZ and PIU Allocation**	**Private sector Allocation**
GROUP 1	There is a general consensus that the largest allocations should go to communities and the traditional authorities mainly because of the large attribution of emissions reduction t community level	There is a general consensus that GRZ and the PIU may need more allocations given the nature of the roles and responsibilities attached to the two entities in the entire jurisdiction	There is uncertainty around what allocation would be ideal, fair and justifiable for the private sector entities.
GROUP 2	There is a general consensus that the largest allocations should go to communities and the traditional authorities mainly because of the large attribution of emissions reduction t community level	There is a general consensus that GRZ and the PIU may need more allocations given the nature of the roles and responsibilities attached to the two entities in the entire jurisdiction	There is uncertainty around what allocation would be ideal, fair and justifiable for the private sector entities.
GROUP 3	There is a general consensus that the largest allocations should go to communities and the traditional authorities mainly because of the large attribution of emissions reduction t community level	There is a general consensus that GRZ and the PIU may need more allocations given the nature of the roles and responsibilities attached to the two entities in the entire jurisdiction	There is uncertainty around what allocation would be ideal, fair and justifiable for the private sector entities.

3.6. 16th March, 2023 – Chipata Meeting with CSOs and NGOs

A total of 30 participants attended the consultative meeting representing the following CSOs and NGOs operating in EP;

- SNV,[33] Land Alliance, SHDP,[34] Kachele Development Trust, Chipata DFA,[35] WILDAF,[36] YDF,[37] Caritas, NGOCC,[38] YWCA,[39] ZNWL,[40] Enlight Abilities Organization, COPECRED,[41] CSPR,[42] and APC.[43]

Meeting Objectives; (1) To share information on the Draft BSP, (2) To gather more information and feedback regarding beneficiation and benefit-sharing in the EP jurisdiction, (3) Consolidate stakeholder consultation around the Draft BSP, and; (4) Improve the Draft BSP with information from Provincial stakeholders.

The jurisdictional arrangement of the EP-JSLP was presented as part of information sharing. The draft BSP was presented with an emphasis on the three current benefit allocation proposals, i.e. (i) GRZ proposal – model 1, (ii) NCRBA and CBNRM proposal – model 2 and (iii) NCRBA, CBNRM and Chiefs Proposal – model 3.

Because the number of participants was relatively smaller than the number of Provincial units on Day 1, the CSOs and NGOs were clustered into two groups, each of which was asked to assess all the three models as follows:

- Group 1: Dealing with models 1, 2 and 3
- Group 2: Dealing with models 1, 2 and 3

Plenary Group presentations

- **Group 1** [Dealing with Models 1, 2 and 3]

The group adopted and justified the Government Proposal [Model 1] and proposed minor adjustments to the same model as follows;

[33] Netherlands Development Organization
[34] Save Humanity Development Program
[35] District Farmers' Association
[36] Women in Law and Development in Africa
[37] Youth Development Forum
[38] Non-Governmental Organizations' Coordinating Council
[39] Young Women Christian Association
[40] Zambia National Women's Lobby
[41] Chimwemwe Organization for Promotion of Early Childhood Rights Education and Development
[42] Civil Society for Poverty Reduction
[43] Action for Positive Change

GRZ PROPOSAL			GROUP 1	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	GRZ and PIU Program costs (MRV)	15%	15%	Justifies the allocation given the crucial role that GRZ and PIU will have to play in monitoring and verifying the ERs
2	Community Groups and Trad. Authority	55%	55%	Justifies the allocation on the premise that communities constitute the largest cohort of people who have a direct role in reducing emissions
3	Mitigation activities and safeguards services ▪ Nested REDD+ projects ▪ GRZ services in non-nested areas	30%	15%	Nested REDD+ projects
			15%	Non-nested areas including CSOs should be segregated from the umbrella of private sector and be allocated their own % share with consideration of the facilitative role CSOs and NGOs can play in the non-nested areas
4	**Total**	**100 %**	**100%**	

Group 1 was of the view that allocation to Nested REDD+ projects should be separated from the allocation to non-nested areas. The group sees CSOs and NGOs as crucial players in addressing and respecting safeguards to enhance the full beneficiation of local communities [especially women, children and people with disabilities] across the entire jurisdiction, especially in non-nested areas. This is the premise upon which the group felt that the 30% allocation for mitigation activities and safeguard services under nested REDD+ project areas should be split into two equal parts of 15/15%.

- **Group 2** [Dealing with Models 1, 2 and 3]

The group adopted the Model 3 – NCRBA/CBNRM/Chiefs' Proposal and proposed somewhat significant changes to the Model as follows;

NCRBA/CBNRM/CHIEFS PROPOSAL			GROUP 2 PROPOSAL	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	GRZ and PIU Program costs (MRV)	40%	20%	
2	Community Groups and Trad. Authority	60%	80%	
Breakdown of Community % share				
3	The Royal Highness	10%	5%	The justification for this reduction is that the Chief has an unfair and disproportionate share of benefits - an issue which has left a lot of communities dissatisfied with the benefits that eventually reach them
4	Construction works	32%	25%	No comments
5	Conservation works	30%	25%	The group feels that conservation works and CBNRM Association should be lumped together and receive the same allocation. The group does not see logic in having the two allocations separate.
6	Livelihoods	20%	15%	The justification for this reduction is that livelihoods can still benefit in kind from the construction and conservation works
7	Traditional activities	5%	3%	The justification for this reduction is that the chief still has benefit allocation from the 5% above, and in addition, the Chief will be responsible for this 3% allocation. This ideally gives the Chief a total of 8% allocation under his/her control.
8	CSOs and Media		7%	The group proposes that the CSOs and Media outreach be given special attention given the common experience with all programs and projects in Zambia - they are short-lived without sustainability plans due to lack of information, misinformation and community ownership

	Total	**100 %**	**100%**	

Group 2 chose to focus on Model 3 specifically to dispute the general framework of allocation in the **40/60** approach. The group felt that more money should go to communities and community programs than anywhere else. The fundamental premise of group 2 was what the group saw as unfairness in the intra-Chiefdom allocation and sharing between Chiefs and their people.

Stakeholder issues and concerns from the meeting

Concerns/issue	**Generative Themes**
1. Do not assume that these stakeholders know about the technicalities of emissions reduction. It is important to make information available and comprehensible in a clear and concise manner	▪ Information gaps
2. Lack of community ownership of projects and programs is increasingly becoming a serious problem especially in EP – a Province which arguably consists of the highest number of NGOs ad CSOs operating in Zambia. A large part of this problem is created by the fact that communities are not part of project/program design right from inception. They are simply passive recipients of a project/program designed and developed outside their reach without their knowledge and input. As such, community participation in most of these projects and programs is only active to the end of the project/program. After which, communities revert to their traditional ways of life. Therefore, sustainability of most projects and programs is equals to zero.	▪ Information gaps ▪ Lapses in consultation processes ▪ Safeguards ▪ Institutional arrangements
3. Inclusion of the vulnerable and disabled people is a very big challenge in most of the programs and projects.	▪ Safeguards
4. Traditional leaders have an unfair and disproportional share of benefits at Chiefdom level. It is a demotivating factor to local communities' participation in projects and programs. Part of the problem stems from ignorance and lack of information regarding the sell and price of ERs. Communities simply do not know the total of what their percentage share is derived from.	▪ Safeguards ▪ Information gaps ▪ Transparency and accountability
5. The rate at which farmers are adopting CSA is worrying because farmers tend to adopt the many new practices as they come but later revert to their traditional ways of doing things after the project/program. One of the ways of improving this is to fund already existing infrastructure such as training centers and farmer schools which have been lying idle as white elephants. This poor adoption of project/program innovations is an indication either that people are	▪ Harmonization ▪ Information gaps ▪ Institutional arrangements

not appreciating these interventions or they are just attracted to the temporal benefits that come with these interventions.	
6. There is a concern that the BSP may worsen the already existing Chiefdom boundary conflicts if not well articulated in view of the 1958 Chiefdom boundaries which government is currently relying on.	▪ Stakeholder conflict
7. How transparent will be the process of verifying the percentages? The percentage share is a share of what? From previous experiences with the legacy projects, communities have never known the total share of which they derive their share. This concern was addressed; that government had promulgated the Forest Carbon Management Regulations under the Forests Act to cure such historical concerns. The law enforces a centralized nesting approach to the generation and sell of ERs in order to increase the regulation, coordination and transparency around this enterprise in Zambia	▪ Transparency and accountability
8. There is a feeling that the law does not outline principles of benefit sharing mechanism. As such, benefit sharing is done haphazardly in a manner that anyone decides to do it. This notion was corrected during the presentation of the Draft BSP. The Forests Act, 2015 and the Forests Carbon Management Regulations of 2021 lays adequate standards and principles for benefit sharing of revenues deriving form carbon stock management. The law further provides for stakeholder consultations in the development of benefit sharing mechanisms.	▪ Information gaps
9. Do not treat COMACO, BCP and CSOs the same way under the same umbrella. These are all different entities which need to be respected and given the attention they deserve for their roles and responsibilities in the jurisdiction. This was well noted, and there are efforts to separate the harmonization MoU for BCP and COMACO.	▪ Harmonization
10. There is a concern that the construction of roads in the Province is causing serious damage to the environment. Stakeholders are wondering why road contractors don't follow environmental safeguards. This was noted and it was agreed that RDA,[44] having the mandate to supervise the construction of road construction in Zambia, should be engaged by the PIU.	▪ Safeguards

[44] Road Development Agency

Salient Conclusions

	Community Allocation	GRZ and PIU Allocation	Private sector Allocation
GROUP 1	There is a general consensus that the largest allocations should go to communities although the communities do not receive the allocation they deserve due to the unfair and disproportional allocations which go to the Chiefs.	The allocation to GRZ and PIU is justifiable given the nature of the roles and responsibilities attached to the two entities in the entire jurisdiction	Firstly, there is a general feeling that allocation to the private sector should be reduced because they only cover a small portion of the Province. Secondly, there is a general consensus that Nested and non-nested areas should be split and treated separately.
GROUP 2	There is a general consensus that the largest allocations should go to communities although the communities do not receive the allocation they deserve due to the unfair and disproportional allocations which go to the Chiefs.	The allocation to GRZ and PIU is justifiable given the nature of the roles and responsibilities attached to the two entities in the entire jurisdiction	There is uncertainty around what allocation would be ideal, fair and justifiable for the private sector entities.

3.7. 18th March, 2023 – Meeting in M'fuwe

The consultative meeting targeted the private sector operating in the wildlife space of the EP, particularly in M'fuwe tourist area of Mambwe District. The meeting was preceded by a courtesy call to His Royal Highness Chief Kakumbi of Mambwe District. The meeting was attended by a total of 15 participants representing tour operators, private lodge owners and safari companies];

- LSA,[45] Flat Dog Lodge, CCT,[46] CSL,[47] DNPW,[48] Mambwe Town Council and a courtesy call to His Royal Highness Chief Kakumbi of Mambwe District.

[45] Luangwa Safaris Association
[46] Chipembele Conservation Trust
[47] Conservation South Luangwa
[48] Department of National Parks and Wildlife

Courtesy call to HRH Chief Kakumbi

The Chief asked for clarification regarding the sale of carbon credits and how the trading was executed in practice. The Chief wondered whether trading in carbon could be compared with the different forms of enterprises such as what the DNPW and the Safari companies in his Chiefdom were engaged in. Using this analogy, the Chief lamented the following issues;

1. The rampant Human Wildlife Conflict (HWC) in the area compounded by the fact that there was no compensation for his subjects who suffer loss and damage caused by game animals in the face of the growing conflict. He wondered how his subjects would be involved in the conservation of a resource [wildlife] which in reality, (i) was their cheapest source of food, (ii) a resource with which his subjects were increasingly having conflict, and (iii) a resource whose conservation the people in the Chiefdom were not deriving tangible benefits from;

2. The lack of tangible benefits flowing from the wildlife enterprises in his Chiefdom to the Chiefdom in general and to his subjects in particular, and;

3. The failure of any sort of benefits to trickle down to the households. The Chief contended that there was no incentive for his subjects to get involved in any sort of conservation enterprise when they were not seeing the effective beneficiation of such enterprises in their homes. The little reported form of benefits to his communities were some transport and lunch allowances paid to the CRB officials for attending meetings.

In his final appeal, the Chief emphasized the need for livelihood improvements of the poor people in his communities by simply ensuring that benefits trickled down to the household level.

Consultation session with tour operators, lodge owners and Safari companies

Meeting Objectives; (1) To share information on the Draft BSP, (2) To gather more information and feedback regarding beneficiation and benefit-sharing in the EP jurisdiction, (3) Consolidate stakeholder consultation around the Draft BSP, and; (4) Improve the Draft BSP with information from Provincial stakeholders.

The jurisdictional arrangement of the EP-JSLP and the Centralized Nesting arrangement were presented as part of information sharing. The draft BSP was presented with an emphasis on the three current benefit allocation proposals, i.e. (i) GRZ proposal – model 1, (ii) NCRBA and CBNRM proposal – model 2 and (iii) NCRBA, CBNRM and Chiefs Proposal – model 3.

That the group smaller than the two previous groupings, an open FGD was used for stakeholder feedback which mainly revealed came in form of the following questions and concerns;

Stakeholder questions and concerns	Generative Themes
11. How will the jurisdictional arrangement affect independent organizations operating in the EP? Example was cited – how will the improved cook stoves be incorporated into the EP-JSLP? It was clarified that the EP-JSLP being a performance-based program with a results-based benefit sharing plan was being designed to incentivize all players actors in the EP to play a direct and/or indirect role in reducing emissions. Recognition will be given to the specific roles and responsibilities of each actor/player in the entire jurisdiction, and the type of incentive or reward that should accrue to them. This also explains why the consultation process had to cover as many stakeholders in the EP as possible.	▪ Information gaps ▪ Harmonization and Nesting
12. Was there a possibility for GRZ to fund CSOs and NGOs for ERs through the EP-JSLP? In other words, could this category of players be regarded as beneficiaries? It was clarified that GRZ was not necessarily funding anybody in the sense of the conventional way NGOs and CSOs are funded. Rather, the role of GRZ was to facilitate the flow of rewards and incentives (benefits) to all the beneficiaries whose roles and responsibilities were either directly or indirectly linked to emissions reduction.	▪ Information gaps ▪ Institutional arrangements
13. How much revenues were expected or estimated to be generated from the sell of ERs in the EP through the EP-JSLP? It was clarified that this level of detail would be finalized as GRZ and the World Bank negotiate the ERPA in the due time. However, estimates have already been made that the entire EP has a total of 12.5 million tons of carbon emissions to be sequestrated.	▪ Information gaps
14. Land use planning is very critical to the sustainability of wildlife and in the management of HWC. This stems from the fact that unsustainable land use change, particularly the conversion of forested land to agriculture was the single major threat to wildlife habitats in the area. Unfortunately, land use plans were just on paper and never enforced because the authorities mandated to enforce these plans are always citing lack of resources and capacity for their failure to enforce the land use plans. Secondly, the majority of land use plans are not incorporating provisions for present wildlife corridors and expansion of future wildlife corridors. How was the EP-JSLP designed to address this issue? It was clarified that mandated institutions and authorities like the Provincial Planning Authority responsible for enforcing Land use plans will be incentivized by the Program through necessary allocations to enable them do their legally mandated work of enforcing Land use plans. In that way, such institutions will be benefiting from the Program on the one hand, and the	▪ Information gaps ▪ Harmonization and nesting ▪ Institutional arrangements

enforcement of Land use plans will also be contributing to the reduction of emissions on the other hand.	
15. Will BCP and COMACO get to sell their ERs through GRZ or independently the way they have always been doing it? It was clarified that BCP and COMACO will continue with their operations as they have always been working, but the sell of their ERs will be harmonized under the centralized jurisdictional approach, regulated and monitored by the state. Essentially, all the BCP and COMACO ERs will be accounted for under the Program and monetized through the same as mandated by the Forest Carbon Management Regulations of 2021.	▪ Harmonization and nesting ▪ Transparency and accountability ▪ Institutional arrangements
16. Will the EJ-JSLP promote and/or incentivize the mushrooming of different players and actors wishing to engage in ERs across the entire jurisdiction? Exactly, the Program is designed to provide incentives to anyone who would like to work under the centralized jurisdictional arrangement as a service provider, and anyone whose roles and responsibilities would directly or indirectly contribute to emissions reduction. This is aimed at enhancing effectiveness of emissions reduction at jurisdictional scale in tandem with government policy and in line with emerging international practice.	▪ Harmonization and nesting
17. Can there be some high-level entity like the PIU to provide oversight and monitoring for compliance with land use plans? It was clarified that the GRZ under the current legal and policy frameworks will play that role. The PIU will also work closely with the GRZ in the same way the ZIFLP – PIU has been working to enhance MRV of all activities under the Program.	▪ Institutional arrangements
18. We need more focused funding to local activities where the destruction is mainly happening. One of the main problems is lack of funding to institutions who must perform certain crucial activities. It was clarified, firstly, that the funding being referred to is actually an incentive or reward to beneficiaries whose role and responsibilities will directly or indirectly contribute to emissions reduction. It will not be funding in the conventional sense of disbursing money to institutions / organizations for its own sake – but it will be incentivizing or rewarding different institutions for the roles and responsibilities in reducing emissions. Secondly, it has been noted that local communities have the largest pool of carbon stocks which means that the highest level of carbon emissions will derive from the local communities. As such, all efforts must be tailored to community level activities to reduce emissions and improve local livelihoods.	▪ Institutional arrangements

19. Will players in the wildlife sectors benefit from this program? It was well noted, taking the case of M'fuwe into consideration, that the wildlife sector's main threat arose from increasing human encroachments into natural wildlife habitats. Particularly, the expansion of agricultural land into forested lands. The EP-JSLP beneficiation system is designed to incentivize institutions and communities to find alternative ways of minimizing the pressure of agricultural expansion towards sustainable ways of farming, as well as rewarding innovative ways of farming that had a direct effect on reducing emissions. That way, agricultural expansion into wildlife natural habitats would be reduced. Secondly, the private sector players in the wildlife sector were free to position themselves as service providers in emission reduction activities and attract incentives and rewards through the Program for their measurable and verifiable ER activities.	▪ Information gaps
20. Is there a mechanism to ensure that revenue comes to the Province rather than stuck with Central government in Lusaka? Yes, the BSP benefit distribution mechanism is being designed to address that matter. For that reason, this consultation meeting was aimed at getting feedback from stakeholders regarding how this can be enhanced to work effectively in practice.	▪ Information gaps ▪ Institutional arrangements
21. There should be a way of ensuring that benefits trickle down to the household level. Otherwise, there will be no incentive for communities to engage or continue engaging in ER activities. There are two working assumptions to address that concern; (i) it is a very complex matter to distribute benefits to household level, (ii) the local institutions like CFMGs, CRBs and farmer groups, were better placed to distribute benefits to their individual members who constitute the different households in every Chiefdom.	▪ Safeguards
22. What will happen to the benefits when and if the carbon markets fail or fall drastically? It was clarified that this matter could be addressed in two ways; (i) forward payments for ERs where money for estimated ERs is paid in advance, and (ii) the benefits of the initial ZIFLP investments generates reasonably good non-carbon benefits to the communities. For that reason, the BSP will not be dealing with non-carbon benefits and no money will be paid for such benefits. Otherwise, the monetary carbon and non-monetary carbon benefits are market and results-driven.	▪ Information gaps
23. How long will the benefits flow to the communities? If the communities will have to wait for more than a year to receive their benefits, they will be discouraged to commit to ER activities.	▪ Information gaps ▪ Safeguards

The flow of benefits to the beneficiaries will be determined by MRV. If the MRV can be done annually, then benefits can also flow annually. But because of the complexities involved with MRV, it normally takes more than a year. Otherwise, GRZ and all those involved in designing the Program are trying to make sure that the annual payment system can work effectively to avoid keeping communities waiting for too long. On the other hand, the payment of benefits will be strictly tied to performance on safeguards, making sure that women, children, persons with disability and the vulnerable peoples' lives are not worsened by the beneficiation.	
24. At the close of the session, a strong concern was raised regarding the use of CRBs as locally-existing institutions for channeling community benefits. The concern derives from historical precedence that CRBs governance has been marred in lack of transparency and poor accountability. Doubts have been strongly raised whether such institutions could be trusted for this task when they had historically failed to be accountable over financial matters and in their dealings with the community. This concern generated a secondary debate regarding the need to propose new institutional arrangements for the administration of community benefits or the maintenance of existing ones? Two prominent proposals pointed to the need for the WDCs[49] under the Local Government Act, 2019, and the establishment of a Chiefdom Development Trust, for the management of community benefit allocations as opposed to CRBs and their Association.	▪ Transparency and accountability ▪ Institutional arrangements

From the presentation of the three current benefit allocation proposals, i.e. (i) GRZ proposal – model 1, (ii) NCRBA and CBNRM proposal – model 2 and (iii) NCRBA, CBNRM and Chiefs' Proposal – model 3, the following were the outcomes of the session after assessing the three proposed models;

A. Model 1

GRZ PROPOSAL			**SECONDMENTS, COUNTER-PROPOSALS AND OPPOSERS**	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	GRZ and PIU Program costs (MRV)	15%		Seconded by one participant only
2	Community Groups and Trad. Authority	55%		Seconded by one participant only

[49] Ward Development Committees

3	Mitigation activities and safeguards services ▪ Nested REDD+ projects ▪ GRZ services in non-nested areas	30%		Seconded by one participant only
				Seconded by one participant only
4	**Total**	**100 %**		

The GRZ model 1 was supported and adopted by one participant only while the rest of the other participants did not comment on the model.

B. Model 2

NCRBA/CBNRM PROPOSAL			**SECONDMENTS, COUNTER-PROPOSALS AND OPPOSERS**	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	Program costs (MRV and PIU)	10%		No comments
2	Community Groups and Trad. Authority	55%		No comments
3	GRZ	5%		No comments
4	Mitigation activities and safeguards services: ▪ Nested REDD+ projects ▪ GRZ services in non-nested areas	30%		No comments
5	**Total**	**100 %**		

The Model-2 NCRBA and CBNRM proposal received no comments at all. It was neither adopted nor rejected by any of the 15 participants.

C. Model 3

NCRBA/CBNRM/CHIEFS' PROPOSAL			SECONDMENTS, COUNTER-PROPOSALS AND OPPOSERS	
Sn	**Description**	**% Share**	**% Share**	**Rationale**
1	GRZ and PIU Program costs (MRV)	40%	???	One specific question raised: was the implementation cost of the PIU fixed [non-negotiable or negotiable]? How would the PIU know that this allocation was enough to meet its implementation costs?
2	Community Groups and Trad. Authority	60%	???	Raised a lot of concerns and heavily questioned; ▪ The ineffectiveness of the BCP BSP model has been attributed to lack of transparency and accountability. This proposal mirrored the BCP model; ▪ Existing local institutions, especially the CRBs and CBNRM Association, cannot be trusted to handle this money because of the inefficiencies marred by their historical governance challenges, lack of transparency and poor accountability systems; ▪ As such, there is a tight rope to be walked between the use of locally existing institutions or creation of new institutions to administer this money at chiefdom level; ▪ Two prominent suggestions for new institutions point to WDCs[50] under the Local Government Act, 2019 and Chiefdom Development Trusts [whose composition should include all stakeholders operating in the area, i.e. traditional authorities, local authorities, private sector, NGOs

[50] Ward Development Committees [Section 36 of the Local Government Act, 2019].

				and CSOs], to administer, monitor and provide oversight over this money.
Breakdown of Community % share				
3	The Royal Highness	10%	???	It was proposed that this allocation be split into two; 5% to Chief as an individual and 5% to Chief as an institution (Traditional Authorities)
4	Construction works	32%	???	▪ It is not clear who will administer, control and provide oversight over this money; ▪ The sort of construction anticipated here could raise emissions instead of reducing them. There is also a fear raised that this money may be mismanaged; ▪ There are formal institutions mandated with construction works and not the communities; ▪ It is not clear who procures these construction works and which procedure will be followed to procure them; ▪ The Chief may still be involved to control the procurement of these constructions; ▪ There is a high risk of elite capture through these construction works.
5	Conservation works	30%	???	▪ It is not clear who will administer, control and provide oversight over conservation works.
6	Livelihoods	20%	???	▪ It is not clear how this money will actually flow to the community to improve their livelihoods; ▪ Who will administer this money;

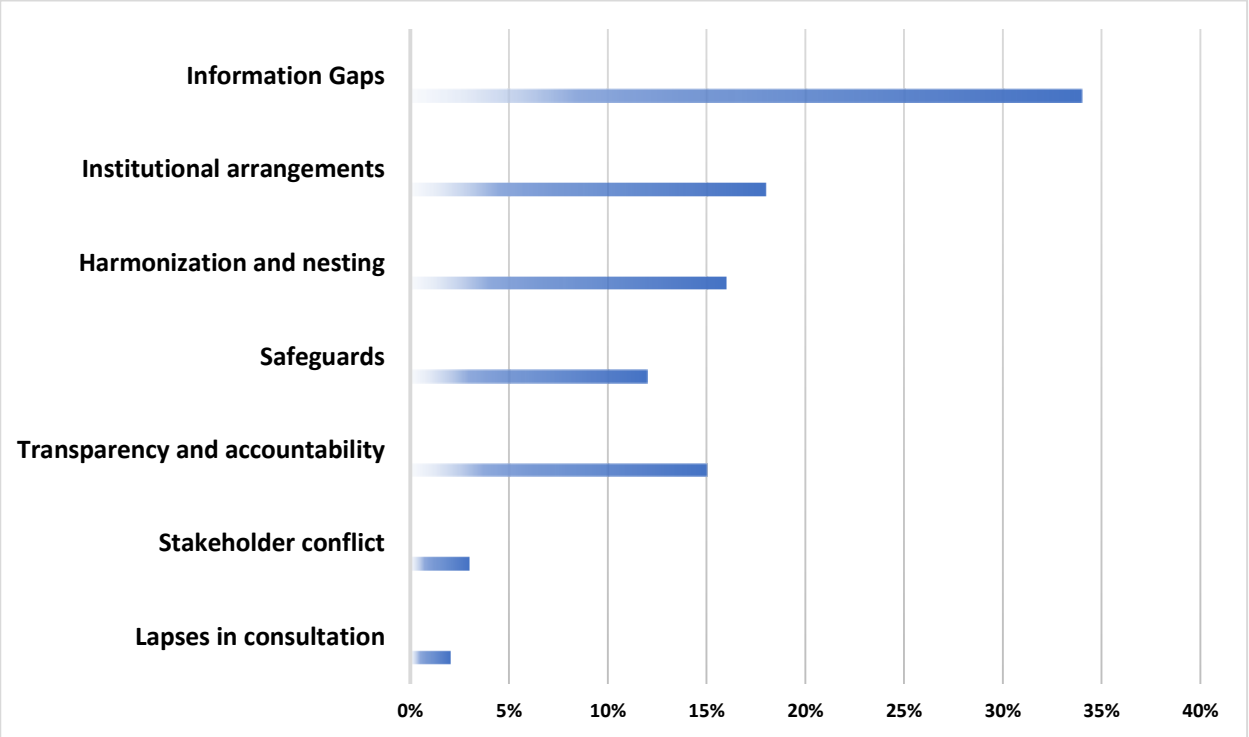
				▪ Which local institutional arrangement will be used to administer this money; ▪ What guarantee is there that community households will actually benefit from this money, and depending on the institutional arrangement that will administer it.
7	Traditional activities	5%	???	▪ The Chief will have sole control over this allocation in addition to his/her 10% allocation; ▪ The Chief will most certainly have control of the construction works; ▪ The Chief will also have a strong control over the 3% CBNRM Association allocation because he/she is the Patron; ▪ In total, the Chief alone has 50% of the community allocation under his/her control; ▪ There is a high risk that the flow of benefits to the community members will be drastically be reduced due to elite capture.
8	CBNRM Association	3%	???	▪ It would be better for the CRBs themselves to administer this money [if they can be trusted] as opposed to the Association; ▪ There is need to dissociate the CRB Bank accounts from the CFMG financial transactions – as the case is, CRBs [under the Wildlife Act, 2015] do operate as CFMGs for carbon trade [under the Forests Act]
	Total	**100 %**		

Model 3 was heavily contested raising more questions than answers. As such, none of the participants proposed or seconded this model. Essentially, model 3 raised three crucial issues which were seen as risks for the EP-JSLP benefit sharing:

- **Elite capture**
- **Lack of transparency and accountability, and**
- **Institutional ineffectiveness**.

The participants' feared that the three issues put together may jeopardize the ability of benefits flowing to the communities as the primary beneficiaries, and consequently undermine community commitment to ER activities. As such, the elephant in the meeting was the debate around the creation of new local institutions to administer community allocations or to rely on the existing institutions for the same purpose?

Summary of Generative Themes from all three stakeholder consultative meetings



BSP Annex II: Legal Underpinnings

Both the consultative process through which the BSP was developed, and the subsequent operationalization of the document to guide overall beneficiation in the EP-JSLP are premised on laws of Zambia:

- The Constitutional principles, rights and privileges provided for the people of Zambia regarding (i) environmental and natural resources management and development in Article 255, (ii) protection of environmental and natural resources in Article 256, and (iii) the utilization of natural resources in Articles in Article 257. In addition, it is by the Constitutional privileges, rights and duties provided for Chiefs under Articles 166-67 that Chiefs may sign up to the CERPA;
- The need to respect and enforce these Constitutional rights in practice as provided by section 4 of the Environmental Management Act, 2011, the duties to protect the environment and the principles of environmental management in sections 5 and 6 of the Act;
- The principles of SFM as enacted by section 8 of the Forests Act, 2015, and the rights, duties and obligations of the community towards forest resources as stipulated by the Community Forests Management Regulations of 2018, including the right to benefit from the management of community forests. The Forests Act characterizes Carbon as a major forest produce whose ownership, like the ownership of all other major forest produce on all types of forests in Zambia, is vested in the President for, and on behalf, of the Republic. Therefore, ownership rights over Carbon remain vested in the President under the state jurisdiction of the Director of Forestry until lawfully transferred or assigned to other entities such as communities under the provisions of the Act. The procedural rules for the transfer of Carbon rights to the Communities are stipulated in the Community Forest Management Regulations of 2018 and the Carbon Forest Management Regulations of 2021;
- Upon lawful transfer of Carbon rights to the Community Forest Management Groups (CFMG) under the legal principle of Community Forest Management (CFM), the exercise of the Carbon rights, the obligations and responsibility to engage in forest carbon stock management, and to benefit from proceeds of carbon stock management through a benefit sharing mechanism, the communities' rights to earn their revenues from carbon stock management at gross rather than at net, and the duty for any proponent of carbon stock management project or program to outline a stakeholder engagement plan, are provided by the Forest Carbon Management Regulations of 2021 and the Community Forest Management Regulations of 2018;
- Insofar as the ownership of, and rights to, carbon in the agriculture sector is concerned, the Ministry of Agriculture Administrative Order provides the required guidance [Annexed below as IIB]
- That the definition and delineation of forest in the Forests Act, 2015, is linked to land, the Lands Act Cap 184 of the Laws of Zambia provides for the legal recognition and protection of customary land holding, i.e. land on which the majority of the EP-JSLP ER activities will actually take place in the different chiefdoms of EP. Therefore, while the Community Forests Management Regulations provides chiefdoms with resource tenure rights over community forests and forest resources, the Lands Acts provides them with customary rights over the land;

- Flowing from the foregoing, the chiefdom will serve as the functional unit for the generation of ERs. Consequently, the jurisdiction of the Chiefs prescribed by the Chiefs Act Cap 287 of the laws of Zambia will prevail, especially in respect to the redress of benefit-related conflicts under the powers, duties and responsibilities of the chief enacted by section 11. In addition, it is by the privileges, rights, power, duties and functions of the Chiefs under the Statute that Chiefs may sign up to the CERPA;
- The Tourism and Hospitality Act, 2015, provides a legal safeguard to ensure that tourism activities do not deprive local communities of access to wildlife, land and water resources in the tourist areas, and that tourism activities should be incentivized to utilize green designs or technologies to promote sustainable livelihoods and poverty reduction as enacted in section 7;
- For the GMAs under the Wildlife Act, 2015, the law stipulates a mandatory benefit allocation system through which the CRB receives monetary benefits which the Wildlife Authority is mandated to pay into the CRB fund under the Wildlife (Community Resource Boards Revenue) Regulation of 2004 (Statutory Instrument No.89);
- The foregoing legal and regulatory framework brings into focus the inevitable need for effective institutional arrangements that must work from the lowest community structures to the jurisdictional and national levels. Section 36 of the Local Government Act, 2019, enhances the much-needed institutional collaboration across different sector players at the ward level which is the lowest functional structure of a community in every chiefdom;
- Where security for huge financial transactions deriving from the monetary benefits of ERs may be necessitated in the face of financial risks, specific provisions of the Financial Intelligence Center Act, 2010, will be invoked. The functions of the FIC in relation to investigating, analyzing and assessing suspicious financial transactions may necessarily be invoked under section 5 of the Act in the spirit of reducing risks of financial crimes, fraud and money laundering, and;
- Given the possibility of corruption and corrupt practices related to financial transactions, the Anti-Corruption Act, 2010, provides important safeguards against corruption and corrupt practices through its object to, among other things, provide for the prevention, detection, investigation, prosecution and punishment of corruption and related offenses.

Essentially, the legal framework that forms the legal underpinnings of the BSP is detailed in categorized in summary as follows;

- The legal framework that enhances collaborative stakeholder engagement, mandates consultations and stakeholder participation;
- The legal framework that enhances stakeholder beneficiation by mandating safeguards;
- The legal framework that enhances conflict and dispute redress, and;
- The legal framework that enhances institutional frameworks.

LEGAL AND REGULATORY FRAMEWORKS:	Enhancing collaborative stakeholder engagement, mandates consultation and stakeholder participation	Enhancing stakeholder beneficiation by mandating safeguards	Enhancing conflict and dispute redress	Enhancing institutional frameworks
The Constitution of Zambia [Amendment Act] No.1, 2016, Arts 255-56	✓	✓		
The Environmental Management Act, 2011, Sec 4	✓	✓		✓
The Forests Act, 2015, Preamble, Sec 8	✓	✓		✓
The Lands Act CAP 184 of the Laws of Zambia, Sec 7		✓		
The Chiefs Act CAP 287 of the Laws of Zambia, Sec 11	✓		✓	
The Tourism and Hospitality Act, 2015, Sec 7		✓		
The Arbitration Act CAP 40 of the Laws of Zambia			✓	
Financial Intelligence Center Act, 2010, Sec 5		✓	✓	
Local Government Act, 2019, Sec 36	✓			✓
The Anti-Corruption Act, 2010			✓	
The Forests Act (Community Forest Management Regulations) of 2018	✓	✓		✓
The Forests Act (Forest Carbon Stock Management Regulations) of 2021	✓	✓		✓

The Wildlife Act (Community Resource Boards Regulations) of 2004		✓		✓

Annex IIB

Draft Administrative Order

Ministry of Agriculture Letterhead

ADMINISTRATIVE ORDER: ASSIGNMENT OF CARBON RIGHTS IN THE AGRICULTURAL SECTOR IN THE CONTEXT OF MONETISING EMISSIONS REDUCTIONS

It is widely recognized that climate change poses a significant and serious threat to sustainable development of Zambia. Evidence shows that the country has experienced a number of climate hazards including droughts and dry spells, seasonal and flash floods and extreme temperatures. These directly impact our cropping cycles and ultimately food security of farming households and the nation as a whole. Emissions of greenhouse gases which impact our local, regional and global climate requires action through mitigation and adaptation. The Ministry through its mandate, aims to support interventions that improve agricultural productivity and resilience resulting from adoption of climate-smart agriculture (CSA) practices.

Government is putting in place a regulatory framework relating to carbon emission reduction arising from the agricultural sector and related activities. In the absence of the approved framework, this Administrative Order is issued to clarify the provisions for the transfers of Verified Emissions Reductions related to Agricultural activities and Soils in Eastern Province.

The information contained within this Administrative Order is of importance to those who wish to monetize agricultural related carbon emission reductions and engage in carbon stock management projects and programmes including the trade in greenhouse gas emission reductions or removals in Eastern Province. Persons or projects wishing to monetize agricultural carbon in Eastern Province must obtain and receive permission to do so to allow the transfer of agricultural carbon emissions reductions on all categories of agricultural carbon.

Interpretation

The Government is in the process of establishing a Jurisdictional Sustainable Landscape Program covering Eastern Province (EP-JSLP). This initiative aims to incentivize and reward climate change mitigation actions to reduce emissions coming from the unsustainable land management practices of primarily rural communities and households in the Province. Through the Jurisdictional Program, the Government will secure carbon financing for interventions that increase agricultural productivity, enhance agro and forest ecosystem resilience, reduce GHG emissions, and sequester carbon using a landscape approach.

Regulation of Carbon Emission Reduction Trading in Eastern Province

In accordance with the Laws of Zambia, specifically the Lands Act, Chapter 184, as well as relevant provisions of the Constitution of Zambia (Amendment) Act, 2016, Government has the responsibility to regulate the management and development of Zambia's environment and natural resources such as carbon. In the context of the Jurisdictional Sustainable Landscape Program in Eastern Province, the trading in agricultural carbon will only be allowed with prior permission of the Ministry of Agriculture, following consultation with the Ministry of Green Economy and Environment, indicated as the legal entity for the EP-JSLP by the Ministry of Justice.

Further information may be obtained from the Director of the Department of Agriculture.

BSP Annex III: Stakeholder Analysis

Annex IIIA below distinguishes stakeholders from beneficiaries. Stakeholders are the institutions [government, CSOs or NGOs] who will receive direct allocations for their facilitative role in enhancing ER activities. Beneficiaries are local landscape implementors of ER activities at Chiefdom level who will receive performance-based allocations.

Annex IIIB outlines the criteria for inclusion in the ER Program and eligibility for beneficiary performance-based allocations and stakeholder direct allocations.

- **IIIA: Stakeholder and Beneficiary Roles and Responsibilities**

STAKEHOLDERS	ROLES IN ER PROGRAM	CRITICAL ROLE IN THE EP-JSLP
Government Stakeholders		
Ministry of Finance & National Planning	• Oversees resource mobilization for national development, development planning, funding for policy implementation and Climate Change mitigation and adaption	• Management of funds from the ER sells
Ministry of Green Economy and Environment (MGEE), Climate Change & ZEMA	• Oversees implementation of all climate change projects and programs; has the overall responsibility for environmental protection and sustainability • Holds the overall responsibility for environmental policy formulation and implementation • Secretariat to the Steering Committee of Permanent Secretary on Climate Change • UNFCCC focal point and NDA for the CDM • Houses ZEMA and supervise the Authority's role in the EP-JSLP MRV and enforcement of the Environmental Management Act, 2011 • Provides overall supervision over the PIU • Will sign the ERPA with the World Bank	• Supervisory responsibility over the PIU • Signing the ERPA as GRZ representative in the ERP

Forestry Department in the MGEE	• Responsible over all forestry matters in the country; directly in charge of National Forests, Local Forests, Botanical Reserves, and provides oversight over Community forests • Responsible for the provision forestry extension services and research • Provincial Forestry Officers in every Province the head representative of the Forestry Department and acts in the stead of the Director of Forestry • Responsible for the issuance of all sorts of licenses and permits for all minor and major forest resources and products, including carbon • Houses the REDD+ Coordination Unit and the National REDD+ Registry • Responsible for the implementation of the National Forest Policy, 2014 and enforcement of the Forests Act, 2015, through the Director of Forestry • Provides the National FREL and monitoring system • Responsible for controlling and monitoring the conveyance of charcoal from along the Zambian roads	• Promotion of SFM • Implementation and enforcement of Forestry policy, laws and regulation • Provision of extension services to Community forests • Conservation and protection of National forests, local forests and botanical reserves • Monitoring and regulation of ER projects through the national Registry • Monitor and control the extraction of timber and charcoal production form concessional areas • Reduce the consumption of charcoal by controlling its conveyance so as to disincentivize its unsustainable production from community and local forests
Chiefs & Traditional Affairs, Ministry of Local Government and Rural Development	• Responsible for the safeguarding of the affairs, interests and privileges of Chiefs as a Constitutional office under the Constitution of the Republic of Zambia • Chiefs Affairs Officer serve as the link between the GRZ and traditional leaders • They play an important role in conflict resolution between Chiefs, GRZ and local communities, including benefit sharing-related disputes • They will play a crucial role in facilitating the signing of the CERPAs, clarifying issues, allaying misconstrued notions and providing clear information in the process	• Facilitate the signing of the CERPA • Dispute and conflict resolution between the Program and the Chiefs • Mouth piece for the Chiefs

Ministry of Tourism, DNPW	• Responsible for all matters of wildlife in Zambia • Responsible for the management and protection of all the legally designated wildlife areas such as national parks, Community Partnership Parks and GMAs • Responsible for formulation, implementation and enforcement of national wildlife policy, law and regulations • Provides oversight over CRBs in relation to the management of GMAs including responsibility for regulating the use of wildlife resources in GMAs • Responsible for the issuance of all sorts of licenses and permits related to the consumptive and non-consumptive tourism, utilization of wildlife resources and development of tourism infrastructure in wildlife protected areas	• Conservation and protection of wildlife areas • Enforcement and implementation of wildlife policy, law and regulation • Enhance ER activities in GMAs
Ministry of Agriculture	• Responsible for agriculture and agriculture development including the different subsectors in agriculture such as livestock, fisheries, crop farming and dairy production • Responsible for the provision of agricultural extension services through Agricultural Blocks and Extension Camps across Wards, Districts and Provinces in Zambia • Responsible for the promotion and training of farmers in CSA, agroecology, farm forestry, and conservation farming through agricultural extension services; Camp Agricultural Officers provide training and extension services for Climate Smart Agriculture (CSA) for ZIFL-P, serve as conduit for provision of inputs, linkages to markets • Responsible for the provision of agronomical, agribusiness and land/soil management through	• Provide extension services for CSA, agroecology, conservation farming and farm forestry • Promote the adoption and use of organic fertilizers • Formulate and promote agriculture policy that incentivizes sustainable agriculture • Monitor and control land use change due to agricultural expansion

	extension services and the delivery of farming inputs such as seeds and fertilizers • Responsible for the provision and development of irrigation services and facilities to Districts and farming Blocks across Districts in all Provinces • Responsible for the development, formulation and implementation of national agricultural policies, programs and plans	
Ministry of Fisheries & Livestock	• Similar structure to Agriculture (above) • Responsible for the development and formulation of Livestock and fisheries policies, laws and regulations • Responsible for the development and formulation of livestock and fisheries programs • Responsible for the development of livestock and fisheries diseases control and prevention programs • Responsible for the development of small-medium livestock and fisheries enterprises such as goats and pigs, fish farming and aquaculture as alternative livelihood options	• Promote fish farming and aquaculture as alternatives to unsustainable agriculture and forest-based livelihoods • Promote breed and feed technology to reduce emissions from livestock
Ministry of Community Development & Social Welfare	• Responsible for community development and social welfare • Responsible for the overall welfare and well-being of local communities, especially the vulnerable women, children and persons with disabilities • Responsible for the promotion alternative livelihoods targeting most vulnerable groups • Responsible for the identification and assessment of social vulnerabilities, needs and risks in communities especially among the most vulnerable groups of people • Responsible for developing and implementing community development and social welfare programs	• Enhance social safeguards by reducing the vulnerability of the most vulnerable groups of people • Enhance beneficiation of the most vulnerable from the ER Program by ensuring that women, the aged, children and people with disabilities have unimpeded access to carbon benefits

	to cushion the vulnerability of the most vulnerable people in communities	
Town Council, Local Authorities – Ministry of Local Government	• Responsible for the provision of local government services at District and ward levels • Responsible for the provision of development and municipal services in Towns, Districts and Ward levels, including water and sanitation, land and land use planning, public health and hygiene, waste disposal, reticulation, trade and accommodation • Responsible for passing, implementing and enforcing bye-laws within the jurisdiction of the Local authority, i.e. Towns and Districts • Responsible for the development and enforcement of integrated land use plans • Serves as Secretariat to the District Development Coordinating Committee (DDCC)	• Promote bye-laws that have a direct and indirect positive impact on land use • Develop integrated land use plans • Enforcement of land use plans • Monitor and supervise the WDCs at Ward level • Control the conveyance and sell of illegal charcoal in towns as a way of disincentivizing production in communities
Coordinating Committees and Stakeholder Platforms		
Provincial Development Coordinating Committee (PDCC)	• Responsible for the administration of PDCC; the Platform that brings together authorities from different sectors (agriculture, wildlife, forestry, livestock & fisheries, and others) to meet in committee and make decisions for the province in the spirit of integrated development	• Plays a crucial role in the FGRM
District Development Coordinating Committee (DDCC)	• Responsible for the administration DDCC; the Platform that brings together authorities from different sectors (agriculture, wildlife, forestry, livestock & fisheries, and others) as well as Ward Councilors and Chiefs to meet in committee and make decisions for the District	• Plays a crucial role in the FGRM

FGRM Committee	• Ensure that the FGRM works effectively as a process of collecting and collating information related to stakeholder/beneficiary grievances, complaints, fears and concerns • Correct and counteract, allay and cure misconceptions of the Program created by misinformation, lack of information and any seemingly malicious intent to discredit the Program • Provide timely, adequate and objective feedback to the concerns, fears and anxieties characterized by stakeholder/beneficiaries' grievances and complaints • Assess and analyze Program risks associated with stakeholder/beneficiary grievance, complaints and concerns • Refer to the BSPAC all issues impinging on financial crimes, fraud, corruption and money laundering	• Conflict resolution • Public relations • Program Risk management
BSPAC	• Responsible for investigating, assessing and analyzing issues impinging on financial crimes, fraud, money laundering and corruption as referred from the FGRM • Make appropriate recommendations to the BSC, PSC, PIU and the MGEE regarding its findings on all resolved cases of financial crime, fraud, money laundering and corruption • Commit to the Courts of Law under the Arbitration Act all unresolved cases of financial crimes, fraud, money laundering and corruption for possible Arbitration • Commit to the Police, ACC and/or DEC all confirmed cases of financial crimes, money laundering, fraud and corruption in accordance with the applicable laws of Zambia	• Conflict resolution • Prevention of financial crimes, corruption, money laundering and fraud
Civil Society Organizations		

Land Alliance	• Provides lobby and advocacy for land rights • Provides training and empowerment for local community groups in strengthening their land rights and security of tenure • Conducts empirical research on land use and land rights • Provides evidence-based information on land rights and land tenure challenges in customary lands	• Provides evidence-based information on community challenges around land tenure security and land use practices
District Farmers Associations (DFAs)	• A designated member the Zambian National Farmers' Union at District level • Provides farming information services to its farmer members through the lead farmers to the Information Centers across the Chiefdoms • Provides extension services to its farmer members on new products and services available on the market • Provides timely agriculture information regarding market trends, weather and climate, prices and financial trends • Supports its farmer members through trainings including lobby and advocacy programs • Promotes market linkages for its farmer members • Acts as a bulking and distribution center for farmer input support goods and services such as seeds and fertilizer	• Serves as an important local institution for benefit distribution to the farmer members • Serves as an important information gathering center for farmers participating in ER activities • Serves as an important entry point for farmers' adoption of CSA and other sustainable farming technologies in a Chiefdom
BENEFICIARIES	**ROLES IN THE ER PROGRAM**	**CRITICAL ROLE IN THE EP-JSPL**
Traditional Authority (TA)	• Responsible for the administration, adjudication and enforcement of customary law, order and justice in the Chiefdom • Responsible for dispute and conflict resolution, and the maintenance of peace in the Chiefdom to the village level	• Important local institution for the administration and distribution of community benefits to the households • Dispute and conflict resolution as part of the FGRM • Control and regulate land use and land use change

	• Responsible for the allocation and administration of land in the Chiefdom, including the approval and/or alienation of the land for different land uses • Responsible for the safeguarding and transmission of custom and traditional practices from one generation to the other • Responsible for the preservation of tangible and intangible cultural heritage and heritage sites in the Chiefdom • Comprises the Senior Chief, Chiefs, Sub-chiefs, Indunas, and Headmen at village level • Provide guidance and oversight over community development projects and programs	• Enhance respect for, or adherence to, environmental and social safeguards at Chiefdom level • Approve and facilitate the signing of CERPAs
Chiefs	• Custodians of customary lands • Responsible for the administration, alienation and preservation of customary land • Responsible for conflict and dispute resolution at Chiefdom level • Legally designated Patrons for CRBs under the Wildlife Act, 2015 • Constitutional representatives of the people through the house of Chiefs • Provides consent for creation of Community Forest Management Areas (CFMAs) and Community Resource Boards (CRBs)	• Sign the CERPA • Important for conflict and grievance redress in the FGRM • Enforcement of customary land laws, control and monitor land use and exploitation of land-based resources • Provide consent to facilitate establishment of CRBs and CFMGs and strengthen already existing ones • Enhance environmental and social safeguards at Chiefdom level
Community Structures		
Lead Farmers	• Coming from different farmer groups, they will provide leadership over demonstration farms for the adoption of CSA	• As stated

	• Will serve as conduits for information sharing to other farmers through Information Centers across the Chiefdom • Will serve as an entry point for incentivizing farmers with non-monetary or non-monetary benefits	
Community Forest Management Groups (CFMGs)	• The legally designated local institution for forest management at community level • Designated to act for, and on behalf of, the Director of Forestry, with consent of the Chief in accordance with the Forests Act, 2015. • They provide leadership in the implementation and enforcement of the Forests Act, 2015, Community Forest Management Regulations, 2018 and the Forest Carbon Management Regulations, 2021. • They mobilize the rest of the community members towards SFM using the rights/responsibilities/duties/obligations legally transferred to them the Director of Forests, including carbon rights • They have exclusive rights, powers and duties to restrict access to the community forest to all others (non-community members) in protecting the community forests • They power, duties and obligations to control and regulate the utilization of forest resources in a community forest in accordance with their rights and obligations	• They can provide a good entry point for the control and regulation of charcoal production from community forests • They are crucial in curtailing land use change from forestry to agriculture
Community Resource Boards (CRBs)	• They are legally designated local entity for wildlife management at community level in a GMA • They have devolved powers and responsibilities to participate in the wildlife management and protection as provided by the Wildlife Act	• They are an important local institution for the distribution of benefits to community households

	• They have a right to share in the benefits accruing from the issuance of wildlife licenses in a GMA • The Chief is the Patron of the CRB and provides significant oversight over activities of the CRBs • Works with the DNPW to manage wildlife and wildlife resources in GMAs as a buffer for the National parks • Role restricted to the relevant Chiefdom portion of the declared game management area.	• They are an important avenue for information sharing and dissemination at village level
Village Action Groups (VAGs)	• They are a creation of the CRBs and serve as the fundamental functional units of CRBs at the village level • They are directly involved in supporting livelihood improvement programs and implementation of CRB plans at village level	• They are an important entry point for the adoption of CSA activities at village level across Chiefdoms • They are an important avenue for benefit distribution to households at village level • They are an important avenue for information sharing and dissemination
Nested Private Sector		
COMACO	• The company is a private sector social enterprise (non-profit) mainly dealing with farmers through enhanced product marketing • It promotes the adoption and implementing of CSA, forest regeneration, improved cook stoves, marketing links with communities throughout Eastern Province • It has diversified its business model to ER and carbon trading and desires to upscale to larger parts of Eastern • It has grown its farmer base in its operational areas in EP • Its business model has generated interest for ER among farmers	• Draws important lessons for the EP-JSLP • Its important to maintain the momentum of ER activities initiated by the company • Increases the scope of ER activities and impact within the company's operational area • It has practical lessons of benefit sharing from its experiences so far • Its potential upscale to wider areas of EP is a good opportunity to increase

		the impact of the company as a service provider
BioCarbon Partners (BCP)	• Developed the Luangwa Community Forests Project (LCFP), through USAID support, validated and verified by the Verified Carbon Standard (VCS) and Climate, Communities & Biodiversity Alliance (CCBA) • LCFP is a partnership between Government, 12 Chiefdoms (with a population of 173,000 people) to protect the biodiversity corridor between the Lower Zambezi and Luangwa National Parks • The project is funding forest protection and community development through the sale of carbon offsets	• Same as COMACO

- **IIIB: Criteria for Inclusion in the ER Program and Eligibility for Allocation**

BENEFICIARIES	• ELIGIBILITY CRITERIA FOR PEREFORMANCE-BASED ALLOCATIONS
Landscape Level Implementers	

Traditional Authorities (Chiefs, Headmen, Indunas)	• The Chief is the signatory to the CERPA with the EP JSLP for the Chiefdom to participate in the creation of ERs. The CERPA includes:
	  ○ Commitment of the Chiefdom to produce ER through the CERPA under the ERPA
	  ○ Types of ER activities that will be undertaken under the CERPA
	  ○ Roles & Responsibilities of each of the actors and players in the Chiefdom
	  ○ The local institutional arrangement outlining how the benefits [funds]will be managed at a community level
	• Because ER Program will fundamentally operate at Chiefdom level, there is a requirement to demonstrate ER results through monitoring data
	• Headmen and Indunas must show commitment to the Chiefdom to facilitate ER activities in their village(s)
	• The Chiefdom will be under obligation to show commitment to social and environmental safeguards
	• There will be a requirement to refer to the inclusion of existing agreements with CRBs, CFMGs and any other relevant organization as additional layer of governance instruments

Registered Farmers (Lead Farmers, District Farmer Associations)	• Will be included in the CERPA to be monitored by the PIU • Will operate within the Chiefdom where they are located with respect to that Chiefdom's allocated RBF based on performance • Must be registered as a Farmer Group with the Ministry of Agriculture or any other relevant registration authority such as Cooperative • Will be required to have a bank account and financial management protocols for the purpose of administering monetary benefits [funds]

Registered Community Groups – CFMGs	• Included in the CERPA as above and will be monitored by the PIU for activities to produce ERs (e.g. land use planning, forest management, etc.) • It must operate under the Chiefdom where it is located with respect to the allocated RBF based on performance • It must be registered as a CFMG with the Department of Forestry with a valid legal transfer of rights and a commitment to ER activities within the community forest • Should be able to submit annual workplans, budget and auditable activities • Should be able to submit plans for livelihood benefits and respect to safeguards • Must have a bank account with financial management protocols for the purpose of administering monetary benefits [funds]
Registered Community Resource Boards Groups - CRBs	• Included in the CERPA as above and will be monitored by the PIU for ER activities (e.g. land use planning, forest management, control within GMP etc.) • It will operate in a Chiefdom where it is located with respect to allocated RBF based on performance • It must be registered as a CRB with the Department of National Parks and Wildlife (DNPW) • It should be able to submit annual workplan, budget and audited activities • It should be able to submit plans for the VAGs livelihood improvements and benefits • It msut have a bank account and financial management protocols for the purpose of administering monetary benefits (funds).
Village Action Groups (for public goods and on behalf of Community groups)	• It will operate in a Chiefdom where it is located under the CERPA • It must be registered as a VAG under the umbrella of the CRB • It should be able to submit plans to the CRB or CFMG for projects that have public benefit to the community and are aligned with larger development objectives (i.e. support provision of clean water, education, health, etc.) • It should focus on the protection/provision of benefits to vulnerable & marginalized community members (widows, children, elderly, chronically ill, disabled, orphans etc.)

Households & Individuals	• They must have demonstrated participation / contribution to ERs within their villages/communities under a Chiefdom
	• Their qualifying activities will include;
	  ○ Own small plots and are willing to set aside these areas as protected forests
	  ○ Engaged in tree planting and/or Agroforestry activities
	  ○ Utilizing improved cook stoves
	  ○ Practicing CSA (out of a registered Farmer Groups)
	  ○ Involvement in law enforcement to prevent illegal activities or activities that contradict agreements under the ER Program
	• Benefits will be provided through membership of recognized community institution indicated in the respective CERPA.

ER Related Projects, CSOs and Private Sector	
CSOs	• Should be able to submit a proposal to the PIU to provide technical support to communities including ER performance-based deliverable criteria; • Must be an organization legally registered in Zambia
Private Companies	• Should be able to propose to the PIU along with demonstration of a percentage of matching requirements • Must be classified as forestry, agriculture, or livestock and / or implementing activities in the landscape that could result in ERs (i.e. improved charcoal, cook stoves, alternative energy, support value chains, investments into CSA, etc.) • Must be legally registered in Zambia
Nested ER projects	• Must be a signatory to a NERPA in the context of a centralized nested arrangement as mandated by the Law • Must include a commitment to environmental and social safeguards including FPIC and FGRM • Must be legally registered in Zambia holding an appropriate permit or license for engaging in forest carbon management as required under the Forest Carbon Stock Management Regulations, 2021
STAKEHOLDERS	**ELIGIBILITY CRITERIA FOR DIRECT ALLOCATIONS**

All stakeholders listed in Annex IIIA	• CSOs, NGOs and private sector actors who wish to play the role of a stakeholder should submit their valid registration certificates • All stakeholders should be able to submit their workplans and annual budgets • Clearly outline, in their work plans, which activities require direct allocations of funds • Demonstrate, in their work plans, how their planned activities will facilitate the enhancement of ER activities at Chiefdom level • Demonstrate, in their work plans, how their activities will contribute to achievement of the overall objectives of ER Program in the Province; particularly, in reducing emissions, improving local livelihoods at Chiefdom level, grievance redress related to benefit sharing and building consensus towards the implementation of CERPAs • Demonstrate, in their work plans, the kind of technical support and capacity building related to the objectives of the ER they will be offering to local implementors at community level.

BSP Annex IV: Roles and Responsibilities of the PSC and BSC

1. THE PROJECT STEERING COMMITTEE [PSC]

The role of the PSC is to assess and approve work plans and budgets, providing performance monitoring, ensuring coordination and co-operation between different institutions. Essentially, the PSC will be the link between the Program and GRZ.

As such, the PSC will provide guidance for the ER Program implementation in order to guarantee transparency and accountability, effectiveness and efficiency. The PSC will ensure that the Program's expected outputs are achieved and funds are managed efficiently and effectively, in accordance with the ERPD.

Where deviations from the ERPD are considered necessary, the PSC will review proposals made by the Program Manager and recommend to the MGEE for their approval. However, the PSC will be able to make minor adjustments and/or reformulations of Program activities as long as such adjustments do not create material deviations from Program objectives outlined in the ERPD. Any such adjustments will be reported to the MGEE through the PIU and to the National REDD+ Coordination Unit.

The PSC will not be expected to intervene in the day-to-day management and implementation of Program activities and other interventions as this will be the mandate of the PIU. In this regard, specific tasks of the PSC at Provincial level will include:

A. The provision of oversight, guidance and support to the Project Manager and his/her implementing teams (PIU and DMTs) in all Program activities, including stakeholder engagement, benefit allocation and distribution, conflict resolution and grievance redress in the Province.
B. Promote the Program, its goals, objectives and activities to relevant stakeholders and beneficiary groups, agencies and other interested parties as a way of ensuring coordination and cooperation between and among the agencies, institutions and stakeholders.
C. Review, assess and evaluate work plans and budget as prepared by the PIU for implementing the Program; make variations, adjustments and recommendations as necessary to the proposed plans and budgets.
D. Review, assess, evaluate and approve quarterly progress and financial reports of the PIU; monitor and evaluate progress of the Program against approved workplans, milestones, budgets and objectives; address issues and/or deviations from the approved workplans and budgets.
E. Review, assess and approve MRV reports to authorize disbursement of Performance-based allocations to all beneficiary groups and grants for CSOs and Private Sector;
F. Review and evaluate decisions made by the PIU and any appeals coming from the FGRM; appeals will be dealt within a maximum period of two weeks, unless the issue needs to be referred to the BSPAC if it borders on financial crimes, money laundering, fraud or corruption.

G. Review, assess, evaluate and approve the Program's Procurement Plans, and in particular, procurement contracts in accordance with thresholds set out in the PIM.

1.1. Composition of the PSC

The Provincial Permanent Secretary will chair the PSC, and the committee will be meeting initially each quarter of the year. The PSC will be composed of the following members:

- Provincial Permanent Secretary, Chairperson
- Provincial Officers from Forestry Department, ZEMA, MoA, DNPW, MLGRD, Department of Chiefs Affairs, Department of Community Development and Social Services;
- Private sector representatives (2) (non-permanent members to be invited)
- CSO representatives (2) (non-permanent members to be invited)
- Independent experts (non-permanent members to be invited)
- PIU as a secretariat

1.2. Selection of invited members of the PSC

Procedure and criteria for selecting and inviting non-permanent (adhoc) members of the PSC will be determined by the permanent PSC members in the first PSC meeting.

The permanent members will annually review the composition of the PSC and make necessary changes either to composition of permanent members of to the composition of non-permanent members as need may arise in due time.

In doing so, the PSC will ensure to maintain good and functional representation of the PSC for the sake of effectiveness and efficiency of the ER Program.

2.0. THE BENEFIT SHARING COMMITTEE (BSC)

In addition to the PSC, the EP-JSLP will also have a Provincial Steering Committee comprising of representatives from the Chiefs, CRBs, CBNRMF, Government, Private Sector, CSOs and NGOs. This committee will be sitting as the BSC to;

- Deliberate on issues that require deliberation regarding benefit allocation and the actual sharing to Chiefdoms based on performance as guided by the MRV and the CERPA;
- Deliberate on any benefit sharing issues that require deliberations arising out of the 76 Chiefdoms, and;
- Deliberate on any benefit sharing issues that require deliberation from the Nested NERPAs regarding the Nested existing carbon projects in the Province.

BSP Annex V: FRGM and the BSP Arbitration Committee [BSPAC]

The Feedback and Grievance Redress Mechanism (FGRM) is designed to provide a timely, responsive and effective system of resolving community or individual grievances in the project areas including those related to implementation of this Benefit Sharing Plan (e.g. delayed disbursements of funds, etc.). The mechanism is a multi-stage process that starts at the district level and then goes through the Provincial to the National Level.

The FGRM stages are as follows:

- **Step 1: Identifying Focal Points**

Staff in charge of grievance redress should be skilled and professional. Therefore, the ER Program management will identify high-caliber staff (Focal Points) at all levels of their projects and assign them responsibility for handling (receiving and registering) grievances. GRMs can have multiple focal points to receive and register grievances.

This FGRM is designed to give the aggrieved parties access to seek redress to their perceived or actual grievance using this mechanism or other existing mechanisms such as the National legal system (i.e. local Courts, magistrate courts, High court and Supreme Court), various tribunals (e.g. Land tribunal), mediation boards, District Development Committees and Provincial Development Committees and traditional systems (village courts). It is equally important to have someone who has overall responsibility for tracking and following up on issues and complaints raised. The descriptions of the FGRM functions should clearly stipulate the official designations and the roles of the focal points so that they can really be held accountable for performing their functions. The FGRM for the ER Program has identified the focal point persons from community to national level and their tasks have been formulated.

At community level, the project grievance redress structure will be linked and interface to the existing traditional authority structure as this already provides for resolving conflicts in the communities. This will ensure accessibility to the FGRM as the traditional structures are close to the people. The Focal Point in the community will be the Village Secretary and supported by the Project Committee Chairperson. The Focal Person will be someone with knowledge of the local and/or official language of communication and should be able to record the grievances where need be.

