Forest Carbon Partnership Facility (FCPF)
Carbon Fund

Emission Reductions Program Idea Note (ER-PIN)

Country: GUYANA

ER Program Name: Guyana's Emission Reduction Programme for Sustainable Forest Management

Date of Submission or Revision: September 20, 2015

Disclaimer

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Guidelines:

1. The FCPF Carbon Fund will deliver Emission Reductions (ERs) from activities that reduce emissions from deforestation and forest degradation, conserve forests, promote the sustainable management of forests, and enhance forest carbon stocks in developing countries (REDD+) to the Carbon Fund Participants.
2. A REDD Country Participant interested in proposing an ER Program to the Carbon Fund should refer to the selection criteria included in the Carbon Fund Issues Note available on the FCPF website (www.forestcarbonpartnership.org) and to further guidance that may be communicated by the FCPF Facility Management Team (FMT) over time.
3. ER Programs shall come from FCPF REDD Country Participants that have signed their Readiness Preparation Grant Agreement, using this ER Program Idea Note ('ER-PIN') template.
4. The completed ER-PIN should ideally not exceed 40 pages in length (including maps, data tables, etc.). If additional information is required, the FCPF FMT will request it.
5. Please submit the completed ER-PIN to: 1) the World Bank Country Director for your country; and 2) the FCPF FMT (fcpfsecretariat@worldbank.org).
6. As per Resolution CFM/4/2012/1 the Carbon Fund Participants' decision whether to include the ER-PIN in the pipeline will be based on the following criteria:
    i. **Progress towards Readiness:** The Emission Reductions Program (ER Program) must be located in a REDD Country Participant that has signed a Readiness Preparation grant agreement (or the equivalent) with a Delivery Partner under the Readiness Fund, and that has prepared a reasonable and credible timeline to submit a Readiness Package to the Participants Committee;
    ii. **Political commitment:** The REDD Country Participant demonstrates a high-level and cross-sectoral political commitment to the ER Program, and to implementing REDD+;
    iii. **Methodological Framework:** The ER Program must be consistent with the emerging Methodological Framework, including the PC's guiding principles on the methodological framework;
    iv. **Scale:** The ER Program will be implemented either at the national level or at a significant sub-national scale, and generate a large volume of Emission Reductions;
    v. **Technical soundness:** All the sections of the ER-PIN template are adequately addressed;
    vi. **Non-carbon benefits:** The ER Program will generate substantial non-carbon benefits; and
    vii. **Diversity and learning value:** The ER Program contains innovative features, such that its inclusion in the portfolio would add diversity and generate learning value for the Carbon Fund.

1. Entity responsible for the management of the proposed ER Program

1.1 Entity responsible for the management of the proposed ER Program	
Name of managing entity	Guyana Forestry Commission
Type and description of organization	Regulatory The GFC is a semi-autonomous organization formed in 1979 with a legal mandate to manage and control the utilization of the State Forest Estate. Its main role is to ensure the sustainable utilization of the State Forest Estate in keeping with sustainable forest management principles and guidelines captured in the Forest Act 2009. Governed by a developmental mandate, this agency ensures that there is a balance among the pillars of social, economic and environmental development. Over the past decade, the Commission has undergone rapid development in the implementation of sustainable forest management, legality, and environmental standards. In this regard, the GFC has been tasked with the responsibility of overseeing the process to develop and implement the national REDD+ Strategy, including the national MRVS, as well as readiness activities under the FCPF. A REDD Secretariat (RS) was established as a new operational unit to execute all REDD+ related activities with oversight of the GFC.
Main contact person	James Singh
Title	Commissioner of Forest
Address	1 Water Street, Kingston, Georgetown, Guyana
Telephone	592-226-7271-4
Email	commissioner@forestry.gov.gy ; Project.coordinator@forestry.gov.gy
Website	www.forestry.gov.gy