The Project will implement a training program to teach staff, Focal Points, community members and other stakeholders how to handle grievances and why the FGRM is important to the project's success. This training should include information about interacting with beneficiaries about grievances, the organization's internal policies and procedures in relation to grievance redress. It will also be useful to establish or build on local and community-based FGRMs by providing grievance redress training for stakeholders at the local level. This greatly reduces FGRM costs while enhancing beneficiary satisfaction with, and ownership of, the grievance redress process.

- **Step 2: Registration of Grievances**

A register of grievances, which will be held by the Community Liaison Officer (CLO) or any other appointed person by the project. The AP must register their grievances with the CLO, the District Planner within the District Monitoring Team (DMT) in the district.

To register the grievance, the AP will provide information to the CLO to be captured in the Grievances Registration Form. The FGRM will accept complaints from the Affected Parties (APs) submitted through verbal, email, phone, Facebook, WhatsApp, meeting or letter to the office of the CLO, in English or any local language spoken in that region or District. The focal point persons handling grievances will transcribe verbal submissions. Receipt of grievances shall be acknowledged as soon as possible, by letter or by verbal means.

When a complaint is made, the FGRM will acknowledge its receipt in a communication that outlines the grievance process; provides contact details and, if possible, the name of the CLO who is responsible for handling the grievance; and notes how long it is likely to take to resolve the grievance. Complainants will receive periodic updates on the status of their grievances. This FGRM has established clearly defined timetables for acknowledgment and follow-up activities. And to enhance accountability, these timetables will be disseminated widely to various stakeholders, including communities, civil society, and the media.

- **Step 3: Assessment and Investigation**

This step involves gathering information about the grievance to determine its validity and resolving the grievance. The merit of grievances should be judged objectively against clearly defined standards. Grievances that are straight-forward (such as queries and suggestions) can often be resolved quickly by contacting the complainant.

Having received and registered a complaint, the next step in the complaint-handling process is for the focal points to establish the eligibility of the complaint received. The CLO, who is the Grievances Registration Officer once a complaint or grievance is registered, shall within 5 days assess the registered complaint or grievances to determine its validity and relevance i.e. is it within the scope of the Program Implementation Unit (PIU)-FGRM as defined in this document. The following criteria can be used to assess and verify eligibility:

- The complainant is affected by the project;
- The complaint has a direct relationship to the project;
- The issues raised in the complaint fall within the scope of the issues that the FGRM is mandated to address.

Having completed the complaint assessment, a response can be formulated on how to proceed with the complaint. This response should be communicated to the complainant. The response should include the following elements:

- Acceptance or rejection of the complaint
- Reasons for acceptance or rejection
- Next steps – where to forward the complaint
- If accepted, further documents and evidence required for investigation e.g. field investigations

Once the registered grievance or complaint has been determined as falling within the scope of this FGRM, the CLO shall investigate the complaint. Investigation of the complaint may include the following:

- On site visit and verification;
- Focus Group discussions and interviews with key informers;
- Review of secondary records (books, reports, public records); and
- Consultations with local government and traditional authorities.

The ER Program will ensure that investigators are neutral and do not have any stake in the outcome of the investigation. At the end of the field investigation, the CLO shall compile a Grievance Investigation Report (GIR) using a standard template on the outcomes of the investigations and the specific recommendation to resolve the grievance or complaint.

- **Step 4: Recommendations and Implementation of Remedies**

After the investigations, the CLO shall inform the AP of the outcome of the investigations and the recommended remedies if any. The AP shall be provided with written response clearly outlining the course of action the project shall undertake to redress the grievances and the specific terminal date by which the recommended remedies shall be completed. Potential actions will include responding to a query or comment, providing users with a status update, imposing sanctions, or referring the grievance to another level of the system for further action. The project will take some action on every grievance. If the recommended remedy involves monetary compensation, the CLO must then seek the approval of the Grievance Committee through the National Project Manager.

The Aggrieved Party shall, provide a response agreeing or disagreeing with the proposed course of action within a minimum reasonable period after receiving the recommended actions as provided for in the FGRM Policy.

- **Step 5: Referral to the Provincial Office**

In the event that the AP is not satisfied with the recommended remedy, the CLO shall forward the copy of Grievance Registration Form (GRF) and GIR to the Provincial Focal Point Person (PFPP), who in this case shall be the PPM.

The PFPP shall once has received the GRP and the GIR from the District must conduct own investigations and complete his own GIR and communicate to the AP within 30 working days (i.e. repeat stages 2-3). The PFPP in his recommendation shall take into consideration the reasons why the AP rejected the remedies offered by the District Focal Point Person (DFPP). He may decide to offer the same remedies as the CLO or different and improved offer.

Once the PFPP has concluded the investigations and communicated to the AP. The AP shall have 7 days or less to agree or disagree with the proposed remedies. If the AP is agreeable to the remedy the PFPP shall ensure that the remedy is implemented within the agreed time frame.

For a remedy that requires monetary compensation the PFPP will submit the information to the relevant government department through the National Project Manager for action.

- **Step 6: Referral to Grievances Committee**

If and when the AP disagrees with the recommendation of the PFPP, the PFPP shall within 7 days of receiving the notice of rejecting the offer from the AP compile all the necessary documents regarding the grievance from district and the province to the Grievance Committee through the grievance Chairperson who will be elected by the Committee.

The Environmental and Social Inclusion Officer with other staff from government implementing partners at the national level shall investigate the matter further and taking into consideration the recommendation of the CLO and PPM. The Environmental and Social Inclusion Officer shall compile the GIR and submit to the Grievance Committee for

consideration. Once the Grievance Committee arrives at a decision it is the responsibility of the ER Program to implement the remedies within the agreed time. If the AP disagrees with the remedy offered by the Grievance Committee, the AP reserves the right to appeal to other external GRMs outside ER Program.

The above-described steps and timeframes will be followed to address grievances emanating from implementing of project activities. For grievances that need quick and urgent attention, the described steps will be adhered to. However, in terms of timeframe, the grievances will be addressed in the shortest feasible period based on a case-to-case basis.

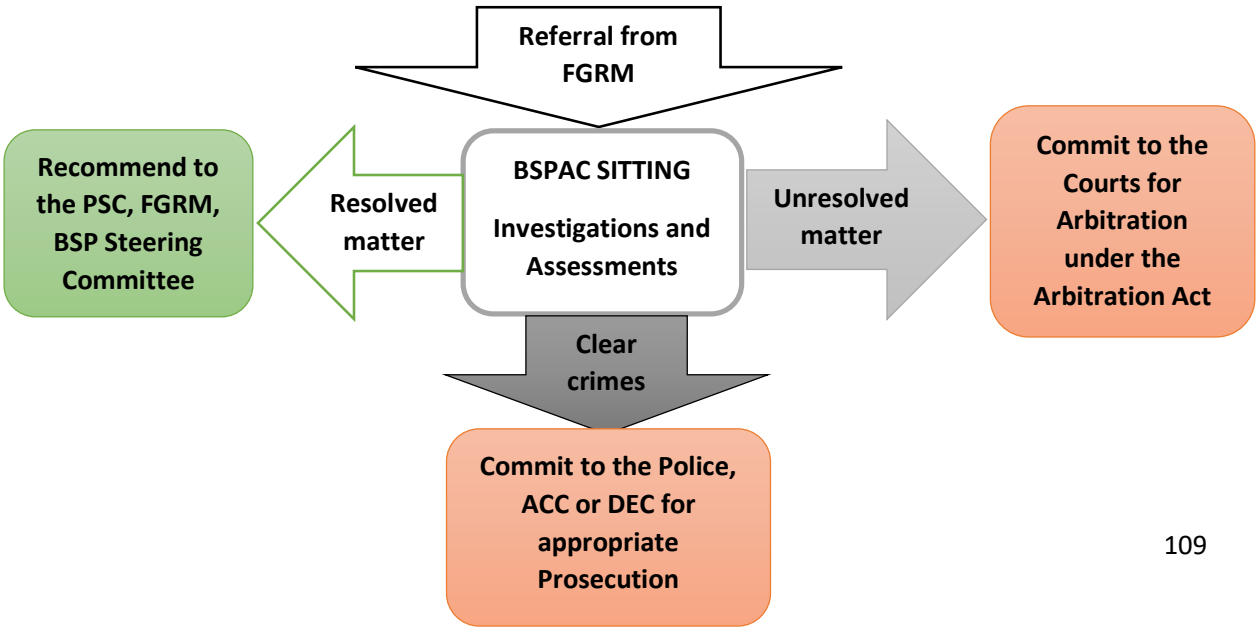
For grievances that cannot be resolved at the project level, these will be reported and directed to World Bank Management through the GRS for further redress.

- **FGRM Referral to the BSP Arbitration Committee (BSPAC)**

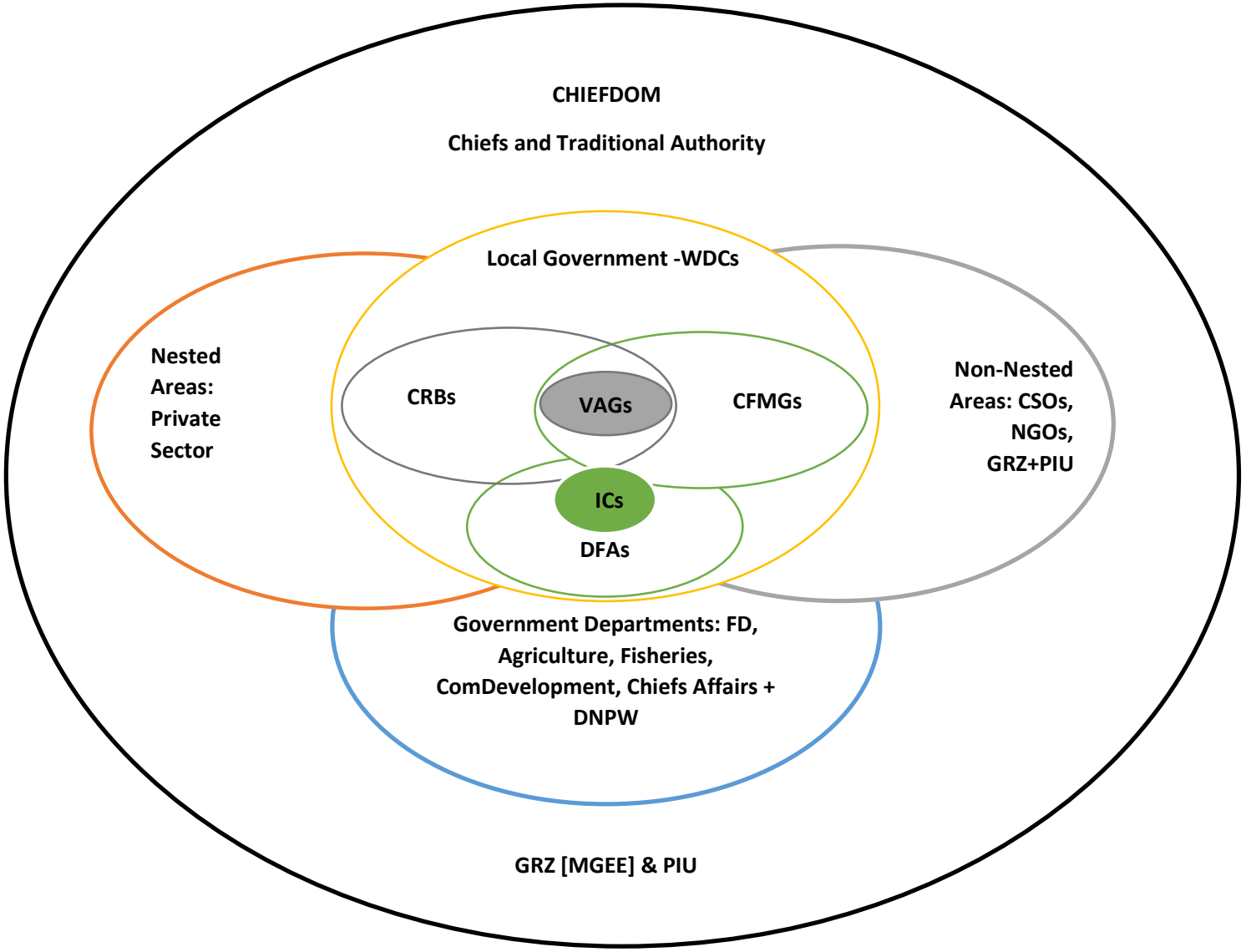
For matters impinging on financial crimes, money laundering, fraud and corruption, the FGRM shall refer such cases to the BSPAC. Under the laws of Zambia, the FGRM and its staff may not have appropriate jurisdiction, authority an expertise to handle serious matters impinging on financial crimes, fraud, money laundering and corruption. The BSPAC will be composed of the following officials;

- The Provincial Permanent Secretary – Chairperson
- Representative of the Attorney General's Chambers [Government Lawyer] – Vice Chairperson
- Provincial Police Commissioner – Secretary
- Official from the Anti-Corruption Commission - Member
- Official from Drug Enforcement Commission (DEC) Anti-Money Laundering Unit – member
- Official from Transparency International Zambia (TIZ) – Member
- Official from the Financial Intelligence Center – Member
- GRZ official from the Chief's Affairs Office – Member

BSPAC Resolution Process



BSP Annex VI: Outlook of institutional arrangements at Chiefdom level



Annex 5: Design Process for Benefit Sharing Arrangements for the ISFL ER Programme

Design and Consultation Process

Stakeholder and Beneficiary Identification. In order to identify stakeholders in the programme area, the Consultant relied on work that was previously completed through the ZIFL-P as well as expert consultations.

- The Asian Consulting Engineers (Pvt) Ltd.'s work to prepare the Draft Strategic Environmental and Social Assessment (SESA), as part of Zambia's REDD+ readiness activities. Asian Consulting Engineers (Pvt) Ltd conducted consultations and Focus Group Discussions (FDGs) in all 14 districts in Eastern Province including with the Government, NGOs, and community members and, through this process, identified all key stakeholders in the ZIFL-P. The ZIFL-P prepared a report entitled "*Preliminary List of Stakeholders Identified in the Districts by Component*" (Draft 23rd June 2018), which identified all "service providers" in Eastern Province. On February 27th, 2020, the Consultant led a break-out discussion group with key ZIFL-P staff and National Government representatives at the World Bank offices in Lusaka. The group reviewed the list and identified the stakeholders they considered key to programme implementation.

Stakeholder Consultation Plan. The BSP is a product of broad stakeholder engagement processes in complying with BioCF ISFL programme requirements on stakeholder consultation. Constitutional principles and rights of the people of Zambia, environmental management principles in the Environmental Management Act, 2011, and principles of SFM as provided in the Forests Act, 2015, have also been fundamental in informing the consultation process.

The Stakeholder Engagement and Consultation Process followed the process below:

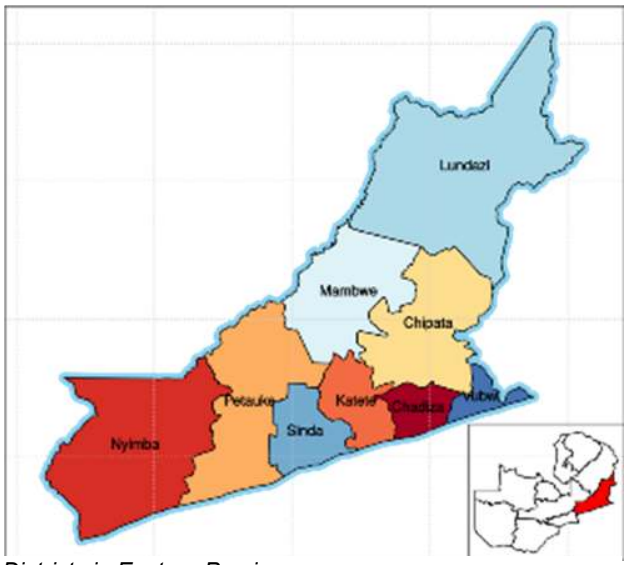
Based on the identification of stakeholders, the Consultant working with the ZIFLP PIU planned a series of consultations in Eastern Province, in the form of FDGs and informational interviews, in ***March 2020.*** The purpose of these consultations was to inform the design of the Draft Benefit Sharing Plan.

In total (9) FDGs and informational interviews were held in (4) Districts: Chipata, Kasenengwa (not shown on map), Lundazi and Mambwe. These discussions included 126 individuals from various groups: the PDCC, DDCC, Lead Farmers, CFMGs, CRBs, Chiefs, and CSOs. Additionally informational interviews were conducted with private sector entities COMACO and BioCarbon Partners (BCP) that are currently implementing REDD+ benefits sharing in Eastern Province, with local communities (See Table 1). Feedback from these workshops was used to prepare the initial draft of the BSP.

Table 1. Initial Stakeholder Consultations, Locations, Dates, # of Participants

Stakeholder	**Type**	**Location**	**#***	**Date**
PDCC and DDCC Meeting	FGD	Chipata District	26	02 March 2020
Chisitu Farm School Lead Farmers	FGD	Chipata District	45	02 March 2020

Banki Community Forest Management Group (CFMG)	FGD	Kasenengwa District	18	02 March 2020
COMACO	Informational Interview	Chipata District	4	03 March 2020
Land Alliance	Informational Interview	Chipata District	4	03 March 2020
Meeting with HRH Chief Kazembe	Informational Interview	Kazembe Chiefdom, Lundazi District	N/A	04 March 2020
Meeting with Kazembe Community Resource Board (CRB)	FGD	Kazembe Chiefdom, Lundazi District	17	04 March 2020
BioCarbon Partners	Information Interview	Lusaka	2	28 February 2020
Meeting with HRH Chief Jumbe and Community Resource Board (CRB)	Informational Interview	Jumbe Chiefdom, Mambwe District	N/A	05 March 2020
Meeting with Jumbe Community Resource Board (CRB)	FGD	Jumbe Chiefdom, Mambwe District	12	05 March 2020
# Indicates number of participants. Note that attendance was not taken at the meetings with Chiefs; therefore, these are not included in the total # of participants.				



Districts in Eastern Province

A second set of Stakeholder Consultations was implemented by the GRZ throughout Eastern Province from **November 23rd – December 1st, 2020**. The goals of these consultations were to widely engage stakeholders for the development of a robust BSP in line with the national and ISFL guidelines. The process was driven by GRZ and involved consulting with communities, traditional authorities, CRBs, CFMGs, CSOs, government and private sector at national, provincial, district and chiefdom levels. GRZ teams conducted FGDs and Informational Interviews with each of the categories of beneficiaries identified to review feedback on the initial design of the BSP. Table 2 shows the list of stakeholders consulted.

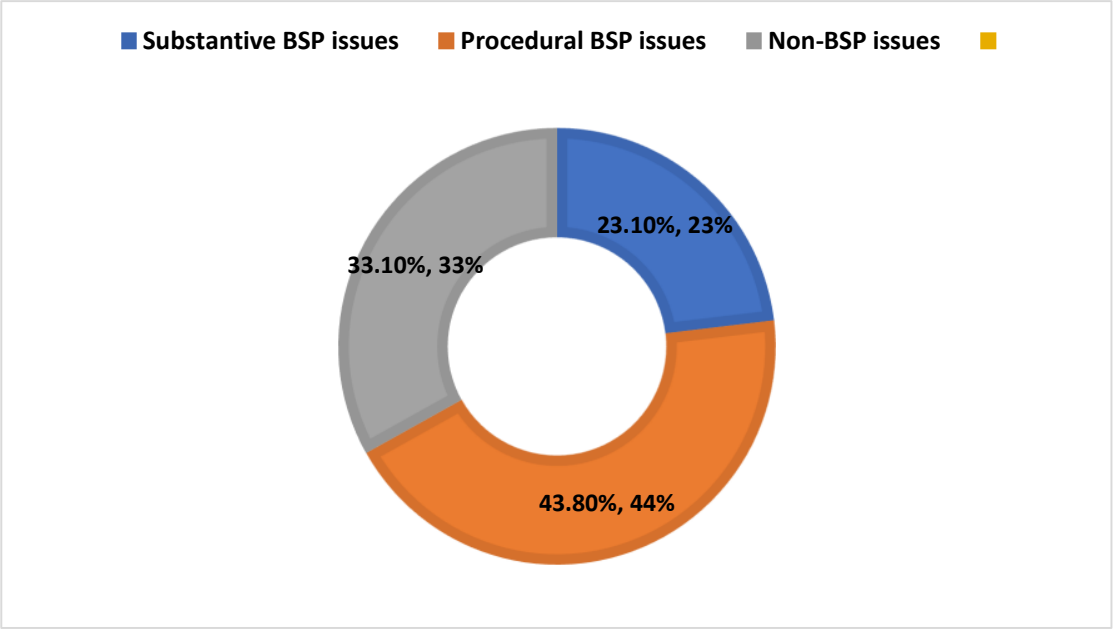
In total (13) Chiefdoms spanning across the EP were included in the Stakeholder Consultations and included Chiefs, Headmen and CRBs from the various communities. These discussions included more than 100 individuals. Feedback from these workshops was incorporated into this version of the Draft BSP.

Further engagements were held from November 2022 to March 2023, to validate the earlier consultations held in early stages of initial stages of the BSP development. The third round of consultations aimed at concretizing consultations at an advanced stage using a clustered approach to; (i) advance the draft the BSP to validation stage, (ii) iron out any teething issues which the draft BSP could have brought forward thus far, and (iii) galvanize consensus over

benefit allocation and percentage shares – which remained, by far, the most contentious issue among stakeholders and beneficiaries.

- The third round of consultations commenced with a two-day high-level BSP consultative workshop in Lusaka on 5-6th December 2022. The workshop attracted a high-power delegation of 37 participants from: Government [FD,[32] MoE, MGEE, MoT – DNPW and MoA]
- Regulatory authorities – ZEMA
- CSOs – ZCBNRMF[33] and Chalimbana Head Waters Association
- Community representatives – CFMGs and ZCRBA
- Traditional Authorities – Two Chiefs from EP
- World Bank Consultants [3] and 3 World Bank Staff

From the workshop, there were still some information gaps among stakeholders which raised misunderstandings. Part of the significant missing information was in regard to the actual harmonization of legacy REDD+ projects and nesting them into the jurisdictional arrangement using a centralized approach as required by law. Below is a summary of issues collated from this stakeholders meeting.



[32] Forestry Department
[33] Zambia Community Based Natural Resources Management Forum

2-3rd February 2023 – The Petauke Stakeholders Consultative Meeting

The HTWG met in Petauke District, EP, to, among other things, address technical issues of harmonization and centralized Nesting emanating from the Lusaka national meeting; to discuss the BSP, i.e., benefit allocation of percentage shares, and to agree on roadmap for the technical group going forward. The HTWG is a group of multi-sectoral experts appointed by the GRZ to provide technical recommendations to the MGEE regarding the practical issues of harmonization and centralized Nesting. In Petauke, the group consisted of.

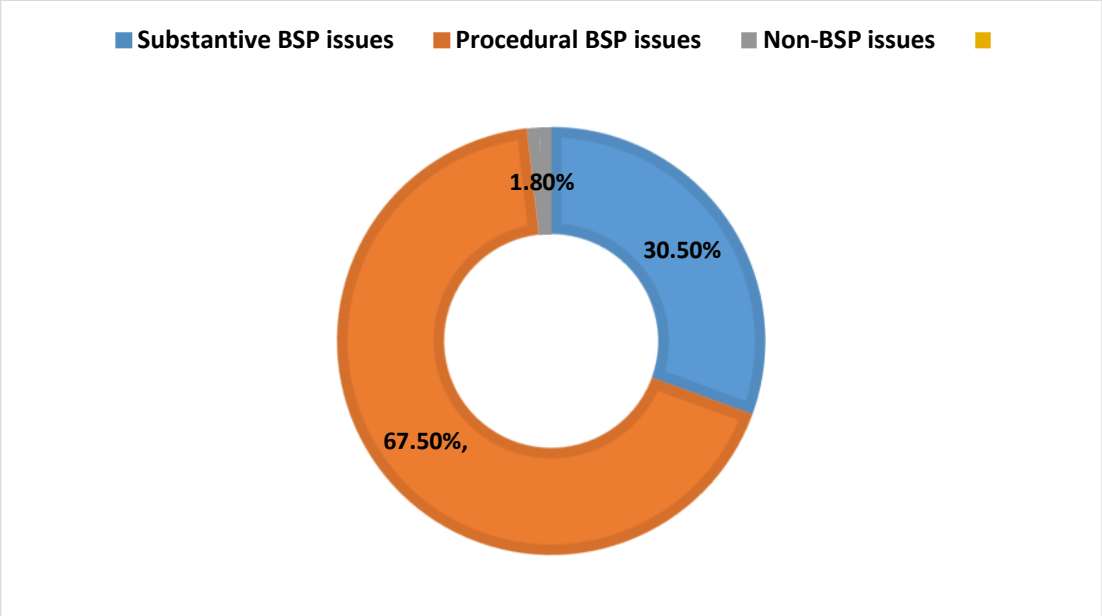
- The ZIFLP PIU
- Government [Dept of FD (Co-Chair), MoE, MGEE, Dept of Agriculture, Provincial Planning]
- Regulatory authorities – ZEMA [The Chair]
- Representative of the Chiefs from Chief Affairs
- Community representatives, also representing the chiefs in their respective CRBs and CBNRM Forums – CRBA and ZCRBA
- Private sector and Legacy Projects – BCP and COMACO.

Other stakeholders in attendance included.

- World Bank STC-BSP Consultant
- Snr. Chief Lwembe [by virtual connection]
- Private sector; COMACO and BCP

The meeting showed concerted positive effort to answer the key question raised from the Lusaka meeting of December 2022, i.e., percentage shares, and the rationale behind the proposed percentage shares. During this meeting a government proposal of the benefits sharing mechanism was discussed and counter proposals shared by the different stakeholders. The proposed sharing mechanism by the Government included PIU management costs 15%; Community 55%; and Private Sector/ER Service Providers (nested & non nested 30%

A summary of issues was collated as follows:



6-8th February 2023 – Private Sector Meetings with Legacy Projects; COMACO and BCP in Lusaka.

The meetings were meant to be open discussions guided by open-ended questions so the respondent(s) could be free and open to provide as much information as possible.

The overall objective of these meetings was to gain a clear and independent view of the Private Sector's existing Carbon Projects towards the EP-JSLP. The specific objective was to gain their clear and independent view regarding benefit sharing. Outcomes of the meetings were varied between the two companies, but key issues were that the two companies were agreed with the Jurisdictional Programme as provided for by the SI 66 of 2021 but required further clarity around the benefit sharing mechanisms, the harmonization and nesting of the existing Carbon Projects into the Jurisdiction, transparency and accountability, information sharing & management and the operational modalities of the centralised nesting arrangement.

March 2023 -Katete Meeting with NCRBA, CBNRMF AND Chiefs

This meeting was attended by nine Chiefs from the EP and select CRBs and the ZCBNRM. The meeting was held to discuss the sharing mechanism proposals made in the Petauke meeting with the Traditional leaders. The meeting also discussed the operational modalities of the EP-JSLP and how it would lead to more benefits to the communities in light of the various lessons learnt in the operations with the existing Carbon Projects operating in the EP.

The conclusion of the meeting produced a counter proposal to the Government initial proposal on the sharing mechanism in the following ratios; Communities 60%, GRZ/PIU 10% and (nested and non-nested service Providers 20%.

15th March 2023 – The Chipata Government Stakeholders Consultative Meeting

A Provincial consultative meeting was held for Provincial Planning units from all the Districts of EP. The meeting was attended by the following clusters of 40 participants.

- PPU [34] (District and Provincial Planning Officers), FD[35] (District and Provincial Forestry Officers), MCDSS[36] (District and Provincial Social Welfare Officers, Socio-economic Planners), Local Authorities (District Councils and Town, Urban and Environmental Planners), DNPW,[37] ZIFLP-PIU and MoA[38] (Provincial and District Agricultural Officers).

Meeting Objectives: (1) To share information on the Draft BSP, (2) To gather more information and feedback regarding beneficiation and benefit-sharing in the EP jurisdiction, (3) Consolidate stakeholder consultation around the Draft BSP, and; (4) Improve the Draft BSP with information from Provincial stakeholders.

The participants were clustered into three groups, each of which was asked to assess the three models of the BSP sharing mechanism generated following previous consultative engagement with stakeholders as follows: Group 1: Dealing with model 1 (initial Government Proposal), Group 2: Dealing with model 2 (Traditional Leaders & community proposal) and Group 3: Dealing with model 3 (revised ER Programme Operational costs (EP-JSLP PIU) 15%, Community 55% and Nested and non-nested Service Providers 30%.

[34] Provincial Planning Unit

[35] Forestry Department

[36] Ministry of Community Development and Social Services

[37] Department of National Parks and Wildlife

[38] Ministry of Agriculture

The stakeholders were generally in agreement with allocating more resources to the communities as the custodians of the natural resources but was generally opposed to the breakdown of the community share which seemed to allocate more control and management of resources to the Chief. Other proposals were that the Chiefs share of benefits should be broken down into percentages for the Chief as an individual and a portion to the Chieftaincy to cover other members of the Royal family.

There was general consensus that GRZ and the PIU may need more allocations given the nature of the roles and responsibilities attached to the two entities in the entire Jurisdiction. There was uncertainty around what allocation would be ideal, fair and justifiable for the private sector entities.

16th March 2023 – Chipata Meeting with CSOs and NGOs stakeholders

A total of 30 participants attended the consultative meeting representing the following CSOs and NGOs operating in EP.

- SNV,[39] Land Alliance, SHDP,[40] Kachele Development Trust, Chipata DFA,[41] WILDAF,[42] YDF,[43] Caritas, NGOCC,[44] YWCA,[45] ZNWL,[46] Enlight Abilities Organization, COPECRED,[47] CSPR,[48] and APC.[49]

Meeting Objectives: (1) To share information on the Draft BSP, (2) To gather more information and feedback regarding beneficiation and benefit-sharing in the EP jurisdiction, (3) Consolidate stakeholder consultation around the Draft BSP, and; (4) Improve the Draft BSP with information from Provincial stakeholders.

the CSOs and NGOs were clustered into two groups, each of which was asked to assess all the three models of the BS mechanisms.

Salient conclusions from the stakeholders included.

- There was a general consensus that the largest allocations should go to communities although the communities do not receive the allocation, they deserve due to the unfair and disproportional allocations which go to the Chiefs.

[39] Netherlands Development Organization
[40] Save Humanity Development Program
[41] District Farmers' Association
[42] Women in Law and Development in Africa
[43] Youth Development Forum
[44] Non-Governmental Organizations' Coordinating Council
[45] Young Women Christian Association
[46] Zambia National Women's Lobby
[47] Chimwemwe Organization for Promotion of Early Childhood Rights Education and Development
[48] Civil Society for Poverty Reduction
[49] Action for Positive Change

- The allocation to GRZ and PIU was justifiable given the nature of the roles and responsibilities attached to the two entities in the entire jurisdiction.
- Firstly, there is a general feeling that allocation to the private sector should be reduced because they only cover a small portion of the province. Secondly, there was a general consensus that Nested and non-nested areas should be split and treated separately.

18th March 2023 – Meeting in M'fuwe

The consultative meeting targeted the Private Sector operating in the wildlife space of the EP, particularly in M'fuwe tourist area of Mambwe District. The meeting was preceded by a courtesy call to His Royal Highness Chief Kakumbi of Mambwe District. The meeting was attended by a total of 15 participants representing tour operators, private lodge owners and safari companies].

- LSA,[50] Flat Dog Lodge, CCT,[51] CSL,[52] DNPW,[53] Mambwe Town Council and a courtesy call to His Royal Highness Chief Kakumbi of Mambwe District.

Meeting Objectives: (1) To share information on the Draft BSP, (2) To gather more information and feedback regarding beneficiation and benefit-sharing in the EP jurisdiction, (3) Consolidate stakeholder consultation around the Draft BSP, and; (4) Improve the Draft BSP with information from Provincial stakeholders.

The meeting was very interactive with stakeholders raising many questions around the generative themes of Information gaps and Harmonization and Nesting. Like the other consultative meeting the three benefits sharing mechanisms generated from previous stakeholders' consultations building on the Government proposal were discussed. The community benefits share proposal raised a number of issues including the following.

- The ineffectiveness of the BCP BSP model has been attributed to lack of transparency and accountability. This proposal mirrored the BCP model.
- Existing local institutions, especially the CRBs and CBNRM Association, has had issues managing funds because of the inefficiencies marred by their historical governance challenges, lack of transparency and poor accountability systems.
- there is a tight rope to be walked between the use of locally existing institutions or creation of new institutions to administer resources at chiefdom level.
- Two prominent suggestions for new institutions point to Ward Development Committees under the Local Government Act, 2019 and Chiefdom Development Trusts [whose composition should include all stakeholders operating in the area,

[50] Luangwa Safaris Association
[51] Chipembele Conservation Trust
[52] Conservation South Luangwa
[53] Department of National Parks and Wildlife

i.e., traditional authorities, local authorities, private sector, NGOs and CSOs], to administer, monitor and provide oversight over the benefits funds.

- It was proposed that this allocation be split into two; 5% to Chief as an individual and 5% to Chief as an institution (Traditional Authorities).
- Concerns of who manages the resources under the community allocations with misgivings of more control of funds falling on the Traditional authorities.
- Issues of Elite capture, Lack of transparency and accountability, and Institutional ineffectiveness was also a source of concern for these stakeholders, stating that the three issues put together may jeopardize the ability of benefits flowing to the communities as the primary beneficiaries, and consequently undermine community commitment to ER activities.

Table 2. Comprehensive Stakeholder Consultations, Location, Dates, and # of Participants

Stakeholder	**Type of Group**	**Location**	**#***	**Date**
Ngoni Headmen at Epheduken Palace Feni.	Traditional leaders	Unknown	Unknown	23rd November 2020
Gogo Mazimawe	Traditional leaders	Unknown	1	23rd November 2020
Ngoni Headmen at Mazimawe Palace	Traditional leaders	Unknown	Unknown	23rd November 2020
Senior Chief Luembe, Headmen and CRB Members	CRB and Headmen	Nyimba	21	24th November 2020
HRH Chief Nyalugwe and Headmen	Traditional leaders	Chief Nyalungwe's Palace, Nyimba	1	25th November 2020
Nyalugwe, Nyimba	CRB/CFMG	Chief Nyalugwe Palace, Nyimba	unknown	25th November 2020
Her Royal Highness Chieftainess Mwanya	Traditional Leader	Lumezi (part of former Lundazi)	Men 23, Women - 2	28th November 2020
Headmen and Women, and CRB members of Mwanya Chiefdom	Traditional Leaders and CRB	Lumezi (part of former Lundazi)	unknown	28th November 2020
Jumbe and Kakumbi CRBs	CRB	Mkhanya Chiefdom, Mfuwe, Mambwe	9	26th November 2020
Headmen and Headwomen Nsefu Chiefdom	Traditional Leaders	Nsefu Chiefdom, Mfuwe, Mambwe	unknown	26th November 2020
Headmen of Mwase Lundazi Chiefdom	Traditional Leaders	Lundazi	Men – 26, Women - 0	30th November 2020
Group Headmen, Headmen and Chitungulu CRB	Traditional Leaders and CRB	Chief Chitungulu, Lumezi	Men -21, Women - 2	1st December 2020
Kasembe CRB	Traditional Leader	Lumezi (part of old Lundazi)	unknown	2nd December 2020

Validation Workshops on this Draft BSP are anticipated to take place in 2023 where a summary, translated, version of BSP, will be presented to communities (in clusters) throughout Eastern Province. Any additional feedback received will be used to prepare the final Draft of the BSP, which will be sent to the BioCF ISFL for final review.

Detailed information is found in the attached Benefit-Sharing Plan (Annex 4).

Annex 6: GHG inventory of all AFOLU categories, subcategories, gases and pools in the Programme Area

Republic of Zambia

Ministry of Green Economy and Environment

Final Draft Greenhouse Gas Emissions Inventory Baseline Report for the Agriculture, Forestry and Other Land use Sectors in Eastern Province

For Consultancy Services for the Emissions Reduction Baseline Study for the Greenhouse Gas Emission (GHG)

Zambia Integrated Forest Landscape Project

CEEZ
Centre for Energy, Environment and Engineering Zambia Limited

In partnership with

RuralNet Associates Ltd
Development Consultants

June 2022

Updated March 2023

1 INTRODUCTION

Zambia is implementing a REDD+ project in the Eastern Province called the Zambia Integrated Forest Landscapes Project (ZIFL-P) whose objective is to improve landscape management and increase environmental and economic benefits for targeted rural communities in the Eastern Province. The Project will be implemented over a period of five years from 2018 to 2022.

The Project had set aside funds to conduct an Emissions Reduction Baseline Study for Eastern Province. The Study aimed to conduct a GHG inventory of the Eastern Province, develop an Emissions Baseline and provide relevant analytical work for developing an interim roadmap for moving toward comprehensive accounting of GHG emissions that would improve landscape management for Eastern province. The ZIFL-P identified interventions that prevent deforestation and forest degradation, such as: improved land-use planning, climate smart agriculture development, rural energy generation, and laws and policies that protect forests and wildlife. These activities informed the baseline study. Establishing such an emissions baseline required a substantial technical analysis of historical land use and land use changes and associated emission factors. The baseline study results will serve as a per ton CO_2eq baseline for all land use categories including deforestation and forest degradation across the Eastern Province, against which future verified payments for emission reductions will be made, in line with the principles specified in the BioCF ISFL's Methodological Approach.

2 EASTERN PROVINCE GHG INVENTORY FOR AFOLU

2.1 Descriptive Summary of AFOLU Categories and Subcategories

A GHG inventory was conducted for the AFOLU Sector. GHG Inventory of the AFOLU categories, subcategories, gases and pools which are prevalent in Eastern Province was compiled in accordance with the Initiative for Sustainable Landscapes (ISFL) Emission Reductions Programme Requirements, Version 2, April 2021, the 2006 IPCC guidance and guidelines for National Greenhouse Gas Inventories. In accordance with the IPCC guidance and guidelines, Eastern Province GHG Inventory has applied as far as possible the basic principles of Transparency, Accuracy, Completeness, Consistency over time and Comparability as defined by the IPCC. The Eastern Province GHG Inventory is comparable in its use of definitions, categories and subcategories with national processes such as the national GHG inventory and the Biennial Update Report.

The GHG inventory for AFOLU categories and subcategories as contained in the IPCC 2006 Guidelines are outlined in Table 1.

Table 1. Summary of AFOLU Categories and Subcategories

Categories/ subcategories Data input into IPCC Inventory Software	**Description**	**Gases**	**Pools**	**Method**	**Dates of data**	**Source of Activity Data**	**Source of Emission factors**
3A Livestock							
3A1 Enteric Fermentation	GHG from enteric fermentation consist of methane gas production in digestive systems of ruminants and to a lesser extent of non-ruminants.	CH_4		Tier 1	2009 to 2018 (Data between 2010 and 2013 was extrapolated)	Livestock Annual Reports (2009 – 2018) and Livestock Census Report, 2018	IPCC 2006 Guidelines
3A2 Manure Management	GHG emissions from manure management Consist of methane and nitrous oxide gases from aerobic and anaerobic manure decomposition processes.	CH_4, N_2O		Tier 1	2009 to 2018	Manure Management Systems estimates from Provincial and District Livestock Experts	IPCC 2006 Guidelines
3B Land							
3B1a Forest Land remaining Forest Land	This category includes: • Forest land remaining forest land	CO_2,	Aboveground biomass, belowground biomass, Dead organic	Tier 2 (for activity data and emission factor) Tier 2 derived SOC stocks for AFOLU categories	2009 to 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme,	ILUA II; IPCC 2006 Guidelines, ZARI Report

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
			matter, Soils, Litter	in the Eastern Province.		ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	
3B1bi Cropland Converted to Forest Land	This category includes: • abandoned cropland regenerate into forest land (Forest gains)	CO_2,	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils, Litter.	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data, Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II; IPCC 2006 Guidelines, ZARI Report
3B1bii Grassland converted to Forest land	Not Estimated (NE)	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	ILUA II; IPCC 2006 Guidelines, ZARI Report
3B1biii Wetlands converted to Forest land	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	ILUA II; IPCC 2006 Guidelines, ZARI Report

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
3B1biv Settlements converted to Forest land	This category includes: • abandoned settlements regenerates into forest land (Forest gains)	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils Litter.	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter); Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II; IPCC 2006 Guidelines, ZARI Report
3B1b v Other Land converted to Forest land	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	ILUA II; IPCC 2006 Guidelines, ZARI Report
3B2ai Cropland remaining cropland	This category includes. • cropland remaining cropland	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils Litter	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 2 derived SOC stocks for AFOLU categories	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land	ILUA II IPCC 2006 Guidelines, ZARI Report, VCS SALM Methodology (VM0017)

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
				in the Eastern Province. Tier 3/2 CSA baseline SOC equilibrium factor (steady state method in line with IPCC 2019 Refinement and VM0017 SALM Methodology		use categories in Eastern Province For The CSA component: Crop Forecast Survey farm-based data and reports, Post Harvest Survey data, Lead Farmer Register, ZIFLP Baseline Survey	
3B2bi Forest Land Converted to Cropland	This category includes: • Forest land converted to cropland	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils Litter.	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II IPCC 2006 Guidelines, ZARI Report

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
3B2bii Grassland Converted to Cropland	This category includes: • Grassland converted to cropland	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils Litter.	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II IPCC 2006 Guidelines, ZARI Report
3B2biii Wetlands converted to Cropland	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B2biv Settlements converted to Cropland	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B2bv Other land converted to cropland	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B3a Grassland remaining Grassland	This category includes:	CO_2	Aboveground biomass, belowground biomass Dead Organic	Tier 2 (For activity data and emission factor) (Aboveground biomass)	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil	ILUA II IPCC 2006 Guidelines, ZARI Report

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
	• Grassland remaining Grassland		Matter, Soils, Litter.	Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC stocks for AFOLU categories in the Eastern Province.		Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	
3B3bi Forest land Converted to Grassland	This category includes: • Forest land converted to Grassland	CO_2	Aboveground biomass, belowground biomass Dead Organic Matter, Soils, Litter	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter)	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II IPCC 2006 Guidelines, ZARI Report
3B3bii Cropland converted to Grassland	This category includes: • Cropland converted to Grassland	CO_2	Aboveground biomass, belowground biomass Dead Organic Matter, Soils, Litter	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land	ILUA II IPCC 2006 Guidelines, ZARI Report

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
				Organic Matter and Litter) Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.		use categories in Eastern Province	
3B3biii Wetlands converted to Grassland	This category includes: • Wetlands converted to Grassland	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils, Litter.	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Soils, Dead Organic Matter and Litter)	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme	ILUA II; IPCC 2006 Guidelines
3B3biv Settlements converted to grassland	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B3bv Other land converted to wetlands	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B4a Wetlands remaining Wetlands	This category includes: • Wetlands remaining Wetlands	CO_2	Aboveground biomass, belowground biomass, Dead Organic	Tier 2 (For activity data and emission factor) (Aboveground biomass)	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics	ILUA II; IPCC 2006 Guidelines

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
			Matter, Soils, Litter.	Tier 1 (Emission factors (Soils, Dead Organic Matter and Litter)		Bureau IPCC Soil Classification Scheme	
3B4ai Land converted to Wetlands	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B4aii Flooded land remaining Flooded land	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B.5a Settlements remaining Settlements	This category involves: ● Settlements remaining Settlement	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils, Litter	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter Tier 2 derived SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II IPCC 2006 Guidelines, ZARI Report
3B5bi Forest land Converted Settlements	This category involves: ● Forest land converted Settlements	CO_2	Aboveground biomass, belowground biomass, Dead Organic	Tier 2 (For activity data and emission factor) (Aboveground biomass)	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme,	ILUA II IPCC 2006 Guidelines, ZARI Report

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
			Matter, Soils, Litter	Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.		ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	
3B5bii Cropland Converted to Settlements	This category involves: • Cropland Converted to Settlements	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils, Litter	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC EF from measured SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II IPCC 2006 Guidelines, ZARI Report
3B5biii Grassland converted to Settlements	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
3B5biv Wetlands converted to Settlements	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3B6a Otherland remaining Otherland	This category involves: • Otherland remaining Otherland	CO_2	Aboveground biomass, belowground biomass, Dead Organic Matter, Soils, Litter	Tier 2 (For activity data and emission factor) (Aboveground biomass) Tier 1 (Emission factors (Dead Organic Matter and Litter) Tier 2 derived SOC stocks for AFOLU categories in the Eastern Province.	2008 and 2018	Saiku Data, Collect Earth http://openforis.org Data; Central Statistics Bureau IPCC Soil Classification Scheme, ZARI Report on measured SOC stocks (Tier 2) of AFOLU land use categories in Eastern Province	ILUA II IPCC 2006 Guidelines, ZARI Report
3B 6b Land converted to Other	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3C Aggregate Sources and non-CO_2 emissions							
3C1a Emissions from biomass burning in Forest land	This category includes biomass burning on forest land under the form of controlled burning and	CH_4, N_2O, CO, NO_x		Tier 1 (Emission Factor) Tier 2(Activity Data)	2009 to 2018	Hollingsworth et al, 2015 and Chidumayo 2013	IPCC 2006 Guidelines

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
	wildfires. And Estimated under Forest land remaining Forest land–Disturbances from Fires						
3C1b Emissions from biomass burning in Cropland	This category includes biomass burning on cropland under the form of controlled burning and wildfires (crop residue management)	CH_4, N_2O, CO, NO_x		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Hollingsworth et al, 2015 and Chidumayo 2013	IPCC 2006 Guidelines
3C1c Emissions from biomass burning in Grassland	This category includes biomass burning on grassland under the form of controlled burning and wildfires	CH_4, N_2O, CO, NO_x		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Hollingsworth et al, 2015 and Chidumayo 2013	IPCC 2006 Guidelines
3C1d Emissions from biomass burning in Other Land	This category includes biomass burning on other land (Wetlands, Settlements and Bare land) under the form of controlled burning and wildfires	CH_4, N_2O, CO, NO_x		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Hollingsworth et al, 2015 and Chidumayo 2013	IPCC 2006 Guidelines

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
3C 2 Liming	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	
3C3 Urea Application	Urea accounts for CO_2 emissions and should be summed for all type of lands.	CO_2		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Crop Forecasting Survey, Ministry of Agriculture	IPCC 2006 Guidelines
3C4 Direct N_2O Emissions from Managed Soils	This category includes Inorganic and organic N fertiliser application for all type of land Urine and dung N deposited on pasture, range and paddock by grazing animals N in crop residues.	N_2O		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Crop Forecasting Survey, Ministry of Agriculture	IPCC 2006 Guidelines
3C5 Indirect N_2O Emissions from managed Soils	This category includes indirect N_2O emissions due to atmospheric deposition and N leaching/run-off of managed soils	N_2O		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Crop Forecasting Survey, Ministry of Agriculture	IPCC 2006 Guidelines
3C6 Indirect N_2O Emissions from manure management	This category includes indirect N_2O emissions due to volatilization, leaching and runoff	N_2O		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Crop Forecasting Survey, Ministry of Agriculture	IPCC 2006 Guidelines

Categories/ subcategories Data input into IPCC Inventory Software	Description	Gases	Pools	Method	Dates of data	Source of Activity Data	Source of Emission factors
	from manure management systems						
3C7 Rice Cultivation	This category includes CH_4 emissions from flooded fields through anaerobic decomposition of organic materials with defined rice ecosystem, water management and organic amendments	CH_4		Tier 1 (Emission Factor) Tier 2 (Activity Data)	2009 to 2018	Crop Forecasting Survey, Ministry of Agriculture	IPCC 2006 Guidelines
3C8 Others (Specify)	NE	NE	NE	NE	NE	Collect Earth Activity Data did not capture any data on this subcategory	

The emission estimates in the following AFOLU subcategories 3B1bii Grassland converted to Forest Land, 3B1biii Wetlands converted to Forest Land, 3B1bv Other Land converted to Forest Land, 3B2biii Wetlands converted to Cropland, 3B2biv Settlements converted to Cropland, 3B2bv Other land converted to Cropland, 3B3biv Settlements converted to Grassland, 3B3bv Other land converted to Grassland, 3B4b Land converted to Wetlands, 3B5biii Grassland converted to Settlements, 3B5biv Wetlands converted to Settlements, 3B6b Land converted to other Land, 3C2 Liming and 3C8 Other (please specify) were Not Estimated (NE) since the Collect - Earth dataset that was analysed by Forestry Department did not have data on the listed conversions.

For the Livestock sector, Tier 1: basic characterisation for livestock populations and default emission factor according to the IPCC 2006 Guidelines were used to calculate CH_4 emissions from enteric fermentation, and CH_4 and N_2O emissions from manure management, for the period 2009 to 2018. The source of activity data was Livestock Annual Reports[54] and Livestock Census Report[55]. The reporting period was from 2009 to 2018 (10 years).

For Land use categories, Tier 2 methods were used to collect Land Use Activity Data to estimate carbon stock changes for each land use category and corresponding subcategories. The Collect Earth Tool[56] was used to determine Land use Change. The Gain-Loss Method was used to estimate change in carbon stock in biomass. The carbon pools included in the GHG Inventory in LULUCF sector are above ground biomass (AGB), below ground biomass (BGB), Dead organic matter (only Deadwood), and litter and soil carbon. For soil carbon, measured SOC stocks in the Eastern Province undertaken by ZARI, Ministry of Agriculture, University of Zambia and CEEEZ representing the main AFOLU categories were used from the reference period to derive constant SOC equilibrium factors for land categories remaining as well as to derive SOC change factors for land use categories in transition. For cropland remaining cropland an addition climate smart agriculture baseline equilibrium SOC factor was derived based on soil modelling using activity data on CSA practices from various farm based (Tier 3) surveys from the reference period.

The gases estimated include CO_2, CH_4, N_2O, CO and NO_x. The Deadwood constituted emissions from firewood collected for cooking and heating and for charcoal production, and both FGpart (Fuelwood harvesting which is mostly deadwood) and FGwhole (charcoal production) were considered. Carbon stock

[54] Ministry of Fisheries and Livestock. Livestock Report

[55] Summary Report - The 2017/2018 Livestock and Aquaculture Census, Ministry of Fisheries and Livestock and Central Statistical Office Lusaka, 2018

[56] Saiku Data, Collect Earth http://openforis.org

changes in litter were estimated based on Tier 1 approach. Tier 2 Emission factors for aboveground biomass for Forest land – Forest land remaining Forest land were obtained from the Integrated Land Use Assessment Report II (ILUA II)[57]. For the land use conversions (land use converted to another land use), the land use data sets used were 2008 and 2018 and for land remaining in the same category the land use datasets and statistics used were from 2009 to 2018.

For Aggregate Sources and Non-CO_2 emissions, CH_4 and N_2O Emissions from Biomass Burning in Forest land, Cropland, Grassland and Other Land were estimated by using country specific activity data (Tier 2) on burnt areas from Hollingsworth et al, 2015 and IPCC default emission factors (Tier 1). Direct emissions of N_2O from managed soils and Indirect N_2O emissions from managed soils and Indirect N_2O Emissions from manure management were estimated by using country specific activity data from National published data from Crop Forecast Surveys, Ministry of Agriculture[58] and Livestock Annual Reports from the Ministry of Fisheries and Livestock and Tier 1 IPCC default emission factors. CO_2 emissions from Urea application were estimated by using country specific activity data obtained from Crop Forecast Surveys, Ministry of Agriculture and Tier 1 IPCC default Emission Factors. Tier 1 Emission Factors obtained from IPCC 2006 Guidelines were used to calculate CH_4 emission from rice cultivation and using country specific activity data on area harvested. CO_2 emission from liming was not estimated since it is not commonly practiced in Eastern Province. The reporting period of GHG estimates from Aggregate sources and non-CO_2 emissions was from 2009 to 2018. Table 2 shows procedures used for data collection by data providers.

Table 2: Procedures used for data collection by data providers.

Data Description	Data Sources	Narrative of data	Data gathered from – District, Provincial, National or Global level
Livestock population data	Livestock Annual Reports (2009 – 2018)	Administrative data	District
Livestock population data	Livestock Census Report, 2018. Lead Farmer Register	Census	District and provincial, Agroecological zones

[57] Integrated Land Use Assessment II. Forestry Department 2016.

[58] Crop Forecasting Survey, Ministry of Agriculture

Data Description	Data Sources	Narrative of data	Data gathered from – District, Provincial, National or Global level
Forestry emission factors	ILUA II[59]	National Forestry Inventory	National
Crop production data	Crop Forecast Survey farm-based data and reports, Post Harvest Survey data, Lead Farmer Register, ZIFLP Baseline Survey	Census	District, Agroecological zones
Fertiliser Data			
Crop Residue Management data			
Fire data (Burnt area data)	Hollingsworth et al, 2015	Fire Assessment Study	National
IPCC Soil Classification scheme	IPCC	Global Soil Map	Global
SOC equilibrium factors for main land use categories	SOC measurements from ZARI, Ministry of Agriculture	SOC measurements of the topsoil (30 cm) from at least three sampling campaigns	Provincial
Fuelwood extraction data	Forestry Department and Ministry of Energy	Administrative data	National
Timber harvesting data	Forestry Department	Administrative data	National
Land Use data	Forestry Department	Collect Earth	Province
Climate data	Climate toolbox	Monthly mean min & max temperature, mean precipitation	District and agro-ecological zone

[59] Integrated Land Use Assessment II. Forestry Department 2016.

Data Description	Data Sources	Narrative of data	Data gathered from – District, Provincial, National or Global level
Soil data	SOILGRIDS.ORG/ ZARI	Average clay content, soil carbon stocks for soil depth of 30 cm	Agro-ecological zone

3 GENERAL DESCRIPTION OF INVENTORY PROCEDURES OR APPROACH

3.1 General approach

Institutional Arrangements

The consultancy team took the lead in data collection and analysis. The activity data for estimating GHG inventory for Eastern Province was undertaken in 2020 in collaboration with the Zambia Environment Management Agency (ZEMA) and the Forestry Department (FD). The main areas of focus for data collection included the following:

a) To collect data for the years 2008 to 2018, for compilation of GHG inventory for the AFOLU sector in Eastern Province.

b) To establish the nature of AFOLU data available as well as existing gaps.

c) To undertake ground truthing of mitigation activities on the ground as well as establish their nature.

d) To assess the quality of data available through triangulation of provincial, district and community level data; and

e) To assess the confidence levels of respective datasets.

The data collection process involved stakeholder consultation with key Provincial Heads of Department of the three ministries:

a) Ministry of Green Economy and Environment (MGEE), Forestry Department (FD).

b) Ministry of Agriculture (MoA); and

c) Ministry of Fisheries and Livestock (MFL).

Further consultations were undertaken with the three ministries in the 9 Districts of Eastern Province (Nyimba, Sinda, Petauke, Katete, Chadiza, Lundazi, Vubwi, Chipata and Mambwe). The ministries participated in activity data collection for their respective sectors. Activity data related to Land use was provided by the Forestry Department. Emission factors mainly for agriculture were collected from IPCC Emissions Factor Database and those for Land from ILUA II. The Ministry of Agriculture collected activity data on hectares planted by crop, and fertiliser application under Farmer Input Support Programme (FISP). However, the data collected by Ministry of Agriculture, this was not done in accordance with the IPCC reporting format which resulted in data gaps. The data gaps included manure application data, hectarage disaggregated by annual crops, perennial crops, data on hectares for agroforestry, and records on synthetic fertiliser distribution from private sector.

Forestry Department has been involved in data collection and processing at a national level for the submission of the Forest Reference Emission Level (FREL) to the UNFCCC under REDD+. During the study, data for emissions baseline was collected using the Collect Earth tool for determining Land Use and supplemented by the ILUA II report. Similarly, the Collect Earth tool was used to generate land use data using technical staff from Eastern Province with support from ZIFLP. At Provincial and District levels, data collected included loss of carbon in biomass from wood removals from indigenous forest (charcoal production, timber harvest, firewood collected) and Forest Plantation (plantation poles, sawn timber and plantation trees).

The Forestry Department is responsible for forestry statistics but works very closely with Zambia Environmental Management Agency (ZEMA) and National Remote Sensing Centre in monitoring biomass disturbances such as fires. However, the accuracy of the data collected was affected by limited coverage. For example, the data collected only reflected legally produced charcoal and timber did not include what was produced illegally. The consequence was that there was inadequate data for use in GHG estimations for biomass disturbances.

The Ministry of Fisheries and Livestock at Provincial and District level collects animal-based population data by livestock type. Migration from Tier 1 to Tiers 2 and 3 needs enhanced characterisation (type, weight, age, average weight gain per day, feeding situation, whether stall, pasture or grazing in large areas, average milk production, fat content, and percentage of females that give birth in a year). However, only three out of nine Districts (Nyimba, Chadiza and Katete) gave some aspects of the enhanced characterised data (Age, sex, weight gain per day, feeding system, average daily work), whilst the rest of the districts did not collect enhanced characterisation data. Even the three districts which collected enhanced characterization data did not collect the data systematically.

3.2 Description of Tools used for the GHG Inventory

The inventory preparation process involved data collection, data sorting and documentation. The data documentation involved provision of source and sink category information, methodological choices and description, listing of activity data, identification of emission factors and uncertainty estimates. Additional information and recommendations for future improvements were also documented. On completion of data documentation, the respective sector compilers submitted the data documented for Quality Control (QC) to evaluate for completeness and accuracy. After QC of all activity data and emission factors, they were input into the IPCC software to generate GHG estimates. All data and documentation were archived in the GHG Management System. The tools used in the inventory preparation process included spreadsheets, IPCC 2006 Guidelines, and IPCC Software.

The AFOLU GHG Inventory was revised to address comments from the GHG Auditors. As part of the revision, the excel spreadsheet were used to enable estimation of emissions using Tier 2 methodologies including Tier 2 SOC data and the additional CSA baseline factor for cropland remaining cropland. The IPCC software in its current state does not allow emissions estimate at Tier 2 level in the AFOLU sector. It is for this reason that a decision was made to use Excel spreadsheets so as to accommodate emissions estimate at Tier 2 for the Land subcategory. The relevant equations from IPCC 2006 Guidelines were inserted as algorithms in the Microsoft Excel spreadsheet. In addition, activity data and emission factors were inserted into the worksheets to enable emissions and removals estimates. The excel worksheets are provided separately as part of data documentation). The excel spreadsheets enhanced Transparency, Accuracy, Completion and Consistency in the estimates. The emissions and removal estimates were recalculated for all the AFOLU subcategories and pools.

3.3 Description of Reference Documentation Procedure

Reference Documentation has been provided as a separate folder that is necessary to ensure transparency. The information documented includes sources and scope of datasets for Agriculture, Forestry and Other Land Uses.

3.4 Description of Data Storage, Access and Archiving

Inventory compilation has been done by the Consultant and archiving will be done at ZEMA, where an IT Platform has been established. Data and documentation files are stored and held in separate and unique folders. The

folders includes Data Documentation Summary Report, GHGi Technical Reports, GHGi Database, GHGi Raw Data, Data Documentation Sheets/Tables and Copies of the SOP and MRV system and Technical Presentations.

3.5 Description of QA/QC Procedures Applied

Quality control was conducted at three levels of the inventory process as follows:

a) Pre-inventory preparation quality control: This involved activity data compilation and cleaning by sector teams prior to inventory compilation.

b) Quality control during inventory preparation: This involved checking and verification of activity data and emissions factors and ensuring correct entry of figures in the software.

c) Post inventory preparation Quality Control: This involved checking and verification of activity data, emission factors and results of emissions.

The Internal QA/QC Team was comprised of two experts from the Consultancy Team who were not involved in the compilation of the GHG Inventory. The methodology used in the QA/QC process involved checking each variable including the datasets and data sources used as well as assumptions used. The QA/QC process led to the production of two reports, the first based on the 2018 inventory data and the second targeting all the 10 years under focus.

3.6 Key Category Analysis

IPCC defines a Key Category as: “a category that is prioritised within the national inventory system because its estimate has a significant influence on a country’s total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals. Whenever the term Key Category is used, it includes both source (“emission”) and sink (“removal”) categories.” Quantitative Approaches for conducting a key category analysis involves two levels: (i) Level Assessment which identifies categories that contribute at least 95% of the total emission in the current GHG inventory and, (ii) Trend Assessment which identifies categories that may not be large enough to be identified by the level assessment, but whose trend is significantly different from the trend of the overall inventory.

Both Level Assessment and Trend Assessment were used in this report for determining key categories and subcategories in the AFOLU sector. The key category analyses were performed using the IPCC Inventory Software and the USEPA Key Source Calculation Tool.

3.7 Uncertainty Analysis

The Uncertainty Analysis (UA) for AFOLU sector was estimated using approach 1. Approach 1 is based on error propagation and is used to estimate uncertainty in individual categories, in the inventory as a whole, and in trends between a year of interest and a base year. In Approach 1 uncertainty in emissions or removals can be propagated from uncertainties in the activity data, emission factor and other estimation parameters through the error propagation equation and computed using the IPCC 2006 software. Combined uncertainty was estimated using Equation 3.1 Combining Uncertainties – Approach 1 of the IPCC 2006 Guidelines.

3.8 General assessment of completeness

The GHG emission inventory includes calculation of emissions for AFOLU from all relevant sources where data was available and are occurring in Zambia in accordance with the IPCC 2006 Guidelines.

4 AFOLU EMISSION CATEGORIES

AFOLU consist of three categories namely Agriculture, Forestry and Other Land Use. In the AFOLU sector, anthropogenic GHG emissions and removals by sinks are defined as all those occurring on 'managed land'. Managed land is where human interventions and practices have been applied to perform production, ecological or social functions. Land use and management influence a variety of ecosystem processes that affect greenhouse gas fluxes such as photosynthesis, respiration, decomposition, nitrification/denitrification, enteric fermentation, and combustion. These processes involve transformations of carbon and nitrogen that are driven by the biological (activity of microorganisms, plants, and animals) and physical processes (e.g., combustion, leaching, and run-off).

4.1 Livestock

Livestock is a subcategory of the AFOLU sector and estimates GHG emissions from enteric fermentation and manure management. CO_2 emissions from livestock are not estimated because annual net CO_2 emissions are assumed to be zero–the CO_2 photosynthesised by plants is returned to the atmosphere as respired CO_2.

4.2 Land

Land is a subcategory of the AFOLU sector and estimates GHG emission from land conversion. The six land-use categories in the 2006 IPCC Guidelines namely: Forest land, cropland, grassland, wetlands, settlements, and other land. Each land-use category is further subdivided into land remaining in that category and converted from one category to another (e.g., Forest Land converted to Cropland).

4.3 Aggregate Sources and Non-CO_2 Emissions on Land

This subcategory estimates emissions of N_2O emissions from managed soils, including indirect N_2O emissions from additions of N to land due to deposition and leaching, and emissions of CO_2 following additions of liming materials and urea-containing fertiliser. Managed soils are all soils on land, including Forest Land, which is managed.

4.4 Livestock Methodology

This section provides emissions related to enteric fermentation and manure management. Livestock production can result in methane (CH_4) emissions from enteric fermentation and both CH_4 and nitrous oxide (N_2O) emissions from livestock manure management systems. Cattle are an important source of CH_4 in many countries because of their large population and high CH_4 emission rate due to their ruminant digestive system. Methane emissions from manure management tend to be smaller than enteric emissions, with the most substantial emissions associated with confined animal management operations where manure is handled in liquid-based systems. Nitrous oxide emissions from manure management vary significantly between the types of management system used and can also result in indirect emissions due to other forms of nitrogen loss from the system. The calculation of the nitrogen loss from manure management systems is also an important step in determining the amount of nitrogen that will ultimately be available in manure applied to managed soils, or used for feed, fuel, or construction purposes. The source categories for GHG emissions in the Livestock sector include Enteric Fermentation and Manure Management. Livestock produce GHGs in the form of CH_4 from enteric fermentation, while N_2O and methane from manure management and manure deposited on pastures and rangeland by grazing animals.

Enteric Fermentation

Methodology

Methane (CH_4) is produced in herbivores as a by-product of enteric fermentation, a digestive process by which carbohydrates are broken down by micro-organisms into simple molecules for absorption into the bloodstream. The amount of CH_4 that is released depends on the type of digestive tract, age, and weight of the animal, and the quality and quantity of the feed consumed. Ruminant livestock e.g., cattle and goats are major sources of CH_4 with moderate amounts produced from non-ruminant livestock (e.g., Pigs).

Methane emissions from enteric fermentation for all livestock species were calculated using a Tier 1 method according to the 2006 IPCC Guidelines using Equation 10.19 and Equation 10.20 for the time series 2009 to 2018.

$$CH4\ Emissions = EF_T x \frac{N_T}{10^6} \quad \text{Equation 1}$$

Where: CH_4Emissions = methane emissions from Enteric Fermentation, Gg CH_4 yr^{-1}, $EF_{(T)}$ = emission factor for the defined livestock population, kg CH_4 $head^{-1}$ yr^{-1}; $N_{(T)}$ = the number of head of livestock species / category T in the country; T = species/category of livestock.

$$Total\ CH_{4\ Enteric} = \sum_i E_i \quad \text{Equation 2}$$

Where: Total $CH_{4\ Enteric}$ = total methane emissions from Enteri Fermentation, Gg CH_4 yr-1

E_i = the emissions for the livestock categories and sub-categories.

Due to unavailability of enhanced characterisation of livestock data according to species types, age, feeding situation, Tier 2 method was not used. The best available Activity Data on annual Livestock population data (Non-Dairy cattle (Other Cattle), Goat, Sheep, Pigs and Poultry) for Eastern Province was extracted from Livestock Report[8] and Livestock Census Report, 2018[9] and used to estimate CH_4 emissions from enteric fermentation. The annual livestock population data used for the estimation of CH_4 emission for the year 2009– 2018 is shown in

Table 3. The annual livestock population data was not disaggregated by representative livestock categories[8,9] in Table 10.1 in 2006 IPCC Guidelines for National Greenhouse Gas Inventories to characterise beyond the basic groups. Further there was no data available on average daily feed intake (megajoules (MJ)) per day and/or kg per day of dry matter); and CH_4 conversion factor (percentage of feed energy converted to CH_4) for the representative animal categories in Eastern Province.

Table 3. Livestock population for the year 2009 to 2018

Year	Livestock Type				
	Other Cattle	Sheep	Goats	Swine	Poultry
2009	339,711	11,143	208,131	245,284	152,589
2010	340,867	11,725	208,042	243,325	157,083
2011	342,802	13,189	216,754	244,389	165,836
2012	344,738	14,654	225,467	245,454	174,588
2013	362,747	16,119	246,549	246,518	183,341
2014	482,769	28,419	261,942	299,059	234,530
2015	514,435	29,097	270,405	315,629	244,857
2016	546,101	29,774	359,247	315,629	244,857
2017	601,921	30,524	359,247	306,527	394,702
2018	464,017	29,267	278,460	365,007	244,857

Source: Ministry of Fisheries and Livestock

Detailed livestock population per district in Eastern Province are presented in Annex IIa. There was, however, no livestock data provided for the years 2010 to 2013. The missing data for 2010 to 2013 was obtained by extrapolation using available data for the years 2009 on the lower end and 2014, 2015, 2016, 2017 and 2018 on the upper end. Eastern Province has an insignificant population of dairy cows and hence CH_4 emissions from enteric fermentation and CH_4 and Nitrous oxide (N_2O) from manure management were not estimated for this subcategory.

Emission Factors

Default emission factors for enteric fermentation, for all livestock species was obtained from 2006 IPCC Guidelines (Table 10.10 and Table 10.11 of the IPCC 2006 Guidelines) because country-specific emission factors to estimate CH_4 emission from enteric fermentation is not available. Table 4 shows default emission factors for the different livestock subcategories according to the basic characterisation scheme that was used to estimate CH_4 emissions from enteric fermentation.

Table 4. Emission Factors (Default) – CH_4 Emissions from Enteric Fermentation

Livestock Type	Emission Factor (Kg CH_4/(head/yr)
Other Cattle	31
Sheep	5
Goats	5
Swine	1

Source: IPCC 2006 Guidelines, Vol 4, Chapter 10, Tables 10.10 and 10.11

CH_4 emissions from Enteric fermentation

Figure 1 shows the results of CH_4 emissions from Enteric Fermentation from different livestock types (Other Cattle, Swine, Sheep and Goats). The largest contribution of CH_4 emissions came from Other Cattle which increased from 221,152.12 tCO_2eq in 2009 to 302,075.07 tCO_2eq in 2018 representing a growth rate of 36.59% and an annual growth rate of 3.66%. The overall CH_4 emissions from enteric fermentation increased from 249,326.87 tCO_2eq in 2009 to 342,051.549 tCO_2eq in 2018, representing an overall growth rate of 37.19% and annual growth rate of 3.72%. However, there was a 22.1 % decrease from 2017 to 2018 (Figure 1), which could be attributed to a severe drought, which was experienced in the 2017/2018 season.

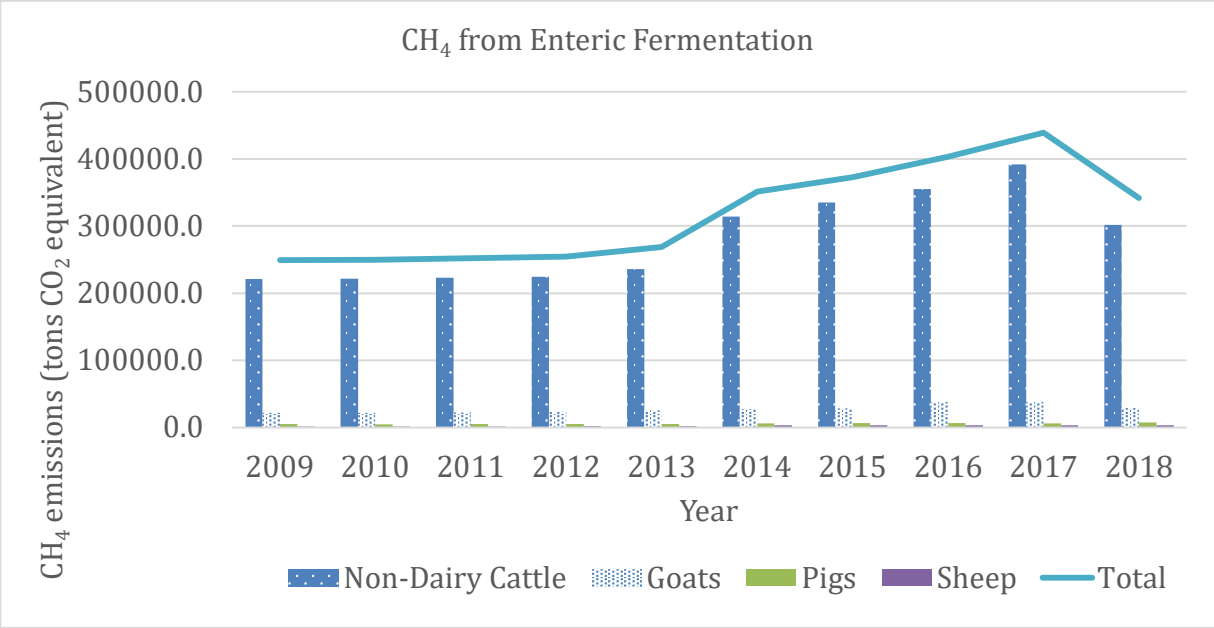


Figure 1 Enteric Fermentation – CH_4 Emissions by Livestock Subcategories

Manure Management

Methodology

Methane and N_2O emissions are produced from manure management. Emission of CH_4 and direct N_2O emission from manure during storage and treatment depends on the nitrogen and carbon content of manure, duration of the storage, type of treatment, acidity and moisture content. Indirect emissions result from volatile nitrogen losses that occur primarily in the forms of ammonia and NO_x. The fraction of excreted organic nitrogen that is mineralized to ammonia nitrogen during manure collection and storage depends primarily on time, and to a lesser degree temperature.

The 2006 IPCC methodology, Tier 1 method was used to calculate CH_4 emission and direct N_2O emission from manure management using equations 10.22 and 10.25, respectively.

$$CH_{4\,manure} = \sum_{T} \frac{EF_T * N_T}{10^6}$$ Equation 3

Where: CH_4Emissions = CH_4 emissions from manure management, for a defined population, Gg CH_4 yr^{-1}; $EF_{(T)}$ = emission factor for the defined livestock population, kg CH_4 $head^{-1}$ yr^{-1}(Table 39); $N_{(T)}$ = the number of head of livestock species/category T in the country T = species/category of livestock.

Manure Management (N_2O)

Direct N_2O emissions occur via combined nitrification and denitrification of nitrogen contained in the manure. The emission of N_2O from manure during storage and treatment depends on the nitrogen and carbon content of manure, duration of the storage, type of treatment, acidity and moisture content. Indirect emissions result from volatile nitrogen losses that occur primarily in the forms of ammonia and NO_x. The fraction of excreted organic nitrogen that is mineralized to ammonia nitrogen during manure collection and storage depends primarily on time, and to a lesser degree temperature.

Direct N_2O emissions from manure management is given by:

$$N_2O_{D(mm)} = \left[\sum_S \left[\sum_T \left(N_{(T)} * Nex_{(T)} * MS_{(T,S)}\right)\right] * EF_{3(S)}\right] * \frac{44}{12} \quad \text{Equation 4}$$

Where:

	N_2OD (mm) =	Direct N_2O emissions from Manure Management in the country, kg N_2O yr^{-1}
	$N_{(T)}$ =	number of animal's/category T in the country
	$N_{ex(T)}$ =	annual average N excretion/head of species/category T, kg N $animal^{-1}$ yr^{-1}
	MS (T, S) =	fraction of total annual N excretion for each livestock species/category T handled in MMS, S in the country, dimensionless
	EF3(S) =	EF for direct N_2O emissions from MMS, S in the country, kg N_2O-N/kg N in MMS, S
	S =	manure management system

T = species/category of livestock

44/28 = conversion of (N_2O-N) (mm) emissions to N_2O(mm) emissions

Higher Tier method could not be used due to absence of country specific emission factors. CH_4 is produced during the storage and treatment of manure, and from manure deposited on pasture. Most favourable conditions for CH_4 production are when large numbers of animals are managed in a confined area (e.g., dairy farms, beef feedlots, swine and poultry farms), and where manure is disposed of in liquid-based systems. The main factors affecting CH_4 emissions are the amount of manure produced and the portion of the manure that decomposes anaerobically that are influenced by storage conditions (liquid/solid), retention times and temperature.

Activity Data

Activity data used to estimate direct N_2O emissions with manure management systems were annual livestock population data by livestock type for Eastern province (Tier 1) and fraction (percentage) of livestock category manure handled using manure management system (MMS) in Eastern province to derive the total nitrogen excretion for the different manure management system (kg N yr). The activity data was obtained from the National Livestock population data from Livestock Report[5] and Livestock Census Report, 2018[6].

Emission Factors: Livestock Manure Management

Due to the absence of country specific emission factors, CH_4 emission was calculated using default emission factors from 2006 IPCC Guidelines Tables 10.14 and 10.15 (CH_4 emission Factor for Manure Management). Table 5 shows Emission Factors for manure management.

Table 5. Emission Factors - CH_4 Emissions from Manure Management

Emission Factor for Manure Management (kg CH_4 / Head / year)	Average Annual Temperature, °C	Value
1. Non-Dairy Cows	> 28	1
2. Sheep	> 25	0.2
3. Goats	>25	0.22
4. Swine	< 28	1
5. Poultry (broilers)	>25	0.02

Source: IPCC 2006 Guidelines, Vol 4, Tables 10.14 and 10.15

In order to estimate direct N_2O emissions from manure management, annual excretion rate for all livestock species was calculated using Equation 10.30 according to the 2006 IPCC Guidelines. Nitrogen Excretion Rate and Typical Animal Mass is from 2006 IPCC Guidelines. Table 10A-4, 10A5, 10A-9 and 10.19 were used, due to the absence of country specific data.

Equation 5

$$Nex_{(T)} = N_{rate(T)} * \frac{TAM}{1000} * 365 \qquad \text{Equation 5}$$

Where: $Nex_{(T)}$ =annual N excretion for livestock category T, kg N animal^{-1} yr^{-1}

$N_{rate(T)}$=default N excretion rate kg N (1000 kg animal mass)$^{-1}$; TAM=typical animal mass for livestock category T, kg animal^{-1}

Table 6 presents Nitrogen Excretion Rate and Typical Animal Mass used in the estimation of N_2O emissions from manure management.

Table 6. Nitrogen Excretion Rate and Typical Animal Mass

Livestock Category	Developing Countries	Typical Animal Mass (TAM) – (Kgs)	Reference	Region	Default Values for Nitrogen Excretion Rate A (Kg N (1000 Kg Animal Mass) -1 Day-1)	Reference
Other Cattle	Default Value: Bulls Grazing	275	2006 IPCC Guidelines ; Tables 10A-4 to 10A-9	Africa	0.63	2006 IPCC Guidelines; Table 10.19
Sheep	Default Value	28	2006 IPCC Guidelines ; Tables 10A-4 to 10A-9	Africa	1.17	2006 IPCC Guidelines; Table 10.19

Goats	Default Value	30	2006 IPCC Guidelines ; Tables 10A-4 to 10A-9	Africa	1.37	2006 IPCC Guidelines; Table 10.19
Pigs	Default Value – Market Breed	28	2006 IPCC Guidelines ; Tables 10A-4 to 10A-9	Africa	1.47 (Nitrogen excretion rate of swine is based on an estimated population of 90% market swine and 10% breeding swine)	2006 IPCC Guidelines; Table 10.19
Poultry (Other Chickens)	Country Specific	1.8	Investors Guide – Poultry in Zambia – Page 4	Africa	0.82	2006 IPCC Guidelines; Table 10.19

Default Emission Factors from IPCC 2006 Guidelines for estimating Direct N_2O Emissions from Manure Management Systems are presented in Table 7 based on country specific manure management system and Table 8 shows manure management system allocation used for all livestock species.

Table 7. Manure Management: Direct N_2O Emissions from Manure Management Systems

Livestock Category	Emission factor for direct N_2ON emissions from MMS		Reference
	Manure Management System (MMS)	Default Value [kg N_2O-N (kg N in MMS)$^{-1}$]	
Other Cattle	Solid storage	0.005	2006 IPCC Guidelines; Table 10.21
	Dry lot	0.02	2006 IPCC Guidelines; Table 10.21
	Liquid Slurry	0.005	2006 IPCC Guidelines; Table 10.21
	Pit Storage	0.002	2006 IPCC Guidelines; Table 10.21
	Aerobic Treatment	0.01	2006 IPCC Guidelines; Table 10.21

Livestock Category	Emission factor for direct N_2ON emissions from MMS		Reference
	Manure Management System (MMS)	Default Value [kg N_2O-N (kg N in MMS)$^{-1}$]	
Sheep	Dry lot	0.02	2006 IPCC Guidelines; Table 10.21
	Pit Storage	0.002	2006 IPCC Guidelines; Table 10.21
	Aerobic Treatment	0.01	2006 IPCC Guidelines; Table 10.21
Goats	Dry lot	0.02	2006 IPCC Guidelines; Table 10.21
	Pit Storage	0.002	2006 IPCC Guidelines; Table 10.21
	Aerobic Treatment	0.01	2006 IPCC Guidelines; Table 10.21
Pigs	Dry lot	0.02	2006 IPCC Guidelines; Table 10.21
	Liquid /Slurry	0.005	2006 IPCC Guidelines; Table 10.21
	Aerobic Treatment	0.01	2006 IPCC Guidelines; Table 10.21
Poultry	Dry lot	0.02	2006 IPCC Guidelines; Table 10.21
	Pit Storage	0.002	2006 IPCC Guidelines; Table 10.21
	Deep Litter	0.001	2006 IPCC Guidelines; Table 10.21
	Aerobic Treatment	0.01	2006 IPCC Guidelines; Table 10.21

Table 8. Manure management system allocation used for all livestock species (%)

Livestock	Burned as Fuel	PRP	AD	Dry Lot	Solid Storage	Daily Spread	Pit Storage	Liquid/Slurry	Anaerobiotic Treatment	Litter
Cattle	5	28	5	10	15	15	3	4	15	
Sheep		35		25			25		15	
Goats		35		25			25		15	
Swine		30		20				35	15	
Poultry		30		20			20		10	20

Source: Ministry of Fisheries and Livestock

CH_4 and N_2O emissions from Manure Management from Livestock

Figure 2 shows CH_4 and N_2O emissions from Manure Management from different livestock subcategories (Other Cattle, Sheep, Goats, Swine and Poultry). The largest contribution came from Other Cattle which increased from 7,133.93 tCO_2eq in 2009 to 9,744.35 tCO_2eq in 2018 representing a growth rate of 36.59% and an annual growth rate of 3.66%. The overall emissions from Manure Management increased by 41.6 % from 13357.4 t CO_2eq. in 2009 to 18921.73 t CO_2eq. in 2018, representing an annual growth rate of 4.1 %

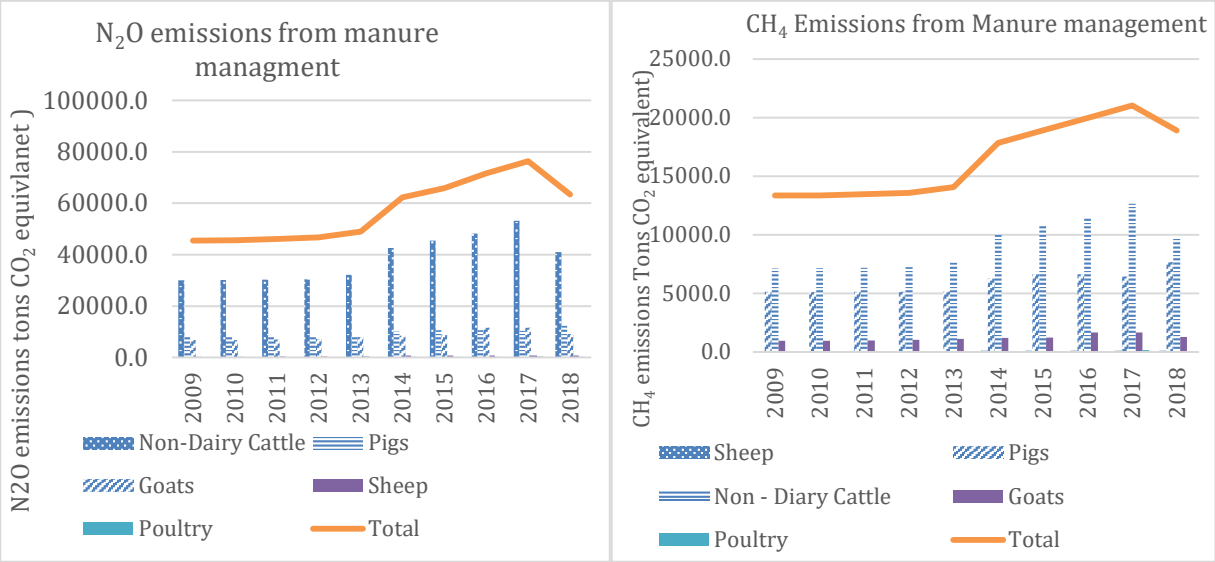


Figure 2 Manure Management – CH_4 and N_2O Emissions by Livestock Subcategories

4.5 Land Methodology

Land Use Definitions

The main land use, land cover classification scheme developed in Table 9 was based on the IPCC Land Use Classification Scheme (Figure 3) and national classification scheme. The IPCC classification scheme was adopted to align the data needed for the national greenhouse gas (GHG) inventory and to provide baseline data for the land use, land-use change and Forestry (LULUCF).

Table 9. The land cover classification scheme

Land Cover Categories	National Land Cover Descriptions
Settlements	Land covered mainly by densely populated and organised or irregular settlement patterns surrounding cities, towns, chiefdoms and rural centres commonly referred to as urban and rural built-up areas.
Cropland	Land actively used to grow agriculture (annual and perennial) crops which may be irrigated or rain feed for commercial, peasant and small-scale farms around urban and rural settlements
Grassland	Land that includes wooded rangeland that may be covered mainly by grasslands, plains, dambos, and pans found along major river basins and water channels.
Forest land	This is land covered both by natural and planted forest meeting the threshold of 10% canopy cover growing over a minimum area of 0.5 ha with trees growing above 5m height and includes young stands that have not yet

	reached, but are expected to reach, a crown density of ten (10%) percent and tree height of five (5) meters that are temporarily under stocked areas (Forest Act No. 5 of 2015, page 7).
Wetlands	Land, which is waterlogged, may be wooded such as marshland, perennial flooded plains and swampy areas (*surface water bodies included*).
Other land	Barren land covered by natural bare earth / soil such as sandy dunes, beach sand, rocky outcrops and may include old open quarry sites for mines and related infrastructure outside settlements.

Source: ILUA II Final Report, 2016

The datasets have multi-disciplinary applications such as providing a basis for accurately reporting on the annualized deforestation rate for the country, updating the vegetation maps, forest estate maps and deriving and formulating land use plans among others. Therefore, has an extended classification for Tier 2 sub-categories. The classification in Figure 3 is used for image interpretation of a forest land definition which is based on percent canopy cover determined using Collect Earth sample distribution systematically distributed over Eastern Province. The forest type categories are directly extracted from a vegetation map crossed with forest densities in Figure 3. However, the interpreters assigned and classified each observation unit (sample area) to its specific sub-division classes provided in the data collection cards of Collect Earth. This is the information subsequently used to align such interpretations with specific vegetation types for all forest plots classified as forest in Collect Earth.

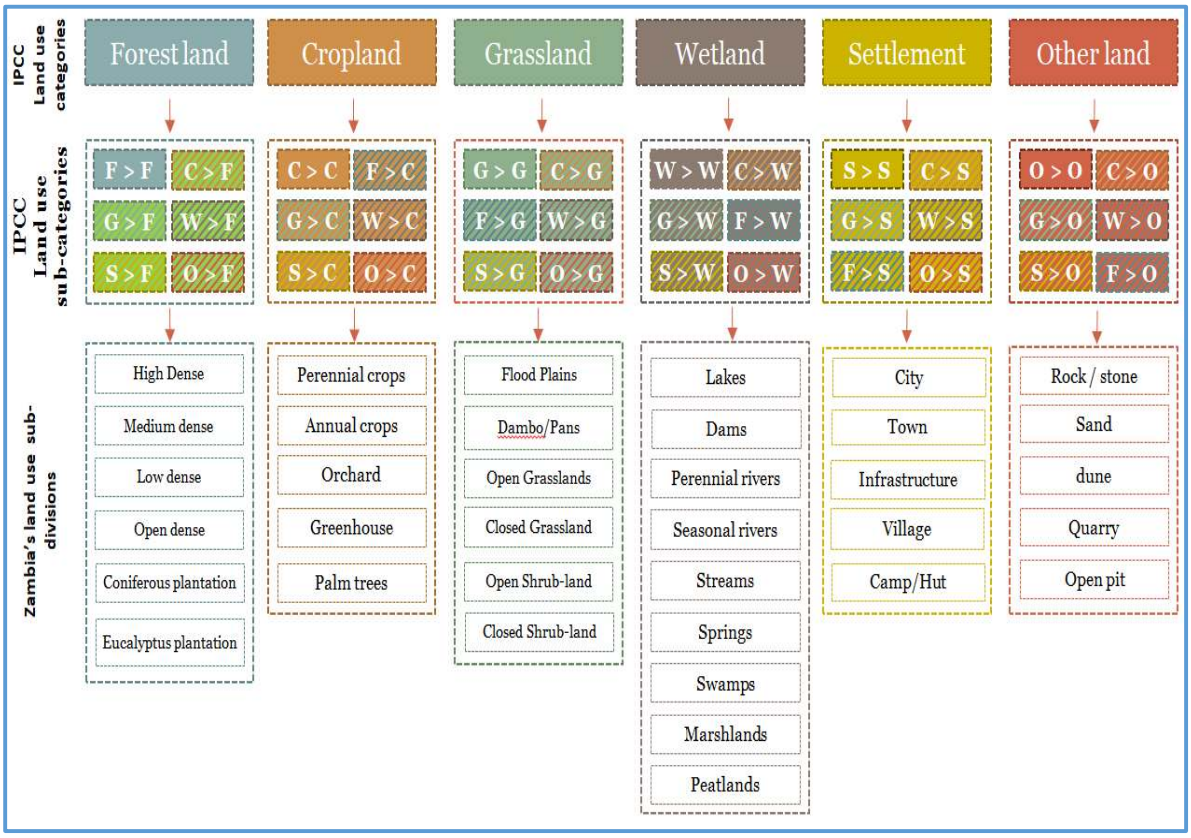


Figure 3: IPCC and Zambia's Sub-categorisation of Land Use

General method for Land

The method used in the estimation of carbon stock change in a given pool in Eastern Province, was Gain-Loss Method. As shown in IPCC 2006 Guidelines, Equation 2.4 and Equation 2.7, the annual carbon stock change in the pool is estimated by taking the difference between the annual gain of carbon and the annual loss of carbon (Section 2.4 for detailed discussion of the methodology).

The Carbon Pools considered in this assessment were: Above-Ground Biomass, Below-Ground Biomass and Dead organic matter (only Deadwood), and Litter. Gain-Loss Method was chosen because there was no sufficient data to use Stock-Difference Method. Stock-Difference Method is applicable in countries that have national inventory systems for forests and other land-use categories, and where the stocks of different biomass pools are measured at periodic intervals. For SOC, measured SOC stocks were used to establish soil carbon equilibria factors for each relevant land use category assuming no change in the baseline for those categories remaining. For those converted to other land use categories, the difference between the established SOC equilibria was used to establish emission factors using the IPCC default SOC equilibrium transition period of 20 years.

Since the Programme focuses, among others on the implementation and upscaling of climate smart agriculture practices, a CSA specific SOC baseline equilibrium factor was derived for cropland remaining cropland in line with overall IPCC guidance and by application of the VCS SALM Methodology (VM0017) (see cropland remaining cropland below).

Activity Data Generation

Collect Earth Software[7] was used to generate land use area data through point data sampling, land use and land use change matrix for Eastern Province. The Collect Earth Tool is a free and open-source software for land monitoring developed by the Food and Agriculture Organisation of the United Nations (FAO). Built on Google desktop and cloud computing technologies, the Collect Earth Tool facilitates access to multiple freely available archives of satellite imagery, including archives with very high spatial resolution imagery (Google Earth, Bing Maps) and those with very high temporal resolution imagery (e.g., Google Earth Engine, Google Earth Engine Code Editor)[60]. Figure 4 presents an overview of Collect Earth land monitoring system with supporting software.

[60] The data collection workflow involves launching Collect Earth to automatically open Google Earth (Figure 3, Sf-5 and Si1; Figure 3) with the list of plots to be assessed in the places panel.

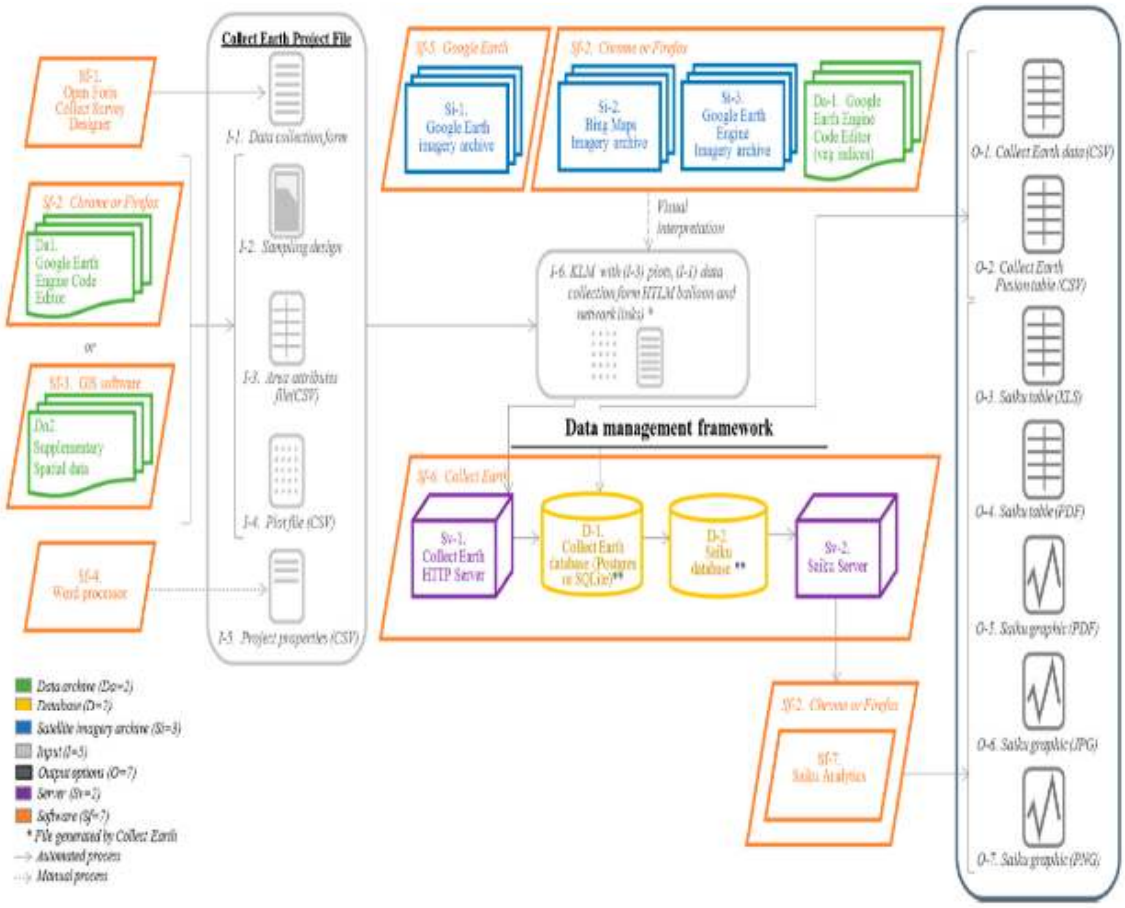


Figure 4 Overview of Collect Earth land monitoring system with supporting software.

Collect Earth is a land monitoring system that can be divided into four main parts: (1) inputs; (2) data collection framework; (3) data management framework and (4) analytical tools for visualising results and generating outputs. The inputs define the parameters of the data collection framework. Data collected are automatically managed by servers and structured within databases. The tools for analysis and data dissemination access these databases to facilitate the interpretation of land characteristics. Collectively, these four parts draw upon seven software products, three imagery archives, two supplementary data archives and two servers (Figure 4).

There were 3,200 sample plots (SP) assessed and activity data collected for Eastern Province. The sample plots are designed in a systematic grid at an equidistance of 4 x 4 kilometres over Eastern province. The sample size of 3,200 sample plots was determined based on a second phase sampling system extracted using the boundary extent of Eastern Province from a grid sampling frame of 4 x 4 km distance. All plots that fell within the borders of administrative

boundaries were taken as the final sample size. Each sample plot measures 70 x 70 metres in size and has 49 control points used for assessing the land use categories. Data in each of these plots was assessed continually over the period 2008 to 2018.

There were 26 individual data files extracted from the 3,200 sample plots on the grids. The distribution of sample plots in each data file was randomly undertaken to ensure that each of the data collectors had an opportunity to assess the entire study space (Eastern Province) and understand how the trend of land use change looks like. The data collectors were drawn from technical staff with some basic to advanced Geographical Information System (GIS) and Remote Sensing background employed by Government Department from Forestry, Agriculture and Livestock.

The data entered in Collect Earth is automatically saved to a database management system illustrated in Figure 6. A number of inter-connecting CSV files holding plot attributes, plot files and project properties are managed into data collection forms linked to Collect earth HTTP server that holds postgres (D1) and Saiku databases (D2). The land use subcategory conversions and total number of plots for each conversion were generated and used as the main Saiku data inputs for analysis. There were 12 main land use conversions identified in 3,200 sample plots across Eastern Province. Using the provincial area extent of 5,097,587 hectares, the expansion factor of 1,593 was produced by dividing the total number of sample plots assessed over Eastern Province into the provincial area extent.

The process for quality control and assurance (QC/QA) was conducted digitally within Collect Earth's built-in validation controls using the data collection cards. However, enhanced QC/QA support was attained by the review of all data entries by an experienced "Golden Operator" who made a random final review, interpretation of at least 10% of the data entry files and when errors are detected, the involved data clerks were alerted to rectify the errors to ensure high quality data entries were edited accordingly into the software. Later, a comprehensive data checking for all data files by the Golden Operator was necessary to ensure that manual edits and screening of all entries was undertaken. The Golden Operator is an experienced Collect Earth user and has high remote sensing interpretation skills coupled with extensive field knowledge of all provinces in Zambia including Eastern Province.

Presented in Tables 10 and 11 are: (i) Land-use Conversions Matrix Codes, and (ii) Land-use Conversion Matrix (2008-2018) for Eastern Province. The detailed analysis of land use conversion matrices can be accessed in the EP_Filtered _and Analyzed_AD_final_16.12.22.

Table 10. Land Use Conversion Matrix Codes

Land Use/Forest Change CODES		Latest Land Use (2018)					
		Forest	Cropland	Grassland	Otherland	Wetland	Settlement
Initial Land Use (2008)	Forest	F > F	F > C	F > G	F > O	F > W	F > S
	Cropland	C > F	C > C	C > G	C > O	C > W	C > S
	Grassland	G > F	G > C	G > G	G > O	G > W	G > S
	Otherland	O > F	O > C	O > G	O > O	O > W	O > S
	Wetland	W > F	W > C	W > G	W > O	W > W	W > S
	Settlement	S > F	S > C	S > G	S > O	S > W	S > S

Table 11. Land Use Conversion Matrix (2008 – 2018)

Land Area Extents in Hectares		Latest Land Use (2018)						
		Forest	Cropland	Grassland	Otherland	Wetland	Settlement	TOTAL
Initial Land Use (2008)	Forest	2,805,266	130,626	0	0	0	7,965	2,943,856
	Cropland	4,779	1,339,710	11,151	0	0	1,593	1,357,233
	Grassland	0	20,709	643,570	0	0	0	664,279
	Otherland	0	0	0	27,081	0	0	27,081
	Wetland	0	0	0	0	23,895	0	23,895
	Settlement	0	0	0	0	0	81,243	81,243
	TOTAL	**2,810,045**	**1,491,044**	**654,721**	**27,081**	**23,895**	**90,801**	**5,097,587**

Specific Methodology - Land remaining in land use category.

Annual carbon stock change in a given pool as a function of Gains and Losses (Gain-Loss Method)

Equation 6: $\Delta C = \Delta C_G - \Delta C_L$

Where:

Δ_C = annual carbon stock change in the pool, tons C yr^{-1}

ΔC_G = annual gain of carbon, tons C yr^{-1}

ΔC_L = annual loss of carbon, tons C yr^{-1}

Tier 1 methods to estimate dead organic matter (DOM) pools in land remaining in the same land-use category, report zero changes in carbon stocks or carbon emissions from those pools. Annual change in carbon stocks from mineral soils was assumed constant estimated assuming measured SOC stocks as SOC equilibrium factors for all land use categories remaining.

Annual increase in carbon stocks due to biomass increase in land remaining land.

Equation 7: $\Delta CG = \sum i\ j\ (Ai\ j \bullet GTOTAL\ i\ j \bullet CF\ i\ j)$

Where:

ΔC_G = annual increase in biomass carbon stocks due to biomass growth in Land remaining in land by vegetation type and climatic zone, tons C yr^{-1}

A = area of forest land remaining forest land, ha

G_{TOTAL}= mean annual biomass growth, tons d. m. ha^{-1} yr^{-1}

G_{Total} = Iv*BCEF*(1+R)

Where?

Iv = average net annual increment for specific vegetation type, m3 ha-1 yr-1

BCEF: biomass conversion and expansion factor for conversion of net annual increment in volume

(Including bark) to above-ground biomass growth for specific vegetation type, tons above-ground.

biomass growth (m3 net annual increment)- 1.

R: Ratio of below-ground biomass to above-ground biomass for a specific vegetation type, in ton

i = ecological zone (i = 1 ton)

j = climate domain (j = 1 to m)

CF = carbon fraction of dry matter, ton C (ton d.m.)$^{-1}$

Annual decrease in carbon stocks due to biomass losses in land remaining land

Annual biomass loss is the sum of losses from wood removal (harvest), fuelwood removal (not counting fuelwood gathered from woody debris), and other losses resulting from disturbances, such as fire, storms, and insect and diseases.

Equation 8: $\Delta C_L = L_{wood\ removals} + L_{fuelwood} + L_{disturbance}$

Where:

ΔC_L = annual decrease in carbon stocks due to biomass loss in Forest land remaining Forest land, tons C yr^{-1}

$L_{wood\text{-}removals}$ = annual carbon loss due to wood removals, tons C yr^{-1}

$L_{fuelwood}$ = annual biomass carbon loss due to fuelwood removals, tons C yr^{-1}

$L_{disturbance}$ = annual biomass carbon losses due to disturbances, tons C yr^{-1}

Loss of biomass and carbon from wood removal (harvesting), Lwood-removals

The method for estimating the annual biomass carbon loss due to wood-removals is provided in Equation 4:

Equation 9 $L_{wood\ removals} = \{H * BCEF_R * (1 + R) * CF\}$

Where:

$L_{wood\ removals}$ = annual carbon loss due to biomass removals, tons C yr^{-1}

H = annual wood removals, round wood, m^3 yr^{-1}

R = ratio of below-ground biomass to above-ground biomass, in ton d.m. below-ground biomass (ton d.m. above-ground biomass)$^{-1}$.

CF = carbon fraction of dry matter, ton C (ton d.m.)$^{-1}$

$BCEF_R$ = biomass conversion and expansion factor for conversion of removals in merchantable volume to total biomass removals (including bark), tons biomass removal (m^3 of removals)$^{-1}$. However, if BCEFR values are not available and if the

biomass expansion factor for wood removals (BEF_R) and basic wood density (D) values are separately estimated, then the following conversion can be used:

Equation 10: $BCEF_R = BEF_R \bullet D$

Loss of biomass and carbon from fuelwood removal, $L_{fuelwood}$

Fuelwood removal will often be comprised of two components. First, removal for fuelwood of living trees and parts of trees such as tops and branches, where the tree itself remains in the forest, will reduce the carbon in the biomass of growing stock and should be treated as biomass carbon loss. The second component is gathering of dead wood and logging slash. This will reduce the dead organic matter carbon pool. The method used for estimating annual carbon loss in biomass of fuelwood removal is provided in Equation 11.

Equation 11: $L_{fuelwood} = [\{FG_{trees} \bullet BCEF_R \bullet (1+ R)\} + FG_{part} \bullet D] \bullet CF$

Where:

$L_{fuelwood}$ = annual carbon loss due to fuelwood removals, tons C yr^{-1}

FG_{trees} = annual volume of fuelwood removal of whole trees, m^3 yr^{-1}

FG_{part} = annual volume of fuelwood removal as tree parts, m^3 yr^{-1}

R = ratio of below-ground biomass to above-ground biomass, in ton d.m. below-ground biomass

(Ton d.m. above-ground biomass)$^{-1}$; R must be set to zero if assuming no changes of below-ground biomass allocation patterns. (Tier 1)

CF = carbon fraction of dry matter, ton C (ton d.m.)$^{-1}$

D = basic wood density, tons d.m. m^{-3}

$BCEF_R$ = biomass conversion and expansion factor for conversion of removals in merchantable volume to biomass removals (including bark), tons biomass removal (m^3 of removals)$^{-1}$, If $BCEF_R$ values are not available and if the biomass expansion factor for wood removals (BEF_R) and basic wood density (D) values are separately estimated, then the following conversion can be used:

Equation 12: $BCEF_R = BEF_R \bullet D$

Biomass Expansion Factors (BEF_R) expand merchantable wood removals to total aboveground biomass volume to account for non-merchantable components of the tree, stand and forest. BEF_R is dimensionless.

Loss of biomass and carbon from disturbance, L disturbance

A generic approach for estimating the amount of carbon lost from disturbances is provided in Equation 13. In the specific case of losses from fire on managed land, including wildfires and controlled fires, this method should be used to provide input to the methodology to estimate CO_2 and non-CO_2 emissions from fires. This method was used to estimate the annual carbon losses in biomass due to disturbances.

Equation 13: $L_{disturbance} = \{A_{disturbance} \bullet B_W \bullet (1 + R) \bullet CF \bullet fd\}$

Where:

$L_{disturbances}$ = annual other losses of carbon, tons C yr^{-1}

$A_{disturbance}$ = area affected by disturbances, ha yr^{-1}

B_W = average above-ground biomass of land areas affected by disturbances, tons d.m. ha^{-1}

R = ratio of below-ground biomass to above-ground biomass, in ton d.m. below-ground biomass

(Ton d.m. above-ground biomass)$^{-1}$. R must be set to zero if no changes of below-ground biomass

are assumed (Tier 1)

CF = carbon fraction of dry matter, ton C (tons d.m.)$^{-1}$

fd = fraction of biomass lost in disturbance (see note below)

Note: The parameter fd defines the proportion of biomass that is lost from the biomass pool: a stand replacing disturbance will kill all (fd = 1) biomass while an insect disturbance may only remove a portion (e.g., fd = 0.3) of the average biomass C density.

Constant SOC equilibrium/ reference factors

Following the overall IPCC assumption of the SOC equilibrium theory, SOC equilibrium factors for all relevant land use categories are derived from measured data from the Eastern Province. Using these measured values is more in line with the Tier 2 expectations of the ISFL requirements. The source of data for these reference soil organic carbon factors was obtained from the Zambia Agriculture Research Institute (ZARI).

The tables below show three measurement campaigns done by ZARI representative for the 2009 to 2018 reference period. The average value derived

now represents the Tier 2 soil carbon equilibrium value for each of the three relevant land use categories over the entire baseline period remaining constant in the baseline.

1. Forested Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	33.67	**33.39**
2016	30.88	
2019	35.61	

2. Wildlife (Grassland) Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	28.25	**30.90**
2016	24.55	
2019	39.90	

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	**30.86**
2016	28.27	
2019	28.31	

Source: Soil Survey Report of the Eastern Province (2020)

Specific Methodology - Land converted to new land use category.

The methods for estimation of emissions and removals of carbon resulting from land-use conversion from one land-use category to another are presented in this section. Possible conversions include conversion from Non - Forest to Forest Land, Cropland and Forest Land to Grassland, and Grassland and Forest Land to Cropland.

Estimating the annual change in biomass carbon stocks from land converted to a new land category (Tier 2)

Equation 14: $\Delta CB = \Delta CG + \Delta CCONVERSION - \Delta CL$

Where:

ΔC_B = annual change in carbon stocks in biomass on land converted to new land, in tons C yr^{-1}

ΔC_G= annual increase in carbon stocks in biomass due to growth on land converted to new land, in tons C yr^{-1}

$\Delta C_{CONVERSION}$ = initial change in carbon stocks in biomass on land converted to new land, in tons C yr^{-1}. The equation used to estimate the initial change in biomass carbon stocks is $\Delta C_{CONVERSION} = \sum i \{(B_{AFTER} - B_{BEFORE}) \bullet \Delta A_{TO\_OTHERS} \bullet CF\}$

ΔC_L = annual decrease in biomass carbon stocks due to losses from harvesting, fuel wood gathering and disturbances on land converted to new land, in tons C yr^{-1}

Conversion to another land category may be associated with a change in biomass stocks, e.g., part of the biomass may be withdrawn through land clearing, restocking or other human-induced activities.

Initial Change in Biomass Carbon Stocks

Equation 15: $\Delta C_{CONVERSION} = \sum_i \{(B_{AFTER} - B_{BEFORE}) \bullet \Delta A_{TO\_OTHERS} \bullet CF\}$

Where:

$\Delta C_{CONVERSION}$ = initial change in biomass carbon stocks on land converted to another land category, tons C yr^{-1}

B_{AFTERi} = biomass stocks on land type i immediately after the conversion, tons d.m. ha^{-1}

$B_{BEFOREi}$ = biomass stocks on land type i before the conversion, tons d.m. ha^{-1}

$\Delta A_{TO\_OTHERSi}$ = area of land use i converted to another land-use category in a certain year, ha yr^{-1}

CF = carbon fraction of dry matter, ton C (tons d.m.)$^{-1}$

i = type of land use converted to another land-use category

Loss of carbon stocks in dead organic matter due to land conversion

Equation 16: $\Delta C_{DOM} = A^*(C_n - C_o)/T_{on}$

Where,

ΔC_{DOM}-Annual change in carbon stocks in dead wood/litter (tons C yr^{-1}),

A -Annual area Land Converted to Cropland for biofuels (hectares),

C_o - Dead wood/litter stock (Table A8.4) under the old land-use category(tons C ha^{-1}),

C_n -Dead wood/litter stock under the new land-use category (default value is zero) (tons C ha^{-1}),

T_{on} -Time period of the transition from old to new land-use category (default value is 1) (year)

Note: C_n **= 0;** T_{on} **= 1**

Loss/ gain in carbon stocks in mineral soils

In general, the IPCC equilibrium theory and equation is followed:

Equation 17: $$\Delta C_{\text{min}eral} = \frac{\left(SOC_0 - SOC_{(0-T)}\right)}{D}$$

Where,

SOC_0 representing SOC equilibrium of the initial land use category.

$SOC_{0\text{-}T}$ representing SOC equilibrium of the land use category converted to

D - Time dependence of stock change factors which is the default time period for transition between equilibrium SOC values

NOTE: D= 20 Years IPCC default period

In line with the IPCC equilibrium theory, a change in land use will cause SOC to reach a new SOC equilibrium using the default IPCC timeframe of 20 years. To derive emission factors for land use conversion categories, the SOC equilibrium factors identified above were used as illustrated below for forest land converted to cropland as an example:

1. Forested Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	33.67	**33.39**
2016	30.88	
2019	35.61	

2. Wildlife (Grassland) Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	28.25	**30.90**
2016	24.55	
2019	39.90	

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	**30.86**
2016	28.27	
2019	28.31	

Emission factor for conversion: (33.39 - 30.86) = 2.53/20 years = 0.13 tC/ha/yr

This EF is then applied to the specific activity land use activity data.

As compared to the IPCC Tier 1 equation this approach represents a higher Tier level and is more conservative as the SOC equilibrium factors used now for instance for cropland are much higher as compared to the same value derived from the IPCC default equation (in this case using the forest factor as SOC_{REF} value).

4.6 Overall land emissions

The gross emissions for Land category were 19,204,241.7 tCO_2 eq. in 2009. The emissions increased by 14.6 % to 22,014,244.0 tCO_2 eq. in 2018. On the other hand, gross removals decreased by 4.0% from -9,967,649.3 tCO_2 eq. in 2009 to -9,564,444.7 tCO_2 eq. in 2018. Table 12 shows summary emissions for the land category.

Table 12. Summary emission for land category (tCO_2 eq.)

Land Cover Categories	3. B.1 Forest Land		3.B.2 Cropland	3.B.3 Grassland	3.B.4 Wetlands	3.B.5 Settlements	Gross Baseline Emissions	Gross Baseline removals	Net Baseline Emissions
Year	Uptake	Emissions							
2009	-9967649.4	18141323.0	1017811.0	-95.3	54.0	45149.0	19204241.7	-9967649.4	9236592.3
2010	-9922489.1	18183346.0	1023886.3	-190.7	54.0	45341.3	19252383.0	-9922489.1	9329948.0
2011	-9877454.0	18203203.2	1029961.6	-286.0	54.0	45533.7	19278412.5	-9877454.0	9401012.5
2012	-9832150.6	18294042.3	1036036.9	-381.3	54.0	45726.1	19375423.9	-9832150.6	9543327.3
2013	-9789137.0	18348872.5	1042112.2	-476.7	54.0	45918.5	19436426.5	-9789137.0	9647343.6
2014	-9744395.3	18539921.4	1048187.5	-572.0	54.0	46110.8	19633647.8	-9744395.3	9889306.5
2015	-9699750.3	18972080.9	1054262.8	-667.3	54.0	46303.2	20071979.6	-9699750.3	10372283.3
2016	-9654958.5	19373435.5	1060338.1	-762.7	54.0	46495.6	20479506.5	-9654958.5	10824602.1
2017	-9609694.5	19950865.4	1066413.4	-858.0	54.0	46688.0	21063108.8	-9609694.5	11453468.4
2018	-9564444.7	20895828.2	1072488.7	-953.3	54.0	46880.3	22014244.0	-9564444.7	12449853.3

Source: Collect Earth and Forestry Department

4.7 Forest Land

The climate region for the Eastern Province was defined as having a tropical dry climate based on the IPCC Climate Classifications scheme. The ecosystem type considered was the tropical dry forests. The forest type and species considered under the classification scheme were either natural forests and/or plantations with broadleaf and conifer species respectively.

The age class of the forest types was estimated at older than 20 years for the natural forest and less than 20 years for plantations. The growing stock level (m^3/ha) was categorised based on data in the ILUA II Report. The carbon fraction of aboveground forest biomass (ton C/ (ton.dry. matter), ratio of below – ground biomass to above ground biomass (t root d.m/t shoot. d.m), biomass conversion and expansion factor for wood and fuelwood removal (BCEFr) t/m^3 wood volume, above ground biomass in forest (t.d.m/ha) were all derived from the ILUA II report and considered as country specific emission factors. The aboveground biomass growth in Plantation/natural forest (t.d.m/ha/yr assigned were country specific factors based on the Zambia Forestry Action Plan Report (ZFAP). The country specific reference soil organic Carbon (SOC) stock (t/C/ha) in forest, and litter from the biomass carbon stocks were country specific t/C/ha, respectively. Table 13 provides definitions for different forest types.

Table 13. Forest Type Definitions[61]

	Dry Deciduous Forest	Dry Evergreen Forest	Forest Plantations – Pinus	Forest Plantations – Eucalyptus	Moist Evergreen Forest	Woodlands (semi-evergreen)	Reference
Climate Region	Tropical dry	Tropical dry	Tropical dry	Tropical dry	Tropical dry	Tropical dry	IPCC Software Land Type Manager
Soil Type	Low activity clay/mineral	Low activity clay/mineral	Low activity clay/mineral	Low activity clay/mineral	Low activity clay/mineral	Low activity clay/mineral	IPCC Software Land Type Manager
Ecosystem Type	Tropical dry forest	Tropical dry forest	Tropical dry forest	Tropical dry forest	Tropical dry forest	Tropical dry forest	IPCC Software Land Type Manager
Species	Other broadleaf	Other broadleaf	Pinus	Eucalyptus	Other broadleaf	Other broadleaf	IPCC Software Land Type Manager
Forest type	Natural forest	Natural forest	Plantation	Plantation	Natural forest	Natural forest	IPCC Software Land Type Manager
Age Class (Yr)	≥20 years	≥20 years	≤20 years	≤20 years	≥20 years	≥20 years	IPCC Software Land Type Manager
Growing Stock level(m3/ha)	41 – 60	81-120	121-200	121-200	41-60	61-80	ILUA II Report; Table 18: Mean volume distribution by vegetation types and other areas
Carbon Fraction of aboveground forest biomass (ton C ton.d.m)	0.470	0.470	0.470	0.470	0.470	0.470	UNREDD Report – Carbon Stock Assessment and Modelling in Zambia (2009): Table 4: Carbon Pools and Associated Methods for Carbon Stock estimations, page 11
Ratio of below – ground biomass to above	0.28	0.28	0.28	0.28	0.28	0.28	UNREDD Report – Carbon Stock Assessment and Modelling in Zambia (2009): Table 4: Carbon

[61] The major forest type (vegetation) map (i.e. which is a higher level tier) was crossed with land cover/use classes and digitally extracted to account for the actual distribution of these forest types across Eastern Province to enable further analysis of sub-categories by forest or vegetation types in line with the IPCC 2006 software. However, Figure 2 explains the sub-categories of forests by % tree canopy cover defined for wall-to-wall image processing and biophysical (inventory) assessment methods, while the forest type sub-categories are floristic classes (higher level tier) extracted from a digital vegetation map. The forest density classes detected from remote sensing classification in Figure 2 were associated with the vegetation type categories.

ground biomass (R) (t root d.m / t shoot. d.m							Pools and Associated Methods for Carbon Stock estimations, page 11.
Biomass conversion and expansion factor for wood and fuelwood removal (BCEFr) tons d.m. m-3	1.53	1.53	1.53	1.53	1.53	1.53	ILUA II Technical Report (2016), Biomass Volume Calculations Table 4.3 Biomass expansion factors (ExpFs) for biomass estimated by the product of volume and specific wood density using different methods for miombo woodland trees, page 29.
Biomass Conversion and Expansion Factor(BCEFs) tons d.m. m-3	1.38	1.38	1.38	1.38	1.38	1.38	ILUA II Technical Report (2016), Biomass Volume Calculations Table 4.3 Biomass expansion factors (ExpFs) for biomass estimated by the product of volume and specific wood density using different methods for miombo woodland trees, page 29.
BCEFi (biomass conversion and expansion factor for conversion of net annual increment in volume (including bark) to above-ground biomass growth for specific vegetation type)	1.18	1.18	1.18	1.18	1.18	1.18	Calculated using Equation 2.10 using average annual biomass growth above and below-ground, tonnes d. m. ha-1 yr-1) derived from E. Chidumayo 1990: Above-ground woody biomass structure and productivity in a Zambezian woodland. Calculated ui
Above ground biomass in forest (t.d.m/ha)	37.2	67.8	70.8	70.8	34.2	43.1	Average above ground biomass affected by the disturbance was obtained from ILUA II Report (2016) Table 20: mean biomass and carbon stocks distribution by vegetation and other areas

Aboveground biomass growth in natural forest (t.d.m/ha/yr)	1.3	1.3	15	15	1.3	1.3	Zambia Forestry Action Plan Report
Average basic wood density (tons d.m/ m3)	0.602	0.602	0.602	0.602	0.602	0.602	ILUA II Technical Report (2016), Biomass Volume Calcula–ions - Table 2.4 The Smalian's model: Specific wood density of trees in drier and wetter miombo woodland in Z–mbia - page 22

Forest land remaining Forest land

Annual increase in biomass stocks

Activity data

The annual increase in biomass carbon stocks was determined by (i) country specific activity data of area of forest land remaining forest land (ha) by forest subcategories for the years 2009 to 2018 for the Eastern province; (ii) average annual above-ground biomass growth (tons/ha*yr); (iii) ratio of below ground biomass to above ground biomass (tons bg/tons ag) (iv) average annual biomass growth above and below ground (tons/ha*yr) (v) carbon fraction of dry matter (tons C/tons). Tables 14 and 15 provide area of forest land remaining forest land and forest subcategories in Eastern Province. The source of land use datasets used to generate forest land subcategories areas is Forestry Department and the Collect Earth Tool.

Table 14. Area of Forest land remaining Forest land

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
IPCC Land Use Category	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)	Area (ha)
Forest	2,930,475	2,917,094	2,903,713	2,890,332	2,876,951	2,863,569	2,850,188	2,836,807	2,823,426	2,810,045

Source: Collect Earth and Forestry Department

Table 15. Area of Forest land remaining Forest land by Forest land Subcategories

YEAR OF ASSESSMENT	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Indigenous forest	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)
Dry evergreen forest	1,758	1,750	1,742	1,734	1,726	1,718	1,710	1,702	1,694	1,686
Dry deciduous forests	1,198,057	1,192,582	1,187,106	1,181,633	1,176,134	1,170,654	1,165,174	1,159,695	1,154,222	1,148,748
Moist evergreen forest	28,128	27,999	27,870	27,742	27,613	27,484	27,356	27,227	27,098	26,970
Woodlands (semi-evergreen forests)	1,702,008	1,694,231	1,686,451	1,678,676	1,670,864	1,663,079	1,655,294	1,647,510	1,639,734	1,631,958
Eucalyptus	371	372	373	374	439	448	466	484	485	490
Pinus	154	161	171	173	176	186	189	189	193	193
Sub total	**2,930,475**	**2,917,094**	**2,903,713**	**2,890,332**	**2,876,951**	**2,863,569**	**2,850,188**	**2,836,807**	**2,823,426**	**2,810,045**

Source: Collect Earth and Forestry Department

Emission Factors

The country specific emission factors used to determine annual increase in biomass carbon stocks due to biomass increment in forest land remaining forest land are given in Table 16. The source of data for the emission factors were from the Integrated Land Use Assessment Report II[62] and Forestry compendium report[63].

Table 16. Emission Factors to determine annual increase in biomass carbon stocks.

Forest Subcategories	average net annual increment for specific vegetation type, m3 ha-1 yr-(Iv) 1	Biomass conversion and expansion factor for conversion of net annual increment in volume	Ratio of below ground biomass to aboveground biomass (tons bg / Tons ag) (R)	Average annual biomass growth rate above and below ground (tons / ha*yr) (G Total = Iv*BCEF*(1+R))	Carbon Fraction of dry matter (tons C / ton) (CF)
Dry Deciduous Forest	1.3	1.38	0.28	2.30	0.47
Dry Evergreen Forest	1.3	1.38	0.28	2.30	0.47
Forest Plantations (Pinus)	1.3	1.38	0.28	2.30	0.47
Forest Plantations (Eucalyptus)	1.3	1.38	0.28	2.30	0.47
Moist evergreen Forest	1.3	1.38	0.28	2.30	0.47
Woodlands	1.3	1.38	0.28	2.30	0.47

Source: Forestry Department

[62] Integrated Land Use Assessment Report, 2016

[63] Forestry Compendium Report, 2013

Annual change in carbon stocks in biomass (tons C/yr)

The annual change in carbon stocks in biomass (tons C/year) is given in Table 17 for 2009 to 2018.

Table 17. Annual increase in biomass carbon stocks due to biomass growth (tons C/year)

Year	Annual increase in biomass carbon stocks due to biomass growth (tons C/year) Δ CG = A*Gtotal*CF
2009	-2,718,450
2010	-2,706,133
2011	-2,693,851
2012	-2,681,496
2013	-2,669,765
2014	-2,657,562
2015	-2,645,386
2016	-2,633,170
2017	-2,620,826
2018	-2,608,485

Source: Collect Earth and Forestry Department

Figure 5 shows the annual carbon removals decreased from -2,718,450 tons C/year in 2009 to -2,608,485 tons C/year in 2018 representing a decrease of 4 % over the 10-year period.

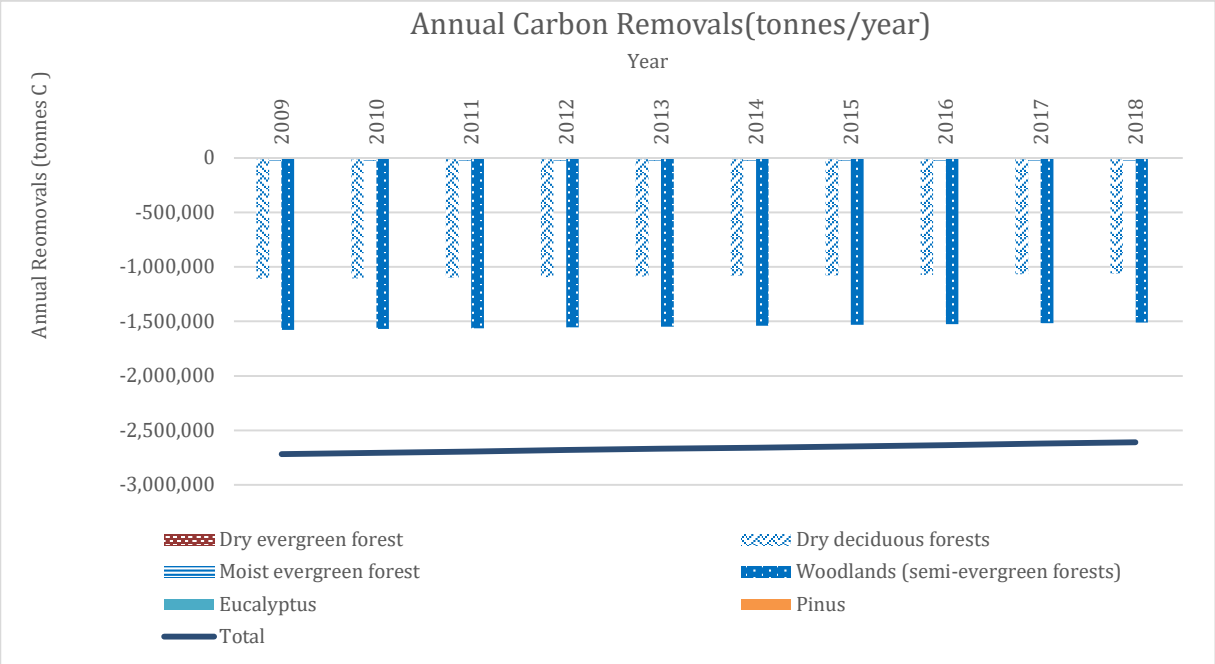


Figure 5 Annual carbon removals

Annual decrease in biomass carbon stocks

This section of the report provides estimates of annual decrease in biomass carbon stocks due to losses (Gain - Loss Method), ΔCL.

Loss of biomass and carbon from wood removal (timber harvesting)

Activity data

The loss of carbon from wood removals was determined by use of country specific activity data of annual harvest of timber (m^3/yr) for the years 2009 to 2018. The source of data for timber harvest was obtained from Forestry Department annual reports (Eastern Province - Provincial Office). Table 18 shows wood removals from timber harvesting from 2009 to 2018.

Table 18. Wood Removals data from timber harvesting (2009 – 2018)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Major Vegetation Types	Annual wood removal (m3/yr)									
Dry evergreen forest	127	322	217	581	204	196	459	436	76	85
Dry deciduous forests	20	49	33	89	31	30	71	67	12	13
Moist evergreen forest	24	61	41	110	39	37	87	82	14	16
Forest woodlands	3,248	8,193	5,528	14,810	5,189	5,006	11,706	11,101	1,949	2,174
Eucalyptus	15	39	26	70	25	24	56	53	9	10
Pines	617	1,556	1,050	2,813	985	951	2,223	2,108	370	413
Sub total	4,051	10,220	6,895	18,473	6,473	6,244	14,602	13,847	2,430	2,711

Source: ILUA II and National Woodfuel Study (2017)

Emission Factors

The country specific emission factors used to determine the loss of carbon from wood removals were (i) biomass conversion and expansion factor for conversion of removal in merchantable volume to total biomass removals (including bark) (tons of biomass removals/m^3 of removals), (ii) Ratio of below ground biomass to above ground biomass (tons bg/tons ag), carbon fraction of dry matter (tons C / ton). Table 19 shows emission factors used to estimate the loss of carbon from timber harvesting.