1.2 List of existing partner agencies and organizations involved in the proposed ER Program

Name of partner	Contact name, telephone and email	Core capacity and role in the proposed ER Program
Guyana Forestry Commission	James Singh commissioner@forestry.gov.gy 592-226-7271-4	Implementation
Department of Natural Resources & the Environment (Ministry of State)	Joslyn McKenzie, Permanent Secretary jmckenzie@nre.gov.gy 592-231-2506 -11	Oversight & Policy guidance
Office of Climate Change	223-5205	Policy guidance
Guyana Geology & Mines Commission	Rockford Vieira, Commissioner 592-226-5591 / 592-225-2862	Implementing partner
Guyana Lands & Surveys Commission	Doorga Persaud, Commissioner 592-226-0524-9	Implementing partner
Environmental Protection Agency	Indarjit Ramdass, Executive Director 592-225-5467-69, 592-225-5471-72, 592-225-6044/48	Implementing partner
Protected Areas Commission	Damian Fernandes, Commissioner 592-227-1888/1903/2265	Implementing partner

2. Authorization by the National REDD+ focal point

Name of entity	Guyana Forestry Commission
Main contact person	James Singh
Title	Commissioner of Forests
Address	1 Water Street, Kingston
Telephone	592-226-7271-4

Email	commissioner@forestry.gov.gy
Website	www.forestry.gov.gy

2.1 Endorsement of the proposed ER Program by the national government

Please provide the written approval for the proposed ER Program by the REDD Country Participant's authorized representative (to be attached to this ER-PIN). Please explain if the national procedures for the endorsement of the Program by the national government REDD+ focal point and/or other relevant government agencies have been finalized or are still likely to change, and how this might affect the status of the attached written approval. ER Program) must be located in a REDD Country Participant that has signed a Readiness Preparation grant agreement (or the equivalent) with a Delivery Partner under the Readiness Fund, and that has prepared a reasonable and credible timeline to submit a Readiness Package to the Participants Committee

Enclosed is a letter from the Guyana Forestry Commission, as the focal point for the Carbon Fund and the REDD Country Participant's authorised representative.

2.2 Political commitment

The Government of the Cooperative Republic of Guyana remain committed to the protection and sustainable management of the nation's forests, and the implementation of REDD+. As already established for the implementation of REDD+, the Guyana Forestry Commission, the focal point for the FCPF, is nested within the now Department of Natural Resources & the Environment (DNRE), formerly the Ministry of Natural Resources and the Environment. This effectively will achieve the same level of commitment to effective natural resources management taken through the implementation of the ERPIN as demanded by DNRE.

Also under the authority of the DNRE are the Guyana Geology & Mines Commission, the Protected Areas Commission, the Guyana Gold Board, the Wildlife Authority, the Guyana Lands & Surveys Commission and the Environmental Protection Agency. Being nested within the DNRE facilitates the required for a multisectoral approach to REDD+ implementation at the national level.

One of the main priority pillars in the development agenda of the Government is the strengthening of a green economy.

3. STRATEGIC CONTEXT AND RATIONALE FOR THE ER PROGRAM

3.1 Brief summary of major achievements of readiness activities in country thus far

Guyana's Readiness Preparation Proposal (R-PP)[1] was assessed and approved by the Participants' Committee of the FCPF in 2009 with the most updated version prepared in December 2012 (GoG, 2012a). Work had commenced on the development and implementation of readiness activities.

Guyana has commenced the development and implementation of REDD+ readiness activities, guided by a national framework, which includes the Low Carbon Development Strategy (LCDS) and Readiness Preparation Proposal (R-PP). To date, Guyana has expended significant domestic resources (Government of Guyana funding) to commence and operationalize various aspects of REDD+, including nation-wide stakeholder engagements on the Low Carbon Development Strategy. Domestic resources have also been directed towards paying for staffing within the REDD Secretariat. Additionally, Guyana has also received funding from various externally funded projects that have supported implementation of the readiness activities. Sources of such funding (external resources) has been through the bilateral agreement on forests and climate between the Government of Guyana and the Kingdom of Norway, a project implemented through a collaboration between Conservation International with financing from KfW, and from the Guiana Shield Facility. Domestic resources along with the payments received through these programmes have assisted in supporting specific REDD+ Readiness activities within the LCDS framework. Both local and project support have assisted the development of the Monitoring, Reporting and Verification System (MRVS) for REDD+, as well as the strengthening the required institutional arrangements.

Other sources of funding have supported the development of further aspects of REDD+, including the development of a Reference Level (RL) for REDD+ for Guyana and the execution of initial REDD+ outreach activities.

On December 4, 2013, Guyana's FCPF Readiness Grant (USD3.8 million) was approved by the Board of the Inter-American Development Bank, Guyana's delivery partner for the FCPF. This Readiness Grant is intended to support improvements in REDD+ readiness activities, including stakeholder consultations, and the preparation of Guyana's REDD+ Strategy in order to facilitate access to additional funding under performance-based incentives.

Due to the progress in development of some of the components of the R-PP through funding from other sources, it was decided funds from the FCPF will not be used for the further development of these components. The components that will not be supported under the FCPF are as follows:

1. Component 2.a.Assessment of Land Use, Land Use Change Drivers, Forest Law, Policy and Governance
2. Component 3 Reference Emissions Level/Reference Level (REL/RL)
3. Component 4.a.National Forest Monitoring System
4. Component 4.b.Information System for Multiple Benefits, Other Impacts, Governance, and Safeguards

Progress in the components are briefly described below:

[1] http://www.forestry.gov.gy/Downloads/FCPF_Readiness_Preparation_Proposal_Guyana_December_2012.pdf

In terms of policy reforms, Guyana has:

Conducted a review and revision of the National Forest Policy Statement and the National Forest Plan	The GFC coordinated the revision of the National Forest Policy Statement and the National Forest Plan in 2010, through a series of consultations involving wide stakeholder involvement including written submissions, community meetings and focus-group engagements. This revised Forest Plan therefore embodies ideals for enhanced development and wider opportunities for the management of Guyana's forest estate. Programme areas of the Plan have expanded to address new dispensations such as the Low Carbon Development Strategy (LCDS), increased value-added production, additional guidelines for sustainable forest management (including non-timber forest products), improvements in marketing strategies, meeting training and human resource capacity needs, ensuring community development are satisfied, and forest resources equitably shared; all of which are enshrined in the National Forest Policy Statement. Emphasis ranging from the development of the timber potential of the forests to management of the multiple goods and services (including ecosystem services) for the national benefit remain pivotal to the mandate of the GFC, whose work programme is driven by the Forest Plan for the fulfilment of the policies promulgated for the management of Guyana's forest estate and the resources therein. The overall objective of the National Forest Policy is: the conservation, protection, management and utilisation of the nation's forest resources, while ensuring that the productive capacity of the forests for both goods and services is maintained or enhanced. The specific objectives are: (a) to promote sustainable and efficient forest activities which utilise the broad range of forest resources and contribute to national development while allowing fair returns to local and foreign entrepreneurs and investors; (b) to achieve improved sustainable forest resource yields while ensuring the conservation of ecosystems, biodiversity, and the environment; (c) to ensure watershed protection and rehabilitation: prevent and arrest the erosion of soils and the deforestation and degradation of forests, grazing lands, soil and water; promote natural regeneration, afforestation and reforestation; and protect the forest against fire, pests and other hazards; (d) identify, quantify and assist in the marketing of environmental services to generate forest incentives for national development. The final documents, the National Forest Policy Statement, 2011 and the National Forest Plan, 2011 can be accessed through the links below: I. http://www.forestry.gov.gy/Downloads/Guyana's_National_Forest_Policy_Statement_2011.pdf II. http://www.forestry.gov.gy/Downloads/Guyana's_National_Forest_Plan_2011.pdf
Completed the strategic Plan for Ministry of Natural Resources & the Environment	the Strategic Plan of the MRNE was developed to ensure that the "The MNRE develops and promotes policies and coordinates development of the natural resources sector for their effective utilization for the ultimate benefit of Guyana and all of its people" (MNRE, 2013). This document can be accessed through the link below: http://www.nre.gov.gy/PDF/Costed%20Strategic%20Framework%20for%20the%20MNRE%20V5_final.pdf
Completed the National Land Use Plan	This National Land Use Plan was developed by the Guyana Lands and Surveys Commission (GL&SC), Land Use Planning Section, with support from the Development of Land Use Planning Project (DLUPP) and financial support from the European Union. It provides support to decision making, through looking at development options and constraints throughout the country. The intent is that it should be incorporated into the lease decision process, with the objective of encouraging decisions which optimise the use of Guyana's resources for the benefit of its people. It can be accessed through the link below: http://www.lands.gov.gy/National%20Land%20Use%20Plan%20GoG%20June%202013%20with%20cover%20pages.pdf
Advanced work in developing and implementing Codes of Practice on Mining.	The codes include those relating to avoiding environmental degradation form mining. GGMC is currently revising the codes of practice, e.g. on the use of mercury and wastewater management. The draft codes of practices have been reviewed. The drafts have also been shared with the mining community, so that they understand future compliance requirements by the GGMC and the Guyana Gold and Diamond Miners Association.