Table 19. Emission factors for estimating annual carbon loss due to biomass removals from timber harvesting.

Forest Subcategories	Biomass conversion and expansion factor for conversion of removal in merchantable volume to total biomass removals (including bark) (tons of biomass removals/m^3 of removals) (BCEFr)	Ratio of below ground biomass to aboveground biomass (tons bg / Tons ag) (R)	Carbon Fraction of dry matter (tons C /ton) (CF)
Dry Deciduous Forest	1.38	0.28	0.47
Dry Evergreen Forest	1.38	0.28	0.47
Forest Plantations (Pinus)	1.38	0.28	0.47

Forest Plantations (Eucalyptus)	1.38	0.28	0.47
Moist evergreen Forest	1.38	0.28	0.47
Woodlands	1.38	0.28	0.47

Source: Forestry Department

Annual Carbon Loss due to Biomass Removals (tons C/yr)

The results of annual carbon loss due to biomass removals from timber harvesting are given in Table 20.

Table 20. Annual carbon loss due to biomass removals (tons C/yr)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	117	297	200	536	188	181	423	402	70	78
Dry deciduous forests	18	45	30	82	29	28	65	62	11	12
Moist evergreen forest	22	56	38	101	36	34	80	76	13	15
Woodlands (semi-evergreen forests)	2,996	7,558	5,099	13,662	4,787	4,618	10,798	10,240	1,798	2,005
Eucalyptus	14	36	24	65	23	22	52	49	8	9
Pinus	569	1,435	969	2,595	909	877	2,051	1,945	341	381
Sub total	**3,737**	**9,427**	**6,360**	**17,040**	**5,971**	**5,760**	**13,470**	**12,773**	**2,242**	**2,501**

Source: Collect Earth and Forestry Department

Figure 6 shows the annual carbon loss due to biomass removals from timber harvesting from 3,737 tons C in 2009 whilst 2018 recorded 2,501 tons C. However, the years 2012, 2015 and 2016 showed an increase in annual carbon loss due to biomass removals. This could have been attributed to unpredictable timber licensing regimes during those years as well as drought which exacerbated the biomass removals from the forest due to energy demand.

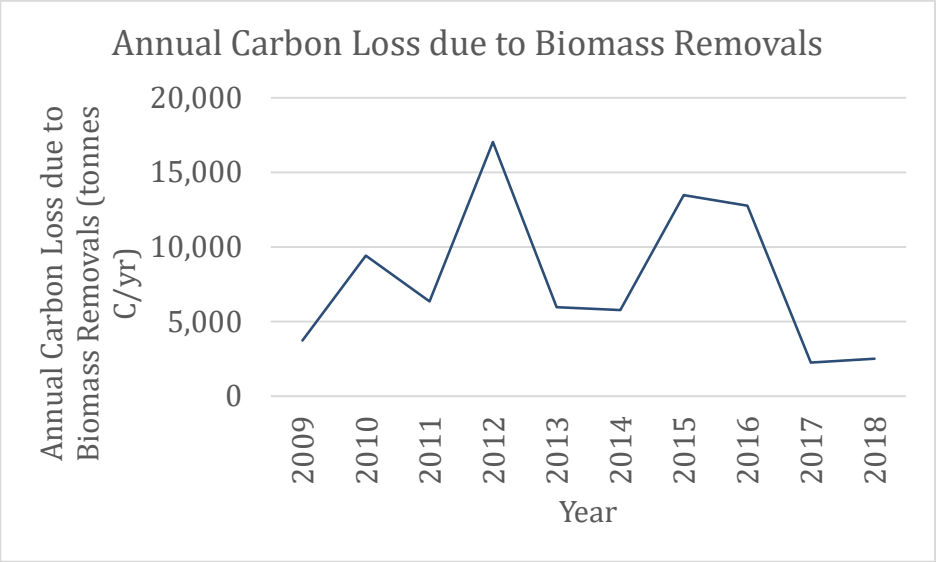


Figure 6 Annual Carbon Loss due to Biomass Removals (tons C/yr) from timber harvesting

Loss of biomass and carbon from fuelwood removal, $L_{fuelwood}$

Activity data

Annual carbon loss due to fuelwood removals (tons C/yr) was estimated using country specific activity data of (i) annual volume of fuelwood removal of whole trees (m^3/yr) (2009 to 2018) mainly attributed to charcoal production; (ii) annual volume of fuelwood removal as parts of trees (m^3/yr) (2009 to 2018) mainly attributed to firewood harvesting mainly for cooking by rural households and (iii) Basic wood density (tons/ m^3) used was 0.65 tons/m^3. The source of data for fuelwood harvest data was obtained from the Department of Energy and Zambia Statistics Agency (ZamStats)[64] and Forestry Department provincial annual reports. Table 21 shows annual volume of fuelwood removal of whole trees (Charcoal) and parts of trees (firewood) (m^3/yr) for the years 2009 to 2018. In Eastern Province, there is no firewood and charcoal production in forest plantations.

[64] CSO Environment Statistics Compendium Report, 2015

Table 21. Wood Removals data from fuelwood (Firewood and Charcoal) (m^3/yr) (2009 – 2018)

Wood removals for Firewood (FG part)											
Dry evergreen forest	3	7	16	35	78	172	383	593	919	1,425	3
Dry deciduous forests	2,285	5,078	11,284	25,075	55,723	123,828	275,173	426,518	661,103	1,024,709	2,285
Moist evergreen forest	54	120	267	593	1,318	2,928	6,506	10,085	15,631	24,228	54
Forest woodlands	3,232	7,182	15,961	35,468	78,818	175,150	389,222	603,294	935,106	1,449,415	3,232
Sub total	5,574	12,387	27,527	61,171	135,935	302,078	671,284	1,040,490	1,612,760	2,499,778	5,574
Wood removals for Charcoal (FG trees)											
Dry evergreen forest	843	857	871	885	900	914	929	944	959	974	843
Dry deciduous forests	606,413	616,273	626,294	636,478	646,827	657,344	668,033	678,721	689,581	700,614	606,413
Moist evergreen forest	14,338	14,571	14,808	15,049	15,294	15,542	15,795	16,048	16,304	16,565	14,338
Forest woodlands	857,749	871,697	885,871	900,275	914,914	929,790	944,909	960,027	975,388	990,994	857,749
Sub total	1,479,344	1,503,398	1,527,844	1,552,687	1,577,933	1,603,591	1,629,666	1,655,740	1,682,232	1,709,148	1,479,344

Source: CSO Environment Statistics Compendium (2015) and National Woodfuel Study (2017)

Emission Factors

The country specific emission factors used to estimate the annual carbon loss due to fuelwood removals are given in Table 22. The source of data was derived from the Forestry Compendium[22] and ILUA II.[11]

Table 22. Emission Factors for estimating annual carbon loss due to fuelwood removals.

Forest Subcategories	Biomass conversion and expansion factor for conversion of removal in merchantable volume to total biomass removals (including bark) (tons of biomass removals/m^3 of removals) (BCEFr)	Ratio of below ground biomass to aboveground biomass (tons bg / Tons ag) (R)	Carbon Fraction of dry matter (tons C /ton) (CF)
Dry Deciduous Forest	1.38	0.28	0.47
Dry Evergreen Forest	1.38	0.28	0.47
Forest Plantations (Pinus)	1.38	0.28	0.47
Forest Plantations (Eucalyptus)	1.38	0.28	0.47
Moist evergreen Forest	1.38	0.28	0.47
Woodlands	1.38	0.28	0.47

Source: Forestry Department

Annual Carbon Loss due to Fuelwood Removal (tons C/yr)

The results for the annual carbon loss due to fuelwood removals (charcoal production and fuelwood harvesting) are given in Table 23.

Table 23. Annual carbon loss due to fuelwood removals (tons C/yr)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	779	793	808	826	852	892	965	1,039	1,145	1,302
Dry deciduous forests	560,034	569,920	580,920	594,216	612,434	641,405	694,087	746,768	823,159	936,215
Moist evergreen forest	13,241	13,475	13,735	14,050	14,480	15,165	16,411	17,657	19,463	22,136
Woodlands (semi-evergreen forests)	792,148	806,132	821,690	840,497	866,266	907,245	981,761	1,056,276	1,164,329	1,324,243
Sub total	**1,366,203**	**1,390,319**	**1,417,153**	**1,449,589**	**1,494,031**	**1,564,708**	**1,693,224**	**1,821,739**	**2,008,095**	**2,283,896**

Source: Collect Earth and Forestry Department

Figure 7 shows an increase in annual carbon loss due to fuelwood removals from 1,366,203 tons C in 2009 to 2,283,896 tons C in 2018 representing an annual growth rate of 67% over the 10-year period.

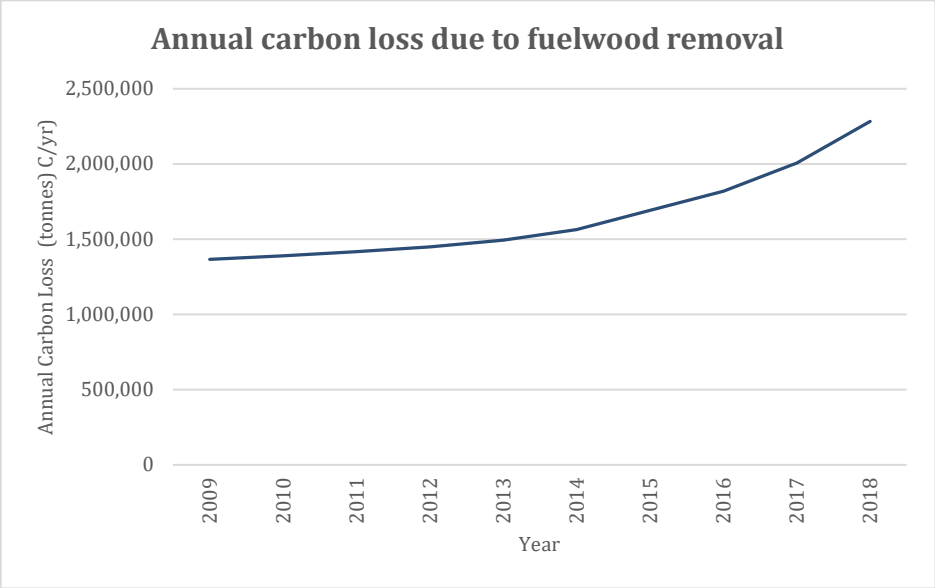


Figure 7 Annual Carbon Loss due to Fuelwood removal (tons C/yr)

Loss of biomass and carbon from disturbance, L disturbance

Activity Data

Annual decrease in carbon stocks due to biomass loss (tons C/yr) was estimated using country specific activity data of area affected by disturbances. The area affected by disturbances was calculated at 20% of the total land area in each forest subcategory based on statistics of fire frequency and occurrence in Eastern Province[65] and the ratio of actual area that is disturbed due to fires (Hollingsworth et al, 2015). The source of fire due to disturbance is from natural occurrences. Table 24 shows areas that are affected by fire disturbances and the fraction of biomass burnt from the disturbance for the years 2008 to 2018 and was calculated at 25% based on fire report for Eastern province and a study by Chidumayo 2013. The total area burnt annually in the Eastern Province is approximately 1 million ha over 8 months period from all land types[23]. The fires considered disturbances are from the late fires (September, October and November) during the fire danger season. The figures in Table 24 and the percent of fire disturbance were derived according to forest type areas whose undergrowth and fuel loads are different based on the variations in the canopy covers (e.g., Baikiea forests and Miombo forests, respectively).

[65] Eastern Province Fire Report, Zambia Environmental Management Agency (2015)

Table 24. Area affected by disturbances from fires and fraction of biomass burnt from disturbance (hectares)

YEAR OF ASSESSMENT	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Indigenous forest	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)	Area (Ha)
Dry evergreen forest	353	352	350	348	347	345	344	342	340	353	352
Dry deciduous forests	240,707	239,611	238,516	237,421	236,327	235,227	234,131	233,035	231,939	240,707	239,611
Moist evergreen forest	5,651	5,626	5,600	5,574	5,548	5,523	5,497	5,471	5,445	5,651	5,626
Woodlands (semi-evergreen forests)	341,958	340,402	338,846	337,290	335,735	334,173	332,616	331,059	329,502	341,958	340,402
Sub total	**588,669**	**585,990**	**583,312**	**580,634**	**577,957**	**575,267**	**572,587**	**569,907**	**567,227**	**588,669**	**585,990**

Source: Collect Earth and Fire Management Assessment of Eastern Province (2015)

Emission Factors

The annual decrease in carbon stocks due to biomass loss from disturbances was estimated using country specific emission factors given in Table 25.

Table 25. Emission Factors to determine annual decrease in biomass carbon stocks.

Forest Subcategories	Average above ground biomass of area affected (tons/ha) (Bw)	Ratio of below ground biomass to aboveground biomass (tons bg / Tons ag) (R)	Carbon Fraction of dry matter (tons C /ton) (CF)
Dry Deciduous Forest	37.2	0.28	0.47
Dry Evergreen Forest	67.8	0.28	0.47
Forest Plantations (Pinus)	70.8	0.28	0.47
Forest Plantations (Eucalyptus)	70.8	0.28	0.47
Moist evergreen Forest	34.2	0.28	0.47
Woodlands	43.1	0.28	0.47

Source: Forestry Department

Annual other losses of carbon (ton C/yr) due to fire disturbance

Table 26 shows the results of the annual other losses of carbon due to fires. Figure 8 shows a graphical presentation of the annual other losses of carbon (ton C/yr) mainly attributed to fire disturbances.

Table 26. Annual other losses of carbon due to fire disturbances (tons C/yr)

YEAR OF ASSESSMENT	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	3,585	3,569	3,552	3,536	3,520	3,503	3,487	3,470	3,454	3,438
Dry deciduous forests	1,340,597	1,334,471	1,328,343	1,322,219	1,316,066	1,309,934	1,303,802	1,297,671	1,291,546	1,285,422
Moist evergreen forest	28,936	28,804	28,671	28,539	28,406	28,274	28,142	28,009	27,877	27,745
Woodlands (semi-evergreen forests)	2,206,565	2,196,482	2,186,396	2,176,316	2,166,188	2,156,096	2,146,002	2,135,911	2,125,830	2,115,749
Sub total	**3,579,683**	**3,563,325**	**3,546,963**	**3,530,610**	**3,514,179**	**3,497,807**	**3,481,432**	**3,465,062**	**3,448,708**	**3,432,353**

Source: Collect Earth and Forestry Department

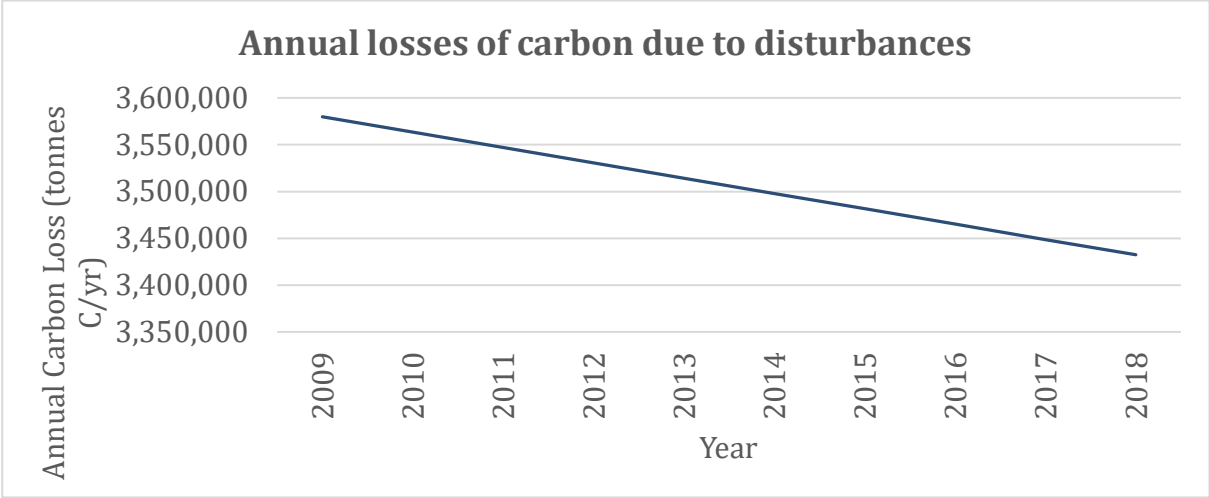


Figure 8 Annual losses of carbon (tons C/yr) due to disturbances

Annual decrease in carbon stocks due to biomass loss (tons C/yr) (ΔCL= Lwr + Lfw + Ldisturb)

The overall annual decrease in carbon stocks due to biomass loss from forest land remaining forest land is given in Table 27.

Table 27. Annual decrease in carbon stocks due to biomass loss from Forest land remaining Forest land (tons C/ year)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	4,481	4,659	4,561	4,898	4,560	4,576	4,876	4,911	4,669	4,818
Dry deciduous forests	1,900,649	1,904,436	1,909,293	1,916,517	1,928,528	1,951,367	1,997,954	2,044,501	2,114,716	2,221,649
Moist evergreen forest	42,199	42,335	42,444	42,690	42,923	43,473	44,633	45,741	47,353	49,895
Woodlands (semi-evergreen forests)	3,001,709	3,010,171	3,013,186	3,030,475	3,037,240	3,067,959	3,138,561	3,202,428	3,291,957	3,441,998
Eucalyptus	14	36	24	65	23	22	52	49	8	9
Pinus	569	1,435	969	2,595	909	877	2,051	1,945	341	381
Sub total	**4,949,622**	**4,963,072**	**4,970,476**	**4,997,239**	**5,014,182**	**5,068,275**	**5,188,125**	**5,299,575**	**5,459,044**	**5,718,750**

Source: Collect Earth and Forestry Department

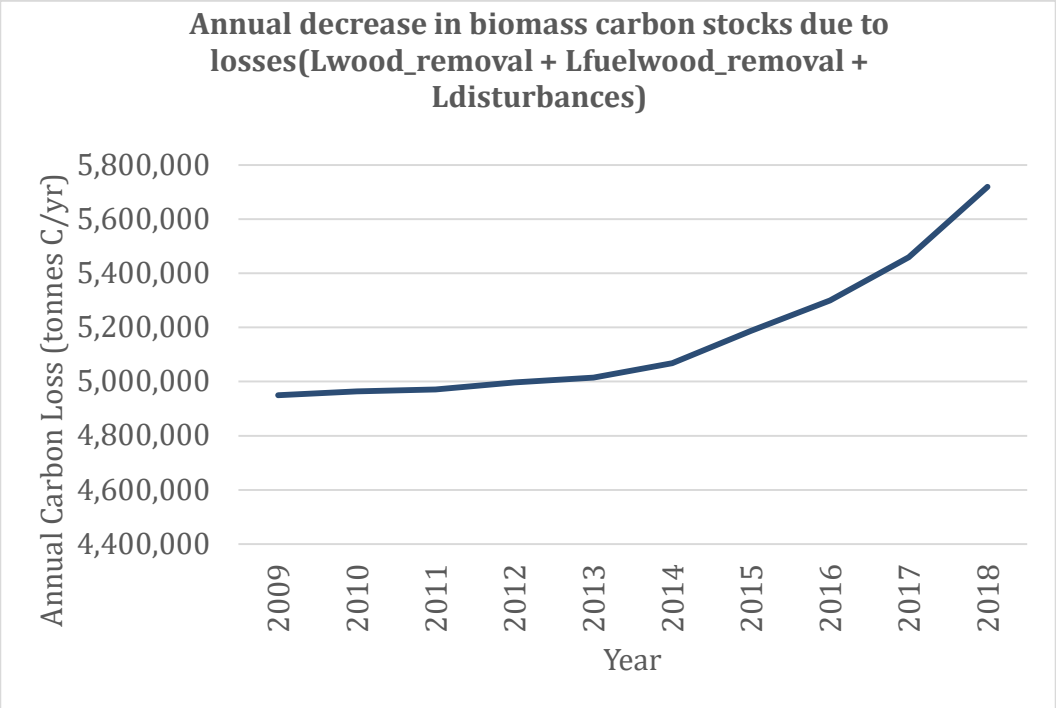


Figure 9 Annual decrease in carbon stocks due to biomass loss (ton C/yr)

Annual change in organic carbon stocks in mineral soils

Activity Data

Country specific measured Soil Organic Carbon densities and area of forest land remaining forest land was used to derive SOC equilibrium factors in forest land remaining forest land. The source of data for reference soil organic carbon was obtained from the Zambia Agriculture Research Institute. Tables 28 to 30 show the estimated soil carbon stocks in soils of Eastern Province.

Table 28. Estimated Soil carbon stocks in soils of Eastern Province Zambia

STATS	t C ha-1	ha (m2)	depth (m)	Forest landscape SOC%	BD g/cm3
2000	37.53	10000	0.3	0.9	1.39
2009	33.67	10000	0.3	0.87	1.29
2016	30.88	10000	0.3	0.83	1.24
2019	35.61	10000	0.3	0.83	1.43
Mean	**30.36**	10000	0.3	0.86	1.18
Average	33.6075				

Table 29. Estimated Soil carbon stocks in soils of Eastern Province Zambia

STATS	t C ha-1	ha (m2)	depth (m)	Wildlife SOC%	BD g/cm3
2000	33.36	10000	0.3	0.8	1.39
2009	28.25	10000	0.3	0.73	1.29
2016	24.55	10000	0.3	0.66	1.24
2019	39.90	10000	0.3	0.93	1.43
Mean	**27.61**	10000	0.3	0.78	1.18
Average	30.7344				

Table 30. Estimated Soil carbon stocks in soils of Eastern Province Zambia

STATS	t C ha-1	ha (m2)	depth (m)	Agriculture SOC%	BD g/cm3
2000	45.87	10000	0.3	1.1	1.39
2009	35.99	10000	0.3	0.93	1.29
2016	28.27	10000	0.3	0.76	1.24
2019	28.31	10000	0.3	0.66	1.43
Mean	**30.55**	10000	0.3	0.863	1.18
Average	33.79944				

Source: Soil Survey Report of the Eastern Province (2020)

The area under forest land remaining forest land for SOC estimation is assumed constant with the 2009 area of 2,930,475 ha. This area is assumed constant for the entire reference period.

SOC equilibrium factor:

Based on the sampling results shown above, the SOC equilibrium factor for forest land remaining forest land was derived by averaging the three results 2009, 2016 and 2019 as representative for the reference period.

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	33.67	
2016	30.88	**33.39**
2019	35.61	

Source: ZARI Report on Soil carbon stocks in soils of Eastern Province Zambia

Annual change in organic carbon stocks in mineral soils

No annual change in SOC is assumed in forest land remaining forest land. The derived SOC equilibrium value for this category is assumed to remain constant over the reference period. The table 31 shows the constant total carbon stocks in mineral soils and the zero annual change.

Table 31. Annual change in organic carbon stocks in mineral soils

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Area remaining constant (ha)	2,943,856	2,930,475	2,917,094	2,903,713	2,890,332	2,876,951	2,863,569	2,850,188	2,836,807	2,823,426
Total $SOC_{Mineral}$ forest land remaining forest land (tC)	97,838,803	97,838,803	97,838,803	97,838,803	97,838,803	97,838,803	97,838,803	97,838,803	97,838,803	97,838,803
Annual change (tC/year)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: ZARI

Net Carbon Stock Change and Emissions from Forest land remaining Forest land

Table 32 shows the summary of Net Carbon Stock Change and CO_2 Emissions from Forest land remaining Forest land.

Table 32. Summary of Net Carbon Stock Change and CO_2 emissions from Forest land remaining Forest land

Year	Increase	Decrease	Net Carbon (tons C)	Net CO_2 Emissions (t CO_2 eq.)
2009	-2,718,450	4,949,622	2,231,173	8,180,966
2010	-2,706,133	4,963,072	2,256,939	8,275,441
2011	-2,693,851	4,970,476	2,276,625	8,347,626
2012	-2,681,496	4,997,239	2,315,744	8,491,060
2013	-2,669,765	5,014,182	2,344,417	8,596,197
2014	-2,657,562	5,068,275	2,410,713	8,839,279
2015	-2,645,386	5,188,125	2,542,739	9,323,376
2016	-2,633,170	5,299,575	2,666,404	9,776,815
2017	-2,620,826	5,459,044	2,838,218	10,406,801
2018	-2,608,485	5,718,750	3,110,265	11,404,306

Source: Collect Earth and Forestry Department

Figure 10 shows CO_2 emissions from Forest land remaining Forest land which increased by 39% from 8,180,966 tCO_2eq in 2009 to 11,404,306 tCO_2eq in 2018 representing an annual increase of 4 %. The CO_2 emissions from Forest land remaining Forest land is attributed to loss of biomass carbon from wood and fuelwood removals, and disturbances as a result of forest fires. Further, it should be reported that CH_4 and N_2O emissions from burning in Forest land are occurring in Forest land remaining Forest land and are not reported in 3C1 Aggregate Sources and Non-CO_2 emissions.

Cropland converted to Forest land.

Annual change in carbon stocks of biomass of Cropland converted to Forest land

Activity Data

Table 33 provides the country specific activity data on annual area that was used in estimating the annual change in carbon stocks of biomass of cropland converted to forest land for the years 2008 to 2018. The source of data for the land use maps that were used to determine the net conversions was obtained from the Forestry Department and the Consultant's own analysis to deduce the net conversions. Detailed methodology is in section 4.5 - General method for Land.

Table 33. Annual area of cropland converted to forest land

Land Use Category	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cropland converted to Forest land	478	478	478	478	478	478	478	478	478	478

Source: Collect Earth and Forestry Department

Emission Factors

The emission factors used to estimate the annual increase in biomass carbon stocks due to biomass growth from cropland converted to forest land include; (i) average annual above ground biomass growth (Gw), (ii) ratio of below ground biomass to aboveground biomass (tons bg/tons ag) and (iii) carbon fraction of dry matter (tons C/ ton) are provided in Table 34.

Table 34. Emission factors for Annual increase in biomass carbon stocks due to biomass growth

Initial land use	Land Use during reporting year	Average annual above ground biomass growth (Gw) (tons/ha)	Ratio of above ground biomass to below ground biomass (tons bg/tons ag)
Cropland	Forest land	1.8	0.28

Source: Forestry Department

Annual increase in biomass carbon stocks due to biomass growth (tons C/yr) from cropland to forest land

Tables 35 shows the calculated annual increase in biomass carbon stocks due to biomass growth.

Annual increase(uptake) of carbon in biomass stocks due to biomass growth as result of conversion from cropland to forest land increased from -1885 tons in 2009 to -18853 in 2018 (Table 35).

Table 35. Annual increase in biomass stocks due to biomass growth from cropland to forest land (tons C/year)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Increase in biomass stocks	-1,885	-3,771	-5,656	-7,541	-9,427	-11,312	-13,197	-15,082	-16,968	-18,853

4.1.1 Annual Change in carbon stocks in dead organic matter due to conversion

Activity Data

Activity data used in estimating annual change stocks in dead organic matter due to conversion was the area undergoing conversion from old to new land use category and time period of the transition from old to new land use category.

Emission Factors

Table 36 shows the country specific emission factors used to estimate the annual change stocks in dead organic matter due to conversion from the GHG baseline spreadsheet.

Table 36. Emission factors for annual change stocks in dead organic matter due to conversion

Initial Land Use	Land Use during reporting year	Vegetation Type	Dead wood / litter stock under the old land use category (tons C / ha)	Dead wood / litter stock under the new land use category (tons C/ha)	Time period of the transition from old to new land use category (yr) Default value is 1
			Co	Cn	Ton
Cropland	Dry Evergreen Forest	Dead wood	0.5	2.3	20
	Dry Decidious Forest	Dead wood	0.5	0.8	20
	Moist Evergreen Forest	Dead wood	0.5	0.48	20
	Woodlands Forest	Dead wood	0.5	0.9	20

Source: ILUA II report, Forestry Department

Annual change in carbon stocks in dead wood /litter (tons C/yr)

Table 37 shows the results of the annual change in carbon stocks in wood/litter (tons C/yr) that was calculated at – 43 tons C/yr and - 430 t CO_2 eq in 2009 and 2018 respectively.

Table 37. Annual change in carbon stocks in wood / litter (tons C/yr)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	-43	-86	-129	-172	-215	-258	-301	-344	-387	-430

Source: Forestry Department

4.1.2 Annual change in carbon stocks in mineral soils

Activity Data

Activity data used in estimating annual change in carbon stocks in mineral soils was the area for land use change by climate and soil, and time dependence of stock change factors (D) (T) (yr) – Default value is 20. The cropland reference soil organic carbon was 30.86 (t C ha).

Emission Factors

Table 38-40 shows emission factors used to estimate annual change in carbon stocks in mineral soils.

Annual change in carbon stocks in mineral soils

Table 38 shows the annual change in carbon stocks in mineral soils from cropland to forest land that was calculated for the 10-year period in the GHG baseline spreadsheet.

Table 38. Annual change in carbon stocks in mineral soils (tons C/year)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cropland to forest land	-60	-121	-181	-242	-302	-363	-423	-484	-544	-605

Source: Forestry Department

Annual change in carbon stocks in biomass, litter and deadwood and soil organic carbon from mineral soils from cropland to forest land

The CO_2 removals from forest gain from abandoned cropland from aboveground biomass stocks, litter and deadwood and soil organic carbon from mineral soils for the 10 year period (2009 – 2018) is shown in Table 39.

Table 39 Annual change in carbon stocks from Biomass (AG), Litter and Deadwood and Soil Organic Carbon in Mineral soils Total Annual change (ΔC = ΔCg -ΔCl)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	-1,989	-3,978	-5,966	-7,955	-9,944	-11,933	-13,921	-15,910	-17,899	-19,888

Source: Forestry Department

Settlements converted to Forest land.

Emissions from settlements converted to forest land were not estimated because the activity is non occurring in Eastern Province.

4.8 Cropland

The cropland subcategories are based on the IPCC software requirements to generate cropland definitions where the cropland category should be segmented according to specific crops as subcategories as collected from a crop survey. The field cropland sub-categories assessed from a field crop survey (higher level tier) where used for accuracy assessment using of the land cover/use layers for Eastern Province to produce specific crop distribution over the annual and perennial cropland area for the following crops: Bambara nuts, Burley Tobacco, Cassava, Cowpeas, Groundnuts, Irish Potatoes, Maize, Millet, Mixed beans, Paprika, Popcorn, Rice, Seed cotton, Sorghum, Soybeans, Sunflower, Velvet beans, Virginia tobacco, Sweet potatoes. The sub-categories of perennial, and annual cropland subcategories are defined classes based on the procedure for digital image processing (DIP) that uses wall-to-wall methodology. Therefore, due to the non-availability of area data for each of the cropland subcategories listed, it was assumed the major driver for land conversions due to agriculture is driven mostly by maize cultivation and hence the reason maize was the only cropland subcategory used under cropland.

To account for specific CSA practices defined by the Programme, an additional CSA soil organic carbon baseline was developed for cropland remaining cropland using a Tier 2/3 soil modelling approach in line with the logic of the IPCC Steady-

State Method of the 2019 Refinement to the 2006 IPCC Guidelines. This IPCC Tier 2 steady-state method provides an optional alternative method for estimating soil C stock changes in the 0-30 cm layer of mineral soils in Cropland remaining Cropland related to CSA practices. Methodologically the VCS SALM Methodology (VM0017 as applied also by the COMACO project referred to above) is followed which requires to model a baseline soil carbon equilibrium factor which is applied during ex-post accounting of CSA benefits. Baseline carbon stock changes are set to zero for agricultural landscapes which are degrading as shown for the Eastern Province.

Cropland Remaining Cropland

Activity Data

Table 40 shows country specific activity data for area of cropland in the Eastern Province (2009 – 2018). Data was obtained from Collect Earth and analysis was undertaken to deduce areas of cropland.

Table 40. Country specific activity data for area of cropland in the Eastern Province

Year	Cropland remaining Cropland (ha)
2009	1,370,614
2010	1,383,995
2011	1,397,376
2012	1,410,757
2013	1,424,138
2014	1,437,520
2015	1,450,901
2016	1,464,282
2017	1,477,663
2018	1,491,044

Source: Collect Earth

Annual change in carbon stocks in Mineral Soils

The area under cropland remaining cropland land for SOC estimation is assumed constant with the 2009 area of 1,370,614 ha. This area increased to 1,491,044ha in 2018.

SOC equilibrium factor:

Based on the soil sampling results shown above in 4.5, the SOC equilibrium factor for cropland remaining cropland was derived by averaging the three results 2009,2016 and 2019 as representative for the reference period.

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	30.86
2016	28.27	
2019	28.31	

Source: ZARI Report on Soil carbon stocks in soils of Eastern Province Zambia

CSA SOC baseline equilibrium factor:

In order to account for specific CSA programme activities a CSA SOC baseline equilibrium factor has been derived following the VCS SALM Methodology VM0017. The soil carbon accounting approach of VM0017 is in line with the IPCC soil carbon equilibrium approach: Equilibrium soil carbon stocks under baseline practices are modelled using the RothC soil carbon model and project-specific values for soil clay content, topsoil thickness, decomposability of incoming plant material, proportion vegetative matter cover by month, monthly mass of carbon input, average monthly temperature, average monthly precipitation, and average monthly evapotranspiration. The RothC model is run again to equilibrium using values for the project activity. Soil carbon stock is assumed to linearly move from the baseline equilibrium to the project equilibrium using IPCC default period of 20 years. Reliability of the soil model is key to this methodology. During validation of this methodology under VCS, the VVB (SCS and DNV) performed a number of model runs, with different soil clay proportions, initial soil carbon starting conditions, and residue input rates. Based on the VVB review, the approach for quantifying project removals is deemed to be appropriate and adequate.

The overall approach is illustrated as follows:

- SOC changes of specific CSA practices are accounted for and not absolute carbon stock changes in the soil. Practices considered in the baseline as well as later during ex-post monitoring and accounting include soil inputs from residue management (mulching), soil inputs from composted manure and soil inputs from soil fertility trees (mainly *Gliricidia* trees).
- Baseline soil carbon changes are conservatively considered zero as per the applicability condition of the SALM Methodology that the cropland is subject to historic and ongoing land degradation. Hence, the ZIFLP AFOLU GHG inventory following IPCC and ISFL requirements remains without changes.

The overall accounting logic of the CSA methodology can be described as follows:

$$PRS_t = \frac{1}{20} * (PS_{equil,t} - BS_{equil,0}) * \frac{44}{12}$$

Where,

PRS_t = Baseline removals due to changes in soil organic carbon in year t, t CO_2e.

$BS_{equil,0}$ = Baseline SOC in equilibrium year 0, tC$PS_{equil,t}$ = Project SOC in equilibrium year t, tC

20 = The IPCC default transition period required for SOC to be at equilibrium after a change in land use or

management practice, year

By applying this equation for each year of the project with monitoring data and soil modelling to establish $PS_{equil,t}$ the net CSA SOC benefits will be derived for the aforementioned CSA practices by deducting the baseline CSA SOC equilibrium $BS_{equil,0}$ representing those farmers in the Programme who already implement these practices in the baseline.

$BS_{equil,0}$ represents the CSA baseline SOC equilibrium representing an average year of the 2009-2018 period. The estimation of $BS_{equil,0}$ is described in detail based on survey data and soil modelling representing the ZIFLP cropland remaining cropland area and the 2009 – 2018 reference period in a separate CSA baseline SOC Report.

The weighted average baseline SOC $BS_{equil,0}$ value for the entire province is:

Total BSequil weighted: -0.11 tCO_2/ha/year.

Interpretation: This value represents the baseline CSA SOC sequestration at equilibrium for the Programme cropland remaining cropland area of those farmers already implementing CSA practices in the baseline. BS_{equil} will be

applied directly during ex post monitoring and accounting. As it represents an equilibrium sequestration, the annual changes in the baseline are conservatively considered zero under the condition that the land subject to this Methodology is degraded or degrading which is the case in this ZIFLP Programme for cropland remaining cropland.

Annual change in organic carbon stocks in mineral soils

No annual change in SOC is assumed in cropland remaining cropland. The derived SOC equilibrium value for this category is assumed to remain constant over the reference period. In addition, also for the CSA baseline the SOC change is considered zero. The table 41 shows the constant total carbon stocks in mineral soils and the zero annual change.

Table 41. Annual change in organic carbon stocks in mineral soils

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Area remaining constant (ha)	1,370,614	1,383,995	1,397,376	1,410,757	1,424,138	1,437,520	1,450,901	1,464,282	1,477,663	1,491,044
Total $SOC_{Mineral}$ forest land remaining forest land (tC)	42,292,570	42,292,570	42,292,570	42,292,570	42,292,570	42,292,570	42,292,570	42,292,570	42,292,570	42,292,570
Annual change $SOC_{Mineral}$ (tC/year)	0	0	0	0	0	0	0	0	0	0
CSA Baseline SOC change tC/year for mulching and other soil inputs	0	0	0	0	0	0	0	0	0	0
Total annual change (tC/year)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Source: ZARI, Unique land use, Forestry department

It should be reported that CH_4 and N_2O emissions from burning in Cropland are occurring in Cropland remaining Cropland but are reported in 3C1 Aggregate Sources and Non-CO_2 emissions.

Forest land converted to Cropland.

Annual change in carbon stocks in biomass from Forest land converted to Cropland.

Activity Data

The annual change in carbon stocks in biomass (tons C/yr) was estimated using country specific activity data of annual area of forest land converted to cropland (ha). The assumption is that forest to cropland conversion was all annual cropland largely driven by expansion of fields for maize cultivation. The annual area of forest land converted to Cropland were derived from land cover maps by analysing land use change in Eastern Province between 2008 and 2018 using the Collect Earth Tool. Table 42 shows the annual area of forest land converted to cropland (ha). The sources of data used to deduce annual areas of forest land converted to cropland are the Collect Earth Tool and Forestry Department. Detailed methodology is in section 4.5 - General method for Land.

Table 42. Annual area of Forest land converted to Cropland (hectares)

Forest land	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	8	8	8	8	8	8	8	8	8	8
Dry deciduous forests	5,341	5,341	5,341	5,341	5,341	5,341	5,341	5,341	5,341	5,341
Moist evergreen forest	125	125	125	125	125	125	125	125	125	125
Woodlands (semi-evergreen forests)	7,588	7,588	7,588	7,588	7,588	7,588	7,588	7,588	7,588	7,588
Total	13,063	13,063	13,063	13,063	13,063	13,063	13,063	13,063	13,063	13,063

Source: Collect Earth and Forestry Department

Emission Factors

The emission factors used to estimate the annual changes in carbon stocks in biomass are given in Table 43. The biomass stocks before the conversion are dry evergreen forest 86.8 t/ha, dry deciduous forest 47.6 t/ha, moist evergreen forest 43.8 t/ha and woodlands 55.1t/ha. The biomass stocks after the conversion

were 7.9 t/ha for all the forest type subcategories (ILUA II 2016 Report, Table 17).

Table 43. Emission Factors for annual change in carbon stocks in biomass

Initial Land Use to	Land Use during reporting year	Biomass stocks before the conversion (Tons/ha) Bb	Biomass stocks after the conversion (Tons/ha) Ba	Carbon Fraction of Dry Matter (Tons C / Ton) CF
Dry Evergreen Forest	Cropland	86.8	7.9	0.47
Dry Deciduous Forest	Cropland	47.6	7.9	0.47
Moist Evergreen Forest	Cropland	43.8	7.9	0.47
Woodlands Forest	Cropland	55.1	7.9	0.47

Source: Forestry Department

Annual change in carbon stocks in biomass (tons C)

Table 44 shows the annual change in carbon stocks in biomass (tons C) for forest land converted to cropland which was estimated at 270,403 tons C/yr for the 10-year period (2009 – 2018). In 2018, the largest loss occurred in woodlands (semi-evergreen forests) at 62.2% followed by dry deciduous at 36.8%. Moist evergreen forest contributed 0.78% and least was Dry deciduous forests at 0.1%.

Table 44. Annual change in carbon stocks in biomass (tons C)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	291	291	291	291	291	291	291	291	291	291
Dry deciduous forests	99,663	99,663	99,663	99,663	99,663	99,663	99,663	99,663	99,663	99,663
Moist evergreen forest	2,116	2,116	2,116	2,116	2,116	2,116	2,116	2,116	2,116	2,116
Woodlands (semi-evergreen forests)	168,333	168,333	168,333	168,333	168,333	168,333	168,333	168,333	168,333	168,333
Sub total	**270,403**	**270,403**	**270,403**	**270,403**	**270,403**	**270,403**	**270,403**	**270,403**	**270,403**	**270,403**

Source: Collect Earth and Forestry Department

Emissions from initial change in biomass carbon stocks on forest land converted to another land estimated at -991,477 tons CO_2 equivalent.

Annual Change in carbon stocks in dead organic matter due to conversion

Activity Data

Activity data used in estimating annual change stocks in dead organic matter due to conversion was the area undergoing conversion from old to new land use category and time period of the transition from old to new land use category.

Emission Factors

Table 45 provides the default emission factors used to estimate the annual change stocks in dead organic matter due to conversion.

Table 45. Emission factors for annual change stocks in dead organic matter due to conversion

Initial Land Use	Land Use during reporting year	Vegetation Type	Dead wood / litter stock under the old land use category (tons C / ha) Co	Dead wood / litter stock under the new land use category (tons C/ha)	Time period of the transition from old to new land use category (yr) Default value is 1
				Cn	Ton
Dry Evergreen Forest	Cropland	Dead wood	2.3	0.5	1
Dry Deciduous Forest	Cropland	Dead wood	0.8	0.5	1
Moist Evergreen Forest	Cropland	Dead wood	0.48	0.5	1
Woodlands Forest	Cropland	Dead wood	0.9	0.5	1

Source: Forestry Department

Annual change in carbon stocks in dead wood /litter (tons C/yr)

Table 46 shows the results of the annual change in carbon stocks in wood/litter (tons C/yr). The annual average loss of carbon estimated at 4,649 tons/yr. The largest contribution to the loss of carbon are woodlands (semi-evergreen forests) at 65.2%. Dry deciduous forest was second at 34.4%. Dry evergreen forests were third at 0.3% and Moist evergreen was least at 0.1%.

Table 46. Annual change in carbon stocks in dead wood/litter (tons C)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Dry evergreen forest	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1	14.1
Dry deciduous forests	1,602.4	1,602.4	1,602.4	1,602.4	1,602.4	1,602.4	1,602.4	1,602.4	1,602.4	1,602.4
Moist evergreen forest	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
Woodlands (semi-evergreen forests)	3,035.2	3,035.2	3,035.2	3,035.2	3,035.2	3,035.2	3,035.2	3,035.2	3,035.2	3,035.2
Sub total	**4,649**	**4,649**	**4,649**	**4,649**	**4,649**	**4,649**	**4,649**	**4,649**	**4,649**	**4,649**

Source: Forestry Department

Annual change in carbon stocks in mineral soils

Activity Data

Similar with the land use categories remaining, the derived SOC equilibrium factors for the main land use categories are used. In the case of this conversion category, the following are applied:

1. Forested Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	33.67	**33.39**
2016	30.88	
2019	35.61	

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	**30.86**
2016	28.27	
2019	28.31	

Source: ZARI

Emission Factors

In line with the IPCC equilibrium theory, a change in land use will cause SOC to reach a new SOC equilibrium using the default IPCC timeframe of 20 years. To derive emission factors for this land use conversion categories, the SOC equilibrium factors identified above were used as illustrated below to derive the emission factor for SOC:

Emission factor for conversion: (33.39 - 30.86) = 2.53/20 years = 0.13 tC/ha/yr

Annual change in soil organic carbon from mineral soils

Table 47 shows the annual change in soil organic carbon from mineral soils.

Table 47. Annual change in soil organic carbon from mineral soils (tC)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Annual change in soil organic carbon	*1,652*	*3,305*	*4,957*	*6,610*	*8,262*	*9,914*	*11,567*	*13,219*	*14,872*	*16,524*

Source: Forestry Department and ZARI

Annual change in carbon stocks in Biomass, Dead wood and Litter and Soil Organic Carbon from Mineral soils

Annual average CO_2 emissions from Forest land converted to Cropland due to annual changes in carbon stocks in biomass, annual change in carbon stocks in dead organic matter due to conversion and annual change in carbon stocks in mineral soils are shown in table 48 below. The conversion of forest land to cropland is attributed to the opening up of the landscape to agriculture activities mainly cultivation of maize.

Table 48. Net CO_2 emissions from forest land converted to cropland ($\Delta C = \Delta C_{gains} - \Delta C_{losses}$)

Year of Assessment	Net change (Tons C)	Net change (CO_2 equivalent)
2009	276,704	1,014,583
2010	278,357	1,020,641
2011	280,009	1,026,700
2012	281,662	1,032,759
2013	283,314	1,038,818
2014	284,966	1,044,877
2015	286,619	1,050,936
2016	288,271	1,056,995
2017	289,924	1,063,053
2018	291,576	1,069,112

Source: Collect Earth and Forestry Department

Grassland Converted to Cropland

Annual change in carbon stocks in biomass from Grassland converted to Cropland

Activity Data

Annual changes in carbon stocks in biomass from grassland converted to cropland were estimated using country specific activity data of annual area of grassland converted to cropland. Table 49 shows the activity data obtained from

the Forestry Department and analysed to deduce net conversions of land uses over a 10-year period (2008 – 2018).

Table 49. Annual area of Grassland converted to Cropland (hectares)

Year	Grassland converted to Cropland (ha)
2009	2,070.9
2010	2,070.9
2011	2,070.9
2012	2,070.9
2013	2,070.9
2014	2,070.9
2015	2,070.9
2016	2,070.9
2017	2,070.9
2018	2,070.9

Source: Collect Earth and Forestry Department

Emission Factors

At Tier 1, carbon stocks in biomass immediately after conversion (B_{AFTER}) are assumed to be zero, since the grassland is cleared of all vegetation before planting crops[66]. Based on ILUA II (2016) report, Table 43, the emission factors for annual loss of biomass carbon (tons C/yr) due to conversion of grassland to cropland is provided in Table 50.

Table 50. Emission factors for annual change in carbon stocks in biomass (Grassland to cropland)

Initial Land Use	Land Use during reporting year	Biomass stocks before the conversion Bb (Tons/ha)	Biomass stocks after the conversion (Tons/ha) Ba	Carbon Fraction of Dry Matter (Tons C / Ton) CF
Grassland	Cropland	8.8	7.9	0.47

Source: Forestry Department

[66] Chapter 5: Cropland, 2006 IPCC Guidelines for National Greenhouse Gas Inventories 5.27

The conversion of grassland to cropland is mainly influenced by the opening up of agricultural land due to crop cultivation.

Annual change in carbon stocks

Due to land conversion from grassland to cropland there was an average annual biomass loss across the time series (2009 to 2018) of 876 tons C translating to 3,212 tons CO_2 eq. as shown in Table 51.

Table 51. Annual change in carbon stocks in biomass

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Grassland to cropland (tons C)	876	876	876	876	876	876	876	876	876	876
Grassland to cropland (tons CO_2 equivalent)	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212	3,212

Source: Collect Earth and Forestry Department

Annual change in carbon stocks in dead organic matter due to conversion

No change of this carbon pools was assumed and conservatively omitted.

Annual change in carbon stocks in mineral soils

Activity Data

Similar with the land use categories remaining, the derived SOC equilibrium factors for the main land use categories are used. In the case of this conversion category, the following are applied:

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	**30.86**
2016	28.27	
2019	28.31	

2. Wildlife (Grassland) Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	28.25	**30.90**
2016	24.55	
2019	39.90	

Source: ZARI

Emission Factors

In line with the IPCC equilibrium theory, a change in land use will cause SOC to reach a new SOC equilibrium using the default IPCC timeframe of 20 years. To derive emission factors for this land use conversion category, the SOC equilibrium factors identified above were used as illustrated below to derive the emission factor for SOC:

Emission factor for conversion: (30.90 – 30.86) = 0.0433/20 years = 0.0022 tC/ha/yr

Annual change in soil organic carbon from mineral soils

Table 52 shows the annual change in soil organic carbon from mineral soils.

Table 52. Annual change in soil organic carbon from mineral soils (tC)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Annual change in soil organic carbon	4	9	13	18	22	27	31	36	40	45

Source: Forestry Department and ZARI

Annual change in carbon stocks in Biomass, Dead wood and Litter and Soil Organic Carbon from Mineral soils

Annual average CO_2 emissions from Grassland converted to Cropland due to annual changes in carbon stocks in biomass, annual change in carbon stocks in dead organic matter due to conversion and annual change in carbon stocks in mineral soils are shown in Table 53 below.

Table 53. Net CO_2 emissions from forest land converted to cropland ($\Delta C = \Delta C_{gains} - \Delta C_{losses}$)

Year of Assessment	Net change (Tons C)	Net change (CO_2 equivalent)
2009	880	3,228
2010	885	3,245
2011	889	3,261
2012	894	3,278
2013	898	3,294
2014	903	3,311
2015	907	3,327
2016	912	3,344
2017	916	3,360
2018	921	3,376

Source: Collect Earth and Forestry Department

4.9 Grassland

The grassland land use definitions comprise of semi-arid grasslands in a tropical dry climate with low activity clay minerals. Table 54 provides the grassland land use definitions.

Table 54. Grassland land use definitions

Land Use Subcategory	Grassland	Reference
Climate Region	Tropical dry	IPCC Software Land Type Manager
Vegetation type	Semi-Arid	IPCC Software Land Type Manager
Improved grassland	Yes	IPCC Software Land Type Manager

Soil Type	LAC	IPCC Software Land Type Manager
Above ground biomass (t d.m/ha)	8.8	IPCC Software Land Type Manager
Reference Soil Organic Carbon Stock (t c/ha)	35.99	IPCC 2019 Guidelines (Volume 4 Chapter 2 Box 2,2 equation 2.25)
Carbon Fraction of Dry Matter	0.47	ILUA II Report; Table 18: Mean volume distribution by vegetation types and other areas

Wetlands were not estimated under land category because the activity was non-occurring.

Grassland Remaining Grassland

Grassland systems are classified by practices that influence soil C storage. In general, practices that are known to increase C input to the soil and thus soil organic C stocks, such as irrigation, fertilisation, liming, organic amendments, more productive grass varieties, are given an improved status, with medium or high inputs depending on the level of improvement. Practices that decrease C input and soil organic C storage, such as long-term heavy grazing, are given a degraded status relative to nominally-managed seeded pastures or native grassland that are neither improved nor degraded.

Activity Data: Grassland Remaining Grassland

Table 55 shows country specific activity data for area of grassland in the Eastern province (2009 – 2018). Data was obtained from the Forestry Department and the Consultant's own analysis was undertaken to deduce areas of grassland.

Table 55. Land area of Grassland remaining Grassland (hectares)

Year	Grassland remaining Grassland (ha)
2009	663,324
2010	662,368
2011	661,412

2012	660,456
2013	659,500
2014	658,545
2015	657,589
2016	656,633
2017	655,677
2018	654,721

Source: Collect Earth and Forestry Department

Annual change in carbon stocks in Mineral Soils

The area under Grassland remaining Grassland for SOC estimation decreased from 663,324ha in 2009 to 654,721 ha in 2018.

SOC equilibrium factor:

Based on the soil sampling results shown above in 4.5, the SOC equilibrium factor for Grassland remaining Grassland was derived by averaging the three results 2009, 2016 and 2019 as representative for the reference period.

2. Wildlife (Grassland) Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	28.25	**30.90**
2016	24.55	
2019	39.90	

Source: ZARI Report on Soil carbon stocks in soils of Eastern Province Zambia

Annual change in carbon stocks in mineral soils (t CO_2 eq)

It should be noted that CH_4 and N_2O emissions from burning in Grassland are occurring in Grassland remaining Grassland but are reported in Aggregate Sources and Non-CO_2 emissions. Table 56 show Net CO_2 emissions from soil organic carbon from mineral soils.

Table 56. Net CO_2 emissions from soil organic carbon from mineral soils

Year of Assessment	Annual change in carbon stocks (tons C)	Annual change in carbon stocks (tons CO_2 equivalent)
2009	0	0
2010	0	0
2011	0	0
2012	0	0
2013	0	0
2014	0	0
2015	0	0
2016	0	0
2017	0	0
2018	0	0

Source: Collect Earth and Forestry Department

Forest land converted to Grassland

Emissions from forest land converted to grassland were not estimated because the activity is non occurring in Eastern Province.

Cropland converted to Grassland

Conversion to another land category may be associated with a change in biomass stocks, e.g., part of the biomass may be withdrawn through land clearing, restocking or other human-induced activities.

Annual changes in carbon stocks in biomass from Cropland converted to Grassland

Activity Data

Annual changes in carbon stocks in biomass from cropland converted to grassland were estimated using country specific activity data of annual area of cropland converted to grassland. Table 57 shows the activity data obtained from the Forestry Department and analysed to deduce net conversions of land uses over a 10-year period (2008 – 2018).

Table 57. Annual area of Cropland converted to Grassland (hectares)

Year	Cropland converted to Grassland (ha)
2009	1,115
2010	1,115
2011	1,115
2012	1,115
2013	1,115
2014	1,115
2015	1,115
2016	1,115
2017	1,115
2018	1,115

Source: Collect Earth and Forestry Department

Emission Factors

Table 58 shows emission factors for calculating annual change in biomass stocks.

Table 58. Emission factors and annual carbon change in carbon stocks in biomass

			Forest land to Cropland	
Initial Land Use	Land Use during reporting year	Biomass stocks before the conversion (Tons/ha) Bb	Biomass stocks after the conversion (Tons/ha) Ba	Carbon Fraction of Dry Matter (Tons C / Ton) CF
Cropland	Grassland	7.9	8.8	0.47

Source: ILUA II Report

Annual change in carbon stocks in Biomass

Carbon loss arising from conversion from cropland to grassland increase from 24 to 236 tons C in 2009 and 2018, respectively.

Table 59. Annual gain of biomass carbon (tons C/yr)

Year of Assessment	Cropland to Grassland
2009	-24
2010	-47
2011	-71
2012	-94
2013	-118
2014	-142
2015	-165
2016	-189
2017	-212
2018	-236

Source: Collect Earth and Forestry Department

Annual change in carbon stocks in dead organic matter due to conversion

No change of this carbon pools was assumed and conservatively omitted.

Annual change in carbon stocks in mineral soils

Activity Data

Similar with the land use categories remaining, the derived SOC equilibrium factors for the main land use categories are used. In the case of this conversion category, the following are applied:

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	**30.86**
2016	28.27	
2019	28.31	

2. Wildlife (Grassland) Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	28.25	**30.90**
2016	24.55	
2019	39.90	

Source: ZARI

Emission Factors

In line with the IPCC equilibrium theory, a change in land use will cause SOC to reach a new SOC equilibrium using the default IPCC timeframe of 20 years. To derive emission factors for this land use conversion category, the SOC equilibrium factors identified above were used as illustrated below to derive the emission factor for SOC:

Emission factor for conversion: (30.86 – 30.90) = -0.04/20 years = -0.002166667 tC/ha/yr

Annual change in soil organic carbon from mineral soils

Table 60 shows the annual change in soil organic carbon from mineral soils.

Table 60. Annual change in soil organic carbon from mineral soils (tC)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Annual change in soil organic carbon	-2	-5	-7	-10	-12	-14	-17	-19	-22	-24

Source: Forestry Department and ZARI

Annual change in carbon stocks in Biomass, Dead wood and Litter and Soil Organic Carbon from Mineral soils

Annual average CO_2 emissions from Grassland converted to Cropland due to annual changes in carbon stocks in biomass, annual change in carbon stocks in dead organic matter due to conversion and annual change in carbon stocks in mineral soils are shown in the table below.

Table 61. Net CO_2 emissions from grassland converted to cropland

Year of Assessment	Net change (Tons C)	Net change (CO_2 equivalent)
2009	-26	-95
2010	-52	-191
2011	-78	-286
2012	-104	-381
2013	-130	-477
2014	-156	-572
2015	-182	-667
2016	-208	-763
2017	-234	-858
2018	-260	-953

Source: Collect Earth and Forestry Department

4.10Settlements

Settlements Remaining Settlements

Emissions from settlements remaining settlements were not estimated because the reference carbon stock (SOC_{REF}) data on settlements in eastern province is not available.

Cropland Converted to Settlements

Annual change in carbon stocks in biomass

Activity Data

Table 62 shows country specific activity data of annual area of cropland converted to settlements that was used to estimate annual change in carbon stocks in biomass. The annual area data was analysed to determine emissions from changes in carbon stocks in biomass.

Table 62. Annual area of Cropland converted to Settlement (hectares)

Year of Assessment	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cropland converted to Settlement	159	159	159	159	159	159	159	159	159	159	159

Source: Collect Earth and Forestry Department

Emission Factors

Table 63 shows the emission factors used to estimate the annual change in carbon stocks in biomass (tonnes / yr).

Table 63. Emission factors for annual change in carbon stocks in biomass

Initial Land Use	Land Use during reporting year	Vegetation Type	Biomass stocks before the conversion (Tonnes/ha)	Biomass stocks after the conversion (Tonnes/ha)	Time period of the transition from old to new land use category (yr) Default value is 1
Cropland	Settlements		7.9	20.8	20

Source: Forestry Department

The change in biomass carbon stocks from cropland to settlements was estimated as shown in Table 64.

Table 64. Annual change in biomass carbon stock on cropland to settlements (tons C/year)

Year of Assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cropland converted to Settlements	-48	-97	-145	-193	-241	-290	-338	-386	-435	-483

Source: Collect Earth and Forestry Department

Annual change in carbon stocks in dead organic matter due to conversion.

No change of this carbon pools was assumed and conservatively omitted.

Annual change in carbon stocks in mineral soils

Activity Data

Similar with the land use categories remaining, the derived SOC equilibrium factors for the main land use categories are used. In the case of this conversion category, the following are applied:

3. Agriculture and Settlement Landscapes

Year	tC ha^{-1}	Average baseline period tC ha^{-1}
2009	35.99	**30.86**
2016	28.27	
2019	28.31	

Source: ZARI

Emission Factors

Since the same SOC equilibrium factor is used for both land use categories, the emission factor for this conversion is zero.

Annual change in carbon stocks in Biomass, Dead wood and Litter and Soil Organic Carbon from Mineral soils

CO_2 emissions from cropland converted to settlements from biomass, dead organic matter and soils was estimated at -1774t CO_2 eq. in 2009 and -1771 t CO_2 eq. in 2018. as shown in Table 65.

Table 65. Net emissions from cropland converted to settlements from biomass, dead organic matter and soils (t CO_2 eq.)

Year of Assessment	Net change (Tons C)	Net change (CO_2 equivalent)
2009	-48	-177
2010	-97	-354
2011	-145	-531
2012	-193	-708
2013	-241	-885
2014	-290	-1,062
2015	-338	-1,239
2016	-386	-1,417
2017	-435	-1,594
2018	-483	-1,771

Source: Collect Earth and Forestry Department

4.11Aggregate Sources and Non-CO_2 Emissions Sources on Land

Non – CO_2 Emissions from Biomass Burning

Methodology

Non-CO_2 greenhouse gas emissions for Forest land (CH_4, N_2O and precursor gases due to incomplete combustion of the fuel) were calculated using Tier 1 Method using equation 2.27 of the IPCC 2006 Guidelines.

$$L_{Fire} = A \times M_B \times C_f \times G_{ef} \times 10^{-3}$$

Where :

L_{Fire} = Amount of greenhouse gas emissions from fire, tons of each GHG e.g., CH_4, N_2O, etc.

A = area burnt, ha

M_B = Mass of fuel available for combustion, tons ha-1. This includes biomass, ground litter and dead wood. When Tier

1 methods are used then litter and dead wood pools are assumed zero, except where there is a land-use change.

C_f = combustion factor, dimensionless

G_{ef} = emission factor, g (kg dry matter burnt)$^{-1}$

Biomass Burning in Cropland

Methodology

Non-CO_2 greenhouse gas emissions for Cropland (CH_4 and N_2O and precursors due to incomplete combustion of the fuel) were calculated using the same method as for Forest land which was based on Tier 1 Method equation 2.27 of the IPCC 2006 Guidelines.

Activity Data

Activity data used to estimate non-CO_2 emissions from biomass burning in cropland were (i) Area of cropland residue that is burnt, (ii) mass of fuel available for combustion(tons/ha) and combustion factor (derived from the 2006 IPCC Guidelines Table 2.6).

The mass of fuel available for cropland burning in Table 66 was derived using country specific data of the above ground biomass for the various crops (Crop T [t C ha-1 yr-1]) which was obtained from the surveys undertaken by the Ministry of Agriculture multiplied by the slope plus the intercept based on equation 11.6 from Volume 4 Chapter 11 of the 2006 IPCC Guidelines and then multiplied by the percentage of burning in crop residue. Table 67 shows the mass of fuel (tons/ha) for the different crops grown in Eastern Province and default combustion factor since country specific combustion factor are not yet developed for Eastern Province.