Commencement of application for candidacy for The Extractive Industries Transparency Initiative (EITI).	Guyana has commenced the application process with the conducting of an initial scoping exercise. This exercise examined the scope and implications of implementing the EITI Programme to Guyana's extractive industries (oil, gas, large and small-scale mining). This process is ongoing.
Continuing negotiations with EU FLEGT with the aim of entering into a Voluntary Partnership Agreement (VPA).	In March 2012, the Governments of Guyana and the European Union announced the decision to enter into formal negotiations on a Voluntary Partnership Agreement (VPA). The VPA is the mechanism under FLEGT that outlined the ambits of the trade and forest governance agreement that Guyana and the EU jointly agree to. EU FLEGT is the EU's global programme to curb illegally logging worldwide by putting a programme in place to prevent timber logged from illegal sources not to enter into the EU market. This includes timber sourced directly from Guyana as well as timber that is sourced from other country that may have originated from Guyana. EU FLEGT therefore addresses the compliance of forest legality at the point of origin of that timber. Legality in each country case is with respect to the laws that govern that country. There have been three negotiation meeting to date between the EU and the GoG: I. December 2012 II. July 2013 III. April 2015 By the end of the process there will be at most 3 additional negotiation sessions. The negotiations are aimed as discussing and agreeing to the contents of the VPA and includes aspects such as the definition of legality, the wood tracking system, the list of products that will be included in the scope of the agreement, and the legality assurance system. The process of negotiation is guided by a Roadmap which charts the path forward for the negotiation process. The timeline for finalising the VPA has been revised in the April 2015 negotiation sessions, and the plan is for the VPA to be ratified by September 2016, with the first licence issued in early 2017.

Guyana has submitted its Proposal on Reference Level for REDD+ to the UNFCCC in December 2014. This is currently undergoing review by a technical team convened by the UNFCCC. This review process is ongoing. The RL developed at national scale to avoid issues of leakage and due to its relatively small size. This is based on the detailed and robust analysis of historic emissions from deforestation from all causes and from degradation due to timber harvesting, and includes the following:

- Key drivers of deforestation & degradation
- Forest, as defined by the national definition;
- All five IPCC recognized carbon pools and the key GHG- CO2;
- Historic period selected 2001 to 2012, a total of 12 years;
- Collection and analysis of activity data (AD) and field data on forest carbon stocks consistent with good practice in that they neither over- nor under-estimate as far as can be judged; and
- All data at Tier 2 and 3 levels for the following reasons:
    - Wall-to-wall coverage of satellite imagery used to obtain AD related to conversion of forest lands to other uses and such data are combined and co-registered with other key spatial data bases in a GIS such as roads, rivers, settlements, vegetation class, location of logging concessions, location of mining concessions, and topography.