Table 66. Cropland Data for Areas Planted (2008 – 2018)

ID	Type of Crops	2008 Area Planted (ha)	Area Burnt (2008)	2009 Area Planted (ha)	Area Burnt (2009)	2010 Area Planted (ha)	Area Burn (2010)	2011 Area Planted (ha)	Area Burnt2011)	2012 Area Planted (ha)	Area Burnt (2012)	2013 Area Planted (ha)	Area Burnt (2013)
1	Bambara nuts	775	39	1,350	68	1,069	53	1,292	65	530	27	505	25
2	Burley Tobacco	15,927	7,9	17,895	8,948	17,809	8,904	18,103	9,051	6,052	3,026	6,602	3,301
3	Cashew nut	-	0	-	0	-	0	-	0	-	0	-	0
4	Cassava (LS & MS)	8,608	0	6,349	0	3,831	0	2,021	0	3,553	0	4,560	0
5	Castor beans	-	0	-	0	-	0	-	0	-	0	-	0
6	Coffee	-	0	-	0	-	0	-	0	195	0	-	0
7	Cowpeas	504	50	660	66	742	74	101	10	358	36	543	54
8	Groundnuts	208,234	10,412	189,812	9,491	235,914	11,796	176,271	8,814	135,060	6,753	159,925	7,996
9	Irish Potatoes	516	413	224	179	762	610	511	409	514	411	564	451
10	Maize	736,394	147,279	740,953	148,191	766,575	153,315	815,425	163,085	658,506	131,701	687,633	137,527
11	Millet	9,852	1,970	7,680	1,536	4,419	884	4,689	938	754	151	277	55
12	Mixed Beans	13,452	3,363	10,365	2,591	9,660	2,415	6,830	1,708	8,833	2,208	8,057	2,014
13	Paprika	20	0	7	0	-	0	5	0	14	0	12	0
14	Pineapples	-	0	-	0	-	0	-	0	-	0	-	0
15	Popcorn	659	0	-	0	403	0	310	0	347	0	317	0
16	Rice	6,764	1,353	7,680	1,536	11,253	2,251	6,965	1,393	4,971	994	4,534	907
17	Seed Cotton	170,656	136,525	186,310	149,048	157,163	125,730	223,684	178,947	452,712	362,170	458,210	366,568
18	Sorghum	8,177	1,635	6,571	1,314	6,110	1,222	4,967	993	29	6	2,839	568
19	Soybeans	23,692	4,738	25,107	5,021	27,159	5,432	19,429	3,886	20,810	4,162	8,041	1,608
20	Sugar cane	-		-		-		-		-		-	
21	Sunflower	119,653	23,931	130,194	26,039	99,249	19,850	68,992	13,798	64,611	12,922	58,933	11,787

22	Sweet Potatoes	5,956	0	8,220	0	5,548	0	4,436	0	4,301	0	4,344	0
23	Velvet beans	-	0	-	0	-	0	-	0	-	0	-	0
24	Virginia Tobacco	1,227	0	537	0	608	0	2,788	0	3,124	0	2,499	0
25	Wheat	395	0	-	0	91	0	-	0	-	0	-	0
-	**Total**	**1,331,459**		**1,339,913**		**1,348,367**		**1,356,820**		**1,365,274**		**1,408,396**	

Table continued…

ID	**Type of Crops**	**2014 Area Planted (ha)**	**Area Burnt (2014)**	**2015 Area Planted (ha)**	**Area Burnt (2015)**	**2016 Area Planted (ha)**	**Area Burnt (2016)**	**2017 Area Planted (ha)**	**Area Burnt (2017)**	**2018 Area Planted (ha)**	**Area Burnt (2018)**
1	Bambara nuts	1,300	65	680	34	390	20	723	36	267	13
2	Burley Tobacco	15,938	7,969	12,079	6,040	11,013	5,507	7,860	3,930	17,699	8,849
3	Cashew nut	-	0	-	0	-	0	-	0	-	0
4	Cassava (LS & MS)	2,499	0	1,458	0	733	0	4,622	0	-	0
5	Castor beans	-	0	-	0	-	0		0	-	0
6	Coffee	-	0	-	0	-	0		0	-	0
7	Cowpeas	718	72	529	53	309	31	2,550	255	657	66
8	Groundnuts	191,567	9,578	158,365	7,918	173,050	8,653	190,424	9,521	247,143	12,357
9	Irish Potatoes	474	379	665	532	928	742	389	311	182	145
10	Maize	792,289	158,458	782,286	156,457	731,349	146,270	771,329	154,266	704,556	140,911
11	Millet	951	190	1,664	333	1,112	222	1,329	266	319	64
12	Mixed Beans	13,784	3,446	10,266	2,567	6,356	1,589	7,753	1,938	7,997	1,999
13	Paprika	-	0	97	0	-	0	22	0	-	0

14	Pineapples	-	0	-	0	-	0	-	0	-	0
15	Popcorn	31	0	693	0	67	0	480	0	-	0
16	Rice	1,972	394	2,533	507	3,923	785	3,018	604	2,952	590
17	Seed Cotton	181,261	145,009	236,006	188,805	168,463	134,770	108,032	86,425	145,298	116,238
18	Sorghum	477	95	508	102	261	52	10	2	323	65
19	Soybeans	52,855	10,571	56,167	11,233	83,899	16,780	164,302	32,860	137,457	27,491
20	Sugar cane	-		-	0	-	0	-	0	-	0
21	Sunflower	112,925	22,585	118,347	23,669	208,023	41,605	133,304	26,661	142,993	28,599
22	Sweet Potatoes	6,398	0	4,157	0	6,518	0	9,900	0	4,464	0
23	Velvet beans	-	0	446	111	1,992	498	-	0	0	0
24	Virginia Tobacco	6,743	0	3,686	0	702	0	1,494	0	3,688	0
25	Wheat	-	0	-	0	-	0	-	0	0	0
-	**Total**	**1,382,181**		**1,390,635**		**1,399,089**		**1,407,542**		**1,415,996**	

Source: Ministry of Agriculture

Table 67. Activity Data for Biomass Burning in Cropland

Crops	Mass of Fuel [tons ha-1 yr-1]	Reference	Combustion Factor	References
Bambara nuts	0.125	Own Analysis based on studies done at UNZA on Mass of fuel available for combustion (tons/ha)	0.80	2006 IPCC Guidelines Table 2.6
Burley Tobacco	0		0	N/A
Cassava	0		0	N/A
Castor Beans	0		0	N/A
Coffee	0		0.80	2006 IPCC Guidelines Table 2.6
Cowpeas	0.15		0.80	2006 IPCC Guidelines Table 2.6
Groundnuts	0.11		0.80	2006 IPCC Guidelines Table 2.6
Irish Potatoes	1.04		0.80	2006 IPCC Guidelines Table 2.6
Maize	0.62		0.80	2006 IPCC Guidelines Table 2.6
Millet	0.22		0.80	2006 IPCC Guidelines Table 2.6
Mixed Beans	0.375		0.80	2006 IPCC Guidelines Table 2.6
Paprika	0		0.80	2006 IPCC Guidelines Table 2.6
Pineapple	0		0.80	2006 IPCC Guidelines Table 2.6
Popcorn	0		0.80	2006 IPCC Guidelines Table 2.6
Rice	0.78		0.80	2006 IPCC Guidelines Table 2.6
Seed cotton	0		0.80	2006 IPCC Guidelines Table 2.6
Sorghum	0.38		0.80	2006 IPCC Guidelines Table 2.6
Soybeans	0.5		0.80	2006 IPCC Guidelines Table 2.6
Sugarcane	0		0.80	2006 IPCC Guidelines Table 2.6
Sunflower	0		0.80	2006 IPCC Guidelines Table 2.6
Sweet Potatoes			0.80	2006 IPCC Guidelines Table 2.6
Velvet Beans	0.375		0.80	2006 IPCC Guidelines Table 2.6
Virginia Tobacco	0		0.80	2006 IPCC Guidelines Table 2.6
Wheat	0		0.80	2006 IPCC Guidelines Table 2.6

Source: IPCC 2006 Guidelines Tables 2.6 for Combustion Factor for fires Agriculture Residues; and Table 2.5 for Biomass Burning Emission Factor in Agriculture Resides

Emission Factors

The emission factors used to estimate the non-CO_2 emissions from biomass burning in cropland were categorised as agriculture residues with corresponding

values of emission factors for the non-CO_2 gases. Table 68 shows the emission factors for biomass burning in cropland. Country specific emission factors have not yet been developed, and therefore the basis to assign default emission factors to estimate biomass burning in cropland.

Table 68. Emission Factors (g Kg -1 Dry Matter Burnt) for biomass burning in cropland

Category	CO	CH_4	N_2O	NO_x
Agriculture Residues	92 +/- 84	2.7	0.07	2.5+/- 1.0

Source: IPCC 2006 Guidelines; Table 2.5

Results

Figure 11 shows emissions from biomass burning in cropland and indicated increase of 5.30% from 6,186.99 t CO_2eq in 2009 to 6,515.46t CO_2eq in 2018, representing an increase in annual growth rate of 0.53%.

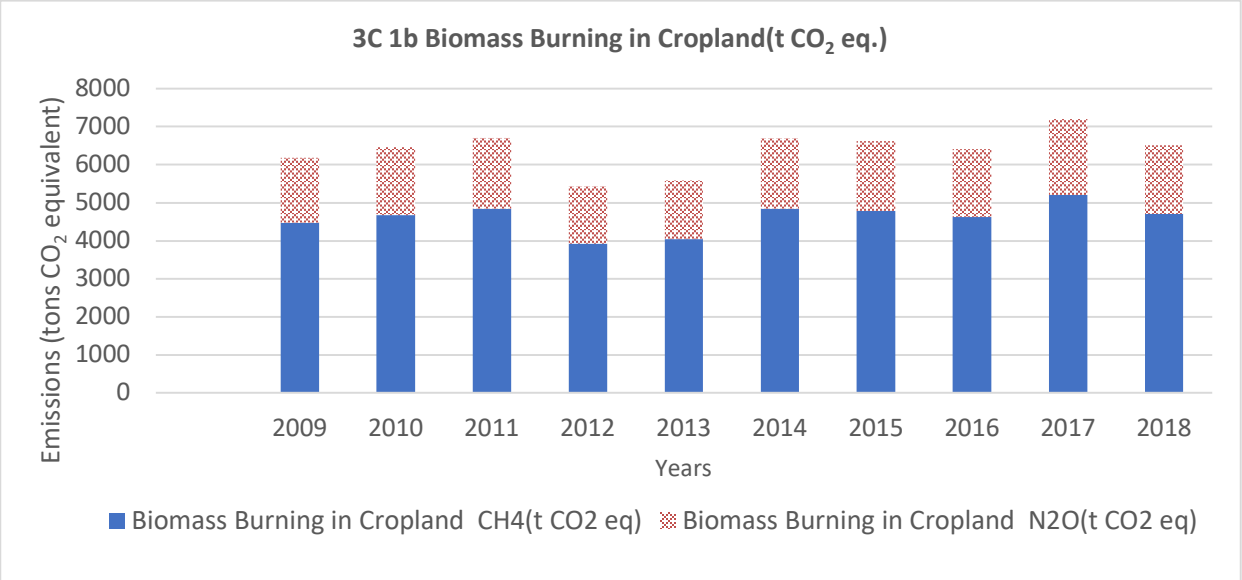


Figure 10 Biomass burning in cropland

Biomass Burning in Grassland

Methodology

Non-CO_2 greenhouse gas emissions for Grassland (CH_4 and N_2O and precursor gases due to incomplete combustion of the fuel) were calculated using the same method as for Forest land based on Tier 1 Method using equation 2.27 of the IPCC 2006 Guidelines.

Activity Data

The Activity data to determine the non-CO_2 emissions from biomass burning in grassland were (i) Area burnt which was obtained from the Forestry Department and Hollingsworth et al, 2015 as shown in Table 69, and (ii) Mass of fuel available for combustion for savanna woodlands (early dry season burns), which is a default value was obtained from Table 2.4 of the 2006 IPCC Guidelines. Table 70 shows mass of fuel available for combustion.

Table 69. Burnt Areas in Grassland

Land cover	Subcategory/ Vegetation Type	Burned Area (ha)									
		Year (Period)									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Grassland	Grassland	131,328.5	217,332.4	233,200.4	218,202.1	179,028.8	119,715.0	205,279.7	170,571.2	185,059.4	205,183.2

Source: Fire Management Assessment of Eastern Province (2015)

Table 70. Mass of fuel available for combustion for Biomass Burning in Grassland

Activity Data	CH_4	N_2O	NO+NO	CO	Reference
Mass of fuel available for combustion (tons ha-1 yr-1)	2.5	2.5	2.5	2.5	2006 IPCC Guidelines Table 2.4 Savanna Woodland (early dry season burns) Reference 28
Combustion factor	1	1	1	1	2006 IPCC Guidelines Table 2.6

Source: IPCC Guidelines Table 2.4 for data on mass of fuel; Table 2.6 for Combustion Factor for fires in Savana and Grassland; and Table 2.5 for Biomass Burning Emission Factor in Savana and Grassland

Emission Factors

The emission factor for grassland was categorised as savanna/ grassland with corresponding values for the non-CO_2 gases. Table 71 shows the emission factors for the non-CO_2 gases that were assigned to estimate biomass burning in grassland. Country specific emission factors have not yet been developed, and hence the basis for assigning default emission factors.

Table 71. Emission Factors (g Kg -1 Dry Matter Burnt) for various types of Burning

Category	CO	CH_4	N_2O	NO_x
Savanna/Grassland	65 +/- 20	2.3 +/- 0.9	0.21 +/- 0.10	3.9 +/- 2.4

Source: IPCC 2006 Guidelines; Table 2.5

Results

Figure 12 shows the emissions from biomass burning in grassland with an increase of 56.24% from 37,231.64 tCO_2eq in 2009 to 58,169.45 tCO_2eq in 2018 representing an annual growth rate of 5.62%.

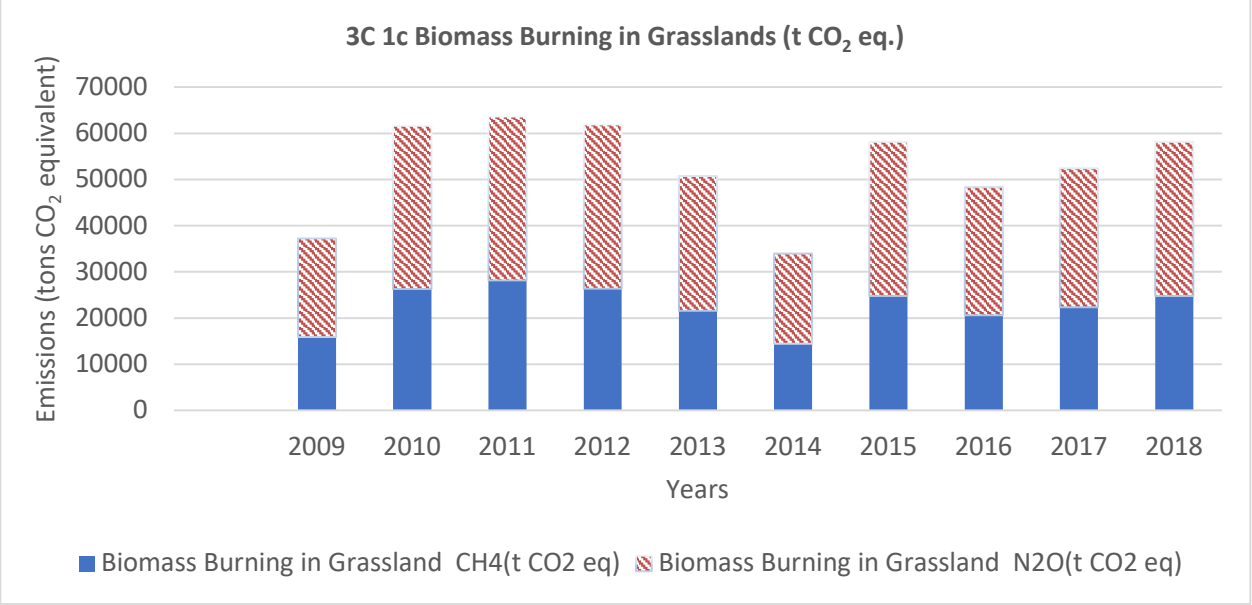


Figure 11 Emissions from Biomass Burning in Grassland

Biomass Burning in Other land

Methodology

Non-CO_2 greenhouse gas emissions in Otherland (CH_4 and N_2O and precursor gases due to incomplete combustion of the fuel) were calculated same method as for Forest land based on Tier 1 Method using equation 2.27 of the IPCC 2006 Guidelines.

Activity Data

Non-CO_2 emissions from biomass burning in other land were estimated from the following land use categories (i) Wetlands, (ii) Settlements and (iii) Bare land (Other land) .

The Activity data used to estimate non-CO_2 emissions from biomass burning in Other land were from (i) Areas burnt in Wetlands, Settlements and Other land based on data obtained from the Forestry Department and Hollingsworth et al, 2015, (ii) Mass of fuel available for combustion, and (iii) Combustion factor. Table 72 shows the activity data of areas burnt in Wetlands, Settlements and Other land.

Table 72. Areas burnt in Wetlands, Settlements and Other land

Year of assessment	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Grassland	131,329	217,332	233,200	218,202	179,029	119,715	205,280	170,571	185,059	205,183
Wetlands	10,303	10,301	10,277	10,259	10,241	10,223	10,217	10,202	10,175	10,153
Settlements (Rural)	121	121	120	120	120	120	120	119	119	119
Flooded Areas	1,514	1,514	1,510	1,508	1,505	1,502	1,502	1,499	1,495	1,492

Source: Fire Management Assessment of Eastern Province (2015)

The mass of fuel available for combustion in Wetlands, Settlements and Other-land were derived from the ILUA II Report Table 19 and are reflective of the conditions and circumstances in Eastern Province in terms of the mean biomass and carbon stocks distribution. The mass of fuel available for burning in Table 73 were derived from the mean biomass and carbon stocks distribution by vegetation and other areas of settlements (16.3), wetlands (6.6) and other land (2.1) by dividing the settlements mean biomass (16.3) over the settlements mean biomass (16.3) and multiplying by half of the lowest value of the mass of fuel available for burning in forest land subcategories, dry deciduous forest (0.63). This calculation was done for other land and wetlands to derive the values for mass available for burning in wetlands and other land. The combustion factor was derived from 2006 IPCC Guidelines, Table 2.6. The country specific mass of fuel activity data was assigned to estimate biomass burning in other land.

Table 73. Mass of fuel available for combustion and Combustion factor.

Activity Data	Category	CH_4	N_2O	NO+NO	CO	Reference
1. Mass of fuel available for combustion (tons/ha)	Wetlands	0.13	0.13	0.13	0.13	ILUA II Report, Table 20: Mean biomass and carbon stocks distribution by vegetation and other areas
2. Combustion factor		0.5	0.5	0.5	0.5	IPCC 2006 Guidelines Table 2.6
3. Emission Factor (g(GHG/(kg dm burnt)	Wetlands	2.3	21	3.9	65	IPCC 2006 Guidelines Table 2.5
4. Mass of fuel available for combustion (tons/ha)	Settlements	0.315	0.315	0.315	0.315	ILUA II Report, Table 20: Mean biomass and carbon stocks distribution by vegetation and other areas
5. Combustion factor		0.8	0.8	0.8	0.8	IPCC 2006 Guidelines Table 2.6
6. Mass of fuel available for	Other land	0.04	0.04	0.04	0.04	ILUA II Report, Table 20: Mean biomass and carbon stocks

combustion (tons/ha)						distribution by vegetation and other areas
7. Combustion factor		0.52	0.52	0.52	0.52	IPCC 2006 Guidelines Table 2.6

Source: IPCC Guidelines Table 2.4 for data on mass of fuel; Table 2.6 for Combustion Factor for fires Wetlands, Settlements and Bare land; and Table 2.5 for Biomass Burning Emission Factor from Savana and grassland in Wetlands and Bare land and Agriculture residues in Settlements

Emission Factors

The emission factors for biomass burning in Other Land are given in Table 74 with corresponding values of emission factors for the non-CO_2 gases.

Table 74. Emission Factors for Biomass Burning

Emission Factor	Category	CH_4	N_2O	NO+NO	CO	Reference
Emission Factor (g(GHG/(kg dm burnt)	Wetlands	2.3	21	3.9	65	IPCC 2006 Guidelines Table 2.5
Emission Factor (g(GHG/(kg dm burnt)	Settlements	2.7	0.07	2.5	65	IPCC 2006 Guidelines Table 2.5
Emission Factor (g(GHG/(kg dm burnt)	Other land	2.3	2.3	2.3	2.3	IPCC 2006 Guidelines Table 2.5

Results

Figure 13 shows emissions from biomass burning in other land (Wetlands, Settlements and Bare land) indicating a decrease of 1.3% between 2009 (102.30t CO_2eq) and 2018 (100.87) t CO_2eq.

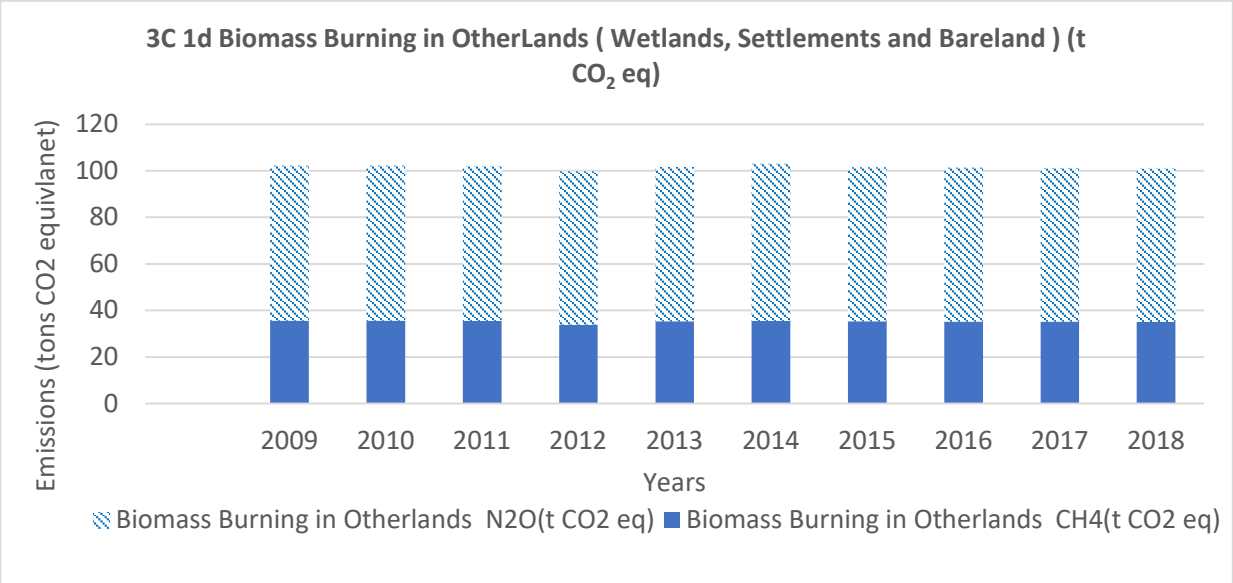


Figure 12 Emissions from Emission Burning in Other Land

Figure 14 shows that the result of CH_4 and N_2O emissions from biomass burning from land to include Forest land, Cropland, Grassland and Other Land increased by 48.86% from 43,520.93 t CO_2eq in 2009 to 64,785.78 t CO_2eq. in 2018, representing an annual growth rate of 4.89%.

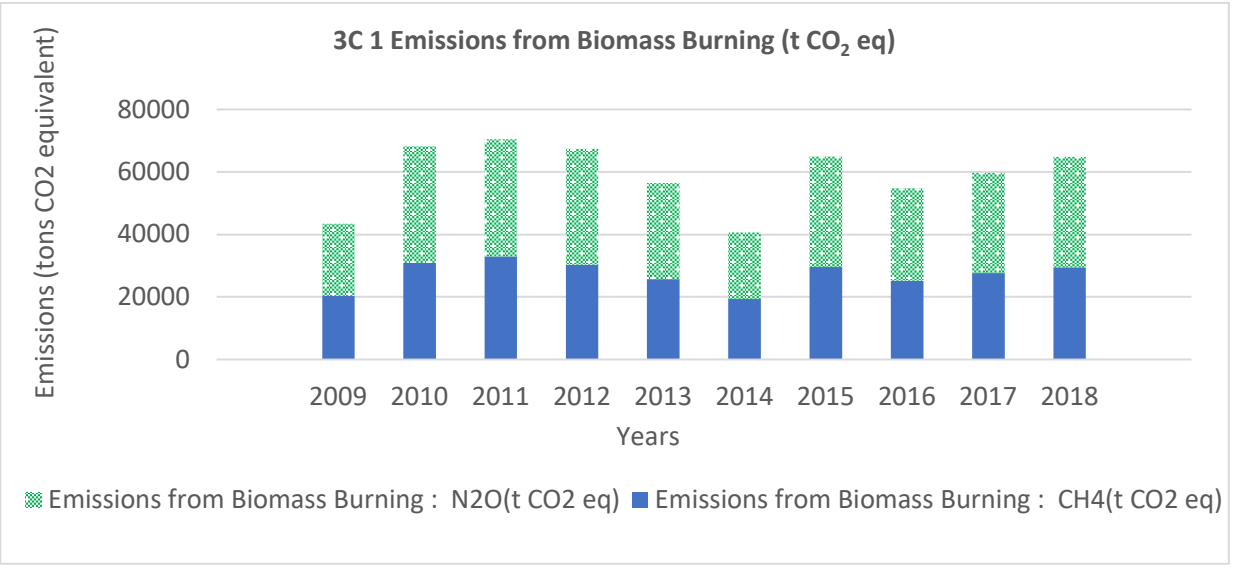


Figure 13 Overall Emissions from Biomass Burning

Urea Application

Methodology

Fertilisation with urea can lead to a loss of carbon dioxide (CO_2) that was fixed during the industrial production process. On its basis, the IPCC has proposed a value of 0.2 Mg C per Mg urea (2006 IPCC Guidelines), which is the mass fractions of C in urea, as the CO_2 emission coefficient from urea for the agriculture sector. Carbon dioxide emissions resulting from application of fertilisers was estimated based on Tier 1 method using Equation 11.13 (Equation 38) from the 2006 IPCC Guidelines. Default Emission factors were used as there were no country specific emission factors.

CO_2 emissions resulting from application of fertilisers was estimated using Tier 1 method. Equation 38 from the 2006 IPCC Guidelines has been used, together with the use of default emission factors since there were no higher tier emission factors.

$$CO_2 - C\ Emission = EF * M \quad (210)$$

$CO_2 - C\ Emission$ -Annual CO_2-C emissions from Urea Fertilisation (tons C yr^{-1}), EF -Emission factor annual [tons of C (ton of urea)$^{-1}$]), M -Annual amount of Urea Fertilisation(tons urea yr^{-1}),

Activity Data

Activity data on amount of urea fertiliser for the years 2009-2018 was collected from the Crop Forecast Survey Report in the Ministry of Agriculture[67]. The percentage of Nitrogen (N) in Urea was given by the manufacturers as 46%. Table 75 shows choice of activity data for urea fertiliser application (Annex IIIf: Mineral fertiliser statistics).

Table 75. Mineral fertiliser statistics with amount of N contained in the fertiliser

Year	Basal Fertiliser (Tons)	Amount of N applied from "D" compound	Top dressing Fertiliser	As N	TOT N	Uncertainty (%)
2009	12,091	1,209	12,522	5,760	6,969	+/- 25
2010	20,945	2,095	17,176	7,901	9,995	+/- 25
2011	43,892	4,389	36,711	16,887	21,276	+/- 25
2012	10,864	1,086	9,164	4,215	5,302	+/- 25

[67] Crop Forecast Reports, Ministry of Agriculture/Zambia Statistical Agency, 2009 – 2018

2013	10,232	1,023	8,420	3,873	4,896	+/- 25
2014	21,640	2,164	14,585	6,709	8,873	+/- 25
2015	35,227	3,523	35,028	16,113	19,635	+/- 25
2016	21,622	2,162	21,967	10,105	12,267	+/- 25
2017	34,970	3,497	38,148	17,548	21,045	+/- 25
2018	35,969	3,597	32,346	14,879	18,476	+/- 25
As N	-	23,536	-	98,230	121,766	

Source: CSO and Ministry of Agriculture

Emission Factors

Table 76 shows emission factors used to estimate CO_2 emissions from application of urea fertiliser.

Table 76. Default Emission Factor for Urea Fertiliser Application

Emission Factor (tons of C/tons of urea	Value	Reference
Urea	0.2	IPCC 2006 Guidelines, Volume 4, Chapter 11, page 11.34

Source: IPCC 2006 Guidelines, Volume 4, Chapter 11, page 11.34

Results

CO_2 emissions from Urea Application varied significantly from year to year with the highest being in 2017 (27,975.2 t CO_2eq), 2011 (26,921.4 t CO_2eq), 2015 (25,687.2 t CO_2eq) and followed by 2018 (23,720.4 t CO_2eq), 2016(16,109.13 tCO_2eq), 2010(12,595.73 tCO_2eq) and 2014(10, 700 t CO_2eq). In terms of overall trend, the emissions from urea application increased from 9,182.8 tCO_2eq in 2009 to 23,720.4 t CO_2eq in 2018 registering an increase of 158.31% representing an annual growth rate of 15.83% as shown in Figure 15.

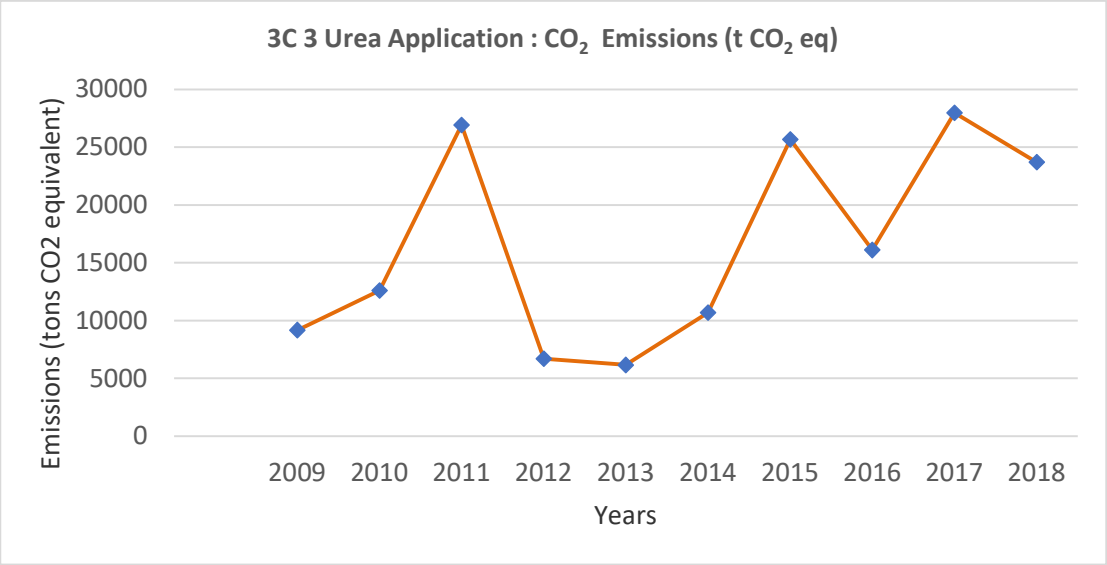


Figure 14. CO_2 Emissions from Urea Application

Direct N_2O from Managed Soils

Methodology

Nitrous oxide is produced naturally in soils through the processes of nitrification and denitrification. The emissions of N_2O due to anthropogenic N inputs (i.e., from application of synthetic N fertiliser, organic amendment, crop residues, etc.) occur through both a direct pathway (i.e., directly from the soils to which the N is added), and through two indirect pathways (i.e., through volatilization as NH_3 and NO_x and subsequent redepositing, and through leaching and runoff).

Direct N_2O emission from Managed Soils was calculated using Tier 1 methodology, Equation 39 from the IPCC 2006 Guidelines and default emission factor was used from the 2006 IPCC Guidelines.

EQUATION 11.1
DIRECT N_2O EMISSIONS FROM MANAGED SOILS (TIER 1)

$$N_2O_{Direct}\text{–}N = N_2O\text{–}N_{N\,inputs} + N_2O\text{–}N_{OS} + N_2O\text{–}N_{PRP}$$

Where:

$$N_2O\text{–}N_{N\,inputs} = \left[\begin{array}{l}\left[(F_{SN} + F_{ON} + F_{CR} + F_{SOM}) \bullet EF_1\right] + \\ \left[(F_{SN} + F_{ON} + F_{CR} + F_{SOM})_{FR} \bullet EF_{1FR}\right]\end{array}\right]$$

$$N_2O\text{–}N_{OS} = \left[\begin{array}{l}\left(F_{OS,CG,Temp} \bullet EF_{2CG,Temp}\right) + \left(F_{OS,CG,Trop} \bullet EF_{2CG,Trop}\right) + \\ \left(F_{OS,F,Temp,NR} \bullet EF_{2F,Temp,NR}\right) + \left(F_{OS,F,Temp,NP} \bullet EF_{2F,Temp,NP}\right) + \\ \left(F_{OS,F,Trop} \bullet EF_{2F,Trop}\right)\end{array}\right]$$

$$N_2O\text{–}N_{PRP} = \left[\left(F_{PRP,CPP} \bullet EF_{3PRP,CPP}\right) + \left(F_{PRP,SO} \bullet EF_{3PRP,SO}\right)\right]$$

Activity Data for Managed Manure N available for application to managed soils, feed, fuel or construction

Managed Manure N available for application to managed soils, feed, fuel or construction was calculated based on the manure management systems and different livestock numbers by determining (i) Total nitrogen excretion for the manure management system (MMS) (Kg N/yr), and (ii) Fraction of manure nitrogen that is lost in the MMS to estimate the amount of managed manure nitrogen available for application to managed soils to estimate Direct N_2O emissions from managed soils (Equations 11.3 and 11.5 from the 2006 IPCC Guidelines). Table 77 shows organic N applied to soils.

Table 77. Organic N applied to managed soils

Year	Sum of N for all MMS except PRP = V	Sum of N for PRP (Cattle, Poultry and Pigs)	Sum of N for PRP (Sheep and Other animals)	N from Organic N additions applied to soils (Fon) (Kg N/ yr)
2018	24,117,675.80	1,584,546.22	10,066,020.71	24,117,675.80
2017	30,164,133.22	2,013,981.04	12,427,298.23	30,164,133.22
2016	27,105,204.63	1,588,805.03	11,332,636.33	27,105,204.63
2015	25,460,942.35	1,541,541.78	10,606,777.96	25,460,942.35
2014	24,279,053.97	1,494,269.09	10,126,435.05	24,279,053.97
2013	18,675,079.22	1,297,022.16	7,714,175.08	18,675,079.22
2012	17,853,012.57	1,245,148.43	7,381,904.16	17,853,012.57
2011	17,676,341.95	1,193,269.45	7,334,219.51	17,676,341.95

2010	17,499,732.78	1,141,399.90	7,286,557.08	17,499,732.78
2009	17,457,323.00	1,139,431.48	7,270,499.60	17,457,323.00

Source: CSO and Ministry of Agriculture

Activity Data: Direct N_2O Emissions from Managed Soils

Anthropogenic N- inputs activity data to estimate annual direct N_2O emissions produced from managed soils were (i) synthetic fertilisers, (ii) animal manure and compost, (iii) crop Residue, and (iv) N in mineral soils that mineralized in association with loss of soil C from soil organic matter as a result of changes to land use management were not estimated due to lack of data on soil C loss.

The synthetic fertilisers statistics (2009 – 2018) were obtained from the Ministry of Agriculture and Zambia Statistical Agency through crop forecast surveys that are undertaken annually. The amount of N contained in synthetic fertilisers was calculated for each fertiliser. The percentage of Nitrogen (N) in Urea was given by the manufacturers as 46%. The annual amount of N from animal manure was calculated from livestock numbers based on basic characterisation and manure management systems. It was supposed to have been also been calculated from ages of the animals, but data was not available.

The amount of N in crop residues was determined in studies carried out at University of Zambia (UNZA), Zambia Agriculture Research Institute (ZARI) and Golden Valley Agricultural Research Trust (GART) and through expert judgement from experts in the agriculture sector. Improvements have been made to also determine N in plant parts.

Table 78 provides the prevalent practice of crop residue management systems in Zambia which are also applicable to Eastern Province. The data in the table was used in the calculation of Direct N_2O emissions for the N crop residue that is returned to the soil.

Table 78. Crop Residue Management Systems

Crop	%N	Ref	Returned	Grazed	Burnt	Export
Bambara nuts	2.6	Expert judgement	25	70	5	
Barley tobacco	3.5	Expert judgement	20	0	50	30
Cassava	2.5	Expert judgement	80	0	0	20
Castor beans	-	-	-	-	-	-

Crop	%N	Ref	Returned	Grazed	Burnt	Export
Coffee	-	-	-	-	-	-
Cowpea	2.1	CSP	30	60	10	
Groundnut	3.6	Expert judgement	30	60	5	5
Irish potato	4.4	Expert judgement	20	0	80	
Maize	2.5	CSP	10	70	20	
Millet	1.6	CSP	10	70	20	
Mixed beans	1.7	Expert judgement	20	50	25	5
Paprika	-	-	-	-	-	-
Pineapple	-	-	-	-	-	-
Popcorn	1.9	Expert judgement	10	70	20	
Rice	0.7	CSP	10	70	20	
Seed cotton	2.3	Expert judgement	20	0	80	
Sorghum	1.4	CSP	10	70	20	
Soybean	2.2	Expert judgement	10	70	20	
Sugarcane	2.2	Expert judgement	100	0	0	
Sunflower	1.8	Expert judgement	30	50	20	
Sweet potato	3.0	Expert judgement	20	70	0	10
Velvet beans	3.4	CSP	70	30	-	-
Virginia tobacco	0.8	Expert judgement	25	70	5	
Wheat	0.7	CSP	0	100	-	-

Key:

CSP Country specific studies carried out by UNZA, ZARI and GART some

of which were implemented with tracers using N-15 labelled Urea

Export Shows plant part which was removed from the particular Crop:

Barley tobacco Stems used structural component for building of tobacco barn

Cassava Stems used for planting material

Groundnut Groundnut husks for preparation of ash solution for softening vegetables when cooking

Mixed beans Mixed beans husks for preparation of ash solution for Softening vegetables when cooking

Sweet potato Sweet potato husks for preparation of ash solution for softening vegetables when cooking

The amount of N in mineral soils was derived from International Forum on Soil Taxonomy and Agro technology Transfer, 1985. The latest analysis of N in mineral soils was determined in 2020 under the ESLIP Project. The inherent soil N content is taken into account when calculating the amount of required N for crop production. The anthropogenic N inputs choice of activity data is given in Table 79.

Table 79. Choice of Activity Data for Direct N_2O emissions

Activity Data	N – Inputs	Reference
Anthropogenic N input types to estimate annual direct N_2O – N emissions produced from managed soils	Annual amount of N Applied (Kg N yr -1)	
	$F_{SN:}$ N in synthetic fertilisers	N in Synthetic fertilisers – Crop Forecasting Surveys – Ministry of Agriculture and Zamstats
	F_{ON}: N in animal manure, compost	Calculated value based on N_2O from Manure Management in different livestock types based on basic characterisation.
	$F_{CR:}$ N in Crop residue	N in Crop Residues – Calculated value based on

Activity Data	N – Inputs	Reference
		percent of residue management from different crop yields
Anthropogenic N input types to estimate annual direct N_2O – N emissions produced from Flooded Rice	F_{SOM}: N in mineral soils that mineralized in association with loss of soil C from soil organic matter as a result of changes to land use management	
	F_{SN}: N in synthetic fertilisers	N in Synthetic fertilisers – Crop Forecasting Surveys – Ministry of Agriculture and Zamstats
	F_{ON}: N in animal manure, compost	
	F_{CR}: N in Crop residue	
	F_{SOM}: N in mineral soils	

Activity Data for Direct N_2O Emissions from managed organic soils

Annual direct N_2O– N emissions produced from managed organic soils (Kg N_2O – N /yr) were not calculated because of the non- availability of activity data on the annual area of managed / drained organic soils (ha).

Activity Data of Direct N_2O Emissions from Managed Soils – Urine and Dung inputs to grazed soils Annual amounts of urine and dung N deposited by grazing animals on pasture range and paddock (Kg N/yr) was calculated from the Sum of N for PRP (Sheep and Other animals) and sum of N for PRP – Cattle, poultry and pigs (CPP). The assumption used in calculation of FPRP was that there is little management of animal urine and dung deposited by grazing animals in pastures, fields and paddocks.

Emission Factors for Direct N_2O emissions from managed land

The choice of using default emission factors (Tier 1) were based on non-availability of country specific emission factors for N_2O emissions from anthropogenic N – inputs from N synthetic fertilisers, N animals and compost manure, N in crop residues and N in mineral soils that is mineralized. Table 80

provides emission factor N- inputs that were assigned to estimate direct N_2O emissions from managed soils.

Table 80. Emission factor - N - inputs

Emission Factor	Emission factor for N_2O emissions from N – inputs (Kg N_2O – N/Kg N input)
Direct N_2O Emission Factor for N additions from mineral fertilisers, organic amendments and crop residues, and N mineralized from soils, (Kg N_2O – N/Kg N input)	0.01
Direct N_2O Emission Factor for N additions in Flooded Rice Fields (Kg N_2O – N/Kg N input)	0.003
Direct N_2O Emission Factor Urine/Dung Deposited on Pasture, Range, and Paddocks, for cattle, poultry, and pigs (Kg N_2O – N/Kg N input)	0.02
Direct N_2O Emission Factor Urine/Dung Deposited on Pasture, Range, and Paddocks, for sheep and other animals (Kg N_2O – N/Kg N input	0.01

Source: IPCC 2006 Guidelines, Volume 4, Table 11.1

Emission Factor for Direct N_2O Emissions from Managed Soils – Urine and Dung inputs to grazed soils

The Direct N_2O emissions from managed soils – urine and dung inputs to grazed soils were estimated by assigning emission factors for N_2O emissions from urine and dung N deposited on pasture, range and paddock by grazing animals (Kg N_2O – N / Kg N – input) which are default values. There are no country specific emission factors, hence default emission factors were used. Table 81 shows emission factors default values that were assigned to estimate Direct N_2O emissions from managed soils – urine and dung inputs to grazed soils.

Table 81. Emission factor for N_2O emissions from urine and dung N deposited on pasture, range and paddock by grazing animals (Kg N_2O – N / Kg N – input)

Anthropogenic N – Input	Emission Factor (Kg N_2O – N / Kg N – input)	Uncertainty	Reference
Cattle, Poultry and Pigs	0.02	0.007 – 0.06	2006 IPCC Guidelines
Sheep and Other Animals	0.01	0.003 – 0.03	2006 IPCC Guidelines

Results

Figure 16 presents Direct N_2O emissions from anthropogenic N inputs from N in synthetic fertilisers, N in animal manure and compost, N in crop residues and N in mineral soils that is mineralized associated with soil carbon loss from soil organic matter as a result of land use change. Direct N_2O emissions increased by 141.97% from 126,292.63 t CO_2 eq in 2009 to 305,586.17 t CO_2 eq in 2018 representing an annual growth rate of 14.19%.

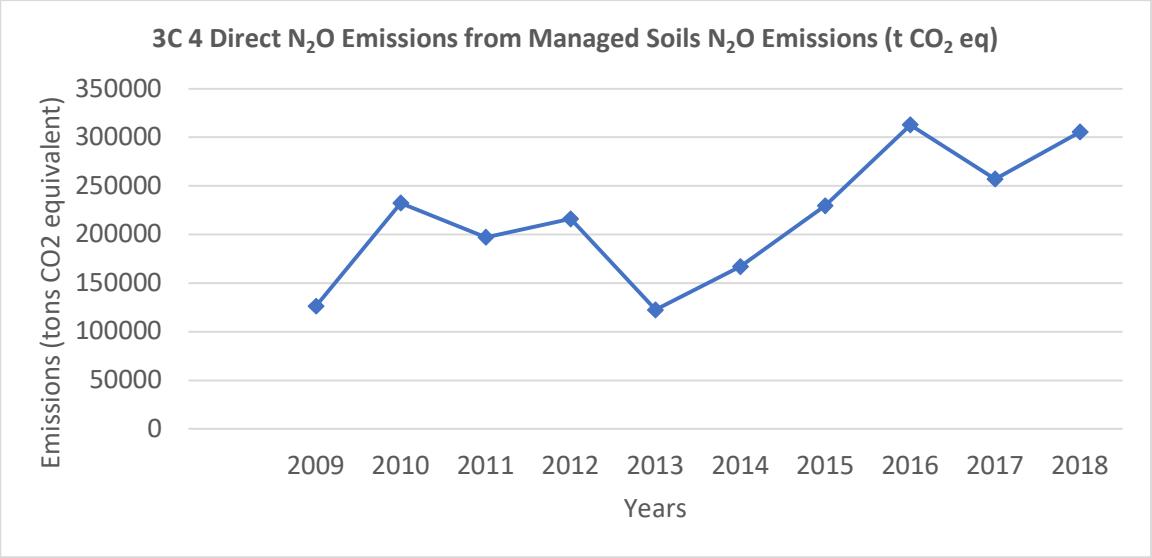


Figure 15. Direct N_2O Emissions from Managed Soils

Indirect N_2O from Managed Soils and Manure management

Methodology

Indirect pathways involve nitrogen that is removed from agricultural soils and animal waste management systems via volatilization, leaching, runoff, or harvest of crop biomass. Like their direct counterparts, the long-term fate of agricultural nitrogen also eventually provides substrate for microbial nitrification and denitrification, with associated N_2O production. Nitrous oxide, as a greenhouse gas, is produced during the nitrification-denitrification of nitrogen contained in livestock waste. In addition to the direct emissions of N_2O from managed soils that occur through a direct pathway (i.e., directly from the soils to which N is applied), emissions of N_2O also take place through two indirect pathways:

- volatilization of N as NH_3 and oxides of N (NO_x), and the redepositing as NH_{4+} and NO_3 onto soils and the surface of lakes and other waters;
- leaching and runoff from land of N.

Indirect N_2O emissions from atmospheric deposition of N volatilized and N that is lost through leaching/run-off from managed soil were estimated using Tier 1 methodology, using Equation 11.90 (equation 40) and Equation 11.10(equation 41), respectively according to the 2006 IPCC Guidelines, using default emission factors and fractions.

Equation 40

EQUATION 11.9
N_2O FROM ATMOSPHERIC DEPOSITION OF N VOLATILISED FROM MANAGED SOILS (TIER 1)

$$N_2O_{(ATD)}\text{–}N = \left[\left(F_{SN} \bullet Frac_{GASF}\right) + \left(\left(F_{ON} + F_{PRP}\right) \bullet Frac_{GASM}\right)\right] \bullet EF_4$$

Where:

$N_2O(ATD)$–N = annual amount of N_2O–N produced from atmospheric deposition of N volatilized from soils, kg N_2O–N yr^{-1}

F_{SN} = annual amount of synthetic fertiliser N applied to soils, kg N yr^{-1}

$Frac_{GASF}$ = fraction of synthetic fertiliser N that volatilizes as NH_3 and NO_x, kg N volatilized (kg of N applied)$^{-1}$

F_{ON} = annual amount of managed animal manure, compost, sewage sludge and other organic N additions applied to soils, kg N yr^{-1}

F_{PRP} = annual amount of urine and dung N deposited by grazing animals on pasture, range and paddock, kg N yr^{-1}

$Frac_{GASM}$ = fraction of applied organic N fertiliser materials (FON) and of urine and dung N deposited by grazing animals (FPRP) that volatilizes as NH3 and NO_x, kg N volatilized (kg of N applied or deposited)$^{-1}$

Equation 41

EQUATION 11.10
N_2O FROM N LEACHING/RUNOFF FROM MANAGED SOILS IN REGIONS WHERE LEACHING/RUNOFF OCCURS (TIER 1)

$$N_2O_{(L)}\text{–}N = (F_{SN} + F_{ON} + F_{PRP} + F_{CR} + F_{SOM}) \bullet Frac_{LEACH\text{–}(H)} \bullet EF_5$$

$N_2O(L)$–N = annual amount of N_2O–N produced from leaching and runoff of N additions to agricultural soils in regions where leaching/runoff occurs, kg N_2O–N yr^{-1}

F_{SN} = annual amount of synthetic fertiliser N applied to soils in regions where leaching/runoff occurs, kg N yr^{-1}

F_{ON} = annual amount of managed animal manure, compost, sewage sludge and other organic N additions applied to soils in regions where leaching/runoff occurs, kg N yr^{-1}

F_{PRP} = annual amount of urine and dung N deposited by grazing animals in regions where leaching/runoff occurs, kg N yr^{-1}

F_{CR} = amount of N in crop residues (above- and below-ground), including N-fixing crops, and from forage/pasture renewal, returned to soils annually in regions where leaching/runoff occurs, kg N yr^{-1}

F_{SOM} = annual amount of N mineralized in mineral soils associated with loss of soil C from soil organic matter as a result of changes to land use or management in regions where leaching/runoff occurs, kg N yr^{-1}

$Frac_{LEACH-(H)}$ = fraction of all N added to/mineralized in soils in regions where leaching/runoff

occurs that is lost through leaching and runoff, kg N (kg of N additions) $^{-1}$

Activity Data for the indirect N_2O emissions from atmospheric deposition of N volatized from managed soils

The indirect N_2O emissions from atmospheric deposition of N volatized from managed soils was calculated from (i) annual amount of synthetic fertiliser N applied to soils(Kg N/yr), (ii) fraction of synthetic fertiliser N that volatilizes(Kg NH_3 – N + NO_x N/Kg/ Kg/N), (iii) annual amount of animal manure, compost intentionally added to soils (Kg N/yr), (iii) annual amount of urine and dung N deposited by grazing animals on pasture, range and paddock, (iv) Fraction of applied organic N fertilisers material (Fon) and of urine and dung N deposited by grazing animals FPRP that volatizes(Kg NH_3 – N + NO_x N/Kg/Kg/N). The Activity data used was the same as that which was used to estimate direct N_2O emission from managed soil and indirect N_2O emission from atmospheric deposition of N and N leaching/runoff from managed soils.

Table 82 shows the fraction of synthetic Fertiliser N that volatilizes (Frac GASF) and Fraction of applied organic N fertilisers material (Fon) and of urine and dung N deposited by grazing animals (Frac GASM) that were assigned to estimate annual amount of N_2O-N produced from atmospheric deposition of N volatized from managed soils (Kg N_2O – N /yr) and annual amount of N_2O – N produced from managed soils to regions were leaching and runoff occurs (Kg N_2O – N /yr).

Table 82. Frac GASF and Frac GASM

Anthropogenic – N inputs	Default Values	Uncertainty	References
Frac GASF (Kg NH_3 – N + NO_x N/Kg/ Kg/N)	0.1	0.05 – 0.5	2006 IPCC Guidelines, Table 11.3
Frac GASM (Kg NH_3 – N + NO_x N/Kg/Kg/N)	0.2	0.03 – 0.3	2006 IPCC Guidelines, Table 11.3

Activity Data: N_2O from N leaching/runoff from managed soils

Nitrous oxide from N leaching runoff from managed soils was calculated from (i) annual amount of synthetic fertilisers applied to soils(Kg N /yr), (ii) annual amount of animal manure, compost N additions intentionally applied to soils (Kg

N/yr), (iii) annual amount of urine and dung deposited by grazing on pasture, range and paddock (Kg/N/yr), (iv) amount of N crop residues returned to the soils (Kg N /yr) and (v) The fraction of all N additions to managed soils that is lost through leaching and runoff (Kg N / Kg of N additions) (Frac(Leach)).

The Frac (Leach) used was 0.3 with uncertainty of 0.1 to 0.8. The source of data for Frac (Leach) was obtained from the 2006 IPCC Guidelines, Table 11.3. The Eastern Province does not have country specific activity data on Frac(Leach) and hence default values were assigned to determine emissions from N leaching /runoff from managed soils. Table 83 shows N crop residues returned to the soils.

Table 83. N in crop residues retained to the soil

Crop	Above-ground residue dry matter AGDM(T) (Mg/ha): AGDM(T)	Crop Residue Management Returned to soils (%)	Fraction of Crop Residue returned to soils	N in Crop residue	N in Crop residue Kg N/yr
Bambara nuts	2.51	25	0.25	0.63	
Cowpeas	1.49	30	0.3	0.45	
Groundnuts	2.21	30	0.3	0.66	
Irish Potatoes	1.27	20	0.2	0.25	
Maize	3.06	10	0.1	0.31	
Sunflower	0	30	0.3	0	
Seed Cotton	0	20	0.2	0	
Millet	1.11	10	0.1	0.11	
Velvet beans	1.55	70	0.7	1.08	
Mixed Beans	1.55	20	0.2	0.31	
Rice	3.92	10	0.1		392.31
Sorghum	1.90	10	0.1	0.19	
Soybeans	2.45	10	0.1	0.25	
Sweet Potatoes	1.15	20	0.2	0.23	
Wheat	8.63	0	0	0	

Crop	Above-ground residue dry matter AGDM(T) (Mg/ha): AGDM(T)	Crop Residue Management Returned to soils (%)	Fraction of Crop Residue returned to soils	N in Crop residue	N in Crop residue Kg N/yr
Virginia Tobacco	0	25	0.25	0	
Burley Tobacco	0	20	0.2	0	
Total			0	4.46	4463.36

Source: CSO and Ministry of Agriculture

Table 84 shows the source of data on the choice of activity data assigned to estimate indirect N_2O from managed soils and manure management.

Table 84. Activity data (Indirect N_2O from Managed soils and Manure management)

Activity Data	Anthropogenic N- Inputs	Reference
	$F_{SN:}$ Annual amount of synthetic fertiliser N added to soils	Crop Forecast Surveys – Ministry of Agriculture and Zamstats
	F_{ON}: Annual amount of animal manure, compost intentionally added to soils	Calculated value based on N_2O from Manure Management from basic characterisation of different livestock types
	$F_{PRP:}$ Annual amount of Urine and Dung N deposited by grazing animals in pasture range and paddock (kg N/yr)	Calculated value based on N_2O from Manure Management from basic characterisation of different livestock types
	Frac(GASF): fraction of synthetic fertilisers N that volatilizes	IPCC 2006 Guidelines, Table 11.3
	Frac(GASM): Fraction of applied organic N fertiliser material (FON) and FPRP that volatilizes	IPCC 2006 Guidelines, Table 11.3
	Frac (GasMS): Fraction of Managed Livestock Manure nitrogen that volatilizes (%)	Manure Management Systems

Emission Factors for indirect N_2O emissions from atmospheric deposition of N volatized from managed soils and N_2O from N leaching/runoff from managed soils

The indirect N_2O emissions from atmospheric deposition of N volatized from managed soils and N_2O from N leaching/runoff from managed soils emission factors assigned were default values as there are no country specific emission factors. Table 85 shows the default emission factors for atmospheric deposition of N on soil and water surfaces (kg N_2O – N/kg NH_3 – $N+NO_x$ – N volatilized) and N leaching and runoff (kg N_2O-N (kg N leaching/runoff).

Table 85. Emission factor for indirect N_2O from volatilization, leaching and runoff

Emission Factor	Value	Uncertainty	Reference
Emission factor for N_2O emission from atmospheric deposition of N on soil and water surfaces (kg N_2O – N/kg NH_3 – $N+NO_x$ – N volatilized)	0.01	0.002 – 0.05	2006 IPCC Guidelines, Table 11.3
Emission factor for N_2O emissions from N leaching and runoff (kg N_2O-N (kg N leaching/runoff)	0.0075	0.0005 – 0.025	2006 IPCC Guidelines, Table 11.3

Source: IPCC 2006 Guidelines, Volume 4, Table 11.3

Results

Figure 17 presents results from indirect N_2O emissions from managed soils and manure management increased from 69,122.92 t CO_2eq in 2009 to 96,652.70 t CO_2eq in 2018 representing an overall increase of 39.83% and annual growth rate of 3.98%, respectively. This was attributed to N_2O that is lost due to atmospheric decomposition of N volatilized and N_2O from N leaching / runoff in managed soils.

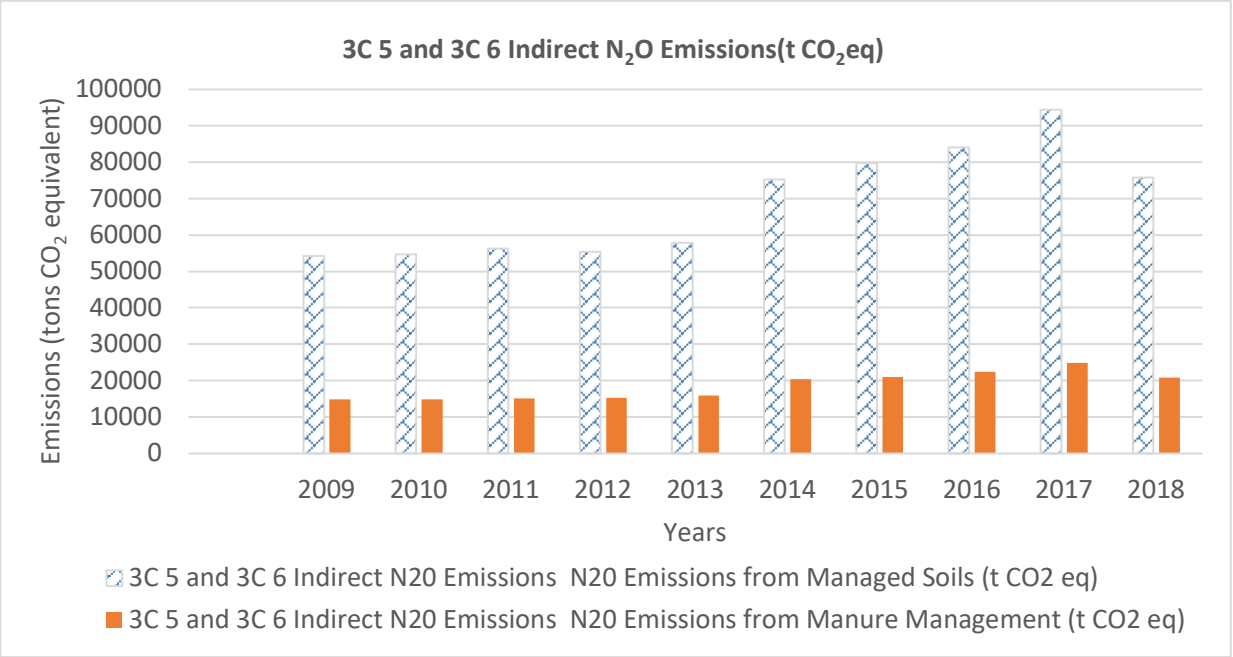


Figure 16 Indirect N_2O Emissions from Managed Soils and Manure Management

Methane Emissions from Rice Cultivation

Methodology

Anaerobic decomposition of organic material in flooded rice fields produces CH_4, which escapes to the atmosphere primarily by transport through the rice plants. The annual amount emitted is dependent on rice cultivar, number and duration of crops grown, soil type and temperature, water management practices, and the use of fertilisers and other organic and inorganic amendments.

Methane emissions resulting from rice cultivation was estimated using Tier 1 method in Equation 5.1 of the IPCC 2006 Guidelines, together with the use of default emission factors.

Equation 42:

$$CH_{4\ Rice} = \sum_{i,j,k} (EF_{i,j,k} \bullet t_{i,j,k} \bullet A_{i,j,k} \bullet 10^{-6})$$

Where :	CH_4 Rice =	annual methane emissions from rice cultivation, Gg CH_4 yr^{-1}
	EF_{ijk} =	a daily emission factor for i, j, and k conditions, kg CH_4 ha-1 day^{-1}
	t_{ijk} =	cultivation period of rice for i, j, and k conditions, day
	A_{ijk} =	annual harvested area of rice for i, j, and k conditions, ha yr-1
	i, j, and k =	represent different ecosystems, water regimes, type and amount of organic amendments, and other conditions under which CH_4 emissions from rice may vary

Activity Data for Rice Methane

The activity data for CH_4 emissions from rice cultivation was established from the area of rice harvested annually. Table 86 shows cropland data on area planted with rice for the years 2008 to 2018 and Table 87 gives the choice of activity data used

Table 86. Area of Planted Rice

Rice Cultivation	
Year	**Area Planted (ha)**
2009	7680
2010	11253
2011	6965
2012	4971
2013	4534
2014	1972
2015	2533
2016	3923
2017	3018
2018	2952

Source: CSO and Ministry of Agriculture

Table 87. Choice of Activity Data – CH_4 Rice Cultivation

Type of activity data	Activity data (value and units)	Year of data	Reference	Other information/data source	Are all data entered correctly into software etc.? Yes / No (list corrective action)
Area of rice harvested	• harvested area(ha)	2009 to 2018	Crop forecasting survey reports	Ministry of Agriculture – Also in Annex	Yes
Water Management System	• Continuously flooded • Intermittently flooded • Rain fed • Deep Water	2009 to 2018	Expert Judgment and Survey from Farmers		Yes
Water Regime before the cultivation period	• 90 days • 60 days • 30 days	2009 to 2018	Expert Judgment and Survey from Farmers		Yes
Amount of organic amendments added to rice fields	• Tons/ha	2009 to 2018	Expert Judgment and Survey from Farmers		Yes

Source: CSO and Ministry of Agriculture

Emission Factors for Rice Methane

Default emission factors were used for Rice CH_4 as there are no country specific emission factors for continuously flooded fields without organic amendments (kg CH_4/ha), scaling factor for water regime before and during cultivation period, and conversion factor for organic amendments. Table 88 shows default emission factors that were assigned to estimate Rice CH_4.

Table 88. Emission factors for CH_4 Rice cultivation

Emission Factor	Value	References
Baseline Emission factor for continuously flooded fields without organic amendments (kg CH_4/ha)	1.3	2006 IPCC Guidelines Table 5.11
Scaling Factor for water regime during cultivation period	1	2006 IPCC Guidelines Table 5.12
Scaling Factor for water regime before cultivation period	0.28	2006 IPCC Guidelines Table 5.13
Conversion factor for organic amendment	1	2006 IPCC Guidelines Table 5.14

Source: IPCC 2006 Guidelines, Table 5.11, 5.12, 5.13, 5.14

Results

Figure 18 presents results of CH_4 emissions from cultivation of rice which decreased from 5,283.53 t CO_2eq in 2009 and 2,030.86 t CO_2eq in 2018 representing an overall and annual decrease of 61.56 % and 6.16 %, respectively. The decrease is attributed to the drought experienced during the 2010/2011 and 2016/2017 seasons.

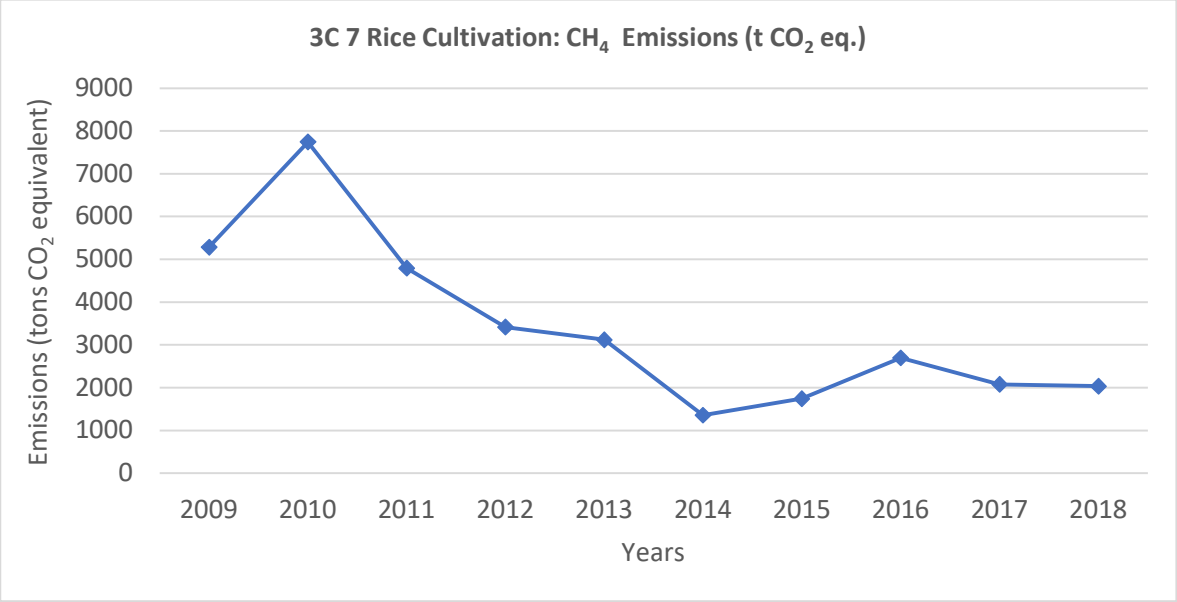


Figure 17 CH_4 Emissions from Rice Cultivation

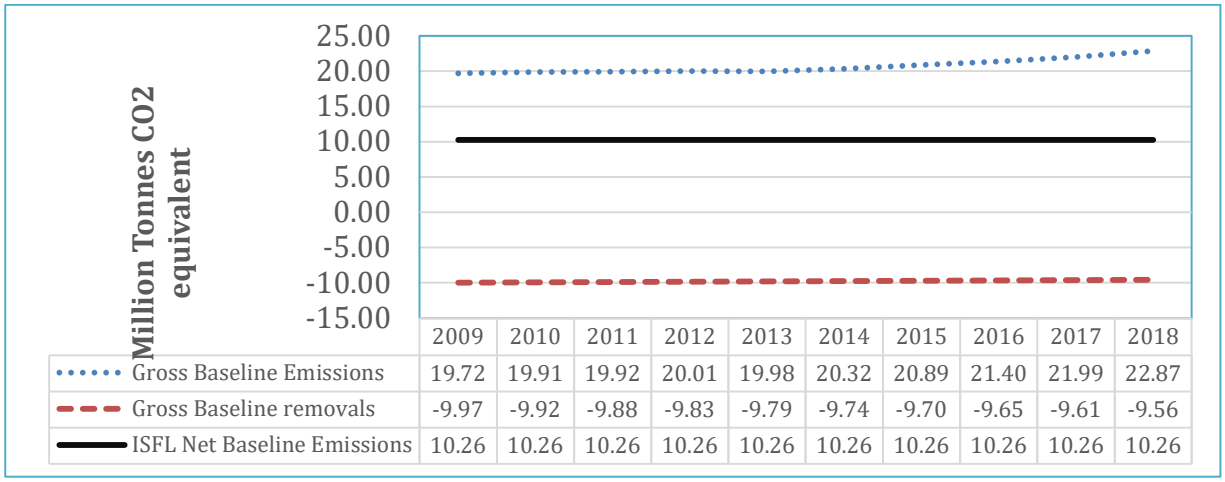
5 OVERAL EMISSIONS AND REMOVALS FROM AFOLU CATEGORIES

Provided in Table 89 are gross emissions, removals and net emissions over the time series. Gross baseline emissions are estimated from all the sub categories, while the Removals are estimated from forest land remaining forest land, cropland converted to forest land, settlements converted to forest land, cropland converted to forest land, cropland converted to grassland and cropland converted to settlements. Overall gross baseline emissions indicate increasing trends over the period 2009 to 2018.

Table 89. Overall Baseline emissions and removals (tons CO_2 equivalent)

Year	Gross Baseline Emissions	Gross Baseline removals	Net Baseline Emissions
2009	19,720,374	-9,967,649	9,752,725
2010	19,906,614	-9,922,489	9,984,125
2011	19,917,742	-9,877,454	10,040,288
2012	20,008,204	-9,832,151	10,176,053
2013	19,981,537	-9,789,137	10,192,400
2014	20,317,998	-9,744,395	10,573,602
2015	20,886,666	-9,699,750	11,186,916
2016	21,395,603	-9,654,958	11,740,645
2017	21,989,802	-9,609,694	12,380,107
2018	22,868,111	-9,564,445	13,303,666

The gross baseline emissions increased by 16% from 19,720,374 tCO_2 eq. in 2009 to 22,868,111 tCO_2 eq. in 2018 (Figure 19). On the other hand, Gross Baseline Removals decreased from -9,967,649 tCO_2 eq. in 2009 to -9,564,445 tCO_2 eq. in 2018, representing a change of -4 %. Net Baseline emissions increased from 9,752,725 tCO_2 eq. in 2009 to 13,303,666 tCO_2 eq in 2018.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Gross Baseline Emissions	19.72	19.91	19.92	20.01	19.98	20.32	20.89	21.40	21.99	22.87
Gross Baseline removals	-9.97	-9.92	-9.88	-9.83	-9.79	-9.74	-9.70	-9.65	-9.61	-9.56
ISFL Net Baseline Emissions	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26	10.26

Figure 18 Overall emissions and removals trends

By category the largest contribution to emissions in 2009 was Land with 98%, followed by livestock at 1.0% and aggregate sources and non-CO_2 emissions sources on land at 1.0%. In 2018 the contribution from Livestock increased by 2% and aggregate sources and non-CO_2 emissions sources on land increased slightly to 2% while Land reduced slightly to 96% (Figure 20).

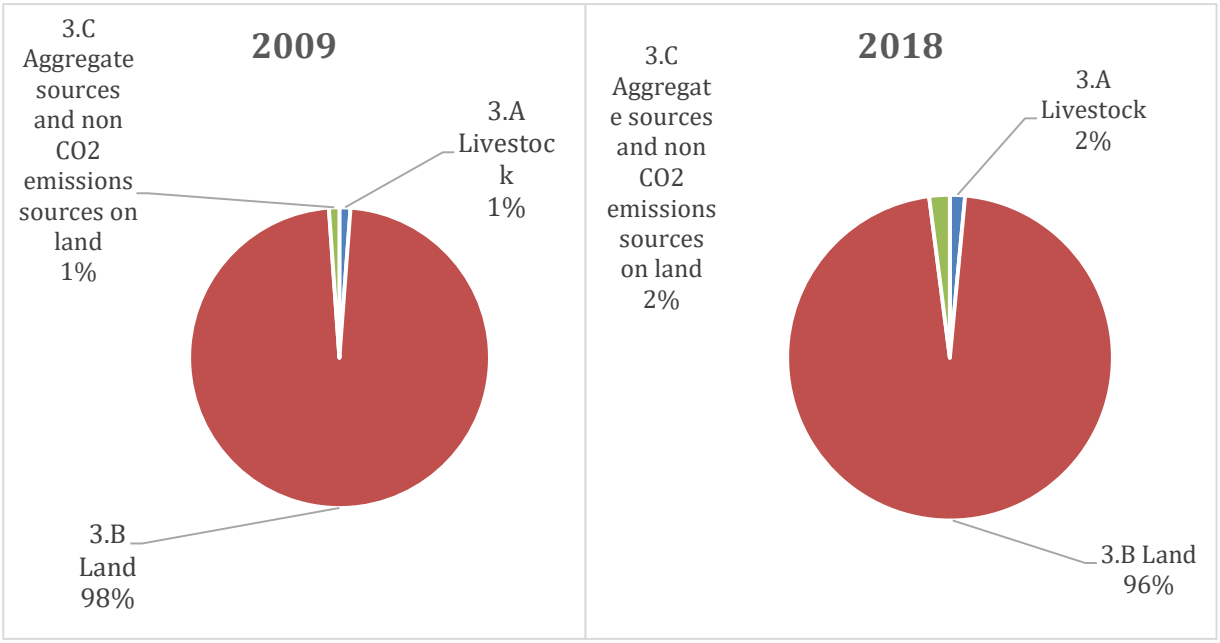


Figure 19 Emissions percentage contribution by category

The largest contribution to emissions in 2009 came from CO_2 with 98%, while N_2O and CH_4 contributed 1% each. In 2019 contribution from CH_4 increased to 2% while N_2O and CO_2 were at 2% and 96%, respectively (Figure 21).

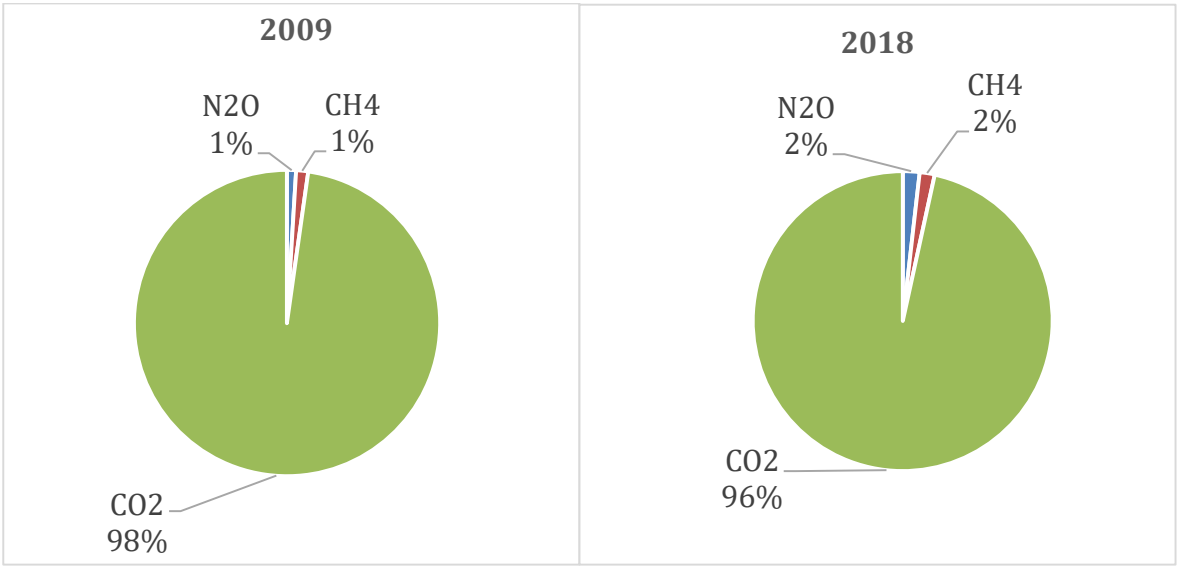


Figure 20 Emissions contributions by gas

Provided in Tables 90 and 91 are short and detailed summaries of emissions, respectively. Figure 22 illustrates net CO_2 emissions from AFOLU subcategories.

Table 90. Short Summary of emissions

Sub category			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
3.A LIVESTOCK	3.A.1 Enteric Fermentation		249,327	250,090	252,440	254,791	268,905	351,051	372,973	402,987	439,214	342,052
	3.A.2 Manure Management		13,357	13,344	13,457	13,571	14,078	17,846	18,906	19,984	21,031	18,922
3.B LAND	3. B.1 Forest Land	Uptake	-9,967,649	-9,922,489	-9,877,454	-9,832,151	-9,789,137	-9,744,395	-9,699,750	-9,654,958	-9,609,694	-9,564,445
		Emissions	18,141,323	18,183,346	18,203,203	18,294,042	18,348,873	18,539,921	18,972,081	19,373,435	19,950,865	20,895,828
	3.B.2 Cropland		1,017,811	1,023,886	1,029,962	1,036,037	1,042,112	1,048,188	1,054,263	1,060,338	1,066,413	1,072,489
	3.B.3 Grassland		-95	-191	-286	-381	-477	-572	-667	-763	-858	-953
	3.B.5 Settlements		45,149	45,341	45,534	45,726	45,918	46,111	46,303	46,496	46,688	46,880
3.C AGGREGATE SOURCES AND NON CO_2 EMISSIONS SOURCES ON LAND	3.C.1 Biomass Burning		43,521	68,179	72,911	67,389	56,446	40,733	64,917	54,861	59,762	64,786
	3.C.2 Liming		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	3.C.3 Urea application		9,183	12,596	26,921	6,720	6,175	10,696	25,687	16,109	27,975	23,720
	3.C.4 Direct N_2O emissions from managed soils		126,293	232,621	197,285	216,161	122,587	167,044	229,515	312,899	257,203	305,586
	3.C.5 Indirect N_2O emissions from managed soils		54,239	54,659	56,330	55,345	57,803	75,195	79,783	84,070	94,405	75,858

	3.C.6 Indirect N_2O emissions from manure management		14,884	14,902	15,092	15,283	15,894	20,312	21,044	22,362	24,896	20,794
	3.C.7 Rice cultivation		5,284	7,742	4,792	3,420	3,119	1,357	1,743	2,699	2,076	2,031

Table 91. Detailed summary of emissions (t CO_2 eq.)

Sub category				**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
3.A LIVESTOCK	3.A.1 Enteric Fermentation		CH_4 Emissions from Enteric Fermentation (tonnes CO_2 equivalent)	249326.9	250089.6	252440.5	254791.4	268905.3	351050.8	372973.0	402987.2	439213.6	342051.5
	3.A.2 Manure Management		CH_4 Emissions from Manure Management (tonnes)	13357.4	13344.4	13457.5	13570.5	14078.3	17846.4	18905.7	19983.9	21031.1	18921.8
			Direct N_2O Emissions MMS (tonnes N_2O / yr)	45.5	45.6	46.1	46.6	49.0	62.3	65.9	71.6	76.4	63.4
	TOTAL LIVESTOCK			262729.7	263479.5	265944.1	268408.6	283032.7	368959.4	391944.6	423042.7	460321.1	361036.7
3.B LAND	3. B.1 Land Forest	3.B.1.a Forest Land remaining Forest Land	Annual increase in carbon stocks in biomass(including above ground and below ground	-9967649.4	-9922489.1	-9877454.0	-9832150.6	-9789137.0	-9744395.3	-9699750.3	-9654958.5	-9609694.5	-9564444.7

			biomass) tonnes										
			Estimating annual decrease in biomass carbon stocks due to losses (Lwood_removal + Lfuelwood_removal + Ldisturbances)	1814861 5.2	1819793 0.5	1822507 9.8	1832321 1.1	1838533 3.6	1858367 4.7	1902312 6.3	1943177 3.2	2001649 5.3	2096875 0.4
			Annual change in carbon stocks in dead wood and litter due	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils,(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.B1.b.1 Cropland Converted to Forest land	Change in biomass carbon stocks on land converted to another land	-6912.8	-13825.6	-20738.4	-27651.2	-34564.0	-41476.8	-48389.6	-55302.4	-62215.3	-69128.1
			Annual change in carbon stocks in dead wood and litter due to land conversion	-157.7	-315.5	-473.2	-631.0	-788.7	-946.4	-1104.2	-1261.9	-1419.7	-1577.4

			Annual change in carbon stocks in mineral soils,(tonnes C yr-1)	-221.7	-443.3	-665.0	-886.7	-1108.3	-1330.0	-1551.7	-1773.3	-1995.0	-2216.7
		3.B.1.b.ii Settlements to Forest land	Change in biomass carbon stocks on land converted to another land	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in dead wood and litter due to land conversion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	3.B.2 Cropland	3.B.2.a Crop Land remaining Crop Land	Annual change in carbon stocks in dead wood and litter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils,(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.B.2.b.i Forest Land Converted to Crop land	Change in biomass carbon stocks on land converted to another land	991476.7	991476.7	991476.7	991476.7	991476.7	991476.7	991476.7	991476.7	991476.7	991476.7

			Annual change in carbon stocks in dead wood and litter due to land conversion	17047.1	17047.1	17047.1	17047.1	17047.1	17047.1	17047.1	17047.1	17047.1	17047.1
			Annual change in carbon stocks in mineral soils,(tonnes C yr-1)	6058.9	12117.7	18176.6	24235.4	30294.3	36353.1	42412.0	48470.8	54529.7	60588.5
		3.B.2.b.ii Grassland converted to cropland	Change in biomass carbon stocks on land converted to another land	3212.0	3212.0	3212.0	3212.0	3212.0	3212.0	3212.0	3212.0	3212.0	3212.0
			Annual change in carbon stocks in dead wood and litter due to land conversion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils,(tonnes C yr-1)	16.5	32.9	49.4	65.8	82.3	98.7	115.2	131.6	148.1	164.5
	3.B.3 Grassland	3.B.3.a Grassland remaining Grass Land	Annual change in carbon stocks in dead wood and litter due to area change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

			Annual change in carbon stocks in mineral soils,(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.B.3.b.i Forest Land Converted to Grassland	Initial change in biomass carbon stocks on forest land converted to settlements	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in dead wood and litter due to land conversion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.B.3.b.ii Cropland converted to grassland	Initial change in biomass carbon stocks on forest land converted to settlements	-86.5	-173.0	-259.4	-345.9	-432.4	-518.9	-605.3	-691.8	-778.3	-864.8
			Annual change in carbon stocks in dead wood and litter due to land conversion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

			Annual change in carbon stocks in mineral soils(tonnes C yr-1)	-8.9	-17.7	-26.6	-35.4	-44.3	-53.2	-62.0	-70.9	-79.7	-88.6
		3.B.3.b.iii Wetlands converted to grassland											
	3.B.4 Wetlands	3.B.4 a.ii Flooded Land remaining Flooded Land (CH_4)	Flooded Land remaining Flooded Land (CH_4)	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
			Land converted to flooded land	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Managed Peatlands	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
	3.B.5 Settlements	3.B.5a Settlements remaining settlements	Annual change in carbon stocks in dead wood and litter due to area change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.B.5.b.i Forest Land Converted to	Initial change in biomass carbon stocks on forest land	42748.9	42748.9	42748.9	42748.9	42748.9	42748.9	42748.9	42748.9	42748.9	42748.9

		Settlements	converted to settlements										
			Annual change in carbon stocks in dead wood and litter due to land conversion	2207.7	2207.7	2207.7	2207.7	2207.7	2207.7	2207.7	2207.7	2207.7	2207.7
			Annual change in carbon stocks in mineral soils(tonnes C yr-1)	369.4	738.9	1108.3	1477.8	1847.2	2216.7	2586.1	2955.5	3325.0	3694.4
		3.B.5.b.ii Cropland converted to Settlement	Initial change in biomass carbon stocks on forest land converted to settlements	-177.1	-354.1	-531.2	-708.3	-885.3	-1062.4	-1239.5	-1416.6	-1593.6	-1770.7
			Annual change in carbon stocks in dead wood and litter due to land conversion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	Otherland		Initial change in biomass carbon stocks on forest land converted to settlements	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in dead wood and litter due to land conversion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			Annual change in carbon stocks in mineral soils(tonnes C yr-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL LAND													
3.C AGGREGATE SOURCES AND NON CO_2 EMISSIONS SOURCES ON LAND	3.C.1 Biomass Burning		Biomass burning in forest land										
			Biomass burning in cropland (CH_4) tonnes	4474.5	4673.9	4843.1	3926.1	4042.5	4838.7	4786.7	4630.6	5204.9	4712.1
			Biomass burning in cropland (N_2O) tonnes	1712.5	1788.8	1853.5	1502.6	1547.1	1851.9	1831.9	1772.2	1992.0	1803.4
			Biomass burning in grassland (CH_4) tonnes	15857.9	26242.9	28158.9	26347.9	21617.7	14455.6	24787.5	20596.5	22345.9	24775.9
			Biomass burning in grassland (N_2O) tonnes	21373.7	35370.8	37953.4	35512.4	29136.9	19483.6	33409.3	27760.5	30118.4	33393.6

			Biomass burning in other land (CH_4) tonnes	35.6	35.6	35.5	33.9	35.4	35.4	35.3	35.2	35.1	35.1
			Biomass burning in other land (N_2O) tonnes	66.7	66.7	66.5	65.9	66.3	67.7	66.2	66.1	65.9	65.8
	3.C.2 Liming												
	3.C.3 Urea application			9182.8	12595.7	26921.4	6720.3	6174.7	10695.7	25687.2	16109.1	27975.2	23720.4
	3.C.4 Direct N_2O emissions from managed soils			126292.6	232621.4	197285.4	216160.6	122586.9	167044.0	229514.9	312898.6	257203.0	305586.2
	3.C.5 Indirect N_2O emissions from managed soils			54238.8	54658.7	56329.5	55345.1	57802.8	75195.1	79782.9	84069.9	94404.8	75858.4
	3.C.6 Indirect N_2O emissions from manure management			14884.2	14901.6	15092.1	15282.5	15893.9	20311.9	21043.6	22362.2	24896.4	20794.2
	3.C.7 Rice cultivation			5283.5	7741.6	4791.6	3419.8	3119.2	1356.7	1742.6	2698.9	2076.3	2030.9

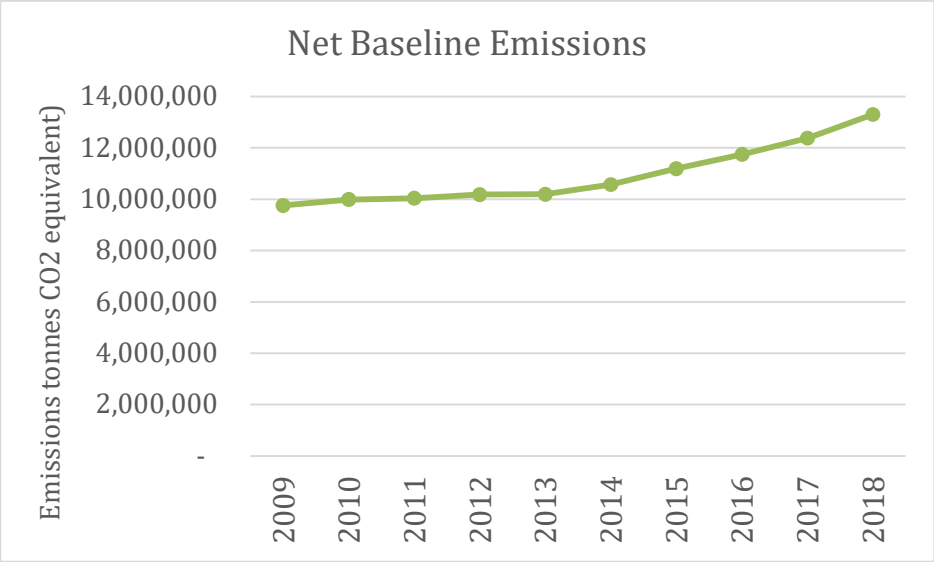


Figure 21 Net CO_2 Emissions from AFOLU Sub Categories

The study identified agricultural expansion, fuelwood extraction and forest fires as the main drivers of deforestation and forest degradation across the entire Province. Deforestation due to agricultural expansion is driven by small-scale farmers who practice small-scale subsistence and cash crop farming, and is widely spread across the landscape. Like agricultural expansion, fuelwood extraction, and forest fires affect forests across the landscapes. Fuelwood extraction includes both firewood and charcoal production carried out part-time by some farmers, but also as an exclusive activity by seasoned charcoal producers.

These drivers and agents were identified as relevant both at the district and Provincial levels. About 156,000 ha of forests were estimated to have been lost in the Eastern Province between 2000 and 2014 – primarily due to agricultural expansion. Fuelwood extraction was estimated to affect 16,000 ha/year in 2016; while fires burnt about 678,000 ha of forests per year on average between 2000 and 2014 (Wathum et al, 2016).

6 UNCERTAINTY ASSESSMENT

The Uncertainty Analysis (UA) for AFOLU sector was estimated using approach 1. Approach 1 is based upon error propagation and is used to estimate uncertainty in individual categories, in the inventory as a whole, and in trends between a year of interest and a base year. In Approach 1 uncertainty in emissions or removals can be propagated from uncertainties in the activity data,

emission factors and other estimation parameters through the error propagation equation[68] and computed using the IPCC 2006 software. Combined uncertainty was estimated using Equation 3.1 Combining Uncertainties – Approach 1 of the IPCC 2006 Guidelines.

The uncertainty for Collect Earth data was 1.4%. Emission factor uncertainty were derived for estimating emissions in the Land category were obtained from the ILUA data with uncertainty of ±6.9%[69]. In case of wood removal for fuelwood, uncertainty was 10%[70]. Average annual biomass growth above and below-ground, uncertainty was 1.68%[71] while, that of fraction of biomass lost in fire disturbance was 4.1%[72]. All the population data for Dairy, other cattle, Buffalo, Sheep, Goat, Swine and poultry were sourced from Central Statistical office (CSO). CSO is the custodian of all data currently because in the years under review, no Livestock census was conducted.

The CSO Livestock data collection commenced in the 2006/07 farming season. The data was collected during the crop forecast surveys which are conducted annually. The sample framework is the standard enumeration area. This data from CSO has an accuracy of 70% (±30%). Prior to 2010 the data records were from administrative reports such as quarterly and annual reports.

Table 92 shows results of the uncertainty analysis in percent for activity data and emission factors and a combined uncertainty. The uncertainty analysis was generated using the IPCC 2006 software.

[68] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_3_Ch3_Uncertainties.pdf
[69] ILUA II report page 38
[70] Draft National Woodfuel Study Report, 2015
[71] E. Chidumayo 1990: Above-ground woody biomass structure and productivity in a Zambezian woodland(page 33 Abstract)
[72] E.N. Chidumayo;2013: Forest degradation and recovery in a miombo woodland landscape in Zambia

Table 92. Uncertainty Results (2009 - 2018)

2006 IPCC Categories	Gas	Activity Data Uncertainty (%)	Emission Factor Uncertainty (%)	Combined Uncertainty %
3.A - Livestock				
3.A.1.a.i - Dairy Cows	CH_4	40	8	40.79
3.A.1.a.ii - Other Cattle	CH_4	30	50	58.31
3.A.1.b - Buffalo	CH_4	0	0	0.00
3.A.1.c - Sheep	CH_4	30	50	58.31
3.A.1.d - Goats	CH_4	30	50	58.31
3.A.1.e - Camels	CH_4	0	0	0.00
3.A.1.f - Horses	CH_4	0	0	0.00
3.A.1.g - Mules and Asses	CH_4	0	0	0.00
3.A.1.h - Swine	CH_4	30	50	58.31
3.A.1.j - Other (please specify)	CH_4	0	0	0.00
3.A.2.a.i - Dairy cows	CH_4	0	0	0.00
3.A.2.a.i - Dairy cows	N_2O	0	0	0.00
3.A.2.a.ii - Other cattle	CH_4	30	50	58.31
3.A.2.a.ii - Other cattle	N_2O	30	50	58.31
3.A.2.b - Buffalo	CH_4	0	0	0.00
3.A.2.b - Buffalo	N_2O	0	0	0.00
3.A.2.c - Sheep	CH_4	30	50	58.31
3.A.2.c - Sheep	N_2O	30	50	58.31
3.A.2.d - Goats	CH_4	30	50	58.31
3.A.2.d - Goats	N_2O	30	50	58.31
3.A.2.e - Camels	CH_4	0	0	0.00
3.A.2.e - Camels	N_2O	0	0	0.00
3.A.2.f - Horses	CH_4	0	0	0.00
3.A.2.f - Horses	N_2O	0	0	0.00
3.A.2.g - Mules and Asses	CH_4	0	0	0.00
3.A.2.g - Mules and Asses	N_2O	0	0	0.00
3.A.2.h - Swine	CH_4	30	50	58.31
3.A.2.h - Swine	N_2O	30	50	58.31
3.A.2.i - Poultry	CH_4	30	50	58.31

3.A.2.i - Poultry	N_2O	30	50	58.31
3.A.2.j - Other (please specify)	CH_4	0	0	0.00
3.A.2.j - Other (please specify)	N_2O	0	0	0.00
3.B - Land				
3.B.1.a - Forest land remaining Forest land	CO_2	1.4	6.9	7.04
3.B.1.b.i - Cropland converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.ii - Grassland converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.iii - Wetlands converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.iv - Settlements converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.v - Other Land converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.2.a - Cropland remaining Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.i - Forest Land converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.ii - Grassland converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.iii - Wetlands converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.iv - Settlements converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.v - Other Land converted to Cropland	CO_2	1.4	6.9	7.04
3.B.3.a - Grassland remaining Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.i - Forest Land converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.ii - Cropland converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.iii - Wetlands converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.iv - Settlements converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.v - Other Land converted to Grassland	CO_2	1.4	6.9	7.04
3.B.4.a.i - Peatlands remaining peatlands	CO_2	1.4	6.9	7.04
3.B.4.a.i - Peatlands remaining peatlands	N_2O	1.4	6.9	7.04
3.B.4.b.i - Land converted for peat extraction	N_2O	1.4	6.9	7.04
3.B.4.b.ii - Land converted to flooded land	CO_2	1.4	6.9	7.04
3.B.5.a - Settlements remaining Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.i - Forest Land converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.ii - Cropland converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.iii - Grassland converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.iv - Wetlands converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.v - Other Land converted to Settlements	CO_2	1.4	6.9	7.04
3.B.6.b.i - Forest Land converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.ii - Cropland converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.iii - Grassland converted to Other Land	CO_2	1.4	6.9	7.04

3.B.6.b.iv - Wetlands converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.v - Settlements converted to Other Land	CO_2	1.4	6.9	7.04
3.C - Aggregate sources and non-CO_2 emissions sources on land				
3.C.1.a - Biomass burning in forest land	CH_4	0	0	0.00
3.C.1.a - Biomass burning in forest land	N_2O	0	0	0.00
3.C.1.b - Biomass burning in cropland	CH_4	10	2.7	10.36
3.C.1.b - Biomass burning in cropland	N_2O	10	0.07	10.00
3.C.1.c - Biomass burning in grasslands	CH_4	5	0.9	5.08
3.C.1.c - Biomass burning in grasslands	N_2O	5	0.01	5.00
3.C.1.d - Biomass burning in all other land	CH_4	5	0.09	5.00
3.C.1.d - Biomass burning in all other land	N_2O	5	0.01	5.00
3.C.2 - Liming	CO_2	0	0	0.00
3.C.3 - Urea application	CO_2	25	50	55.90
3.C.4 - Direct N_2O Emissions from managed soils	N_2O	25	0.03	25.00
3.C.5 - Indirect N_2O Emissions from managed soils	N_2O	10	0.08	10.00
3.C.6 - Indirect N_2O Emissions from manure management	N_2O	0	0	0.00
3.C.7 - Rice cultivation	CH_4	10	0.01	10.00

7 KEY CATEGORY ANALYSIS

The summary results from the USEPA KCA tool for key category (Level and Trend) analysis for the base year estimate (tons C/yr) (2009) and current year estimate (tons C/yr) (2018) are given in Tables 93 and 94, respectively.

A key category analysis was undertaken and formed a basis for initial selection of subcategories eligible for ISFL accounting. The key source categories from trend and level assessment that had a >90% significant contribution to the overall emissions were coming from; (i) 3B1a: CO_2 from Forest Land remaining Forest Land; (ii) 3B2bi: CO_2 from Forest Land converted to Cropland, (iii) 3C4: N_2O Emissions (Direct) from managed soils, (iv) 3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non – Dairy Cattle), (v) CO_2 from Cropland converted to Forest land, (vi) 3B5bi: CO_2 from Forest land converted to Settlements, (vii) 3A2a: N_2O Emissions from Manure in Domestic Livestock (Non - Dairy Cattle), and (viii) 3C3: Urea Application

Table 93. Key Category Analysis: Level Assessment Results

Inventory Categories	Inventory Sector	Base Year Estimate (Gg CO_2 eq.)	Current Year Estimate (Gg CO_2 eq.)	Total	**Cumulative Sum**	**Status**
3B1a: CO_2 from Forest Land remaining Forest Land	AFOLU	8180965.9	11404305.6	84.40%	84.40%	**key source**
3B2bi: CO_2 from FOREST LAND converted to Cropland	AFOLU	1014582.6	1069112.3	7.91%	92.31%	**key source**
3C4: N_2O Emissions (Direct) from managed soils	AFOLU	126292.6	305586.2	2.26%	94.57%	**key source**
3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	AFOLU	221152.1	302075.1	2.24%	96.81%	**key source**
3C5: N_2O Emissions(indirect) from managed soils	AFOLU	54238.8	75858.4	0.56%	97.37%	not key source
CO_2 from CROPLAND converted to Forest Land	AFOLU	-7292.2	-72922.1	0.54%	97.91%	not key source
3B5bi: CO_2 from FOREST LAND converted to Settlements	AFOLU	42748.9	42748.9	0.32%	98.23%	not key source

Table 94. Key Category Analysis: Trend Assessment Results

Inventory Categories	**Inventory Sector**	**Base Year Estimate (Gg CO_2 eq.)**	**Current Year Estimate (Gg CO_2 eq.)**	**Total**	**Cumulative Sum**	**Status**
3B2bi: CO_2 from FOREST LAND converted to Cropland	AFOLU	1014582.6	1069112.3	43.87%	43.87%	**key source**
3B1a: CO_2 from Forest Land remaining Forest Land	AFOLU	8180965.9	11404305.6	20.67%	64.54%	**key source**
3C4: N_2O Emissions (Direct) from managed soils	AFOLU	126292.6	305586.2	17.74%	82.28%	**key source**

CO_2 from CROPLAND converted to Forest Land	AFOLU	-7292.2	-72922.1	8.46%	90.74%	**key source**
3B5bi: CO_2 from FOREST LAND converted to Settlements	AFOLU	42748.9	42748.9	2.16%	92.90%	**key source**
3A2a: N_2O Emissions from Manure in Domestic Livestock(Non - Dairy Cattle)	AFOLU	30034.1	41024.0	1.58%	94.48%	**key source**
3C3: Urea Application	AFOLU	9182.8	23720.4	1.49%	95.97%	**key source**
3C1c: CH_4 from Grassland remaining Grassland (Biomass Burning in Grasslands)	AFOLU	15857.9	24775.9	0.83%	96.81%	not key source
3C7: CH_4 Emissions from Rice Cultivation	AFOLU	5283.5	2030.9	0.70%	97.51%	not key source
3C1c: N_2O from Grassland remaining Grassland (Biomass Burning in Grasslands)	AFOLU	21373.71744	33393.57231	0.54%	98.05%	not key source

8 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC)

Quality control was conducted at three levels of the inventory process as follows:

a) Pre-inventory preparation quality control: This involved activity data compilation and cleaning of the data by sector teams prior to inventory compilation.

b) Quality control during inventory preparation: This involved checking and verification of activity data and emissions factors and ensuring correct entry of figures in the software.

c) Post inventory preparation Quality Control: This involved checking and verification of activity data, emission factors and results of emissions.

The Internal QA/QC Team was comprised of two experts from the Consultancy Team who were not involved in the compilation of the GHG Inventory. The methodology used in the QA/QC process involved checking each variable including the datasets and data sources used as well as assumptions used. The QA/QC process led to the production of two reports, the first based on the 2018 inventory data and the second targeting all the 10 years under focus.

9 PLANNED IMPROVEMENTS

There is need to invest in research that generates country specific emission factors. Further, detailed livestock surveys, including its management systems are required to graduate to Tier 2 methodology for GHG emissions from the livestock sector. Additionally, there is need to update the existing soil map and enhancement of data collection on forest disturbance. There is also need for improvement in data collection for fertiliser use by farmers.

10 CONCLUSION

The GHG Inventory were estimated in accordance with the IPCC 2006 Guidelines. The use of the IPCC software and spreadsheets facilitated the ease of preparation of the inventory. Efforts were made in quality control to ensure good quality data was used in the inventory preparation across all sectors. Overall emissions results indicate Eastern Province was a net source through the period under review. Land category has been the major source of emissions over the years, followed by Livestock and aggregate sources of non-CO_2 emissions sources on Land. Carbon dioxide was the most dominant gas among the GHGs emitted in Zambia, followed by methane and nitrous oxide.

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Annex 7: Review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

A key category analysis was undertaken and formed a basis for initial selection of subcategories eligible for ISFL accounting. The key source categories that had a >90% significant contribution to the overall emissions were from (i) 3B1a: CO_2 from Forest Land remaining Forest Land; (ii) 3B2bi: CO_2 from Forest land converted to Cropland; (iii) 3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle) and (iv) 3C4: N_2O Emissions (Direct) from managed soils.

Summary of the Programme GHG Inventory

Table 1 shows the initial selection of subcategories which are conversions between land-use categories (positive values mean emissions while negative values are removals) for the 2009-2018. The table also shows the relative and cumulative contribution to the absolute level of the total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory.

Table 1. Subcategories involving conversions between land-use categories.

Subcategory involving conversions between land-use categories	Net emissions and removals (t CO_2eq) [73]	Relative contribution to the total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory	Cumulative contribution to the total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory
3B2bi: CO_2 from Forest Land converted to Cropland	1,041,847	99.2	99.2
3B5bi: CO_2 from Forest Land converted to Settlements	46,989	4.5	103.6

[73] When the subcategories has net emissions, please use a positive value. If the subcategory has net removals, use a negative value. However, please ensure that that relative contribution is based on the absolute value, meaning that the total of emissions is the sum of the absolute values of emissions and removals.

3B2bii: CO_2 from Grassland converted to Cropland	3,302	0.3	104.0
3B3bii: CO_2 from Cropland converted to Grasslands	(524)	(0.0)	103.9
3B5bii: CO_2 from Cropland converted to Settlements	(974)	(0.1)	103.8
CO_2 from Cropland converted to Forest Land	(40,107)	(3.8)	100.0
Total absolute GHG emissions and removals associated with all land use conversions in the Programme GHG Inventory	**1,050,533**		

Table 2 shows the initial selection of subcategories for ISFL Accounting.

Table 2. Initial selection of subcategories

Condition	**Subcategory Conversion Between Land Use Categories**	**Net Emissions and Removals Tco_2eq)**
i. Any subcategories involving conversions from or to forest land	3B2bi: CO_2 from FOREST LAND converted to Cropland	1,041,847
	3B5bi CO_2 from Forest Land converted to Settlement	46,989
	CO_2 from Cropland converted to Forest Land	(40,107)

Condition	Subcategory Conversion Between Land Use Categories	Net Emissions and Removals Tco_2eq)
	3B2bi: CO_2 from Forest land converted to Grassland	0
	CO_2 from Settlements converted to Forest Land	0
ii. Forest land remaining forest land	3B1a: CO_2 from Forest Land remaining Forest Land	9,164,187
iii. Any subcategories involving conversions between land-use categories other than forest land that, cumulatively with the conversions from or to forest land, amount to 90% of the absolute level of the total GHG Emissions and Removals associated with all land use conversions in the Programme GHG Inventory	N/A	N/A
iv. The single most significant of the remaining subcategories in order of the relative magnitude of contribution of these subcategories to the absolute level of the total GHG Emissions and Removals in the Programme GHG Inventory	3A1a: CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	282,541
v. Additional non-forest related subcategories may be included at the discretion of the ISFL ER Programme if	CO_2 Cropland remaining Cropland	0
	3B2bii: CO_2 from Grassland converted to Cropland	3,302

Condition	Subcategory Conversion Between Land Use Categories	Net Emissions and Removals Tco_2eq)
the quality requirements in Section 4.2 are met, provided there is a clear rationale for including these subcategories in terms of improving ISFL ER Programme mitigation performance	3C4: N_2O Emissions (Direct) from managed soils	216,719

Review of the available data and methods for selected sub categories for ISFL accounting

Table 3 presents the review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting.

Table 3. Review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

Subcategory	**Forest land remaining Forest land**
Historic time series and data sources available for activity data needed to calculate the baseline	Emissions and removals in Forest land remaining Forest land were estimated for the 2009-2018 period. The gain-loss method was applied to estimate Net Carbon Stock Change and CO_2 Emissions. The annual increase in biomass carbon stocks was determined by (i) country specific activity data of area of forest land remaining forest land (ha) by forest subcategories for the years 2009 to 2018 for the Eastern province; (ii) average annual above-ground biomass growth (tons/ha*yr); (iii) ratio of below ground biomass to above ground biomass (tons below ground/tons above ground) (iv) average annual biomass growth above and below ground (tons/ha*yr) (v) carbon fraction of dry matter (tons C/tons). Activity Data on Land use change which was used for determining annual increase in biomass carbon stocks due to biomass growth for Forest land remaining Forest land Subcategories were obtained using the Collect Earth Tool. Collect Earth Software was used to generate land use area data through point data sampling, land use and land use change matrix for Eastern Province. The Collect Earth Tool is a free and open-source software for land monitoring developed by the Food and Agriculture Organisation of the United Nations (FAO). Built on Google desktop and cloud computing technologies, the Collect Earth Tool facilitates access to multiple freely available archives of satellite imagery, including archives with very high spatial resolution imagery (Google Earth, Bing Maps) and those with very high temporal resolution imagery (e.g., Google Earth Engine, Google Earth Engine Code Editor). The Collect Earth Tool is a land monitoring system that can be divided into four main parts: (1) inputs; (2) data collection framework; (3) data management framework and (4) analytical tools for visualising results and generating outputs. The inputs define the parameters of the data collection framework. Data collected are automatically managed by servers and structured within databases. The tools for analysis and data dissemination access these databases to facilitate the interpretation of land characteristics. Collectively, these four parts draw upon seven software products, three imagery archives, two supplementary data archives and two servers.

Subcategory	Forest land remaining Forest land
	There were 3,200 sample plots (SP) assessed and activity data collected for Eastern Province. The sample plots are designed in a systematic grid at an equidistance of 4 x 4 kilometres over Eastern province. The sample size of 3,200 sample plots was determined based on a second phase sampling system extracted using the boundary extent of Eastern Province from a grid sampling frame of 4 x 4 km distance. All plots that fell within the borders of administrative boundaries were taken as the final sample size. Each sample plot measures 70 x 70 metres in size and has 49 control points used for assessing the land use categories. Data in each of these plots was assessed continually over the period 2008 to 2018. There were 26 individual data files extracted from the 3,200 sample plots on the grids. The distribution of sample plots in each data file was randomly undertaken to ensure that each of the data collectors had an opportunity to assess the entire study space (Eastern Province) and understand how the trend of land use change looks like. The data collectors were drawn from technical staff with some basic to advanced Geographical Information System (GIS) and Remote Sensing background employed by Government Departments from Forestry, Agriculture and Livestock. The data entered in Collect Earth is automatically saved to a database management system. A number of inter-connecting CSV files holding plot attributes, plot files and project properties are managed into data collection forms linked to Collect Earth HTTP server that holds postgres (D1) and Saiku databases (D2). The land use subcategory conversions and total number of plots for each conversion were generated and used as the main Saiku data inputs for analysis. There were 12 main land use conversions identified in 3,200 sample plots across Eastern Province. Using the provincial area extent of 5,097,587 hectares, the expansion factor of 1,593 was produced by dividing the total number of sample plots assessed over Eastern Province into the provincial area extent. The process for quality control and assurance (QC/QA) was conducted digitally within Collect Earth's built-in validation controls using the data collection cards. However, enhanced QC/QA support was attained by the review of all data entries by an experienced "Golden

Subcategory	Forest land remaining Forest land
	Operator" who made a random final review, interpretation of at least 10% of the data entry files and when errors are detected, the involved data clerks were alerted to rectify the errors to ensure high quality data entries were edited accordingly into the software. Later, a comprehensive data checking for all data files by the Golden Operator was necessary to ensure that manual edits and screening of all entries was undertaken. The Golden Operator is an experienced Collect Earth user and has high remote sensing interpretation skills coupled with extensive field knowledge of all provinces in Zambia including Eastern Province. Activity Data on timber harvest was obtained from Forestry Department annual Reports, and fuelwood for firewood and charcoal production was obtained from Compendium of Environmental Data prepared by the ZamStats, and the National Woodfuel Study. The area affected by disturbances from Fires and Fraction of biomass burnt from disturbance and data for estimating annual decrease in biomass carbon stocks due to losses for Forest land remaining Forest land was obtained from Hollingsworth et al, 2015, Chidumayo 2013, Forestry Department Provincial Annual Reports (2009 – 2018), and CSO Environment Statistics Compendium (2015) Report. Finally, activity data for carbon stocks change in mineral soils was obtained from ZARI Report on Soils in Eastern Province representing forested landscapes in the area of interest. Annual decrease in carbon stocks due to biomass loss (tons C/yr) was estimated using country specific activity data of area affected by disturbances. The area affected by disturbances was calculated at 20% of the total land area in each forest subcategory based on statistics of fire frequency and occurrence in Eastern Province and the ratio of actual area that is disturbed due to fires (Hollingsworth et al, 2015). The source of fire due to disturbance is from natural occurrences. Areas that are affected by fire disturbances and the fraction of biomass burnt from the disturbance for the years 2008 to 2018 was calculated at 25% based on a study by Chidumayo 2013. The total area burnt annually in the Eastern Province is approximately 1 million ha over 8 months period from all land types. The fires considered disturbances are from the

Subcategory	Forest land remaining Forest land
	late fires (September, October and November) during the fire danger season. The percent of fire disturbance were derived according to forest type areas whose undergrowth and fuel loads are different based on the variations in the canopy covers (e.g., Baikiea forests and Miombo forests).
Main sources of data for determining emission or removal factors	Country specific emission factors are used to determine annual increase in biomass carbon stocks due to biomass increment in Forest land remaining Forest land Subcategories. Country Emission Factors for estimating annual carbon loss due to biomass removals from timber harvesting and carbon loss due to fuelwood removals and Country Emission Factors to determine annual other losses of carbon mainly attributed to fire disturbances were all obtained from Chidumayo, 2013, Forestry Compendium (2013) and Integrated Forest Land Use Assessment Report (2015). Country specific emission factors used for estimating carbon stocks in mineral soils were obtained from the ZARI Report on forest soils in Eastern Province.
Assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Quality requirement set in ISFL Requirement 4.2.2 states that minimum IPCC Tier 2 methods and data must be used for significant pools and gases for a subcategory-Exception is made for forest land-remaining-forest land, where activity data proxies can be used (ISFL Requirement 4.3.8). Data used for this subcategory does comply with IPCC tier 2 or higher methods and data. Activity data was country specific and qualifies as Tier 2 and was obtained using the Collect Earth Tool, while that of wood removal timber, fuelwood for firewood and wood for charcoal production was obtained from the National Woodfuel Study. Emission Factors were obtained from Forestry Compendium (2013 and Integrated Land Use Assessment Report (ILLUA II and equally qualifies as Tier 2. Activity Data for area burnt was obtained from Hollingsworth et al, 2015 and equally qualifies as Tier 2. Soil C data were obtained from the Soils Report (Tier 2)
Assessment if the data used for the subcategory allows for Approach 3 in land representation of land	The Collect Earth Tool provides additional data for estimates of land use change and has a built in quality assurance and quality control (QA/QC), and it operates at high resolution. Therefore, it qualifies for approach 3

Subcategory	Forest land remaining Forest land
use categories and land use conversions	

Subcategory	Forest land converted to cropland and Settlements
Historic time series and data sources available for activity data needed to calculate the baseline	The annual change in carbon stocks in biomass (tons C/yr) was estimated using country specific activity data of annual area of forest land converted to cropland (ha). The assumption is that forest to cropland conversion was largely driven by annual expansion of fields for maize cultivation. The annual area of forest land converted to Cropland were derived from land cover maps by analysing land use change in Eastern Province between 2008 and 2018 using the Collect Earth Tool. The sources of data used to analyse annual areas of forest land converted to cropland are the Collect Earth Tool and Forestry Department. Emissions and removals in Forest land converted to cropland and settlements are estimated for the 2009-2018 period. The annual change in carbon stocks in biomass (tonnes C/yr) (Annual Biomass carbon loss) was estimated using country specific data of annual area of forest land converted to cropland, and settlement in (ha), respectively, obtained from the Collect Earth Tool. Annual biomass growth in Cropland remaining to cropland is zero. The source of data for the land use maps that were used to determine the net conversions was obtained from the Forestry Department and to deduce the net conversions. Activity data used in estimating annual change in carbon stocks in mineral soils were derived from soil measurements as outlined in the ZARI Report on forest soils and soils representing cropland and settlements in Eastern Province. In the GIS analysis the land use maps were not interfaced by soils and climate maps. Hence area for land use change was not by soil and climate. Activity data used in estimating annual change in carbon stocks in mineral soils was the area for land use change by climate and soil, and time dependence of stock change factors (D) (T) (yr) – Default value is 20. The cropland reference soil organic carbon was 30.86 (t C ha).

Subcategory	Forest land converted to cropland and Settlements
Main sources of data for determining emission or removal factors	Country specific EF for annual increase in carbon stocks in biomass for Forest land Converted to Cropland and Settlement were obtained from Forestry Compendium Report (2015) and ILUA II (2015). IPCC Default EF for annual change stocks in dead organic matter due to conversion for Forest land converted to Cropland and Settlements were obtained from IPCC Software. For mineral soils, annual soil C change factors were derived from differences of these measured (Tier 2) soil data applying the IPCC default SOC equilibrium period of 20 years.
Assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Activity data for estimating annual change in carbon stocks in biomass for Forest land converted to Cropland and Settlements, were country specific and qualifies as Tier 2; and were obtained using the Collect Earth Tool. Emission Factors (EF) were obtained from the Integrated Land Use Assessment Report (ILUA II) and Forest Compendium and qualify for IPCC Tier 2. Soil measured data for different land use categories were used to derive annual change in carbon in mineral soils which also qualifies as Tier 2.
Assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in QA/QC system, and it operates at high resolution. Therefore, it qualifies for approach 3.

Subcategory	Cropland converted to forest land
Historic time series and data sources available for activity data needed to calculate the baseline	Emissions and removals for Cropland converted to Forest land were estimated for the 2009-2018 period. The annual change in carbon stocks in biomass (tons C/yr) (Annual Biomass carbon Gain) was estimated using country specific data of annual area of Cropland converted to Forest land (ha), was obtained from Collect Earth Tool. Activity data used in estimating annual change stocks in dead organic matter for Cropland converted to Forest land due to conversion was the area undergoing conversion

Subcategory	Cropland converted to forest land
	from old to new land use category and time period of the transition from old to new land use category(yr). Default value of 2.1 tons C/ha was applied. Activity data used in estimating annual change in carbon stocks in mineral soils for Cropland converted to Forest land is area for land use change by climate and soil, and time dependence of stock change factors (D) (T) (yr) – Default value is 20. The cropland reference soil organic carbon was 30.86 (t C ha). Activity data used in estimating annual change in carbon stocks in dead organic matter due to conversion was the area undergoing conversion from old to new land use category and time period of the transition from old to new land use category.
Main sources of data for determining emission or removal factors	The Emission Factors used to estimate the annual changes in carbon stocks in biomass from Cropland converted to Forest land are provided in Annex 6, and were obtained from Forestry Compendium Report (2015) and ILUA II (2015). The emission factors used to estimate the annual increase in biomass carbon stocks due to biomass growth from cropland converted to forest land include; (i) average annual above ground biomass growth (Gw), (ii) ratio of below ground biomass to aboveground biomass (tons bg/tons ag) and (iii) carbon fraction of dry matter (tons C/ ton) Default emission factors used to estimate the annual change in carbon stocks in dead organic matter due to conversion in Cropland to Forest land were IPPC default values. IPCC Default emission factors used to estimate annual change in carbon stocks in mineral soils in Cropland converted to Forest land are in Annex 6.
Assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Activity data for Cropland converted to Forest land was country specific and qualifies as Tier 2 and was obtained using the Collect Earth Tool. Emission Factors were obtained from the Integrated Land Use Assessment Report (ILUA II) and Forest Compendium and qualify for Tier 2 IPCC Tier.
Assessment if the data used for the subcategory allows for	The Collect Earth Tool provides additional data for estimates of land use change and has a built in QA/QC

Subcategory	Cropland converted to forest land
Approach 3 in land representation of land use categories and land use conversions	system and it operates at high resolution. Therefore, it qualifies for approach 3.

Subcategory	N_2O Emissions (Direct) from managed soils
Historic time series and data sources available for activity data needed to calculate the baseline	Anthropogenic N- inputs activity data to estimate annual direct N_2O emissions produced from managed soils were (i) synthetic fertilisers, (ii) animal manure and compost, (iii) crop Residue, and (iv) N in mineral soils that mineralized in association with loss of soil C from soil organic matter as a result of changes to land use management were not estimated due to lack of data on soil C loss. The synthetic fertilisers statistics (2009 – 2018) were obtained from the Ministry of Agriculture and Zambia Statistical Agency through crop forecast surveys that are undertaken annually. The amount of N contained in synthetic fertilisers was calculated for each fertiliser. The percentage of Nitrogen (N) in Urea was given by the manufacturers as 46%. The annual amount of N from animal manure was calculated from livestock numbers based on basic characterisation and manure management systems. It was supposed to have been also been calculated from ages of the animals, but data was not available. The amount of N in crop residues was determined in studies carried out at University of Zambia (UNZA), Zambia Agriculture Research Institute (ZARI) and Golden Valley Agricultural Research Trust (GART) and through expert judgement from experts in the agriculture sector. Improvements have been made to also determine N in plant parts. Managed Manure N available for application to managed soils, feed, fuel or construction was calculated based on the manure management systems and different livestock numbers by determining (i) Total nitrogen excretion for the manure management system (MMS) (Kg N/yr), and (ii) Fraction of manure nitrogen that is lost in the MMS to estimate the amount of managed manure nitrogen available for application to managed soils to estimate Direct N_2O emissions from managed soils. The amount of

Subcategory	N_2O Emissions (Direct) from managed soils
	N in mineral soils was derived from International Forum on Soil Taxonomy and Agro technology Transfer, 1985. The latest analysis of N in mineral soils was determined in 2020 under the ESLIP Project. The inherent soil N content is taken into account when calculating the amount of required N for crop production. Annual direct N_2O– N emissions produced from managed organic soils (Kg N_2O – N /yr) were not calculated because of the non- availability of activity data on the annual area of managed / drained organic soils (ha). Annual amounts of urine and dung N deposited by grazing animals on pasture range and paddock (Kg N/yr) was calculated from the Sum of N for PRP (Sheep and Other animals) and sum of N for PRP – Cattle, poultry and pigs (CPP). The assumption used in calculation of FPRP was that there is little management of animal urine and dung deposited by grazing animals in pastures, fields and paddocks.
Main sources of data for determining emission or removal factors	The choice of using default emission factors (Tier 1) were based on non-availability of country specific emission factors for N_2O emissions from anthropogenic N – inputs from N synthetic fertilisers, N animals and compost manure, N in crop residues and N in mineral soils that is mineralized. Nitrous oxide is produced naturally in soils through the processes of nitrification and denitrification. The emissions of N_2O due to anthropogenic N inputs (i.e., from application of synthetic N fertiliser, organic amendment, crop residues, etc.) occur through both a direct pathway (i.e., directly from the soils to which the N is added), and through two indirect pathways (i.e., through volatilization as NH_3 and NO_x and subsequent redepositing, and through leaching and runoff). Direct N_2O emission from Managed Soils was calculated using Tier 1 methodology, from the IPCC 2006 Guidelines and default emission factors were used from the 2006 IPCC Guidelines.
Assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Although Activity Data used is country specific and qualifies as Tier 2, Emission Factors used for this subcategory does not follow IPCC Tier 2 methods and data. According to the decision tree presented in chapter 10 of Volume 4, 2006 IPCC Guidelines, this category should be estimated with a Tier 2 method given that it is a key category which represents a large portion of the Eastern

Subcategory	N_2O Emissions (Direct) from managed soils
	Province's total emissions. An improvement plan will be put in place to migrate to Tier 2.
Assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	N/A

Subcategory	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)
Historic time series and data sources available for activity data needed to calculate the baseline	Emissions for enteric fermentation in non-dairy cattle were estimated for the 2009-2018 period. Due to unavailability of enhanced characterisation of livestock data according to species types, age, feeding situation, Tier 2 method was not used. The best available Activity Data was annual Livestock population data for Eastern Province which was extracted from the Livestock Report and Livestock Census Report, 2018 and used to estimate CH_4 emissions from enteric fermentation. The annual livestock population data was used for the estimation of CH_4 emissions from enteric fermentation in domestic livestock (non-dairy cattle) for the year 2009– 2018. The annual livestock population data was not disaggregated by representative livestock categories in accordance with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories to characterise beyond the basic groups. Further, there was no data available on average daily feed intake (megajoules (MJ)) per day and/or kg per day of dry matter); and CH_4 conversion factor (percentage of feed energy converted to CH_4) for the representative animal categories in Eastern Province. Also, there was no livestock data provided for the years 2010 to 2013. The data gap for 2010 to 2013 was obtained by extrapolation using available data for the years 2009 on the lower end and 2014, 2015, 2016, 2017 and 2018 on the upper end. Eastern Province has an insignificant population of dairy cows and hence CH_4 emissions from enteric fermentation and CH_4 and Nitrous oxide (N_2O) from

Subcategory	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)
	manure management were not estimated for this subcategory.
Main sources of data for determining emission or removal factors	Default emission factors for enteric fermentation, for domestic livestock (non-dairy cattle) was obtained from 2006 IPCC Guidelines (Table 10.10 and Table 10.11 of the IPCC 2006 Guidelines) because country-specific emission factors to estimate CH_4 emission from enteric fermentation is not available. Methane (CH_4) is produced in herbivores as a by-product of enteric fermentation, a digestive process by which carbohydrates are broken down by micro-organisms into simple molecules for absorption into the bloodstream. The amount of CH_4 that is released depends on the type of digestive tract, age, and weight of the animal, and the quality and quantity of the feed consumed. Ruminant livestock e.g., cattle and goats are major sources of CH_4 with moderate amounts produced from non-ruminant livestock (e.g., Pigs). Methane emissions from enteric fermentation domestic livestock (non-dairy cattle) were calculated using a Tier 1 method according to the 2006 IPCC Guidelines.
Assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Data used for this subcategory does not follow IPCC tier 2 methods and data. Tier 1 method was used for estimating GHG emissions from enteric fermentation due to unavailability of country specific livestock characterisation data. The only country specific activity data available was livestock population data. Methane emissions from enteric fermentation for domestic livestock (non-dairy cattle) were calculated using a Tier 1 method in accordance with the 2006 IPCC Guidelines using Equation 10.19 and Equation 10.20 for the time series 2009 to 2018.
Assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	N/A

Subcategory	Cropland remaining Cropland
Historic time series and data sources available for activity data needed to calculate the baseline	Emissions and removals in Cropland remaining Crop were estimated for the 2009-2018 period. Activity Data which was used for determining areas in Cropland remaining Crop were obtained using the Collect Earth Tool.
Main sources of data for determining emission or removal factors	The biomass stocks before the conversion are dry evergreen forest 86.8 t/ha, dry deciduous forest 47.6 t/ha, moist evergreen forest 43.8 t/ha and woodlands 55.1t/ha. The biomass stocks after the conversion were 7.9 t/ha for all the forest type subcategories. In line with the IPCC equilibrium theory, a change in land use will cause SOC to reach a new SOC equilibrium using the default IPCC timeframe of 20 years. To derive emission factors for this land use conversion categories, the SOC equilibrium factors were used. Carbon stocks from mineral soils for Cropland remaining Cropland were obtained from Zambia Agriculture Research Institute through research and measurements that has been supported by the Zambia Integrated Forestry Landscape Project. The SOC stock represents a Tier 2 SOC equilibrium value for cropland. No change in carbon stocks in mineral soils is conservatively assumed for this category. There were no emissions from Dead Wood and Biomass under cropland remaining cropland. To account for specific CSA practices defined by the Programme, an additional CSA soil organic carbon baseline was developed for cropland remaining cropland using a Tier 2/3 soil modelling approach in line with the logic of the IPCC Steady-State Method of the 2019 Refinement to the 2006 IPCC Guidelines. This IPCC Tier 2 steady-state method provides an optional alternative method for estimating soil C stock changes in the 0-30 cm layer of mineral soils in Cropland remaining Cropland related to CSA practices. Methodologically the VCS SALM Methodology (VM0017) is followed which requires to model a baseline soil carbon equilibrium factor which is applied during ex-post accounting of CSA benefits. Baseline carbon stock changes are set to zero for agricultural

Subcategory	Cropland remaining Cropland
	landscapes which are degrading as shown for the Eastern Province. The soil carbon accounting approach of VM0017 is in line with the IPCC soil carbon equilibrium approach: Equilibrium soil carbon stocks under baseline practices are modelled using the RothC soil carbon model and project-specific values for soil clay content, topsoil thickness, decomposability of incoming plant material, proportion vegetative matter cover by month, monthly mass of carbon input, average monthly temperature, average monthly precipitation, and average monthly evapotranspiration. The RothC model is run again to equilibrium using values for the project activity. Soil carbon stock is assumed to linearly move from the baseline equilibrium to the project equilibrium using IPCC default period of 20 years.
Assessment if the data used for the subcategory complies with IPCC tier 2 methods and data	Quality requirement set in ISFL Requirement 4.2.2 states that minimum IPCC Tier 2 methods and data must be used for significant pools and gases for a subcategory-Exception is made for forest land-remaining-forest land, where activity data proxies can be used (ISFL Requirement 4.3.8). Data used for this subcategory does comply with IPCC tier 2 or higher methods and data. Activity data was country specific and qualifies as Tier 2 and was obtained using the Collect Earth Tool. Emission Factors were obtained from a study undertaken by ZARI and supported by the World Bank through the ZIFL Project. CSA baseline equilibrium factor was obtained from Tier 3 farm-based survey data and Tier 2 soil modelling approach following VCS SALM Methodology VM0017 and in line with IPCC SOC equilibrium approach.
Assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in QA/QC system, and it operates at high resolution. Therefore, it qualifies for approach 3.

Subcategory	CO_2 from Grassland converted to Cropland
Historic time series and data sources available for activity data needed to calculate the baseline	Emissions and removals in grassland converted to cropland are estimated for the period 2009-2018. Annual changes in carbon stocks in biomass from grassland converted to cropland were estimated using country specific activity data of annual area of grassland converted to cropland. The activity data was obtained from the Collect Earth Tool and Forestry Department and analysed to deduce net conversions of land uses over a 10-year period (2008 – 2018). The derived SOC equilibrium factors for the main land use categories were used. Annual change in carbon stocks from mineral soils was estimated using country specific activity data of reference soil organic carbon (SOC ref). The source of data on Reference Soil Organic Carbon from Forestry, Agriculture and Wildlife landscapes for Eastern Province was obtained from Zambia Agriculture Research Institute from a study that was supported by the Zambia Integrated Forest Landscape project. Activity data to determine the non-CO_2 emissions, CH_4 and N_2O Emissions from Biomass Burning in cropland were estimated by using country specific activity data (Tier 2) on burnt areas from Fires from Hollingsworth et al, 2015 and IPCC default emission factors (Tier 1) of the IPCC 2006 Guidelines.
Main sources of data for determining emission or removal factors	At Tier 1, carbon stocks in biomass immediately after conversion (B_{AFTER}) are assumed to be zero, since the grassland is cleared of all vegetation before planting crops. Based on ILUA II (2016) report, the emission factors for annual loss of biomass carbon (tons C/yr) due to conversion of grassland to cropland were obtained. Country specific emission factors used for estimating carbon stocks in mineral soils were obtained from the Soils Report for Eastern Province. In line with the IPCC equilibrium theory, a change in land use will cause SOC to reach a new SOC equilibrium using the default IPCC timeframe of 20 years. To derive emission factors for this land use conversion category, the SOC equilibrium factors were used.
Assessment if the data used for the subcategory complies	Data used for some of the subcategories does comply with IPCC Tier 2 or higher methods and data. Activity Data for area burnt was obtained from Hollingsworth et al, 2015 and equally qualifies as Tier 2.

Subcategory	CO_2 from Grassland converted to Cropland
with IPCC tier 2 methods and data	Country specific emission factors used for estimating carbon stocks in mineral soils were obtained from the ZARI Report on Soils in Eastern Province. Emission Factors were obtained from the Integrated Land Use Assessment Report (ILUA II) and Forest Compendium and qualify for Tier 2 IPCC Tier.
Assessment if the data used for the subcategory allows for Approach 3 in land representation of land use categories and land use conversions	The Collect Earth Tool provides additional data for estimates of land use change and has a built in Quality assurance and quality control (QA/QC) system and it operates at high resolution. Therefore, it qualifies for approach 3.

Annex 8: GHG Accounting Scope and Improvement Plan (GHG-ASIP): Time bound plan to increase the completeness of the scope of accounting and improve data and methods for the subsequent ERPA Phases during the ERPA Term

Section A: Institutional processes and responsibilities

A.1 Summary of the process of developing and reaching agreement to this this plan

This plan was proposed and agreed by the entities listed below to improve the data for the subcategory "Direct N_2O emissions from managed soils". This subcategory will not be part of the baseline during the first phase of the ERPA term, after the first monitoring period in 2024-2025. However, it is expected that after the implementation of this plan, this subcategory could be included in the baseline estimation for the subsequent ERPA phases and will be recalculated for the baseline period 2009-2018. This agreement was reached through discussions amongst the institutions that are part of ZEMA's institutional arrangement for GHG Management System under a Memoranda of Understanding.