The current development of the RL following the modalities agreed by the COP, existing IPCC guidance and guidelines for the estimation of emissions and emissions factors. A comprehensive, peer-reviewed, field sampling system was designed and implemented to attain a required precision target of a 95% confidence interval of <+/-15% of the mean total carbon stock of forests. The report can be accessed through the link below: https://unfccc.int/files/land_use_and_climate_change/redd/application/pdf/guyana_proposal_for_reference_level_for_redd+.pdf

Implementation of the MRVS Roadmap Phase 1 was completed. The MRVS Roadmap for Phase 1 was designed to guide the development of Guyana's MRV system for REDD+ and considered the international requirements and national needs for the MRV system. Included was a detailed capacity assessment based on the state of the existing national forest monitoring technical capabilities at the time of its development and the requirements for a MRV system in order to define a detailed plan to establish sustained MRV capacities within the country and to bridge the gap in capacities. The Roadmap was developed through a consultative multi-stakeholder process, which garnered inputs from local and international experts. The aim of Roadmap Phase 1 was to establish a comprehensive national system for monitoring, reporting and verifying forest carbon emissions resulting from deforestation and forest degradation in the country.

Over the period 2009 and 2012, the roadmap was implemented in three phases: National Strategy Formulation, Country Readiness Phase and Implementation Phase. This resulted in the development of a sustained and efficient national mechanism and institutional framework with competences for MRV at different levels, including capacities to perform forest area change assessment for historical periods and to perform carbon stock measurements. In addition, sub-national REDD+ demonstration activities were developed, internal and national communication mechanisms were sustained, research on key issues was conducted and Guyana engaged with the international community. Activities included data gap filling, eligibility gap filling, capacity and institutional gap filling, and methodological gap filling.

In March 2014, through a multi stakeholder engagement process, the MRVS Roadmap Phase 2 was developed. The overall proposed objective for Roadmap Phase 2 is to consolidate and expand capacities for national REDD+ monitoring and MRV. This will support Guyana in meeting the evolving international reporting requirements from the UNFCCC as well as continuing to fulfil additional reporting requirements. It will also support Guyana in further developing forest monitoring as a tool for REDD+ implementation. Consolidating and expanding capacities following Roadmap Phase 2 will allow Guyana to fulfil its REDD+ objectives to:

- Underpin and stimulate strategies and priorities for REDD+ implementation
- Track performance of REDD+ activities and their impacts (carbon & non-carbon)
- Continue to support the building of capacity for MRV implementation at the government and non-government level and other parties that have a role in MRVS related activities

Three specific areas were identified where key activities are recommended for the next 1-3 years in order to consolidate and expand capacities:

a. Consolidate capacities and routine REDD+ monitoring and MRV
b. Develop national forest monitoring as tool for REDD+ implementation
c. Knowledge sharing and capacity building

http://www.forestry.gov.gy/Downloads/Guyana_MRVS_Roadmap_Phase_2_September_2014.pdf
http://www.forestry.gov.gy/Downloads/MRVS_Phase_2_Workshop_Report_Final.pdf

Forest change of Forest to Non-forest excluding degradation between 1 January 2013 and 31 December 2013 (12 months) is estimated at 12 733 ha. Over the Year 4 reporting period, this equates to a total deforestation rate of 0.068%. This rate of change is lower than the previous Year 3 period which was reported as 0.079%. In Year 4, as in previous years an independent map accuracy assessment has been undertaken by a team from the University of Durham. The accuracy of the activity (area) data has been the focus of these assessments to date. The main deforestation driver for the current forest year reported (Year 4) is mining which accounts for 90% of the deforestation in this period. It should be noted that the driver of mining includes mining infrastructure. The majority (86%) of the deforestation is observed in the State Forest Area. The temporal analysis of forest change post 1990 indicates that most of the change is clustered around existing road infrastructure and navigable rivers. In Year 4 the change has continued primarily near the footprint of historical change. The MRVS Interim Measures Report for Year 4 and the accompanying Verification Report can be accessed through the links below:

I. http://www.forestry.gov.gy/Downloads/MRVS_Interim_Measures_Report_Year_4_Version_3.pdf
II. http://www.forestry.gov.gy/Downloads/Final_Verification_Report_Year_4_MRVS.pdf

In continuing to support efforts at the development of MRV at the subnational level, the GFC has been continuing its work with the NRBBD as well as commencing support of the Wai Wai Konashen Community Owned Conservation Area (COCA) CMRV Project, a collaboration with the WWF. A key area of focus during the GFC's interaction with the NRDDB was that of improving pathways for integrating community data into national forest monitoring systems. In continuing its engagement with the NRDDB, the GFC sought to support the CMRV through:

a. **Engaging members of the community in the determination and measurement of drivers/processes of forest change**- in keeping with the multi stakeholder approach used as the national level for the identification of drivers of deforestation and forest degradation, a Community "D&D Drivers" workshop was held in Annai, the focus of which was: "seeing deforestation and forest degradation through community eyes". A total of 41 persons participated from the five Annai District Village Councils inclusive of their respective CREWs (Community Monitors), Makushi Research Unit (MRU) members and the NRDDB-CMRV Project Management Team (PMT).
b. **Building capacity for community-based monitoring in order to demonstrate an approach that could contribute to the National MRVS**– the GFC continued to provide technical through on the ground training in the use of methodologies for conducting forest area change assessment and forest carbon stock assessment. The GFC was able build capacity with representatives or CREWs from each of the 16 villages/districts that make up the North Rupununi Districts in GPS use and navigation as well as in undertaking of biomass plot establishment in accordance with the GFC and WI developed methodology
c. **Integration of Community MRV Demonstration within National Framework**- There were a number of areas that require synchronisation in order to bring the CMRV in conformance with the national MRVS; this is evident in forest type's classification, data collection methods, etc. To bridge the gap it was proposed that the methodology and procedures used at the national level be used at the CMRV level, thus achieving the synergy needed. In doing so, efforts have been undertake to ensure the following:
    - That all relevant Definitions and Drivers used at the community level are in conformance with those at the national level;
    - That national methodologies for the FCMS have been translated to the community level (plot establishment, data collection);
    - That national level satellite imagery can be used to inform the work of the CMRV.

The Kanashen CMRV project seeks to build on two years of experience in the 16 communities of the NRDDB/GCP CMRV Project that was also funded by NORAD. The GFC, as in the case of the NRDDB CMRV project, would be providing technical support and training. The GFC has conducted a number of capacity building sessions with the WWF CMRV team in areas of planning, forest cover monitoring and forest carbon assessment. The forest cover

monitoring training focused on: Definition of Forests; Collecting Data on Drivers; Parts of a Map; Explanation on Reading Maps; Understanding Coordinate Points; Using a GPS; Collecting GPS Data; Collecting Data Over Time; and practical exercises using the GPS carried out.

The forest carbon stock assessment training was centred on the manuals and procedures outlined in the Standard Operating Procedures for Data Collection for the FCMS. A number of training manuals were prepared for the Konashen CMRV team, including a GIS Mapping Manual and a SOP for Forest Carbon Data Collection at the Community level. Follow up sessions continue to be conducted with the WWF CMRV team.

3.2 Current status of the Readiness Package and estimated date of submission to the FCPF Participants Committee (including the REL/FRL, REDD+ Strategy, national REDD+ monitoring system and ESMF).

Though Guyana's bilateral agreement with the Kingdom of Norway, a number of interim performance indicators were outlined against which the country's payments were determined. These indicators were outlined in the Joint Concept Note[2] accompanying the Memorandum of Understanding. Among these interim indicators, was: "Government of Guyana's Readiness Package ("R-package") will be prepared and assessed by the FCPF's Participants Committee (PC) in the fall meeting 2014, contingent on financial resources from FCPF, or other resources, being available in time to do so." (JCN 2012 p. 3). At the time of this assessment, the activities outlined in the R-PP are at varying stages of implementation.