A.2 Overview of entities that have agreed to this plan

The entities that have agreed to the implementation of this plan are listed in the following table:

Table 4: Entities that have agreed to this plan

Name of entity	Role of entity	Name of entity representative	Job title of entity representative
Action for Positive Change	Community Development	Mr. Fackson Zulu	Project Manager
Caritas	Agriculture and Natural Resource Management	Mr. Mthaziko Zulu	Coordinator
Chipata District Farmers Association	Coordination of Farmers in Agriculture	Mr. Malamo	Coordinator
COMACO	Private Sector/ Service Provider	Dr. Dale Lewis	Director

Community Based Natural Resources Management (CBNRM)	Community Representative	Dr. Rodgers Lubilo	Board Chairperson
COPECRED	Afforestation and NRM	Mr. Ruben Zulu	Coordinator
Copperbelt University	NRM/LULUCF	Prof. Felix K. Kalaba	Dean School of Natural resources - CBU
Department of Agriculture	Agriculture	Dr. Shampande	Director
Department of Chiefs Affairs (Ministry of Local Government)	Traditional Leaders Affairs	Mr. Benson Mbewe	Provincial Chiefs Affairs Officer
Department of Environment	Coordination	Mr. Fishani Gondwe	Director
Department of Green Economy and Environment	Coordination	Mr. Ephraim Shitima	Director
Department of National Parks and Wildlife	Sustainable Wildlife Management	Mr. Andrew Chomba	Director
Eastern Region CRB Association	NRM	Mr. Petros Muyunda	Coordinator
Empowering Farmer Foundation (EFF)	Service Provider	Ms. Poova	CEO
Enlighted Abilities Organization	Welfare for the Disabled	Mr. Miyoba Inyambo Amuhuma	Coordiantor
Export Trading Group (ETG)	Private Sector/ Service Provider	Mr. Tapuma Mutasa	Country Focal Point
Forestry Department	Sustainable Forest Management -LULUCF	Mr. Innocent Simasiku	Acting Director of Forestry
Hope for Human Rights	Rights Based approach in Development	Mr. Stephen Ngwenya	Programme Coordinator

Land Alliance	Land Use Planning	Mr. Adam Ngoma	Coordinator
Luangwa Safaries Association	Safari and Tour Operators	Mr. Iyan Macallan	Chairperson
Ministry of Finance and National Planning, (Department of International & Domestic Debt Management)	Responsible for mobilising necessary loan financing to support the implementation of Government Programmes.	Precious Kasengele	Economist
Ministry of Finance and National Planning (Economic Management Division)	Domestic resource mobilization, medium and long-term expenditure; economic monitoring and analysis	Michelle Sinda	Assistant Director
Ministry of Finance and National Planning (Department of Budget & Economic Affairs)	Coordinate Tax Policy formulation, Tax policy review, conduct stakeholder consultation tax and non-tax legislation, conduct tax revenue and non-tax revenue performance monitoring	Allan Mutonga	Budget Analyst
Ministry of Finance and National Planning (Treasury Counsel)	Provides legal and policy advice to the Ministry of Finance and National Planning and GRZ supported projects.	Mrs. Kawama Goma-Simumba	Treasury Counsel
National Remote Sensing Centre	Remote Sensing	Dr Augustine Mulolwa	Director
SHDP	Community Forestry	Mr. Evaristo Siwaki	Coordinator
SNV	Agriculture and Natural Regeneration	Mr. Smart Banda	Project Manager
University of Zambia	Training and Research in Agriculture	Dr. Mick MWALA	Dean School of Agricultural Sciences

WILDAF	Women in Development	Ms. Mwale	Coordinator
World Vision	NGO	Mr. Marvin Mpola	Project Manager
WWF	Biodiversity Conservation	Ms. Nachilala Nkombo	Country Director
YDF	Youth in Development	Hope Mponda	Coordinator
YHHS	Sexual Reproductive Health	Mr. Justina Nkhoma	Project Officer
YWCA	Women In Development	Ms. Dorothy Ndhlovu	Coordinator
Zambia Agriculture Research Institute	Agriculture Research	Dr. Dickson Ngúni	Acting Director
ZCCP Kwatu	Sexual Reproductive Health	Johans Mtonga	CEO
ZEMA	Sustainable management of natural resources and protection of the environment, prevention and control of pollution.	Mr. Maxwell Nkoya	Acting Director General

Section B: Summary of analysis underlying this plan

A summary of the analysis done to determine the final selection of the subcategories eligible for ISFL Accounting is presented in the following table:

Table 2: Summary of analysis to determine the final selection of the subcategories eligible for ISFL Accounting

Subcategory from step 1	Emissions Baseline setting requirement(s) met? (Yes/No)	Methods and data requirement(s) met? (Yes/No)	Spatial information requirement(s) met? (Yes/No)	Eligible for ISFL Accounting? (Yes/No)
Forest Land remaining Forest land	Y	Y	Y	Y

Forest land converted to Cropland	Y	Y	Y	Y
Forest land converted to Settlement	Y	Y	Y	Y
Cropland converted to Forest Land	Y	Y	Y	Y
Direct N_2O Emissions from managed soils	Y	N	N/A	N
CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	Y	N	N/A	N
Cropland remaining cropland	Y	Y	Y	Y
Grassland converted to cropland	Y	Y	Y	Y

Section C: Agreed actions to be undertaken to increase the completeness of the scope of accounting and improve data and methods for the subsequent ERPA Phases during the ERPA Term.

C.1 Actions to be undertaken to bring required subcategories into alignment with ISFL accounting requirements

The actions to be undertaken to bring required subcategories into alignment with ISFL accounting requirements are presented in Table 3 (identification of gaps) below:

Table 3. Identification of Gaps

Subcategory	Direct N_2O from managed soils				
Identification of gaps					
ISFL Accounting requirements	**Requirements met? (Yes/No)**	**If not met, detailed description of the gap(s)**			
Historic time series for baseline setting	Y				
Quality of data and methods	N	There are no country specific emission factors for N_2O emissions from anthropogenic N – inputs from N synthetic fertilisers, N animals and compost manure, N in crop residues and N in mineral soils that is mineralized. Therefore, the Programme is using default emission factors (Tier 1). Emission Factors used for this subcategory do not follow IPCC Tier 2 methods and data. According to the decision tree presented in chapter 10 of Volume 4, 2006 IPCC Guidelines, this category should be estimated with a Tier 2 method given that it is a key category which represents a large portion of the Eastern Province's total emissions.			
Spatial land representation for land use change-related subcategories	N/A				
Identification of actions to address the gap					
Identified gap	**Description of what is technically is needed to address it**	**Potential data sources**	**Responsible entity**	**Planned completion**	**Sources of funding/ support**
Managed manure N available for	Determine manure management systems for different livestock.	Survey	MFL/ZARI/UNZA	*12/2023*	Support Required

application to managed soils.					
Organic N applied to managed soils	Determine the fraction of manure N that is lost in the Manure management system for the different livestock, N in organic bedding (solid storage and deep bedding) for different livestock, Compost applied (kg N/yr). Determine sewage sludge applied (kg N/yr), and Other organics amendments applied (kg N/yr.	Survey	ZARI/UNZA	12/2023	Support Required
Direct N_2O emissions from managed organic soils	Determine the fraction of managed manure used for feed, fraction of managed manure used for fuel, fraction of managed manure used for feed, fraction of N from organic additions applied to flooded rice, N in mineral soils that is mineralized in association with loss of soil carbon from soil organic matter as a result of changes to land use, and annual area of managed organic soils[03]. Develop country specific emission factor for N_2O emissions from drained / managed organic soils (kg N_2O – N/ha*yr)	Research	MOA/ZARI/UNZA/Golden Valley Trust	12/2023	Support Required
Direct N_2O emissions from managed soils (urine and dung inputs to soils)	Develop country specific emission factor forN_2O emissions from urine and dung N deposited on pasture range and paddock by grazing animals	Research	UNZA	12/2023	Support Required

Subcategory	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	
Identification of gaps		
ISFL Accounting requirements	**Requirements met? (Yes/No)**	**If not met, detailed description of the gap(s)**
Historic time series for baseline setting	Y	
Quality of data and methods	N	**There is inadequate data on livestock type, weight, feeding situation and feed digestibility**
Spatial land representation for land use change-related subcategories	N/A	

Identification of actions to address the gap

Identified gap	**Description of what is technically is needed to address it**	**Potential data sources**	**Responsible entity**	**Planned completion**	**Sources of funding/ support**
No country specific data on livestock type, weight, feeding situation and feed digestibility	• Determine Livestock Type (mature females, draught bull locks, mature females grazing, bulls grazing and young) • Determined average weight gain per day • Determine mature weight of livestock by type • Determine feeding situation • Determine feed digestibility	**Survey**	**MFL/ UNZA**	***12/2023***	**Support Required**

C.2 Additional planned improvement to bring not-required subcategories into alignment with ISFL accounting requirements

No other plans have been developed for bringing not required subcategories into alignment with ISFL accounting requirements. Therefore, this section is not applicable.

Financing Plan

Table 4 below provides a summary of the financing plan for implementing the actions detailed in Table 3 above:

Table 4. Financing Plan

Subcategory	Action	Finance requirements (per year in US$) '000'					Total (US$) '000'	Finance available (US$) '000'	Source and Type of Finance (grant/ loan/ government budget) (US$) '000'	Finance gap (US$) '000'
		Y1	**Y2**	**Y 3**	**Y4**	**Y 5**				
Direct N_2O from managed soils	Undertake Spatially analysis and ground-truthing for areas burnt annually	20					20	Nil	0	20
	Determine manure management systems for different livestock.	25	25				50	Nil		50

Subcategory	Action	Finance requirements (per year in US$) '000'					Total (US$) '000'	Finance available (US$) '000'	Source and Type of Finance (grant/ loan/ government budget) (US$) '000'	Finance gap (US$) '000'
		Y1	**Y2**	**Y 3**	**Y4**	**Y 5**				
	Determine the fraction of manure N that is lost in the Manure management system for the different livestock, N in organic bedding (solid storage and deep bedding) for different livestock, compost applied, sewage sludge applied, and other organics amendments applied	50	50				100	Nil		100
CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle)	Determine Livestock Type (mature females, draught bull locks, mature females grazing, bulls grazing and young)		50				50			50
	Determined average weight gain per day		10				10			10
	Determine mature weight of livestock by type		10				10			10
	Determine feeding situation		50		50					100
	Determine feed digestibility		50		50					100

Annex 9: Estimation of the Emissions Baseline and Emissions Reduction

9.1 Approach for estimating Emissions Baseline

The construction of the Emissions Baseline in current ERPA phase follows the ISFL requirements. The first step is the preparation of the GHG Inventory for Agriculture, Forestry and Other Land Use (AFOLU) sector, applying the methodology, categories and subcategories from the 2006 IPCC Guidelines (short description in section 3.1.1). The best available data was used to provide the historical emissions and removals of greenhouse gases in the sector. For the case of Land Use, Land Use Change and Forestry), emissions and removals were estimated with activity data generated specifically for Eastern Province. The source for Emission Factors was ILUA II.

ISFL requirements were applied to finally select the subcategories that are eligible for ISFL accounting at this first ERPA phase, meeting the quality and baseline setting requirements for ISFL accounting: historic data available, at minimum Tier 2 method for estimation of emissions and removals and approach 2 or 3 for spatial information. Direct N_2O Emissions from managed soils and CH_4 emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle) are not complying with quality requirements at this ERPA phase. However, there is data to construct an emissions baseline over a period of 10 years and there is a time bound plan to improve quality of estimations and introduce that categories at least before the end of the first ERPA phase. Therefore, emissions from managed soils and enteric fermentation in Domestic Livestock (Non - Dairy Cattle) have been included in the baseline. The activities considered at this ERPA phase are Forest land remaining Forest land, Forest land converted to Cropland, Forest land converted to Settlements, Cropland converted to forest land, Cropland remaining Cropland including CSA, Grassland converted to Cropland, Direct N_2O emissions from managed soils, and CH_4 emissions from Enteric Fermentation in domestic livestock (non-dairy cattle).

The baseline period considered is 10 years, starting year is 2009 and ending year is 2018. Once the initial selection of categories is complete and the baseline period selected, the baseline is estimated with the sum of the average values of emissions and removals for the 2009-2018 period for the selected categories. Uncertainty for activity data for livestock and non-CO_2 is estimated at +/- 25% and at +/- 1.5% for land.

The full description of the process used to estimate the emissions baseline is described in GHG baseline report in Annex 6.

Emissions Baseline estimate

According to the ISFL Programme requirement, Table 1 of the GHG Report shows the emissions baseline for the final selection of the subcategories eligible for ISFL Accounting. The emissions correspond to the average value of the categories for the period 2009-2018. The following subcategories are eligible for ISFL in the first phase: Forest land remaining Forest land, Forest land converted to Cropland, Forest land converted to Settlements, Cropland converted to forest land, Cropland remaining Cropland including CSA, Grassland converted to Cropland, Direct N_2O emissions from managed soils, and CH_4 emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle).

Table 1. Emissions baseline for the final selection of the subcategories eligible for ISFL Accounting

Year	Forestland Remaining Forestland (tCO_{2e})	Forestland converted to Cropland (tCO_{2e})	Forestland converted Settlements (tCO_{2e})	Cropland converted to Forestland (tCO_{2e})	N_2O Emissions (Direct) from Agricultural Managed Ssoils (tCO_{2e})	CH_4 Emissions from Enteric Fermentation in Domestic Livestock (Non - Dairy Cattle) (tonnes CO_2 equivalent) (tCO_{2e})	Cropland remaining cropland (tCO_{2e})	Grassland converted to Cropland (tCO_{2e})	Total (tCO_{2e})
2009	8,180,965.9	1,014,582.6	45,326.0	-7,292.2	126,292.6	221,152.1	0.0	3,228.4	9,584,255.4
2010	8,275,441.4	1,020,641.4	45,695.5	-14,584.4	232,621.4	221,904.3	0.0	3,244.9	9,784,964.4
2011	8,347,625.8	1,026,700.3	46,064.9	-21,876.6	197,285.4	223,164.2	0.0	3,261.3	9,822,225.3
2012	8,491,060.5	1,032,759.1	46,434.4	-29,168.8	216,160.6	224,424.2	0.0	3,277.8	9,984,947.7
2013	8,596,196.6	1,038,818.0	46,803.8	-36,461.1	122,586.9	236,148.3	0.0	3,294.2	10,007,386.7
2014	8,839,279.4	1,044,876.9	47,173.3	-43,753.3	167,044.0	314,282.6	0.0	3,310.7	10,372,213.5
2015	9,323,376.1	1,050,935.7	47,542.7	-51,045.5	229,514.9	334,897.2	0.0	3,327.1	10,938,548.3
2016	9,776,814.7	1,056,994.6	47,912.1	-58,337.7	312,898.6	355,511.8	0.0	3,343.6	11,495,137.6
2017	10,406,800.9	1,063,053.4	48,281.6	-65,629.9	257,203.0	391,850.6	0.0	3,360.0	12,104,919.5
2018	11,404,305.6	1,069,112.3	48,651.0	-72,922.1	305,586.2	302,075.1	0.0	3,376.5	13,060,184.5
Average	**9,164,186.7**	**1,041,847.4**	**46,988.5**	**-40,107.2**	**216,719.4**	**282,541.0**	**0.0**	**3,302.4**	**10,715,478.3**

A detailed baseline report is included in Annex 6. This information is also supplemented by algorithms provided for in the Inventory workbook.

9.2 Estimation of Emission Reduction

The ZFILP will promote the following projects aimed at reducing emission which has been identified in the Baseline Study: Sustainable agriculture, Sustainable Forest Management, Improved Stoves, and Sustainable Charcoal Production. The overall objective of the Eastern Province Jurisdictional Sustainable Landscape Programme (EP-JSLP) is in line with the Mission of the National Strategy to Reduce Deforestation and Forest Degradation, that is to: coordinate efforts aimed at reducing deforestation and forest degradation through improved management of forests and livelihoods. This is fully cognisant of the two main sources of GHG emissions in Eastern Province from degradation of forests (46.6%) and forest loss through conversion to crop land (16.1%).

The Jurisdictional Sustainable Landscape Programme will promote the following 'ER projects' aimed at reducing emissions in the sub categories which have been identified in the Baseline Study:

- **Sustainable Forest Management** (SFM)- The methodology applied is avoided unplanned deforestation and degradation. VCS -approved Methodology VM0009 – Avoidance of ecosystem conversion.
- **Climate Smart Agriculture (CSA)** - The methodology applied to the Sustainable Agriculture component is: VCS-approved Methodology VM0017 - Adoption of Sustainable Agricultural Land Management.
- **Sustainable Charcoal Production**- The methodology applied is AMS-III.BG Small-scale Methodology: erosion 02.0
- **Improved Biomass Stoves-**The methodology applied is AMS-II.G. Small-scale Methodology-Energy efficiency measures in thermal applications of non-renewable biomass-Version 11.1.

I. Sustainable Agriculture

Sustainable Agriculture which aims to promote widespread adoption of agricultural practices including conservation agriculture that increase food production per unit area and farmers' income**. The interventions include: (i)** promotion and implementation of minimum tillage, (ii) promotion and development of improved crop varieties with biotic and abiotic stress tolerance, (iii) reduction in the use of mineral fertilisers (in-organic) through use of inorganic fertilisers with higher plant nutrient use efficiencies, (iv) promotion of organic fertilisers, such as compost,

manures, (v) improved crop management practices (crop rotations, cover crops), (vi) promotion of appropriate mechanization.

II. Sustainable Forest Management

Sustainable Forest Management (SFM) aims to encourage participation of the local communities in sustainable Forestry through declaring their forest areas on customary land as Community Forest Management areas (CFMA) and collaboration with the Forestry investment in management of Protected forest Areas to enable them access full user rights to the forest resources there-in and thereby reducing forest loss, enhance forest protect and expand areas under natural forest, and conserve biodiversity. This is achieved primarily through Community Forest Management planning and creation of Community Conservation Areas (CCA), coupled with sustainable non-extractive forest use, e.g. honey and mushrooms growing.

III. Improved Stoves

This project involves promotes Improved Utilisation of Wood through use of improved cook stoves aimed at reducing energy losses thereby contributing to reduction in deforestation and GHG emissions. The use of energy-saving **stoves** will transform the way women cook in rural communities. It will also help cut forest loss, save lives, improve livelihoods and protect the environment at the same time.

IV. Sustainable Charcoal Production

This project involves promotion of Regulated production of Wood-fuel through sustainable wood harvesting through introduction, and promotion of coupe system in selected customary areas; (ii) promoting sustainable charcoal production through introduction and promotion of charcoal retort kilns in selected customary areas.

Considering the overall uncertainty in Forest land remaining Forest land (where most of the emissions are emanating), of 2.92%, Forest land converted to Cropland 18.61% and Cropland remaining cropland 50.2%, the uncertainty set aside factor equals 3% being the aggregate uncertainty of emission reductions. Table 2 presents the estimated Emission Reduction which takes account of uncertainty for a period of 10 years.

Table 2. Emission Reduction which takes account of uncertainty for a period of 10 years

ERPA year t	Emissions Baseline (tCO_2-e/yr)	Estimation of expected emissions under the ISFL ER Programme (tCO_2-e/yr)	Estimation of expected set-aside to reflect the level of uncertainty associated with the estimation of ERs during the Term of the ERPA (tCO_2-e/yr) (3%)	Estimated Emission Reductions (tCO_2-e/yr)
1	10,715,478.3	10,584,893	3,917.56	126,667.79
2	10,715,478.3	10,366,902	10,457.29	338,119.09
3	10,715,478.3	7,760,037	88,663.23	2,866,777.90
4	10,715,478.3	7,457,241	97,747.13	3,160,490.41
5	10,715,478.3	7,259,487	103,679.73	3,352,311.25
6	10,715,478.3	7,062,047	109,602.95	3,543,828.60
7	10,715,478.3	6,922,915	113,776.90	3,678,786.29
8	10,715,478.3	6,803,911	117,347.02	3,794,220.44
9	10,715,478.3	6,613,982	123,044.89	3,978,451.46
10	10,715,478.3	6,428,203	128,618.26	4,158,657.16
Total	**107,154,783**	**77,259,618**	**896,854.96**	**28,998,310.39**

A detailed Emissions Reduction Report is provided as a separate document.

9.3 Uncertainty Analysis

The Uncertainty Analysis (UA) for AFOLU sector was estimated using approach 1. Approach 1 is based upon error propagation and is used to estimate uncertainty in individual categories, in the inventory as a whole, and in trends between a year of interest and a base year. In Approach 1 uncertainty in emissions or removals can be propagated from uncertainties in the activity data, emission factor and combined factor through the error propagation equation[74] and computed using the IPCC 2006 software

[74] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_3_Ch3_Uncertainties.pdf

For Livestock, uncertainty for activity data, emission factor, and combined for other cattle, sheep, goats and swine were calculated at 30 %, 50 % and combined 53.8 %, respectively. Table 3 below shows the uncertainty assessment for Aggregate Sources and non-CO_2 Emissions. Table 4 shows the combined uncertainty assement.

Table 3. Uncertainty Assessment for Aggregate Sources and non-CO_2 Emissions

3.C - Aggregate sources and non-CO_2 emissions sources on land		Activity Data Uncertainty (%)	Emission Factor Uncertainty (%)	Combined Uncertainty (%)
3.C.4 - Direct N_2O Emissions from managed soils	N_2O	25	0.03	25.00

Table 4. Combined Uncertainty Assessment

2006 IPCC Categories	Gas	Activity Data Uncertainty (%)	Emission Factor Uncertainty (%)	Combined Uncertainty %
3.A - Livestock				
3.A.1.a.i - Dairy Cows	CH_4	40	8	40.79
3.A.1.a.ii - Other Cattle	CH_4	30	50	58.31
3.A.1.b - Buffalo	CH_4	0	0	0.00
3.A.1.c - Sheep	CH_4	30	50	58.31
3.A.1.d - Goats	CH_4	30	50	58.31
3.A.1.e - Camels	CH_4	0	0	0.00
3.A.1.f - Horses	CH_4	0	0	0.00
3.A.1.g - Mules and Asses	CH_4	0	0	0.00
3.A.1.h - Swine	CH_4	30	50	58.31
3.A.1.j - Other (please specify)	CH_4	0	0	0.00
3.A.2.a.i - Dairy cows	CH_4	0	0	0.00
3.A.2.a.i - Dairy cows	N_2O	0	0	0.00
3.A.2.a.ii - Other cattle	CH_4	30	50	58.31
3.A.2.a.ii - Other cattle	N_2O	30	50	58.31
3.A.2.b - Buffalo	CH_4	0	0	0.00

3.A.2.b - Buffalo	N_2O	0	0	0.00
3.A.2.c - Sheep	CH_4	30	50	58.31
3.A.2.c - Sheep	N_2O	30	50	58.31
3.A.2.d - Goats	CH_4	30	50	58.31
3.A.2.d - Goats	N_2O	30	50	58.31
3.A.2.e - Camels	CH_4	0	0	0.00
3.A.2.e - Camels	N_2O	0	0	0.00
3.A.2.f - Horses	CH_4	0	0	0.00
3.A.2.f - Horses	N_2O	0	0	0.00
3.A.2.g - Mules and Asses	CH_4	0	0	0.00
3.A.2.g - Mules and Asses	N_2O	0	0	0.00
3.A.2.h - Swine	CH_4	30	50	58.31
3.A.2.h - Swine	N_2O	30	50	58.31
3.A.2.i - Poultry	CH_4	30	50	58.31
3.A.2.i - Poultry	N_2O	30	50	58.31
3.A.2.j - Other (please specify)	CH_4	0	0	0.00
3.A.2.j - Other (please specify)	N_2O	0	0	0.00
3.B - Land				0.00
3.B.1.a - Forest land remaining Forest land	CO_2	1.4	6.9	7.04
3.B.1.b.i - Cropland converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.ii - Grassland converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.iii - Wetlands converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.iv - Settlements converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.1.b.v - Other Land converted to Forest Land	CO_2	1.4	6.9	7.04
3.B.2.a - Cropland remaining Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.i - Forest Land converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.ii - Grassland converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.iii - Wetlands converted to Cropland	CO_2	1.4	6.9	7.04
3.B.2.b.iv - Settlements converted to Cropland	CO_2	1.4	6.9	7.04

3.B.2.b.v - Other Land converted to Cropland	CO_2	1.4	6.9	7.04
3.B.3.a - Grassland remaining Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.i - Forest Land converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.ii - Cropland converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.iii - Wetlands converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.iv - Settlements converted to Grassland	CO_2	1.4	6.9	7.04
3.B.3.b.v - Other Land converted to Grassland	CO_2	1.4	6.9	7.04
3.B.4.a.i - Peatlands remaining peatlands	CO_2	1.4	6.9	7.04
3.B.4.a.i - Peatlands remaining peatlands	N_2O	1.4	6.9	7.04
3.B.4.b.i - Land converted for peat extraction	N_2O	1.4	6.9	7.04
3.B.4.b.ii - Land converted to flooded land	CO_2	1.4	6.9	7.04
3.B.5.a - Settlements remaining Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.i - Forest Land converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.ii - Cropland converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.iii - Grassland converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.iv - Wetlands converted to Settlements	CO_2	1.4	6.9	7.04
3.B.5.b.v - Other Land converted to Settlements	CO_2	1.4	6.9	7.04
3.B.6.b.i - Forest Land converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.ii - Cropland converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.iii - Grassland converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.iv - Wetlands converted to Other Land	CO_2	1.4	6.9	7.04
3.B.6.b.v - Settlements converted to Other Land	CO_2	1.4	6.9	7.04
3.C - Aggregate sources and non-CO_2 emissions sources on land				0.00

3.C.1.a - Biomass burning in forest land	CH_4	0	0	0.00
3.C.1.a - Biomass burning in forest land	N_2O	0	0	0.00
3.C.1.b - Biomass burning in cropland	CH_4	10	2.7	10.36
3.C.1.b - Biomass burning in cropland	N_2O	10	0.07	10.00
3.C.1.c - Biomass burning in grasslands	CH_4	5	0.9	5.08
3.C.1.c - Biomass burning in grasslands	N_2O	5	0.01	5.00
3.C.1.d - Biomass burning in all other land	CH_4	5	0.09	5.00
3.C.1.d - Biomass burning in all other land	N_2O	5	0.01	5.00
3.C.2 - Liming	CO_2	0	0	0.00
3.C.3 - Urea application	CO_2	25	50	55.90
3.C.4 - Direct N_2O Emissions from managed soils	N_2O	25	0.03	25.00
3.C.5 - Indirect N_2O Emissions from managed soils	N_2O	10	0.08	10.00
3.C.6 - Indirect N_2O Emissions from manure management	N_2O	0	0	0.00
3.C.7 - Rice cultivation	CH_4	10	0.01	10.00

The subcategories eligible for ISFL fall into the Land category. Method of reducing errors for activity data from the Collect Earth Tool will involve, instead of installing samples systematically, a stratified sampling method should be applied, installing proportionally samples in land use and land use classes with reduced area or in area of land-use change.

The Emission factors for Land Use Subcategories is mainly provided by ILUA II and the uncertainty is from the field work and process of data collected on field. Systematic errors (bias) can be avoided by good measurement practices. It is essential to prepare for the ILUA, a Standard Operational Procedure to summarise the work done and establish guidance for future measurement. The procedure should have a description of the sampling design, land use/cover classification and organisational structure and responsibilities.

Annex 10: Data and parameters to be monitored

Parameter:	Area
Description:	Estimations of area in land remaining land and land use conversions subcategories
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)	• Aerial surveys (using drones) • High resolution imagery/Collect Earth datasets
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of areas from land datasets • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Refresher training for data analysist to improve data interpretation skills. • Procurement of high resolution satellite imagery products • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Area of sampling frame
Description:	Area of sampling frame estimations in land remaining land and land conversions
Data unit:	km^2, ha
Source of data or measurement/calculation methods and procedures to be	• Aerial surveys (using drones) • High resolution imagery/Collect Earth datasets

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)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of areas from land datasets • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Refresher training for data analysts to improve data interpretation skills. • Procurement of high resolution satellite imagery products • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Aboveground biomass
Description:	Above ground biomass estimations in land remaining land and land use conversions subcategories
Data unit:	Tonnes/ha
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)	Derived from an analysis of biophysical measurements and high resolution imagery
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially

Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Field equipment limitations used for measurements • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • Procurement of high quality satellite imagery products • A robust quality control system will be put in place in the field, at district, provincial and national levels

Parameter:	Diameter at Breast Height
Description:	Diameter at breast height estimations for trees in land remaining land and land conversions
Data unit:	cm
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)	• Biophysical measurements during field surveys • Forest Inventories
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Field equipment limitations used for DBH measurements
Process for managing and reducing uncertainty	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty

associated with this parameter	• Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and field assessment skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Height
Description:	Height of trees estimations in land remaining land and land conversions
Data unit:	Metres
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)	• Field surveys and ground measurements • Forest Inventories
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Field equipment limitations used for height measurements
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and field assessment skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Dead wood
Description:	Dead wood estimations in land remaining land and land use conversions subcategories
Data unit:	Tonnes/ha
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)	• Biophysical measurements during field surveys • Forest Inventories
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Field equipment limitations used for measurements
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and field assessment skills. • A robust quality control system will be put in place in the field, at district, provincial and national levels

Parameter:	Litter
Description:	Litter estimations in land remaining land and land conversions
Data unit:	Tonnes/ha
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)	• Biophysical measurement during field surveys • Forest Inventories
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Field equipment limitations used for measurements
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and field assessment skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Basic Wood density
Description:	Basic Wood density estimations for tree species in Eastern Province
Data unit:	g/cm3
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	• Research publications

scientific literature), including the spatial level of the data (local, regional, national, international)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed value.
Quality Assurance/Quality Control procedures to be applied:	N/A
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	N/A
Process for managing and reducing uncertainty associated with this parameter	N/A

Parameter:	Carbon Fraction of dry matter
Description:	Carbon fraction of dry matter estimations in vegetation in land remaining land and in land use conversions
Data unit:	-
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)	• Research publications
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed value.
Quality Assurance/Quality Control procedures to be applied:	N/A
Identification of sources of uncertainty for this parameter following approaches from the	N/A

most recent IPCC guidance and guidelines.	
Process for managing and reducing uncertainty associated with this parameter	N/A

Parameter:	Root to shoot ratio
Description:	Root to shoot ratio estimations in vegetation to estimate belowground biomass in land remaining land and in land use conversions
Data unit:	-
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)	• Research publications
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed value.
Quality Assurance/Quality Control procedures to be applied:	N/A
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	N/A
Process for managing and reducing uncertainty associated with this parameter	N/A

Parameter:	Soil organic carbon
Description:	Soil organic estimations in land remaining land and in land use conversions subcategories

Data unit:	Tonnes C/Ha
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)	• Biophysical measurements during field surveys • Research publications
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Field and laboratory equipment limitations used for measurements
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and field assessment skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Emission factors
Description:	Emission factors in land remaining land, land use conversions, forestry, agriculture, livestock and other land use and energy
Data unit:	Multiple units: a) Average Net Annual Increment for specific vegetation type(m^3/ ha/ yr), b) Biomass Conversion and Expansion Factor (Tonnes of biomass removal /m^3 of removal) c) Fraction of area affected by fire disturbance (%), d) Ratio of below-ground biomass to above-ground biomass for a specific vegetation type, in tonne, e) Carbon Fraction of dry matter (tonne C/ tonne), f) Above ground biomass (tonnes/ha), g) Dead wood / litter stock (tonnes C / ha), Soil Carbon- forestland(tonnes C / ha)

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)	• Biophysical measurements during field surveys • Annual Reports • Research publications • Soil and land evaluation surveys
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of areas from land datasets • Field and laboratory equipment limitations used for measurements • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • Procurement of high quality satellite imagery products • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Vegetation classification/Forestry types
Description:	Vegetation classification in Forest Land remaining Forest Land subcategory
Data unit:	N/A
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC	• Biophysical measurements • Research publications • Collect Earth datasets • High resolution imagery

Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Refresher training for analysists to improve data interpretation skills. • Procurement of high quality satellite imagery products • A robust quality control system will be put in place in the field, at district, provincial and national levels

Parameter:	Disturbances
Description:	Areas Burnt
Data unit:	Ha
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)	• Forest Inventories • Annual Reports • Research publications • Collect Earth datasets • High resolution imagery
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.

Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of areas from land datasets • Equipment limitations used for measurements • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • Procurement of high quality satellite imagery products • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Harvested wood products
Description:	Wood Removal from timber harvest, wood removal for firewood, wood removal for charcoal production and volume of wood harvested
Data unit:	Tonnes, cubic metres
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)	• Forest licensing information • Socio-economic Surveys • Annual Reports • Research publications • Data collection from institutions using firewood as a source of energy • Woodfuel surveys
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter	Sources of uncertainty:

following approaches from the most recent IPCC guidance and guidelines.	• Estimation volumes of harvested wood products
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Biomass burning
Description:	Emissions from biomass burning in land remaining land and in land use conversion categories
Data unit:	Area Burnt, Mass of fuel available for combustion (tonnes/ha),
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)	• Field surveys and ground measurements • Annual Reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS) • Collect Earth datasets • Forest Inventories • Socio-economic Surveys • Annual Reports • Research publications • High resolution imagery
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of areas from land datasets • Equipment limitations used for measurements • Bias in interpretation of imagery due to seasonal variation in data
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • Procurement of high quality satellite imagery products

	• A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Limestone applied
Description:	Liming, lime type and limestone applied
Data unit:	Tonnes
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)	• Annual Reports • Research publications • Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS)
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Equipment used in estimating amount of lime applied
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduced uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Dolomite applied
Description:	Liming, lime type and dolomite applied
Data unit:	Tonnes
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)	• Annual Reports • Research publications • Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS)
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Equipment used in estimating amount of dolomite applied
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduced uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Urea Applications
Description:	Urea Applications and amount of urea fertilisation
Data unit:	Tonnes
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	• Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS)

scientific literature), including the spatial level of the data (local, regional, national, international)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of amount of urea applied
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Fertiliser
Description:	Indirect emissions from inorganic fertiliser application. Type and amount of inorganic fertiliser applied.
Data unit:	Tonnes
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)	• Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS)
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter	Sources of uncertainty:

following approaches from the most recent IPCC guidance and guidelines.	Estimation of amount of inorganic fertiliser applied
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Manure
Description:	Direct & indirect emissions from organic (animal manure applied, compost applied, sewage sludge applied & other organic amendments) fertiliser application. Type and amount of organic fertiliser applied.
Data unit:	tonnes
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)	• Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS) • Field measurements
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of amount of organic fertiliser applied
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Manure deposited on pasture, range and paddocks
Description:	Indirect emissions from Urine and dung. Amount of manure deposited on pasture, range and paddocks.
Data unit:	Tonnes
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)	• Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS) • Field measurements
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of amount of manure deposited on pasture, range and paddocks
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Paddy Rice
Description:	Rice Cultivations. Variety of Rice planted. Harvested area(ha/yr). Cultivation period (days). Application of organic amendment in fresh weight (Tonnes/ha)
Data unit:	• Hectares
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data,	• Provincial records/reports • Crop Forecast Survey (CFS) • Post Harvest Survey (PHS) • Field measurements

official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of harvested area
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • Procurement of high quality satellite imagery products • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Annual Average population herd
Description:	Animal type, Enteric Fermentation and manure management
Data unit:	-
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)	• Annual reports • Research publications • Surveys • Livestock census
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.

Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of population of respective livestock type
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Average weight gain per day for appropriate animal type
Description:	Enteric Fermentation and manure management
Data unit:	Kilograms
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)	• Annual reports • Research publications • Surveys • Livestock census
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Equipment used for estimating average weight gain per day of respective livestock

Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Mature weight for appropriate animal type
Description:	Enteric fermentation and manure management
Data unit:	Kilograms
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)	• Annual reports • Research publications • Surveys • Livestock census
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Equipment used for estimating average weight of respective livestock
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Average number of hours worked per day
Description:	Enteric Fermentation and manure management
Data unit:	Hours
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)	• Annual reports • Research publications • Surveys
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of average number of hours livestock worked per day
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Feeding situation
Description:	Enteric Fermentation and manure management.
Data unit:	-
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	• Annual reports • Research publications • Surveys

scientific literature), including the spatial level of the data (local, regional, national, international)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Determination of feeding situation for livestock
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Mean daily temperature
Description:	Enteric Fermentation and manure management
Data unit:	Degrees ^{o}C
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)	• Annual reports • Research publications • Surveys • Zambia Meteorological Reports
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels

Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Spatial and temporal variation in mean daily temperature
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Average daily milk production
Description:	Enteric fermentation and manure management
Data unit:	Litres
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)	• Annual reports • Research publications • Surveys • Livestock census
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of volumes for daily milk production
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Fat content of milk by weight
Description:	Enteric fermentation and manure management
Data unit:	%
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)	• Annual reports • Research publications • Surveys • Livestock census
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of fat content in milk
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Percent of female that give birth per year
Description:	Enteric fermentation and manure management
Data unit:	%
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	• Annual reports • Research publications • Surveys • Livestock census

the data (local, regional, national, international)	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of percent of female that give birth per year
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Feed digestibility
Description:	Enteric fermentation and manure management.
Data unit:	%
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)	• Annual reports, • Research • publications • Surveys • Research
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied at each stage of data collection in the field, at district, provincial and national levels
Identification of sources of uncertainty for this parameter	Sources of uncertainty:

following approaches from the most recent IPCC guidance and guidelines.	• Estimation of feed digestibility for livestock types
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Increasing the number of samples to reduce uncertainty • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Ash content of manure
Description:	Manure management
Data unit:	%
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)	• Annual reports, • Research • publications • Surveys • Research •
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied in the laboratory and at each stage of data collection
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of ash content in manure
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Parameter:	Percent crude protein in diet
Description:	Manure management
Data unit:	%
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)	• Annual reports • Research publications Surveys • Research •
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored. Biennially.
Quality Assurance/Quality Control procedures to be applied:	QC will be applied in the laboratory and at each stage of data collection
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	Sources of uncertainty: • Estimation of percent crude protein in diet
Process for managing and reducing uncertainty associated with this parameter	Uncertainty can be reduced by • Consistent calibration of the measuring equipment • Refresher training for data collectors and compilers to improve data collection and data interpretation skills. • A robust quality control system will be put in place at district, provincial and national levels

Annex 11: Feedback, Grievance and Redress Mechanism

Introduction

The Zambia Integrated Forest Landscape Project (ZIFLP) is an initiative supported by the government of Zambia with funding from the BioCF, GEF and IDA. The project covers a series of investments that lead ultimately to results-based payments for carbon storage and reduced carbon emissions resulting from reduced deforestation and degradation. The ZIFLP supported many of the foundational and readiness elements for the EP-JSLP. This FGRM developed and implemented for the ZIFLP programme will be used as the EP-JSLP operationalises its implementation.

As with any sustainable landscape programme, the EP-JSLP activities might cause or perceive to cause negative impact on the environment and the livelihoods of the implementing communities. To ensure that the negative impacts are avoided or minimised, the EP-JSLP is implementing environmental and social safeguards in line with the World Bank policies and in country legislation. To this effect, safeguards instruments including the Environmental and Social Management framework (ESMF), the Resettlement Policy Framework (RPF) and the Process Framework (PF) have been developed to guide the project in the implementation of safeguards. The project activities and impacts might however give rise to grievances which might be felt and expressed by a variety of parties including individuals, groups, or entities. To this effect the EP-JSLP has developed a grievance redress mechanism (GRM) to ensure that the potential grievances arising from the implementation of the project activities are adequately addressed.

The FGRM developed by EP-JSLP is specific to EP-JSLP and has been designed to ensure a speedy resolution of the project specific grievances. This FGRM seeks to give the affected parties within the project scope access to seek redress to their perceived or actual grievance or any feedback that needs clarity. This tool helps to effectively addressing grievances from people impacted by the project as a core component of managing operational risk and improving a project result. Furthermore, the FGRM is an effective tool for early identification, assessment, and resolution of complaints on projects.

Purpose of FGRM

The purpose of this Feedback and Grievance Redress Mechanism is to outline the EP-JSLP's approach to accepting, assessing, resolving, and monitoring grievances from those affected by the implementation of the project and sub project activities in a positive or negative way. It provides for a transparent and

credible process to all parties, resulting in outcomes that are fair, effective, and lasting.

The EP-JSLP FGRM encompass concerns as well as serious or long-term issues which might be felt and expressed by a variety of parties including individuals, groups, communities, entities, or other parties affected or likely to be affected positively or negatively by the social or environmental impacts of the Project. The Feedback under the EP-JSLP FGRM is about giving information in a way that encourages the recipient to accept it, reflect on it, learn from it, and hopefully make changes for the better.

The EP-JSLP found it necessary to have a robust and credible mechanism to systematically handle, give feedback and resolve any complaints that might arise in order that they do not escalate and present a risk to the operations or the reputation of the project and its sponsors. EP-JSLP recognises that if well-handled, an effective feedback and grievance mechanism can help foster positive relationships and build trust with stakeholders. This FGRM has been designed to promote dialogue and problem solving as an intermediate way for stakeholders to discuss and resolve problems. It is expected to primarily address interest-based conflicts such as conflicts in which groups with some form of interdependency have a difference in (perceived) interest.

Under EP-JSLP, the FGRM also complements and interface with the legal or Judicial system and other existing public administrative systems. In the case where EP-JSLP stakeholders who are unable to find resolution with the FGRM, they may seek redress through existing judicial and administrative dispute resolution mechanisms. These may include courts, tribunals and traditional legal mechanisms (village courts).

Just like under World Bank, its Grievance Redress Service (GRS) objective is to provide an additional and accessible way for individuals and communities to complain directly to the bank if they believe that the World Bank-funded project had or is likely to have adverse effects on them or their community to help ensure faster and better resolution of project-related complaints. The World Bank's Grievance Redress Service (GRS) is a grievance mechanism managed by the World Bank. It provides a fast and accessible complaint mechanism for individuals and communities who believe that a World Bank-financed project causes harm to their community. The GRS is an additional tool that supplements project-level grievance redress mechanisms. Under the EP-JSLP, issues/concerns that cannot be resolved at the project level, will be directed to World Bank Management through the GRS for further redress.

The EP-JSLP FGRM has the following specific objectives:

- To be responsive to the needs of the beneficiaries by providing a channel for feedback and resolving grievances and disputes at the various levels (local, district) in the project area;
- To provide an opportunity to the aggrieved party and the project implementers to resolve disputes in a short time before they escalate to big problems;
- To collect information that can be used to improve project performance and mitigate project risks;
- To facilitate effective communication between the project and the affected parties;
- To enhance the project's legitimacy among stakeholders by promoting transparency and accountability, and deterring fraud and corruption; and
- To provide a platform to ensure compliance with the provisions of the laws, regulations, and cultural and traditional rules in the project area.

Scope

The scope of grievances to be addressed by this FGRM are provided for in the Environmental and Social Management Framework (ESMF) and they also include potential grievances and disputes that arise during the implementation of the sub-

projects and resettlement issues. Issues related to compensation programmes are referred to in the relevant government legal/administration systems and the EP-JSLP FGRM only provide information to help resolve such grievances. The EP-JSLP FGRM only deals with project specific stakeholders' inquiries, suggestions, concerns, and complaints in the target areas. The FGRM is used by parties or stakeholders living in the target areas or have a stake in the targeted areas that might be inadvertently affected by the project activities and/or outcomes and in their opinion strongly believe they need to seek redress from the Project.

Under the EP-JSLP FGRM a complaint or grievance is an issue, concern, problem, or claim (perceived or actual) that an individual stakeholder or community group has related to EP-JSLP activities. The mechanism does not impede access to judicial or administrative resolutions. This FGRM is intended to deal with grievances that are directly linked to the ZIFL Project and will not address employees' grievances as other channels exist to address such.

The Geographical scope of the EP-JSLP FGRM covers the EP-JSLP operational landscape of Eastern Province and will focus on specific areas of operations within the districts in the eastern province.

Advantages of a FGRM

The following are some advantages:

It provides project staff with a practical feedback system that allows them to be more accountable, transparent, and responsive to beneficiaries.

By publicising how grievances are resolved, it can help build trust between citizens, the project, government and service providers.

Grievance-related data provides management with insights into the effectiveness of the Project Implementation Unit's (PIU) programmes.

An effective FGRM can help identify issues before they become serious or widespread, thereby ensuring project effectiveness.

Potential Grievances Under the EP-JSLP FGRM

The EP-JSLP is proactive in addressing grievances by ensuring that there is adequate stakeholder participation and consultation during the project processes. The Project's ESMF, the Resettlement Policy Framework (RPF) and the Process Framework (PF) are the guiding documents for addressing environmental and social safeguards and provide guidance on anticipated grievances. Potential conflicts or grievances within or between affected communities are resolved. The ESMF describes potential grievances that relate to access to natural resources, access to project benefits and resettlement issues that may arise during project implementation. The RPF and PF are mainly concerned with measures to be undertaken where involuntary resettlement may arise and where restrictions to accessing natural resources in both Protected Areas and Customary Areas will arise.

The EP-JSLP FGRM only deal with project specific grievances and disputes such as the following:

- Inventory mistakes made during census survey as well as inadequate valuation of properties;
- Mistakes related to identification and disagreements on boundaries between affected individual(s) and specifying their land parcels and associated development;
- Disagreements on plot/ asset valuation;
- Where affected individual(s) opt for a settlement-based option and there is disagreement on the settlement package (the location of the resettlement site does not suit them);
- Dispute of alleged voluntary donation of land;

- Unfair award of contracts;
- Delayed payments of contractors;
- Delayed disbursement of Project funds;
- Project impacts on rights or usage of forest or other protected area resources which are also governed by the EP-JSLP Process Framework;
- Traffic problems related to project activities;
- Construction site related complaints: noise, dust, etc.;
- Long procurement procedures;
- Delayed commencement of sub-project activities;
- Ensure that the people that are adversely affected by sub-projects are fully compensated for the loss of assets, livelihoods and access rights and successfully relocated; and
- Make all affected persons aware of the processes available for the redress of grievances and ensure the processes are easily accessible and immediately responsive as prescribed in the EP-JSLP Resettlement Policy Framework (RPF).

Registration Of Grievances

A register of grievances will be held by the Community Liaison Officer (CLO) or any other appointed person by the project. The Aggrieved Party (AP) must register their grievances with the Community Liaison Officer, the District Planner within the District Multi-Stakeholder Team (DMT) in the district.

To register a grievance, the AP will provide information to the CLO to be captured in the Grievances Registration Form (Annex 1). The FGRM will accept complaints from the APs submitted through verbal, email, phone (a dedicated telephone line has been established along with documentation and maintenance of records, and the system is monitored), will be reviewed and is expected to continue through the EP-JSLP, Facebook, WhatsApp, meeting or letter to the office of the CLO, in English or any local language spoken in that region or district. The focal point persons handling grievances will transcribe verbal submissions. Receipt of grievances shall be acknowledged as soon as possible, by letter or by verbal means.

When a complaint is made, the FGRM will acknowledge its receipt in a communication that outlines the grievance process; provides contact details and, if possible, the name of the CLO who is responsible for handling the grievance; and notes how long it is likely to take to resolve the grievance. Complainants will

receive periodic updates on the status of their grievances. This FGRM has established clearly defined timetables for acknowledgment and follow-up activities. And to enhance accountability, these timetables will be disseminated widely to various stakeholders, including communities, civil society, and the media.

Assessment And Investigation

This step involves gathering information about the grievance to determine its validity and resolving the grievance. The merit of grievances should be judged objectively against clearly defined standards. Grievances that are straight forward (such as queries and suggestions) can often be resolved quickly by contacting the complainant.

Having received and registered a complaint, the next step in the complaint-handling process is for the focal points to establish the eligibility of the complaint received. The CLO, who is the Grievances Registration Officer once a complaint or grievance is registered, shall within 5 days assess the registered complaint or grievances to determine its validity and relevance i.e., is it within the scope of the ZIFLP-FGRM as defined in this document. The following criteria can be used to assess and verify eligibility:

- The complainant is affected by the project;
- The complaint has a direct relationship to the project;
- The issues raised in the complaint fall within the scope of the issues that the FGRM is mandated to address.

Having completed the complaint assessment, a response can be formulated on how to proceed with the complaint. This response should be communicated to the complainant. The response should include the following elements:

- Acceptance or rejection of the complaint
- Reasons for acceptance or rejection
- Next steps – where to forward the complaint
- If accepted, further documents and evidence required for investigation e.g., field investigations

Once the registered grievance or complaint has been determined as falling within the scope of this FGRM, the CLO shall investigate the complaint. Investigation of the complaint may include the following:

- On site visit and verification;
- Focus Group discussions and interviews with key informers;
- Review of secondary records (books, reports, public records); and

- Consultations with local government and traditional authorities.

The ZIFLP will ensure that investigators are neutral and do not have any stake in the outcome of the investigation. At the end of the field investigation, the CLO shall compile a Grievance Investigation Report (GIR) using a standard template (Annex 2) on the outcomes of the investigations and the specific recommendation to resolve the grievance or complaint.

Types of Remedies Available Under the EP-JSLP FGRM

The EP-JSLP GRM provides for categories of remedies for the grievances, and these include:

Acknowledgement of Responsibility and Apology

In some cases, such as in the event that the FGRMs determine that the project management failed to undertake its obligations (e.g., failure to provide feedback to community on the Matching Grant process) and the impact on the Aggrieved Party is minimal. The project management shall acknowledge the problem and offer a written apology to the Aggrieved Party.

Modification of Conduct/Actions that caused Grievances

There are specific actions by the project or its agents that could be well intended but may result in individuals or community declaring a grievance. In the event that such actions can be remedied by changing the actions/conduct, the Project Management shall reverse or change such an action.

GUIDING PRINCIPLES FOR THE EP-JSLP FGRM

This EP-JSLP FGRM is guided by the following principles:

Equity

No complaint is too big or small. All complaints received shall be treated with the urgency and the attention they deserve. All Aggrieved Parties regardless of their social standing, gender, political affiliation, religious affiliation shall be given opportunity to be heard by the responsible officers without prejudice.

Accountability

The project outcomes should benefit the people in the targeted communities and as such the Project Management is accountable to the people in the communities, they operate in. The project should be responsive to the needs of the community including their complaints and grievances.

Transparency

Members of the community or aggrieved parties have the right to information on the grievance mechanism, how to access it, who is responsible for handling their complaints and the potential outcome of the processes.

Accessibility

All people in the target communities must have unrestricted and free access to the FGRM. The project shall publicise the GRM to all those who may wish to access it and provide adequate assistance for aggrieved parties who may face barriers of access, including language, literacy, awareness, finance, distance, or fear of reprisal. The Aggrieved Party shall be kept informed at each stage of the process.

Anonymity

The FGRM will not disclose the identity(s) of the AP by name or otherwise to maintain confidentiality

Timely Response

This FGRM should function promptly and speedily. Prompt action is not only desirable from the complaint's point of view, but also from the management's point of view. Since delay causes frustration and tempers may rise, it is necessary that grievances should be dealt with speedily.

It is said that 'Justice delayed is justice denied.' It is for this reason that any 'unnecessary delay constitutes another grievance. Settlement of grievances "in the shortest possible time and at the lowest level possible," is the ideal one. Some of these cases and incidences might require reporting to the WB Task Team immediately.

Confidentiality

Grievances will be treated confidentially. Complainants' names and personally identifiable information will be kept in the strictest confidence.

Building on existing informal and formal dispute resolution flows

The FGRM builds on existing structures of informal and formal dispute resolution to enhance cost effectiveness. The FGRM relies on two existing systems:

Informal dispute resolution practices (through the existing traditional conflict resolution flows) and

Formal resolution practices (through existing administrative and judicial flows by arbitration and courts of law).

By doing this, the mechanism easily become acceptable as the majority of stakeholders are already familiar with it.

The FGRM has been developed and been tested under the implementation phase of ZFILP and will used as a template for the EP-JSLP. Responsibilities are as follows

TABLE 1: FEEDBACK GRIEVANCE REDRESS MECHANISM IMPLEMENTED UNDER ZIFLP				
LEVEL	**FOCAL POINT UNIT/ORGANISATION**	**FOCAL PERSONS** (Grievance Committee)	**ACTION**	**RECORDING COMPLAINTS**
NATIONAL	Grievance Committee	• ESIO – PIU • Independent Auditor • Focal Persons (Forestry, Wildlife, Agriculture & Lands) • Independent Legal personnel from the project implementing Ministry (MLNR)	The PIU or an independent Auditor will try to address the complaint: • When resolved the person who raised the issue will be informed • If not resolved the complaint will be reported to the World Bank within 2 weeks	1. Record the complaint submitted in the national level grievance data base 2. Review monthly monitoring submitted by the district/provincial level and enter all complaints with the status and record in the national level grievance data base 3. M&E Officer will periodically review the grievance data base and follow up with focal point persons to ensure all cases are addressed

LEVEL	FOCAL POINT UNIT/ORGANISATION	FOCAL PERSONS	ACTION	RECORDING COMPLAINTS
PROVINCIAL	• Provincial Planning Sub Committee • Provincial Project Implementation Unit	• Provincial Planner • Provincial Project Manager • M & E Officer	The Planner and Project Manager will discuss the issue and try to address it at the provincial level: • When resolved the person who raised the issue will be informed • If not resolved the complaint will be reported to the National Project Manager (or if the complaint regards the National Project Manager) submit to the independent Auditor	1. Record the complaint submitted in the provincial level grievance data base 2. Record the complaint submitted in the monitoring form 3. Submit the monthly monitoring form including a record of complaints to the National level PIU

LEVEL	FOCAL POINT UNIT/ORGANISATION	FOCAL PERSONS	ACTION	RECORDING COMPLAINTS

DISTRICT	District Planning Sub Committee	District Planner	The Planner will try to address it at the district level: • When resolved the person who raised the issue will be informed • If not resolved the complaint will be reported to the Provincial Planner	1. Record the complaint submitted in the District level grievance data base/Register 2. Record the complaint submitted in a monitoring form 3. Submit the monthly monitoring form including a record on complaints to the Provincial PIU

LEVEL	FOCAL POINT UNIT/ORGANISATION	FOCAL PERSONS	ACTION	RECORDING COMPLAINTS
ZONAL/COMMUNITY	• Project Committee • Maintenance Committee • Traditional Structure • Facilitator	• Project Committee Chairperson • Village Secretary • Facilitator	The focal persons at the community level will discuss and try to address the complaint within the community: • When resolved the person who raised the issue will be informed	1. Record the complaint submitted in the community level grievance Register 2. Record the complaint submitted in a simple form

			• If not resolved the complaint will be reported to the WDC Chairperson	3. Submit the record of complaints to the WDC Chairperson

TABLE 2: TASKS FOR FGRM FOCAL PERSONS

	National Focal Persons	**Provincial Focal Persons**	**District Focal Persons**	**Community Level Focal Persons**
Task	Maintain a data base of grievances Develop Policy and procedures for grievance handling Monitor, evaluate and	Maintain a provincial level data base of grievances Call for meetings to discuss and resolve grievances referred to the Provincial Planner	Maintain a district level data base of grievances Call for District Planning Subcommittee meetings to discuss and address complaints	Maintain a community level register of grievances Call for community level focal point persons to discuss and resolve complaints Raise awareness in the communities on grievances

	adapt as necessary	Supervise and coach district level grievance staff Receive and address incoming and outgoing letters/complaints Monitor and adapt process as necessary	Supervise and coach ward and community level grievance staff Receive and address incoming and outgoing letters/complaints Monitor process as necessary	

Annex 12: Forest Carbon Management Statutory Instrument

The Forest (Carbon Stock Management) Regulations 2021 are provided as a separate document.

GOVERNMENT OF ZAMBIA

STATUTORY INSTRUMENT No. 66 of 2021

The Forests Act, 2015
(Act No. 4 of 2015)

The Forest (Carbon Stock Management) Regulations, 2021

IN EXERCISE of the powers contained in section 105 of the Forests Act 2015, the following Regulations are made:

Title

1. These Regulations may be cited as the Forest (Carbon Stock Management) Regulations, 2021.

Interpretation

2. In these Regulations, unless the context otherwise requires—

"community forest management group" has the meaning assigned to the words in the Act;

"deforestation" means the conversion of forest land to non-forest land where forest land is any land with a tree canopy cover of more than ten percent and an area of more than zero point five hectares and a tree height of five metres;

"Department" has the meaning assigned to the word in the Act;

"Director" has the meaning assigned to the word in the Act;

"forest degradation" means reduction in canopy cover while maintaining a minimum canopy cover of ten percent;

"forest carbon stock management" means engagement in the generation of green house gas emission reduction or removal;

"green house gas emission reduction or removal" means to measure, monitor, report and verify reduction in release or sequestration of gases like carbon dioxide (CO_2), methane (CH_4) or nitrous oxide (N_2O) quantified in terms of carbon dioxide (CO_2) equivalent;

"joint forest management committee" has the meaning assigned to the words in the Act;

Copies of this Statutory Instrument can be obtained from the Government Printer, P.O. Box 30136, 10101 Lusaka. Price K48.00 each.

"jurisdiction" means a geographic area under a Government agency and "jurisdictional" and cognate expressions shall be construed accordingly;

"jurisdictional programme" means a provincial level emission reduction programme developed by Government;

"nesting" means integration of forest carbon stock management projects into larger scale reducing emission from deforestation and forest degradation programmes;

"permit" means a forest carbon management permit issued under these Regulations;

"programme" means a provincescale system or arrangement for the recognition of activities aimed at the generation of green house gas emission reduction or removal for carbon trading;

"project" means an action or activity applied to a defined geographical area, formal or organised scheme, covering an area smaller than a province, for the recognition of activities aimed at the generation of green house gas emission reductions or removals for carbon trading;

"user rights" means rights related to forest produce or forest resources;

"validation" means a systematic, independent and documented process for the evaluation of the design of a project against each of the set standards' criteria; and

"verification" means a systematic, independent and documented process for the evaluation of a project's delivery of net climate, community and biodiversity benefits in accordance with the project's validated design and monitoring plan and each of the set standards criteria.

Eligible activities

3. The following activities are eligible for a project or programme in forest carbon stock management:

(a) deforestation reduction;

(b) forest degradation reduction;

(c) forest conservation;

(d) sustainable management of forest; and

(e) enhancement of carbon stocks.

Areas eligible for forest carbon stock management permits

4. (1) Subject to these Regulations, the Director may issue a forest carbon stock management permit in respect of—

(a) National Forest;

(b) Local Forest;

(c) botanical reserve;

(d) private forest;

(e) joint forest management area;

(f) community forest area;

(g) game management area;

(h) community partner park;

(i) bird and wildlife sanctuaries;

(j) national park; and

(k) private land on leasehold.

(2) Despite subregulation (1), the location of a forest carbon stock management project or programme shall be subject to landuse planning for each land category.

(3) An applicant for a forest carbon stock management permit shall specify the boundaries of the forest carbon stock management project or programme.

User rights

5. An applicant for a forest carbon stock management permit to engage in a forest carbon stock management project or programme shall show proof of user rights of the forest or land where the project will be located in the following manner:

(a) in the case of State land, a certificate of title, and consent from the Director for use of the forest;

(b) in the case of customary land, a community forest agreement, in accordance with the Act; and

(c) in the case of a protected area, a consent letter from the institution mandated to manage the protected area.

Eligible permit holder

6. An eligible permit holder of forest carbon stock management consists of any of the following:

(a) a Government agency;

(b) a business agency, registered under any relevant law;

(c) an international organisation;

(d) a locally existing institution registered under any relevant law;

(e) a community forest management group; and

(f) a joint forest management committee.

Compliance with the regulatory framework

Act No. 11 of 2006
Act No. 12 of 2011
Act No. 10 of 2017

7. A permit holder who is authorised to engage in forest carbon stock management shall comply with the provisions of the Zambia Development Agency Act, 2006, the Environmental Management Act, 2011, the Companies Act, 2017, and any other relevant written law.

Expression of interest

8. (1) A person who intends to engage in forest carbon stock management shall submit to the Director an expression of interest for approval in Form I set out in the First Schedule.

(2) An expression of interest shall include the following:

(a) proposed location;

(b) stakeholder engagement plan;

(c) proposed carbon accounting methodologies;

(d) proposed market;

(e) proposed benefit sharing mechanism; and

(f) any other information related to a project or programme.

(3) The Director may request a person who submits an expression of interest under subregulation (1) for further information that the Director considers necessary in Form II set out in the First Schedule.

Approval of expression of interest

9. The Director shall, within thirty days of receipt of an expression of interest, approve the expression of interest if the applicant complies with the requirements of these Regulations.

Rejection of expression of interest

10. (1) The Director shall, within thirty days of receipt of the expression of interest, reject the expression of interest if the applicant does not comply with the requirements of these Regulations and inform the applicant of the rejection in Form III set out in the First Schedule.

(2) Where the Director fails to make a determination on the submission of an expression of interest under regulation 8(1) within thirty days of the date of submission, the expression of interest shall be deemed to have been approved.

Application for permit

11. (1) A person, whose expression of interest is approved by the Director, shall apply to the Director for a permit in Form IV set out in the First Schedule on payment of a fee set out in the Second Schedule.

(2) An application under subregulation (1) shall be accompanied by—

(a) a joint forest management or community forest management agreement with the Director;

(b) proof of transfer of user rights from the joint forest management committee and the community forest management group in the case of a joint forest management area or a community management area respectively;

(c) a consent letter from the Director of National Parks and Wildlife in the case of National Parks, game management areas, community partnership parks and bird and wildlife sanctuaries;

(d) proof of ownership in case of State land;

(e) a decision letter issued to the applicant by the Zambia Environmental Management Agency regarding the environmental impact assessment undertaken by the applicant in respect of the proposed forest carbon stock management area;

(f) a technical and financial proposal for the undertaking; and

(g) proposed methodology originating from recognised international entities and approved by the Director to quantify emission reductions, and to determine the additionality, baseline, leakage and permanence of forest carbon stocks and forest carbon stock management design document.

Approval and issuance of permit

12. (1) The Director shall, within thirty days of receipt of an application for a permit, approve the application and issue a permit to the applicant if the applicant meets the requirements of these Regulations.

(2) A permit shall be issued in Form VI set out in the First Schedule.

(3) A permit is valid for a period not exceeding thirty years of the date of issue.

Rejection of application for permit

13. The Director shall, within thirty days of receipt of an application for a permit, reject the application if the applicant does not meet the requirements of these Regulations and inform the applicant of the rejection in Form V set out in the First Schedule.

Application for duplicate permit

14. A permit holder shall, where a permit is lost, damaged or defaced, apply to the Director for a duplicate permit in Form VII set out in the First Schedule.

Application for renewal of permit

15. (1) An application for the renewal of a permit shall be made to the Director at least three months before the expiry of the permit, in Form VIII set out in the First Schedule on payment of a fee set out in the Second Schedule.

(2) The Director may, within thirty days of receipt of an application for the renewal of a permit under subregulation (1), renew the permit if the applicant meets the requirements of these Regulations and has complied with the terms and conditions of the permit

(3) The Director shall, where the Director renews a permit, endorse the renewal on the permit.

(4 A permit that is not renewed by the Director lapses on its date of expiry.

Restriction on transfer of permit

16. A permit holder shall not assign, cede or transfer the permit to any other person.

Suspension or cancellation of permit

17. (1) The Director may suspend or cancel a permit if the holder—

(a) obtained the permit by fraud , negligence or misrepresentation;

(b) contravenes the Act and these Regulations or any other written law; or

(c) contravenes any term or condition of the permit.

(2) The Director shall, before suspending or cancelling a permit, notify the holder in writing of the intention to suspend or cancel the permit specifying the reasons for the intended suspension or cancellation of the permit and require the holder to show cause, within a period of thirty days, why the permit should not be suspended or cancelled.

(3) A notice of intention to suspend or cancel a permit shall be in Form IX set out in the First Schedule.

(4) The Director shall, where a permit holder fails to correct the contravention within the period specified under subregulation (2), suspend or cancel the permit.

(5) A notice of the suspension or cancellation of a permit shall be in Form X set out in the First Schedule.

Nesting of projects in higher level entities

18. (1) Where a jurisdictional level forest carbon stock management project or programme is developed and approved by the Director for the purpose of generating greenhouse gas emission reduction or removal, that forest carbon stock management project or programme shall take precedence over a project that is encompassed within the jurisdiction.

(2) A permit holder encompassed within the geographical boundaries of the jurisdiction granted may only trade carbon through the jurisdictional entity.

(3) A permit holder shall not be allowed to trade carbon independently unless with the approval of the Director.

(4) A permit holder encompassed within a jurisdictional project or programme, that has traded carbon before the jurisdictional programme has been approved by the Director, may be granted specific permission by the Director to continue the permit holder's independent trading, for a period not exceeding three years from the date of approval by the Director of the jurisdictional programme.

Double counting of emission reductions

19. A single greenhouse gas emission reduction or removal shall not be generated or monetised by two different entities or sold to multiple buyers.

Transparency

20. (1) Information submitted in a forest carbon stock management project or programme documents shall be available for public inspection during normal office hours at the offices of the Department.

(2) Despite subregulation (1), commercially sensitive information may be protected, where the permit holder can demonstrate that the information is commercially sensitive and confidential.

(3) The Director or an independent validation or verification body shall check that information designated by the permit holder as commercially sensitive does not contain information that would be required to demonstrate—

(a) transparency in accounting methods;

(b) benefit sharing arrangements;

(c) baseline scenario;

(d) additionality;

(e) estimation and monitoring of green house gas emission reduction and removal; and

(f) other important matters related to forest carbon stock management project or programme.

(4) A permit holder shall provide any information requested by the Director including contractual and pricing information from carbon buyers.

(5) The Director may suspend or cancel a permit where a permit holder does not comply with subregulation (3) and (4).

(6) Information in project or programme documents related to the determination of the baseline scenario, demonstration of additionality, and estimation and monitoring of green house gas emission reduction and removal shall not be considered to be commercially sensitive and shall be provided in the public versions of the project or programme documents.

Monitoring, reporting and verification

21. (1) A permit holder shall comply with the monitoring , reporting and verification requirements set out in these Regulations in accordance with methodologies approved by the Director.

(2) Despite the generality of subregulation (1), the permit holder shall—

(a) for the purpose of validation and verification, provide data and parametersused for the quantification of green house gas emission reduction or removal in accordance with the approved methodology;

(b) comply with nationally recognised verification requirements;

(c) establish and apply quality management procedures to manage data and information;

(d) establish a green house gas information system;

(e) provide a monitoring plan in accordance with approved methodologies; and

(f) provide any other relevant information.

(3) A permit holder shall, within thirty days before commencement of the verification and validation notify the Director.

(4) The Director shall assign a forest officer to take part in the validation and verification.

Safeguards

22. A permit holder shall incorporate in the project or programme design and implementation, the social, environmental and fiduciary safeguards in Form XI set out in the First Schedule.

Benefit sharing

23. (1) A permit holder shall submit that permit holder's benefit sharing mechanism to the Director for approval.

(2) Subject to subregulation (1) a benefit sharing mechanism shall—

(a) contain a benefit sharing agreement executed by all interested parties;

(b) be developed jointly with all interested parties;

(c) contain auditable bench marks; and

(d) be derived from the gross revenue of carbon credits sold.

(3) A permit holder shall make public an approved benefit sharing mechanism.

(4) A benefit sharing mechanism shall be periodically reviewed after the benefit sharing mechanism becomes operational.

Risk assessment

24. (1) A permit holder shall demonstrate adequate management capacity and ability to address forest carbon stock management permanence risks during both the planning and operation of the forest carbon stock management project or programme.

(2) A permit holder shall submit a risk assessment and management plan to the Director.

(3) The Director may suspend or cancel a permit where a permit holder does not comply with subregulation (2).

Records and information

25. A permit holder shall ensure that all documents and records are kept in a secure and retrievable manner for at least seven years after the end of the crediting period.

Trade and disclosure

26. A person shall conduct a carbon transaction in accordance with the existing legislation on carbon trading, and take into account the Republic's international obligations.

Register of permits

27. (1) The Department shall keep and maintain a register of permits in Form XII set out in the First Schedule

(2) The Register under subregulation (1) shall be kept at the offices of the Department and shall be open to the public for inspection during normal office hours on payment of a fee set out in the Second Schedule.

Fees

28. The fees set out in the Second Schedule are payable for the matters specified therein.

FIRST SCHEDULE

PRESCRIBED FORMS

(Regulations 8, 10, 11, 12, 13, 14, 15, 17, 22 and 27)

FORM I

(Regulation 8)

REPUBLIC OF ZAMBIA

The Forests Act, 2015

(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

EXPRESSION OF INTEREST IN FOREST CARBON STOCK MANAGEMENT

I.	**Applicant**	
1.	Name	
2.	Organisation	
3.	Title	
4.	Address	
5.	Telephone	
6.	Fax	
7.	Email	
8.	Website	
II.	**Proposed Area for Feasibility Study**	
9.	**Proposed Area:**.....(name of forest area as applicable) Village(s): ..... Chiefdom(s): ..... District, ... (Province).....	
10.	Main objectives:	
11.	Problem identified	
12.	Potential size of area under consideration	
13.	Type of forest carbon stock management project or programme being planned	
14.	Intended partners	
15.	Potential benefits of the initiative	
16.	Potential stakeholders	
17.	How stakeholders will be engaged	
18.	Proposed carbon accounting methodologies	
19.	Proposed market	

FORM II
(Regulation 8(4))

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021
REQUEST FOR FURTHER PARTICULARS OR INFORMATION

1) Here insert the full names and address of the applicant

To (1) .....

.....

.....

2) Here insert the reference no. of the application

Reference No. (2) .....

You are requested to furnish, within thirty days of this notice, the following information or documents in respect of your expression of interest in forest carbon stock management.

(a) .....
(b) .....
(c) .....
(d) .....
(e) .....

If you fail to furnish the requested information within the stipulated period, your application will be treated as invalid and shall be rejected.

Dated this .....day of .....20 .....

.....
Director

FORM III
(Regulation 10(1))

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

NOTICE OF REJECTION OF EXPRESSION OF INTEREST IN FOREST IN FOREST CARBON STOCK MANAGEMENT

(1) Here insert the full names and address of the applicant

To (1) .....

.....

.....

(2 Here insert the reference no. of the application

Reference No. (2) .....

You are notified that your expression of interest in forest carbon stock management permit has been rejected by the Director on the following grounds:

(a) .....
(b) .....
(c) .....
(d) .....

Dated this .....day of .....20 .....

.....

Director

FORM IV
(Regulation 11(4))

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

APPLICATION FOR A PERMIT FOR FOREST CARBON STOCK MANAGEMENT

I.	**Applicant**	
1.	Name	
2.	Organisation	
3.	Title	
4.	Address	
5.	Telephone	
6.	Fax	
7.	Email	
8.	Website	
II.	**Details**	
9.	Total carbon inventory	
10.	Biomass carbon density (tCO_2)	
11.	Soil Organic Carbon density (tCO_2)	
12.	Canopy height	
13.	Canopy cover	
14.	Deforestation rate	
15.	Potential amount of carbon credits to be sold	
III.	**Proposed Area for Forest Carbon Stock Management**	
16.	Proposed Area:..... (name of forest area as applicable)	
	Village(s): ..... Chiefdom(s): ..... District: ..... (Province).....	
17.	Main objectives:	
18.	Problem identified	
19.	Potential size of area under consideration	
20.	Type of forest carbon stock management project or programme being planned	
21.	Type of activities to be undertaken	
22.	Intended partners	
23.	Potential benefits of the initiative	
24.	How benefits are expected to be shared with the identified partners	
25.	How stakeholders will get their benefits (the Type and form of benefits)	

FORM V
(Regulation 12)

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

NOTICE OF REJECTION FOR APPLICATION OF A FOREST CARBON STOCK MANAGEMENT PERMIT

(1) Here insert the full names and address of the applicant

To (1) .....

.....

.....

(2) Here insert the reference no. of the application

Reference No. (2) .....

You are notified that your application for a forest carbon stock management permit has been rejected by the Director on the following grounds:

(a) .....
(b) .....
(c) .....
(d) .....

Dated this .....day of .....20 .....

.....

Director

FORM VI
(Regulation 13(2)

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

FOREST CARBON STOCK MANAGEMENT PERMIT

Subject to the provisions of the Forests Act. No. 4 of 2015, Section 53(1)(a), (b) of the Laws of Zambia, a permit is granted to:

Name/Company: .....

Company Registration/NRC No: .....

Residential Address: .....

.....

District: ..... Postal Address: .....

to operate in ..... Forest Reserve/State Land/Customary Land of ..... District, ...Province.

The Licence will expire on the ..... day of ..... 20.....

The area of operation is ..... hectares with expected emission reduction of .....

.....

Director

TERMS AND CONDITIONS OF FOREST CARBON STOCK MANAGEMENT PERMIT

1. The permit holder shall be governed by the laws of Zambia and other international and agreements that Zambia is party to.

2. The permit holder shall comply with the provisions of the Forest Act, 2015.

3. The permit holder shall provide data and information to the Department related to forest carbon stock management.

4. The permit holder shall provide information related to the volume of emission reduction, buyer, prices, commitment period for such transaction and any other information as requested by the Director.

5. The permit holder shall demonstrate transparency in accounting methods, baseline scenario, additionality, estimation and monitoring of greenhouse gas emission reduction and removal and other important matters.

6. The permit holder shall provide periodic updates on the management of carbon stock and any information that may be necessary in relation to forest carbon stock forest management.

7. Public disclosure shall be mutually agreed throughout the project implementation time.

8. The permit holder shall develop a project or programme design, emission document or emission reduction document or related document depending on the carbon standard and the said document shall contain full information regarding the areas, size, benefit sharing plan, redress mechanism, obligations of the permit holder and all other environmentally and fiduciary information.

9. The benefit sharing plan shall clearly outline the gross revenue and the break down on how the gross revenue shall be shared.

10. The permit holder shall follow all environmental and social safeguards as guided by the Director.

11. The permit holder shall apply the precautionary principle in the development, management and conservation of forest ecosystems, biological diversity and habitats, taking into account the best scientific evidence available.

FORM VII
(Regulation 14)

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

APPLICATION FOR DUPLICATE FOREST CARBON STOCK MANAGEMENT PERMIT

Subject to the provisions of the Forests Act. No. 4 of 2015, Section 53 (1) (a) (b) of the Laws of Zambia, a permit is granted to:

Name/Company: .....

Company Registration/NRC No: .....

Residential Address: .....

District: ..... Postal Address: .....

To operate in ..... Forest Reserve/State Land/Customary Land of ..... District., ... Province

The permit is expected to expire on ..... day of..... 20.....

The area of operation is ..... hectares with expected emission reduction of .....

.....
Director

*A duplicate licence is issued under the conditions on which it was issued according to the Forests Act No. 4 of 2015

FORM VIII
(Regulation 15)

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

APPLICATION FOR THE RENEWAL OF A FOREST CARBON STOCK MANAGEMENT

		Application No:	
		Date Application form submitted:	
		Date Application form verified:	
		Date Application form reviewed:	
		Date of approval or rejection:	
1.	Type of Permit		
2.	Number of the old Permit		
3.	Type of Applicant		
4.	Registration No. of Applicant		
5.	Physical Address		
6.	Postal Address		
7.	Telephone:		
8.	Email:		
9.	Fax:		
10.	Contact person's name		
11.	Objective of the previous forest carbon management		
12.	Reasons for proposed renewal		
11.	Please indicate the amount of emission reduction achieved of your permit.		
12.	Please indicate number of beneficiaries (show proof or records)		
13.	Please indicate type and form of benefits		
14.	Attach a brief report on forest carbon stock management experiences and outputs		
Signature of Applicant (individual or authorised company representative):			
Date:.....			

FOR OFFICIAL USE ONLY		
Submitted to:	**Verified By:**	**Approved By:**
Name:	*Name:*	*Name:* .....
Position:	*Position:*	*Position:* .....
Signature:	*Signature:*	*Signature:* .....
District Forestry Officer Official Date Stamp	*Provincial Forestry Officer* Official Date Stamp	*Director – Forestry* Official Date Stamp
Remarks:		

FORM IX
(Regulation 17(3))

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

NOTICE OF SUSPENSION/CANCELLATION OF PERMIT

(1) Here insert the full names and address of the applicant

To (1)

.....

.....

.....

(2) Here insert the reference no. of the application

Reference No. (2) .....

You are notified that your forest carbon stock management permit issued to you on ..... Will be SUSPENDED/CANCELLED by the Director on the following grounds:

(a) .....
(b) .....
(c) .....
(d) .....

Dated this .....day of .....20 .....

.....

Director

FORM X
(Regulation 17(5))

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

SUSPENSION/CANCELLATION OF PERMIT

(1) Here insert the full names and address of the applicant

To (1) .....

.....

.....

(2) Here insert the reference no. of the application

Reference No. (2) .....

You are notified that your forest carbon stock management permit issued to you on ..... has been SUSPENSION/CANCELLED by the Director on the following grounds:

(a) .....
(b) .....
(c) .....
(d) .....

Dated this .....day of .....20 .....

.....

Director

FORM XI
(Regulation 22)

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

REQUIREMENT FOR ENVIRONMENTAL AND SOCIAL SAFEGUARDS

(Safeguards are a measure taken to protect the environment and people from harm)

I. Information by Permit holder	
1. Name	
2. Organisation	
3. Title	
4. Address	
5. Telephone	
6. Fax	
7. Email	
8. Website	
II. Commitment to Safeguards	
9. Actions complement or are consistent with the objectives of national forest programmes and relevant international conventions and agreements	
10. Describe the procedures or processes to ensure alignment with the national forestry policies	
11. Describe how you will show transparency on the management of forest, engagement with local communities	
12. Describe how you demonstrate respect for the knowledge and rights of local communities	
13. Describe how you will ensure full and effective participation of relevant stakeholders	
14. Demonstrate that the actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions are not used for the conversion of natural forests, but are instead used to incentivise the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits	
15. Demonstrate that the actions will address the risks of reversals	
16. Demonstrate that the actions will reduce displacement of emissions	

Signed.....

Date.....

FORM XI
(Regulation 22)

REPUBLIC OF ZAMBIA

The Forests Act, 2015
(Act No. 4 of 2015)

The Forests (Carbon Stock Management) Regulations, 2021

REQUIREMENT FOR ENVIRONMENTAL AND SOCIAL SAFEGUARDS

(Safeguards are a measure taken to protect the environment and people from harm)

I. Information by Permit holder	
1. Name	
2. Organisation	
3. Title	
4. Address	
5. Telephone	
6. Fax	
7. Email	
8. Website	
II. Commitment to Safeguards	
9. Actions complement or are consistent with the objectives of national forest programmes and relevant international conventions and agreements	
10. Describe the procedures or processes to ensure alignment with the national forestry policies	
11. Describe how you will show transparency on the management of forest, engagement with local communities	
12. Describe how you demonstrate respect for the knowledge and rights of local communities	
13. Describe how you will ensure full and effective participation of relevant stakeholders	
14. Demonstrate that the actions are consistent with the conservation of natural forests and biological diversity, ensuring that the actions are not used for the conversion of natural forests, but are instead used to incentivise the protection and conservation of natural forests and their ecosystem services, and to enhance other social and environmental benefits	
15. Demonstrate that the actions will address the risks of reversals	
16. Demonstrate that the actions will reduce displacement of emissions	

Signed.....

Date.....

SECOND SCHEDULE
(Regulation 30)

PRESCRIBED FEES

Item		*Fee Units*
1.	Application for permit	375,000
2.	Application for renewal of permit	75,000
3.	Search of register of permits	1,667

EDGAR C. LUNGU,
President

LUSAKA
17th June, 2021
[MLNR./FDHQ/101/8/15]

Annex 13: Long-term Implementation Work Plan

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1	SUSTAINABLE FOREST MANAGEMENT		
SUSTAINABLE FOREST MANAGEMENT	**1.1**	**Sustainable forests Managed by Community and Institutional Support**		
SUSTAINABLE FOREST MANAGEMENT	**1.1.1**	**Support capacity building of FD**		
SUSTAINABLE FOREST MANAGEMENT	1.1.1.1	Provision of trainings to forest officers.	Department of Forestry	3,5,7,9
SUSTAINABLE FOREST MANAGEMENT	**1.1.2**	**Support the development of forest management plans based on participatory planning exercises for forest reserves.**		
MONITORING, REPORTING, VERIFICATION	1.1.2.1	Conducting forest inventory	Department of Forestry	3,5,10
MONITORING, REPORTING, VERIFICATION	1.1.2.2	Conducting forest livelihood surveys (PRA and HH Survey)	Department of Forestry	3,5,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.1.2.3	Development of Forest Management plans	Department of Forestry	3,5,10
SUSTAINABLE FOREST MANAGEMENT	**1.1.3**	**Support FD in their management of forest reserves/ Protected Areas**		
SUSTAINABLE FOREST MANAGEMENT	1.1.3.1	Boundaries created and demarcated	Department of Forestry	3,4
SUSTAINABLE FOREST MANAGEMENT	1.1.3.2	Boundaries maintained(Natural forests)	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.3.3	Fire break maintenance(Plantations)	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.3.4	Patrols operational costs.	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.3.5	Engage and train HFOs to support patrolling in PA and FR	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.3.6	HFO patrolling operational costs	Department of Forestry	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.1.3.7	Early burning	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.3.8	Implement other activity as defined in the Forest Management Plan	Department of Forestry	3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	**1.1.4**	**Supporting forest management plan monitoring for forest reserves**		
SUSTAINABLE FOREST MANAGEMENT	1.1.4.1	Boundaries created and demarcated in a participatory manner	Department of Forestry	3,5,7
SUSTAINABLE FOREST MANAGEMENT	1.1.4.2	Boundaries maintained	Department of Forestry	2,3,4,6,8,10
SUSTAINABLE FOREST MANAGEMENT	1.1.4.3	Fire break maintenance	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.4.4	Early burning, operational costs.	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	**1.1.5**	**Identification and support to register Community Forestry areas based on participatory planning exercises**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.1.5.1	Identify target areas for community forest areas	Department of Forestry	1,2,6
SUSTAINABLE FOREST MANAGEMENT	1.1.5.2	Conduct awareness meetings and initiation	Department of Forestry	1,2,6
SUSTAINABLE FOREST MANAGEMENT	1.1.5.3	Engage Chiefs and Community Leaders	Department of Forestry	1,2,3
SUSTAINABLE FOREST MANAGEMENT	1.1.5.4	Connect forest mgmt. and mapping and signing of the map	Department of Forestry	1,2,3
SUSTAINABLE FOREST MANAGEMENT	1.1.5.5	Community forest mgmt. group formation and election	Department of Forestry	1,2,3
SUSTAINABLE FOREST MANAGEMENT	1.1.5.6	Community forest mgmt. planning and formation of rules	Department of Forestry	1,2,3
SUSTAINABLE FOREST MANAGEMENT	1.1.5.7	Community forest mgmt. agreement, preparation, application and signing	Department of Forestry	2,3,4
SUSTAINABLE FOREST MANAGEMENT	1.1.5.8	Implement forest mgmt. plan for forest protection, development, domestic use and forest-based income generation.	Department of Forestry	2,3,4,5

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.1.5.9	Operationalising the CFMG	Department of Forestry	1,2,3,5,6,7
SUSTAINABLE FOREST MANAGEMENT	1.1.5.10	Capacity building for CFMG	Department of Forestry	3,4,5,6,9
SUSTAINABLE FOREST MANAGEMENT	1.1.5.11	Training HFO (honorary forest officer)	Department of Forestry	2,3,7
SUSTAINABLE FOREST MANAGEMENT	1.1.5.12	Equipment for the HFO	Department of Forestry	2,3,7
MONITORING, REPORTING, VERIFICATION	1.1.5.13	Joint M&E	Department of Forestry	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.1.5.14	Capacity building for CFMG (BCP additional)	Department of Forestry	6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	**1.1.6**	**Support activities to revive and enforce village level fire ordinances that were functional and effective in the past for fire management and prevention.**		
SUSTAINABLE FOREST MANAGEMENT	1.1.6.1	Development of community fire rules	Department of Forestry	1,2

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.1.6.2	Procure 4 vehicles	Ministry of Livestock	1,5
SUSTAINABLE FOREST MANAGEMENT	**1.1.7**	**Nursery Establishment and Management**		
SUSTAINABLE FOREST MANAGEMENT	1.1.7.1	Establishing nurseries	Department of Forestry	1,2
SUSTAINABLE FOREST MANAGEMENT	1.1.7.2	Raising of seedlings	Department of Forestry	1,2,3,4,5
SUSTAINABLE FOREST MANAGEMENT	1.1.7.3	Distribution of seedlings	Department of Forestry	1,2,3,4,5
SUSTAINABLE FOREST MANAGEMENT	**1.1.8**	**Plantation Management**		
SUSTAINABLE FOREST MANAGEMENT	1.1.8.1	Land preparation	Department of Forestry	1,2
SUSTAINABLE FOREST MANAGEMENT	1.1.8.2	Silvicultural practices established	Department of Forestry	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.1.8.3	Planting of plantation	Department of Forestry	2,3
SUSTAINABLE FOREST MANAGEMENT	**1.2**	**Develop and support Community Forestry enterprises**		
SUSTAINABLE FOREST MANAGEMENT	**1.2.1**	**Financing of small-scale investments such as NFTP**		
SUSTAINABLE FOREST MANAGEMENT	**1.2.2**	**Implementing of beekeeping**		
SUSTAINABLE FOREST MANAGEMENT	1.2.2.1	Identify and support the organisation of bee keeping groups	Department of Forestry	1,2,3,4,5
SUSTAINABLE FOREST MANAGEMENT	1.2.2.2	Provide inputs, equipment and hives	Department of Forestry	1,2,3,4,5
SUSTAINABLE FOREST MANAGEMENT	1.2.2.3	Provide technical training	Department of Forestry	1,2,3,4,5
SUSTAINABLE FOREST MANAGEMENT	1.2.2.4	Improve value chains for marketing	Department of Forestry	2,3,4,5

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	**1.2.3**	**Financing of basket making/weaving from bamboo**		
SUSTAINABLE FOREST MANAGEMENT	1.2.3.1	Identify the farmers involved in basket weaving	Department of Forestry	3,4
SUSTAINABLE FOREST MANAGEMENT	1.2.3.2	Provision of support, providing trainings	Department of Forestry	3,4
SUSTAINABLE FOREST MANAGEMENT	1.2.3.3	Value addition	Department of Forestry	3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	**1.3**	**Wildlife Management- Increased protect for PA through co-management**		
SUSTAINABLE FOREST MANAGEMENT	**1.3.1**	**Support for the national protected area system**		
SUSTAINABLE FOREST MANAGEMENT	1.3.1.1	Fine-tune of the Information Systems Network	5. Dept of National Park and Wildlife	4
SUSTAINABLE FOREST MANAGEMENT	1.3.1.2	Final SMART Training	5. Dept of National Park and Wildlife	4

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	**1.3.2**	**Community Management of Wildlife**		
SUSTAINABLE FOREST MANAGEMENT	1.3.2.1	Support with elections for CRBs to be formed under the authority of the Wildlife Act to represent communities in wildlife activities at community level	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	1.3.2.2	Capacity Building for CRBs	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	1.3.2.3	Support to CRB Operations (Board meetings, Community meetings etc)	5. Dept of National Park and Wildlife	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.3.2.4	Develop wildlife based enterprises: Strengthen existing boards and communities by supporting them for a limited number of activities, through community matching grants	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	1.3.2.5	Management of Human Wildlife Conflict	5. Dept of National Park and Wildlife	1,3,5,7,9,10
SUSTAINABLE FOREST MANAGEMENT	1.3.2.6	Support efforts to diminish the impacts of HWC on human communities by supporting consultations, implementation of effective techniques, study tours to visit areas and awareness raising.	5. Dept of National Park and Wildlife	1,3,5,7,9,10
SUSTAINABLE FOREST MANAGEMENT	**1.3.3**	**Support to Community Conservation Areas (CCAs)**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.3.3.1	Support consultations, voluntary resettlement of HHs out of CCAs, development of financial incentives for the communities, support to communities outside of CCAs, demarcation of CCAs, and arranging (through DNPW) economic incentives for communities to be derived from LNP	5. Dept of National Park and Wildlife	1,3,5,7,9,10
SUSTAINABLE FOREST MANAGEMENT	**1.3.4**	**Support for Lukusuzi National Park and Luambe National Park**		
SUSTAINABLE FOREST MANAGEMENT	1.3.4.1	Implementation of Fire Management Plan (Procure equipment, Training & Implement fire mgt plan)	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	1.3.4.2	Clearing of Park boundaries	5. Dept of National Park and Wildlife	4
SUSTAINABLE FOREST MANAGEMENT	1.3.4.3	Electricity Connectivity to National Grid at Chikomeni-Lukusuzi NP	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	1.3.4.4	Ecotourism: Identification/assessment of potential tourism facility sites	5. Dept of National Park and Wildlife	4
SUSTAINABLE FOREST MANAGEMENT	1.3.4.5	Purchase of equipment such as radios for communication, park guard equipment, and patrol equipment	5. Dept of National Park and Wildlife	4
SUSTAINABLE FOREST MANAGEMENT	1.3.4.6	Support park patrols, with particular focus on management of poaching	5. Dept of National Park and Wildlife	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.3.4.7	Operating Costs (Vehicle maintenance, fuel for ops, admin etc)	5. Dept of National Park and Wildlife	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.3.4.8	Support to binational initiatives with Malawi for joint management measures within the existing Malawi Zambia Trans frontier Conservation Area Treaty and the long-term creation of biological connectivity between Kasungu National Park in Malawi and the Luangwa valley complex of Protected Areas in Zambia.	5. Dept of National Park and Wildlife	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.3.4.9	Watering Holes (Assessment, drilling & install bore hole, solar installation, piping)	5. Dept of National Park and Wildlife	4
SUSTAINABLE FOREST MANAGEMENT	1.3.4.10	Office Equipment and Furnishing	5. Dept of National Park and Wildlife	5
MONITORING, REPORTING, VERIFICATION	1.3.4.11	Conduct 2021 aerial surveys (Hire aircraft, Consultant & conduct reconnaissance flights)	5. Dept of National Park and Wildlife	5
MONITORING, REPORTING, VERIFICATION	1.3.4.12	Conduct Large Mammals Ground Counts - Carnivore, hippo (Luambe & Lumimba GMA)	5. Dept of National Park and Wildlife	4
MONITORING, REPORTING, VERIFICATION	1.3.4.13	Conduct continuous monitoring of mining activities	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	**1.3.5**	**DNPW Support for GMAs**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	1.3.5.1	Operating Cost	5. Dept of National Park and Wildlife	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.3.5.2	Office Equipment (computers & other items)	5. Dept of National Park and Wildlife	4
SUSTAINABLE FOREST MANAGEMENT	**1.3.6**	**Information dissemination**		
SUSTAINABLE FOREST MANAGEMENT	1.3.6.1	GWP annual conference	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	1.3.6.2	Conduct media visits of project sites for stories/photos	5. Dept of National Park and Wildlife	1,2,3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	1.3.6.3	Procurement evaluations Meetings	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	**1.3.7**	**Monitoring and Backstopping Project Activities**		
MONITORING, REPORTING, VERIFICATION	1.3.7.1	Monitoring of Project Activities		1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	**1.3.8**	**Technical Service Provider**		
SUSTAINABLE FOREST MANAGEMENT	1.3.8.1	Inception Phase (Inceptions visits and consultative meeting)	Technical Service Provider	4
SUSTAINABLE FOREST MANAGEMENT	1.3.8.2	Preparation/Revision of Training manuals	Technical Service Provider	4
MONITORING, REPORTING, VERIFICATION	1.3.8.3	Community engagement, Capacity building, Grant proposal preparation, monitoring and reporting)	Technical Service Provider	4,6
SUSTAINABLE FOREST MANAGEMENT	1.3.8.4	Documentation of good practices	Technical Service Provider	4
MONITORING, REPORTING, VERIFICATION	1.3.8.5	Annual Report	Technical Service Provider	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2	CLIMATE SMART AGRICULTURE (and Livestock)		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1**	**Climate Smart Agricultural Practices**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.1**	**Support conservation agriculture and ISFM. Soil fertility and management practices will be integrated according to local conditions and farmers' indigenous knowledge.**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.1	Promotion of crop rotation involving a leguminous crop. (TOT technical)	Department of Agriculture	3,6
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.2	Retention of crop residues (mulch) (TOT technical)	Department of Agriculture	3,6
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.3	Practicing minimum land disturbance (conservation tillage) (TOT technical)	Department of Agriculture	3,6
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.4	Training of lead farmers (LF) by CEOs/BEO's - CSA Approaches and Awareness training on ISFM (district)	Department of Agriculture	1,3,6,8
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.5	Training of Follower farmers (FF) by LFs -CSA Approaches and Awareness training on ISFM (district)	Department of Agriculture	2,4,7,9

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.6	Planning and review quarterly meetings to address implementation challenges	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.7	Promotion of agroForestry practices.	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.8	Organic matter composting. Advise farmers on composting and organic fertiliser materials. Cow dung, nitrogen rich species.	Department of Agriculture	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.9	Establish an inorganic fertiliser blending plant.	ZARI	6
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.10	On-farm trials of inorganic fertiliser blends	ZARI	7,8,9
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.1.11	Establish a set of standard operating procedures for fertiliser application for blends	ZARI	1,2,3,

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	2.1.1.12	Monitoring of CA and ISFM activities(biannually)/a (National Headquarters)	Department of Agriculture	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.2**	**Technical and financial assistance will be provided to stabilise soils and increase fertility, improve water retention, harvesting and infiltration, increase biomass (particularly carbon).**		
MONITORING, REPORTING, VERIFICATION	2.1.2.1	Monitoring of CA and ISFM activities(quarterly)/a (Province)	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	2.1.2.2	Monitoring of CA and ISFM activities(quarterly)/a (District)	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	2.1.2.3	Monitoring of CA and ISFM activities(monthly)/a (Block and Camp)	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.2.4	Contour cultivation to prevent increased surface water runoff and soil erosion.	Ministry of Agriculture and cooperating partners	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.2.5	Construction of infiltration ditches in order to trap and store run off water thereby increasing infiltration.	Ministry of Agriculture and cooperating partners	1,2,3

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.2.6	Construction of permanent planting basins and rip lines to trap and store water in times of partial drought.	Ministry of Agriculture and cooperating partners	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.2.7	Construction of check dams to reduce soil erosion and increases sediment deposition which would otherwise find its way into water courses.	Ministry of Agriculture and cooperating partners	1,2,3
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.2.8	Terrace cultivation to reduce the effective slope of the field thereby reducing water runoff and increasing infiltration.	Ministry of Agriculture and cooperating partners	1,2,3
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.3**	**Strengthening of agricultural extension and advisory services**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.3.1	Procurement of appropriate transport for extension workers.	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.3.3	Boosting FTC staffing levels with the necessary expertise to drive CSA forward.	Department of Agriculture	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.3.4	Procurement of IT equipment such as computers and projectors to facilitate teaching.	Department of Agriculture	1,3,5,7,9
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.3.5	Procurement of bicycles for the lead farmers (LFs)	Department of Agriculture	1,6
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.3.6	Setting up demonstration CSA demonstration plots at FTC's	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.4**	**Support for integrated agricultural and forest research**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.4.1	Research on fast growing leguminous agroForestry	Department of Agriculture and Forestry Department	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.4.2	Carrying out regular soil testing in order to determine soil fertility status.	Department of Agriculture and Forestry Department	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.4.3	Integrating non-timber forest products into agricultural systems such as mushroom growing, honey production, macadamia.	Department of Agriculture and Forestry Department	5,6,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.5**	**Identify and accommodate various training needs between extension workers, lead farmers, and farmers in terms of awareness, sensitisation to the issues, and detailed technical training**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.5.1	Conducting specific and tailor-made trainings to extension workers and farmers based on their knowledge gaps.	Department of Agriculture	5,6,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.6**	**Conduct trainings for extension staff and support their training of farmers across the EP**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.6.1	Conducting trainer of trainers (TOT)workshops on climate smart agriculture for extension officers.	Department of Agriculture	5,6,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.6.2	Implementing the concept of farmer field schools as centres for hands on learning by farmers.	Department of Agriculture	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.7**	**AgroForestry models through the establishment of seed multiplication and tree nurseries, promotion of sustainable tree species.**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.7.1	Facilitating and empowering FTCs to become seed multiplication centres for agroForestry species.	Department of Agriculture and Forestry Department	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.7.2	Providing all the necessary inputs and materials that are required in production of agroForestry nurseries.	Department of Agriculture and Forestry Department	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.7.3	Prioritising only agroForestry species that have an immediate impact on ameliorating soil fertility.	Department of Agriculture and Forestry Department	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.7.4	Extension officers and farmer training on different techniques of successful agroForestry seed germination	Department of Agriculture and Forestry Department	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.8**	**Scaling up Farmer-Managed Natural Tree Regeneration (FMNR)**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.8.1	Promoting the establishment of community woodlots around farm steady.	Department of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.9**	**Market access and private sector engagement to support farmers**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.9.1	Linking farmers to markets as well as providing market information beyond EP.	Ministry of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.9.2	Linking farmers to private agricultural credit financing schemes.	Ministry of Agriculture	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.1.10**	**Development of community enterprises.**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.10.1	Business promotion on the preservation of farm produce within the farm communities.	Department of Agriculture	3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.10.2	Promoting the formation of cooperatives in order to access farm-based business grants.	Department of Agriculture	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.1.10.3	Training these cooperatives in entrepreneurship skills and how to run these cooperatives as democratic entities.	Department of Agriculture	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2**	**Increasing production and productivity of livestock and fish with reduced carbon emissions**		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2.1**	**Livestock farmers able to cope with climate change through adoption of improved practices that enhance livelihoods;**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.1.1	Livestock farmers acquire breeds resilient to climate change	Ministry of Livestock	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.1.2	Scale up Livestock Pass-on Scheme	Ministry of Livestock	3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.1.3	Train extension officers on GIS to assess carrying capacities	Ministry of Livestock	2,6
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2.2**	**Livestock farmers set up sustainable livestock pastures, fodder banks, rangeland and water harvesting systems**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.2.1	Set-up sustainable livestock pastures, fodder banks and rangelands	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.2.2	Establish land use plans at village level using participatory GIS	Ministry of Livestock	1,2
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.2.3	Plant fodder & fruit trees around homesteads and along the riverine;	Ministry of Livestock	2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.2.4	Construct fire breaks around rangelands	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.2.5	Sustainable Management of existing water resources and develop alternative water sources for livestock (shallow wells, weirs, small dams, boreholes and wells)	Ministry of Livestock	2,6
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2.3**	**Effective practices developed for the community to manage indigenous livestock**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.3.1	Raise awareness of the value of indigenous livestock species and breeds	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.3.2	Improve Community management of indigenous livestock breeds (Best practice and development of breed management manual for farmers and extension workers in local language	Ministry of Livestock	1,2
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.3.3	Train extension staff and farmers on community mgmt. of indigenous livestock breeds	Ministry of Livestock	2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.3.4	Conduct exchange visits for farmers on indigenous livestock breeds	Ministry of Livestock	2,7
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2.4**	**Livestock and fish breeding centres operating optimal rehabilitation and maintenance**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.4.1	Conduct minor rehabilitation and maintenance of breeding centres	Ministry of Livestock	3,7
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2.5**	**Service & maintenance of vehicles**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.2.5.1	Conduct repair and service of motor vehicles	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.2.6**	**Service and maintenance of motor bikes for field staff**		
CLIMATE SMART	2.2.6.1	Conduct service and repair of field motor bikes	Ministry of Livestock	3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
AGRICULTURE (and Livestock)				
CLIMATE SMART AGRICULTURE (and Livestock)	**2.3**	**Resilience of natural resources to climate change enhanced;**		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.3.1**	**Restoration of degraded pasture and increased vegetation cover with different drought tolerant perennials**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.3.1.1	Characterise rangelands	Ministry of Livestock	3,4
CLIMATE SMART AGRICULTURE (and Livestock)	2.3.1.1	Carry out rangeland improvement interventions/strategies (e.g., planting of drought tolerant annual and perennial species).	Ministry of Livestock	4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4**	**Promote sustainable fisheries and aquaculture production to mitigate climate change**		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.1**	**Control of fishing effort and limiting the quantity of fish caught to reduce overfishing as ways of protecting the water bodies and the resource poor fishermen**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.1.1	Implement fishing ban- conduct patrols	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.2**	**Develop, adapt and adopt appropriate fish post-harvest technology**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.2.1	Train farmers in post-harvest technologies	Ministry of Livestock	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.3**	**Expand aquaculture to increase and stabilise fish food supplies and employment**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.3.1	Increase production of fingerlings	Ministry of Livestock	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.3.2	Provide competitive grants for fishpond construction	Ministry of Livestock	3,5,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.4**	**Integration of fish culture with crops and/or poultry**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.4.1	Procurement and provision of poultry for qualifying farmers	Ministry of Livestock	3,4
CLIMATE SMART	2.4.4.2	Procurement and supply of seeds and seedlings for qualifying farmers	Ministry of Livestock	3,4

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
AGRICULTURE (and Livestock)				
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.5**	**Promote the culture of planktophagous and herbivorous fishes**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.5.1	Procure breeding stock for hatcheries	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.6**	**Improve the microclimatic conditions of fish farms, natural waters and the larger environment**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.6.1	Train and demonstrate to farmers on planting trees and shrubs around fishponds and shrubs	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.4.7**	**Promote and support the production of fish feed**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.7.1	Create fish feed demonstrations	Ministry of Livestock	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.4.7.2	Conduct feed formulation trainings	Ministry of Livestock	3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	**2.5**	**Control and management of diseases in livestock and fish to increase resilience and mitigate climate change**		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.5.1**	**Introduce internet and mobile based disease reporting systems**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.1.1	Procure smart phones	Ministry of Livestock	1,2
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.1.2	Train veterinary assistants in mobile based disease reporting	Ministry of Livestock	1,3,5,7,9
CLIMATE SMART AGRICULTURE (and Livestock)	**2.5.2**	**Create and operationalise epidemiological surveillance networks**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.2.1	Update the provincial livestock disease database and create a real time disease risk analysis platform	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.2.2	Form community-based disease reporting platforms	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART	2.5.2.3	Update the district livestock disease data base	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
AGRICULTURE (and Livestock)				
CLIMATE SMART AGRICULTURE (and Livestock)	**2.5.3**	**Screen livestock and fish for diseases**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.3.1	Procure reagents for sousveillance of Newcastle Disease, African Swine Fever and PPR	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.3.2	Conduct serosurvey of Newcastle Disease	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.3.3	Conduct serosurvey of African Swine Fever	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.3.4	Conduct serosurvey of PPR	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.3.5	Conduct an explorative survey of fish diseases	Ministry of Livestock	1,2
CLIMATE SMART AGRICULTURE (and Livestock)	**2.5.4**	**Screen livestock for antimicrobial resistance**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.4.1	Procure reagents and materials	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.4.2	Conduct an explorative surveillance for antimicrobial resistance in poultry, pigs and cattle	Ministry of Livestock	4,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.5.5**	**Vaccinate livestock**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.5.1	Procure Newcastle Disease Vaccine for Poultry	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.5.5.2	Conduct Newcastle Disease Vaccinations	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.6**	**Capacity Building on Climate Change Adaptation for Stakeholders and Communication**		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.6.1**	**Community level: Training artisans in manufacturing livestock-related material as a source of income diversification**		
CLIMATE SMART	2.6.1.1	Prepare training materials for artisans in manufacturing livestock related materials as a source of income diversification;	Ministry of Livestock	3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
AGRICULTURE (and Livestock)				
CLIMATE SMART AGRICULTURE (and Livestock)	2.6.1.2	Train artisans in manufacturing livestock-related materials as a source of income diversification;	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.6.1.3	Exchange visits to affected communities;	Ministry of Livestock	3,5,7,9
CLIMATE SMART AGRICULTURE (and Livestock)	**2.6.2**	**Community level awareness on prevalent and emerging livestock-fish diseases**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.6.2.1	Conduct disease awareness campaigns	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.7**	**Diversification and strengthened livelihoods and source of incomes for rural populations.**		
CLIMATE SMART AGRICULTURE (and Livestock)	**2.7.1**	**Livestock farmers equipped with skills of feed conservation for dry season and for other adaptation measures autonomously implemented**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.7.1.1	Develop Livestock/ Mixed Crop-Livestock Systems	Ministry of Livestock	3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.7.1.2	Promote Conservation Agriculture/Farming - fodder production, forage and cover crops, legume forages	Ministry of Livestock	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.7.1.3	Promote Good Agricultural Practices (GAPs) - manure use, use of crop residues for feeds and soil cover, animal draft power	Ministry of Livestock	1,2,3
CLIMATE SMART AGRICULTURE (and Livestock)	2.7.1.4	Promote Fodder production and conservation for dry season feed	Ministry of Livestock	3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.7.2**	**Provide extra market for poultry and goats**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.7.2.1	Construct a poultry and goat meat processing and packaging plant (Halal standard)	Ministry of Livestock	5,7
CLIMATE SMART AGRICULTURE (and Livestock)	2.7.2.2	Formation of a poultry and small ruminant marketing board	Ministry of Livestock	3,4
CLIMATE SMART AGRICULTURE (and Livestock)	**2.8**	**Demonstration of livestock-fisheries-crop technologies to increase and mitigate negative impacts of climate change**		
CLIMATE SMART	**2.8.1**	**Encourage peer to peer transfer of knowledge**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
AGRICULTURE (and Livestock)				
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.1.1	Establish Farmer Field Schools	Ministry of Livestock	3,4,5
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.1.2	Train lead farmers	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.1.3	Conduct Field days	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	**2.8.2**	**Show case the climate change adaptation strategies to the wider audience**		
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.2.1	Radio and TV programmes	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.2.2	Exhibit at District shows	Ministry of Livestock	2,3,4,5,6,7,8,9,10
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.2.3	Exhibit at Provincial show	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
CLIMATE SMART AGRICULTURE (and Livestock)	2.8.2.4	Exhibit at National show	Ministry of Livestock	2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**2.9**	**Knowledge, Monitoring and Evaluation (M&E management and lessons learnt are captured and appropriately disseminated)**		
MONITORING, REPORTING, VERIFICATION	**2.9.1**	**High level visits**		
MONITORING, REPORTING, VERIFICATION	2.9.1.1	One Project visit by Minister & or Permanent Secretary		6,8,9
MONITORING, REPORTING, VERIFICATION	**2.9.2**	**National HQ subject matter specialist M&E visits**		
MONITORING, REPORTING, VERIFICATION	2.9.2.1	Six visits by HQ team	Ministry of Livestock	3,5,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**2.9.3**	**Provincial backstopping visits**		
MONITORING, REPORTING, VERIFICATION	2.9.3.1	Nine project backstopping visits by provincial HQ	Ministry of Livestock	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**2.9.4**	**District supervision visits**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	2.9.4.1	Nine supervisory visits per district by district teams	Ministry of Livestock	3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**2.9.5**	**Generation of evidence of effects of climate change on rangelands**		
MONITORING, REPORTING, VERIFICATION	2.9.5.1	Produce reports, policy documents and publications	Ministry of Livestock	5,7,9
MONITORING, REPORTING, VERIFICATION	**2.9.6**	**Purchase of vehicles**		
MONITORING, REPORTING, VERIFICATION	2.9.6.1	Procure 2 vehicles	Ministry of Livestock	1,6
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3	IMPROVED UTILISATION OF WOOD FUEL (STOVES)		
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	**3.1**	**Woodlot establishment**		
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	**3.1.1**	**Financing of woodlots for firewood production**		
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.1.1	Training in tree nursery establishment and management	Department of Forestry	2,3

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.1.2	Raising of seedlings for the woodlots	Department of Forestry	2,3
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.1.3	Woodlot establishment	Department of Forestry	2,3
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	**3.1.2**	**Dissemination of improved cookstoves- assess potential use of new stoves, identify gaps in design, identify areas for implementation, incentive mechanisms, distribute to HHs, monitor use.**		
MONITORING, REPORTING, VERIFICATION	3.1.2.1	Carry out baseline survey	Department of Energy	1,2
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.2	Evaluate cookstove options, costs and efficiencies through survey- market assessment and willingness to take up new technologies.	Department of Energy	1,2
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.3	Conduct community awareness on the importance of using improved cookstoves	Department of Energy	2,3,4,5,6,7,8,9,10
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.4	Assess potential use of new stoves	Department of Energy	1,2
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.5	Identify gaps in design of improved stoves	Department of Energy	1,2

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.6	Identify areas for implementation	Department of Energy	1,2
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.7	Identify incentive mechanisms	Department of Energy	1,2
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.8	Distribute of improved cookstoves to HHs	Department of Energy	2,3,4,5,6,7,8,9,10
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.9	provide training on improved cookstove sue	Department of Energy	2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	3.1.2.10	Monitor implementation of improved cookstoves	Department of Energy	2,3,4,5,6,7,8,9,10
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.2.11	Determine how/if additional carbon credits can be generated	Department of Energy	1,2
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	**3.1.3**	**Alternative Fuel Alternatives**		
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.1	Identify feasibility studies of different alternative fuels in different areas of the EP-	Department of Energy	1,3

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.2	Market assessment for new technologies	Department of Energy	1,3
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.3	Identify areas for implementation for each of these fuels	Department of Energy	1,3
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.4	Awareness and sensitisation meetings with communities for specific technologies	Department of Energy	1,3,5,7,9
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.5	Pilot new technologies within the specific areas	Department of Energy	1,3,4,5
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.6	Assessment of pilots and new alternative technologies to use in specific areas of the EP	Department of Energy	2,3,4,5
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.7	Trainings for communities on new technologies	Department of Energy	2,3,4,5,6,7,8,9,10
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.8	Development of standards for the renewable/alternative energy technologies	Department of Energy	1,3
IMPROVED UTILISATION OF	3.1.3.9	Identify and develop incentives for alternative energy adoption	Department of Energy	1,3

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
WOOD FUEL (STOVES)				
IMPROVED UTILISATION OF WOOD FUEL (STOVES)	3.1.3.10	Roll out new technologies with communities in the EP	Department of Energy	3,4,5,6,7,8,9,10
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4	REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION		
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	**4.1.1**	**Support and implementation of sustainable charcoal production**		
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.1	Revise charcoal production manual	Department of Energy	1,2
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.2	Identification of charcoal production areas in EP	Department of Energy	1,2

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.3	Identify charcoal producer groups in EP	Department of Energy	1,2,3
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.4	Identify different charcoal production technologies- kilns	Department of Energy	1,2
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.5	Awareness and sensitisation meeting with the communities in EP	Department of Energy	1,2,3,4,5,6,7,8,9,10
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.6	Training of local charcoal production groups on new technologies	Department of Energy	1,2,3,4,5,6,7,8,9,10
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.7	Pilot identified charcoal production technologies within EP	Department of Energy	1,2,3,4,5

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	4.1.1.8	Assess the impacts of these new technologies and if it can be scaled- community acceptance.	Department of Energy	1,2,3,4,5
REGULATED PRODUCTION OF WOODFUEL (SUSTAINABLE CHARCOAL PRODUCTION	4.1.1.9	Based on pilot research, rollout of these technologies for charcoal producer groups	Department of Energy	2,3,4,5,6,7,8,9,10
ENABLING ENVIRONMENT	5	ENABLING ENVIRONMENT		
ENABLING ENVIRONMENT	**5.1**	**Integrated District Plans established and implemented**		
ENABLING ENVIRONMENT	**5.1.1**	**Provide targeted support to the development of integrated district plans in the province**		
ENABLING ENVIRONMENT	5.1.1.1	Development of a "Planning Programme" or Project Proposal where districts identify a road map to development. Includes budget, timeframe.	Ministry of Local Government (Council)	1
ENABLING ENVIRONMENT	5.1.1.2	Preparation of planning survey and issues report	Ministry of Local Government (Council)	1
ENABLING ENVIRONMENT	5.1.1.3	Preparation of the Spatial development framework	Ministry of Local Government (Council)	2
ENABLING ENVIRONMENT	5.1.1.4	Preparation of the Implementation Framework	Ministry of Local Government (Council)	3

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
ENABLING ENVIRONMENT	5.1.1.5	Approval of the Integrated Development Plan	Provincial Planning Authority/ Ministry of Local Gov	4
ENABLING ENVIRONMENT	5.1.1.6	Attract investment to the district, including the mobilisation of local resources	Ministry of Local Government (Council)	5
ENABLING ENVIRONMENT	**5.2**	**PLUP developed in a participatory manner and implemented**		
ENABLING ENVIRONMENT	**5.2.1**	**Prepare the Participatory Land Use Plans and implementation**		
ENABLING ENVIRONMENT	5.2.1.1	Use of Remote sensing to identify target wards for PLUP that are hotspots of environmental degradation in order to contribute to emission reduction. Agreeing with the TSP on a minimum 22 targeted wards for PLUP	Ministry of Local Government (Council)	1,2
ENABLING ENVIRONMENT	5.2.1.2	Design/Develop/Finalise the engagement process based on the manual that has been developed and incorporating the CCB SBIA.	Ministry of Local Government (Council)	1,2
ENABLING ENVIRONMENT	5.2.1.3	Develop Terms of Reference for the TSP- Technical Service Provider-	Ministry of Local Government (Council)	1,2
ENABLING ENVIRONMENT	5.2.1.4	Determining whether TA need a PLUP or if not, what other form of agreement binds them to supporting the implementation	Ministry of Local Government (Council)	3,4
ENABLING ENVIRONMENT	5.2.1.5	Engagement and sensitisation of Traditional Leader for permission to work in their Chiefdoms. for their support and permission. Sensitisation of the Traditional Leadership-	Ministry of Local Government (Council)	3,4

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
ENABLING ENVIRONMENT	5.2.1.6	Start survey to understand the geography and current land uses	Ministry of Local Government (Council)	3,4
ENABLING ENVIRONMENT	5.2.1.7	Start community engagement, then drawing current land uses with the community and then agreeing on the ideal land uses for the area. Assessment of existing local management Structure	Ministry of Local Government (Council)	3,4
ENABLING ENVIRONMENT	5.2.1.8	Explicitly develop targets for Community Forestry for each PULP by traditional authority	Ministry of Local Government (Council)	1,2
ENABLING ENVIRONMENT	5.2.1.9	Set out the rules for the implementation of the land use plans implementation of participatory land use. To ensure well established local level structure that supports and facilitates the implementation of Participatory Land Use Plans. Effective local management structures that ensure achievement of PLUP activities. Agreeing with local leadership on management structure	Ministry of Local Government (Council)	2,3,4,5,6,7,8,9,10
ENABLING ENVIRONMENT	5.2.1.10	Reviewing the methodology and the template of the PLUP and incorporate what is needed for the long-term implementation of the EP Programme.	Ministry of Local Government (Council)	2,3
ENABLING ENVIRONMENT	5.2.1.11	Signing of PLUP by traditional authorities and Local Gov	Ministry of Local Government (Council)	1,2,3
ENABLING ENVIRONMENT	**5.2.2**	**To ensure effective community participation in local level planning**		
ENABLING ENVIRONMENT	5.2.2.1	Selection of activities for community development that contribute to emission reduction	Ministry of Local Government	1,2
ENABLING ENVIRONMENT	5.2.2.2	Engagement of a TSP	Ministry of Local Government	3,4
ENABLING ENVIRONMENT	5.2.2.3	Train Local communities in tools for local land use planning. Training of Local Communities on use of planning tools	Ministry of Local Government	3,4

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
ENABLING ENVIRONMENT	5.2.2.4	Equip local jurisdictions in the use of landscape planning tools	Ministry of Local Government	3,4
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	6	BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)		
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	**6.1.1**	**Benefit sharing (direct based on actual revenue))**		
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	**6.2.1**	**Incentive payments**		
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	**6.3.1**	**Grants**		**5,6,7,8,9,10**
SUSTAINABLE FOREST MANAGEMENT	6.3.1.1	GRANTS	Department of Forestry	2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	**6.4.1**	**REDD Service Provision**		**5,6,7,8,9,10**
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	**6.5.1**	**Other Support Measures**		**6,7,8,9,10**
BENEFIT SHARING MANAGEMENT (INCENTIVE PAYMENTS, GRANTS, ETC)	**6.6.1**	**Investments (GRZ infrastructure support)**		**7,8,9,10**
SUSTAINABLE FOREST MANAGEMENT	6.6.1.1	Ongoing support, operation and equipment costs to FD	Department of Forestry	5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	6.6.1.2	Road to forest camps rehabilitation	Department of Forestry	3,4,5,6,7,8,9,10
SUSTAINABLE FOREST MANAGEMENT	6.6.1.3	Rehabilitation of forest camps	Department of Forestry	4,5

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
SUSTAINABLE FOREST MANAGEMENT	6.6.1.4	Development of new forest camps	Department of Forestry	6,7
CLIMATE SMART AGRICULTURE (and Livestock)	6.6.1.5	Rehabilitating Farmer Training Centres (FTC's).	Department of Agriculture	4,5,6
SUSTAINABLE FOREST MANAGEMENT	6.6.1.6	Construction of Park entry gate infrastructure at Chikomeni, Changachanga & Chakolwa (Design of entry infrastructure, revenue collection office & guard room, toilets, & barrier)	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	6.6.1.7	Investments in infrastructure: Construction of 8 staff houses , Storeroom/radio room, external works (Water reticulation, electrical reticulation, soakaway, septic tank, Drill borehole/control panel & install solar for water Kalindi & Nchenche)	5. Dept of National Park and Wildlife	4,5
SUSTAINABLE FOREST MANAGEMENT	6.6.1.8	Investments in infrastructure: Upgrading of existing roads and tracks to facilitate park mgt	5. Dept of National Park and Wildlife	4
MONITORING, REPORTING, VERIFICATION	7	MONITORING, REPORTING, VERIFICATION		
MONITORING, REPORTING, VERIFICATION	**7.1**	**Regularisation of land and resource rights**		
MONITORING, REPORTING, VERIFICATION	7.1.1.1	Develop systems to manage data on land rights- documenting current modalities, reviewing options for updating existing rights, programme management and legal drafting and development of monitoring mechanisms		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	7.1.1.2	Identify regulatory issues for sustainable private sector arrangements including characterising formal and informal arrangements, exploring alternative regulatory frameworks and stakeholder engagement		
MONITORING, REPORTING, VERIFICATION	7.1.1.3	Support identification of land rights in selected districts of EP including assessment of demand for different types of formalisations, development of a rural regularisation manual, and land rights mapping.		
MONITORING, REPORTING, VERIFICATION	**7.2**	**Emission Reduction Quantification and Ongoing Monitoring**		
MONITORING, REPORTING, VERIFICATION	**7.2.1**	**Enhance Zambia's capacity to achieve and account for emissions reductions and support relevant entities in negotiations and deliberations leading to signing of the ERPA**		
MONITORING, REPORTING, VERIFICATION	7.2.1.1	Maintain the web-based system for data reporting, evaluate provider capabilities, the need and cost for additionally capacity building and address (1 National & 1 EP); and testing of workflow and reporting production based on discipline module	ZEMA	1,2,3,4
MONITORING, REPORTING, VERIFICATION	**7.2.2**	**Develop an emissions baseline against which future verified payments of emissions reductions will be made.**		
MONITORING, REPORTING, VERIFICATION	7.2.2.1	Test the central national data infrastructure and link to utilisation of common geodata standard for GHG monitoring: One ICT Consultancy	ZEMA	1,2
MONITORING, REPORTING, VERIFICATION	7.2.2.2	Revise the required Statutory Instrument and licensing requirements to enable expanded Data reporting to include the AFOLU Sector.	ZEMA	5,6
MONITORING, REPORTING, VERIFICATION	7.2.2.3	Inventory sector-specific GHGi-related fields for expanded “Statutory Returns” to include the AFOLU sector;	ZEMA	3,4

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	**7.2.3**	**Support for further analytical work to improve data on land use and land use changes, avoiding double counting of ERs and interim roadmap for moving toward comprehensive accounting in the province.**		
MONITORING, REPORTING, VERIFICATION	7.2.3.1	TBD		
MONITORING, REPORTING, VERIFICATION	7.2.3.2	TBD		
MONITORING, REPORTING, VERIFICATION	**7.2.4**	**Develop a benefit-sharing mechanism as a distribution mechanism for project benefits from ER purchases, including managing revenues and monitoring ERs.**		
MONITORING, REPORTING, VERIFICATION	7.2.4.1	Develop CERPA in each Chiefdom	4. Ministry of Local Government	1,
MONITORING, REPORTING, VERIFICATION	7.4.2.2	Op of ERBS committee Province	4. Ministry of Local Government	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**7.2.5**	**Define issues and options for reconciling REDD+ at multiple scales of action in the EP and stakeholder consultations are in progress.**		
MONITORING, REPORTING, VERIFICATION	7.2.5.1	Review CERPA in each Chiefdom		4,6,8,10
MONITORING, REPORTING, VERIFICATION	7.2.5.2	Monitor CERPA in each Chiefdom		3,5,7,9
MONITORING, REPORTING, VERIFICATION	**7.2.6**	**Develop and MRV system- including repeated measurements of land use and land use change and carbon stock changes.**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	7.2.6.1	Hold a stakeholder consultative meeting to assess and discuss the current MRV system, gaps and develop proposals to address gaps.	ZEMA	4,7,9
MONITORING, REPORTING, VERIFICATION	7.2.6.2	Provincial - Equip relevant technical units (provincial Forestry and agriculture units) for consolidating data from districts and reporting to the national level.	ZEMA	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**7.2.7**	**Establish a functional system for accounting of emissions reduction from adoption of sustainable agriculture practices**		
MONITORING, REPORTING, VERIFICATION	7.2.7.1	Provincial - Equip relevant technical units (provincial Forestry and agriculture units) for consolidating data from districts and reporting to the national level.	ZEMA	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	7.2.7.2	District - Equip relevant technical units at the district level (Forestry and agriculture) on how activity data collection and reporting to the provincial level will be coordinated (trainings for implementation of standard operating procedures, software, and hardware).	ZEMA	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**7.2.8**	**Identify and address gaps that exist in the MRV system and develop and implement a work programme to improve data collection and overall reporting/accounting capacity, both at the national and decentralised levels.**		
MONITORING, REPORTING, VERIFICATION	7.2.8.1	National - Test National level data being used for monitoring determine applicability for ISFL, support ZEMA in GHG reporting		
MONITORING, REPORTING, VERIFICATION	7.2.8.2	Provincial - Strengthen a working group to facilitate access, assess, and review available datasets identified for their usefulness for monitoring purposes;		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	7.2.8.3	Provincial - Strengthen the existing working group at the provincial level where REDD+ implementation and pilot projects are actively building upon other activities and work initiated by the Government		
MONITORING, REPORTING, VERIFICATION	7.2.8.4	Provincial - Equip relevant technical units (provincial Forestry and agriculture units) for consolidating data from districts and reporting to the national level.		1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	7.2.8.5	District - Equip relevant technical units at the district level (Forestry and agriculture) on how activity data collection and reporting to the provincial level will be coordinated (trainings for implementation of standard operating procedures, software, and hardware).		1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**7.2.9**	**Develop a legal framework for REDD+**		
MONITORING, REPORTING, VERIFICATION	7.2.9.1	FCSM Regulation / SI approved June 2021		
MONITORING, REPORTING, VERIFICATION	7.2.9.2	TBD		
MONITORING, REPORTING, VERIFICATION	**7.2.10**	**Safeguards - Address key environmental and social issues associated with the analysis and preparation of REDD+ strategy options**		
MONITORING, REPORTING, VERIFICATION	7.2.10.1	District monitoring / ES Screening		1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	7.2.10.2	ESMP monitoring		1,2,3,4,5,6,7,8,9,10

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	**7.2.11**	**Support the development of a national SIS to serve as the main repository and information source for all safeguards-related information across the National REDD+ Programme**		
MONITORING, REPORTING, VERIFICATION	7.2.11.1	Funded by UNEP		
PROJECT MANAGEMENT AND COORDINATION	8	PROJECT MANAGEMENT AND COORDINATION		
PROJECT MANAGEMENT AND COORDINATION	**8.1**	**National Project Unit**		
PROJECT MANAGEMENT AND COORDINATION	8.1.1.1	Finance costs and activities specific to the PIU.		1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	8.1.1.2	Support the NPU in its responsibilities related to web-based and smartphone-based M&E system for collecting and processing and monitoring the impacts over time		
PROJECT MANAGEMENT AND COORDINATION	**8.2**	**Provincial Project Implementation Unit**		
PROJECT MANAGEMENT AND COORDINATION	8.2.1.1	Service provision for project management and implementation		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	8.2.1.2	Management and maintenance of the web-based central national data infrastructure for data reporting and management	ZEMA	1,2,3,4,5,6,7,8,9,10
MONITORING, REPORTING, VERIFICATION	**8.3**	**Support transparency and accountability in benefit share management across beneficiaries**		
MONITORING, REPORTING, VERIFICATION	8.3.1.1	Support financial capacity building in each Chiefdom	4. Ministry of Local Government	1,4,8
MONITORING, REPORTING, VERIFICATION	8.3.1.2	Support financial reporting of beneficiaries in each Chiefdom	4. Ministry of Local Government	1,2,3,4,5,6,7,8,9,10
PROJECT MANAGEMENT AND COORDINATION	8.3.1.3	Staffing Costs		1,2,3,4,5,6,7,8,9,10
PROJECT MANAGEMENT AND COORDINATION	8.3.1.4	Operating Costs		1,2,3,4,5,6,7,8,9,10
Contingent Emergency Response	9	Contingent Emergency Response		
Contingent Emergency Response	**9.1**			
MONITORING, REPORTING, VERIFICATION	**9.1.1**	**External validation and verification**		

Result Areas	#	Sub-Objectives (X) / Outcomes (X.X) /Activities (X.X.X) /Tasks (X.X.X.X) - Taken from GEF workplan a starting point	Lead Implementer	Implementation Yrs. #,#,#,#
MONITORING, REPORTING, VERIFICATION	9.1.1.1	Validation charges	3. Provincial Office of Forestry	1,4,6
MONITORING, REPORTING, VERIFICATION	9.1.1.2	External verification / carbon audit costs	3. Provincial Office of Forestry	3,5,7,9

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