The compilation of this interim R-Package was conducted with the support of an international Expert. A Terms of Reference was developed to reflect the areas of work required. The process commenced with compilation of progress updates, next steps and progress flows for the various components to take stock of progress made in implementation. Along with this, there was engagement with a wide range of stakeholders including government, non-government, civil society, Indigenous NGOs and private sector groups.

Once drafted by the independent consultant, this interim R-Package was subject a number of phases of review and incorporation of comments. A number of different versions were produced and refined to sure that they properly reflected the comments of the stakeholders. The document was submission to Guyana's Delivery Partner (IDB) for tabling to the FCPF.
The report includes recommendations for further work to be considered to fulfil the requirements of the assessment framework. The table below summarises the achievements by readiness sub-component at the time of implementation, using the FCPF Reporting Format.

Summary of the Overall Achievement by Readiness Sub-component

Component	Sub-component	Overall Achievement
1.Readiness Organization and Consultation	1.a.National REDD+ Management Arrangements	Significant progress
	1.b.Consultation, Participation, and Outreach	Progressing well, further development required
2.REDD+ Strategy Preparation	2.a.Assessment of Land Use, Land Use Change Drivers, Forest Law, Policy and Governance	Significant progress
	2.b.REDD+ Strategy Options	Progressing well, further development required
	2.c.Implementation Framework	Progressing well, further development required
	2.d.Social and Environmental Impacts	Further development required
3.Reference Emissions Level/Reference Level (REL/RL)		Significant progress
4.Monitoring System for Forests and Safeguards	4.a.National Forest Monitoring System	Significant progress
	4.b.Information System for Multiple Benefits, Other Impacts, Governance, and Safeguards	Significant progress

[2] Joint Concept Note, 2012
http://www.lcds.gov.gy/images/stories/Documents/Joint%20Concept%20Note%20%28JCN%29%202012.pdf

It is intended that before end of 2015, Guyana, the IDB (Delivery Partner) and the FMT will discuss the status of REDD+ Readiness implementation in Guyana, a process which will include a review and revision of the Result Matrix for the FCPF for Guyana. This will assist in the fostering of a common understanding of areas completed, activities in progress, and aspects to be addressed. This will provide a solid platform for development of the full R Package that will see an integral involvement of the IDB and which will be done based on an updated Results Matrix.

Guyana intends to submit its FCPF Readiness Mid Term Report by PC22 (October 2016), with the full Readiness Package compiled and submitted in April 2018, on completion of implementation of REDD+ readiness activities. These dates are subject to confirmation depending on the outcomes of the afore-mentioned meeting among Government of Guyana, IDB and FMT.

1.3 Consistency with national REDD+ strategy and other relevant policies

The development of the national REDD+ Strategy will be designed to target the main drivers of deforestation and forest degradation in Guyana, to maintain the country's already low rate of forest change. It aims to maintain a low rate of deforestation and forest degradation in Guyana by continuing the development and implementation of related policy, procedures and programmes as well as by robust monitoring and enforcement. These will be aimed at addressing the drivers of forest area change and will be conducted in the context and in support of the national priorities for sustainable development.

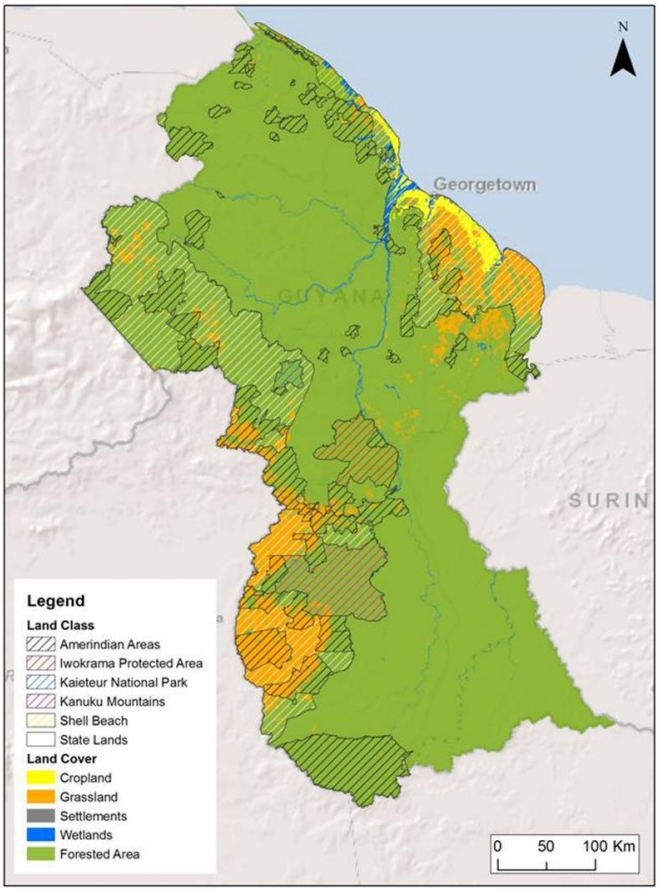
The target areas of the ER Programme are mining, forestry and community forestry activities; the main direct drivers of forest change in Guyana. This is directly in line with the goal of the REDD+ Strategy. In implementing these activities, Guyana aims to continue the country's economic development while maintaining the low rate of forest change through the implementation of improved and more efficient practices. The implementation of the activities proposed in the ER Programme will serve to inform the policies to be designed by the REDD+ Strategy.

The activities outlined in the EP Programme are in keeping with the principles outlined in the key policy documents dedicated to natural resources management in Guyana, Guyana's Low Carbon Development Strategy, National Land Use Plan, 2013, Forest Act in 2009, the Protected Areas System, Commission and Trust Fund and National Forest Policy and Plan 2011.

4. ER Program location and lifetime

4.1 Scale and location of the proposed ER Program

From the outset, Guyana has proposed the use of a national scale programme for implementation of REDD+, in order to avoid leakage. In continuation of this, Guyana will be using a national scale approach for the implementation of its ER Programme.



Map of Guyana

4.2 Expected lifetime of the proposed ER Program

The ER programme is expected to last a period of 10 years (2018- 2028). The implementation is dependent upon i) the availability of funds to enable the implementation of activities in the ER Program and ii) the opportunity for the sale of emission reduction rights through the Carbon Fund. The overall lifetime is divided into three (3) phases, as described below:

1. Preparation and Design Phase (2016-2017): this will include among other activities, stakeholder engagement, full design of ER Programme, design of financing plan, further development of NFMS and completion of the GRM and SESA components of readiness. The program would then submit its ER-PD at the mid of 2018 with the goal of signing an Emission Reductions Program Agreement (ERPA) in the latter part of 2018.

2. Early Implementation, Monitoring, and Payments Phase (2018-2028): during this phase implementation will commence on various programme areas. It is expected that concurrent performance reporting will be executed thereby enabling performance payments to be made. Given that the NFMS is already fully developed (MRVS) we believe that this will enable concurrent reporting and performance payments to be made. This model will potentially offer early learning value for the Carbon Fund.

5. Description of activities and interventions planned under the proposed ER Program

5.1 Analysis of drivers and underlying causes of deforestation and forest degradation, and conservation or enhancement trends

Through consultation with national and international experts and stakeholders in 2009[3], along with the development of the MRVS Roadmap Phase 1[4], the underlying drivers of forest change were identified. These drivers have informed the mapping and monitoring of the direct drivers of forest change. Under each underlying driver are the contributing factor to each driver.

I. Policy/ Institutional
   a. Socio-economic governance
   b. Overlaps in land use policies
   c. Incentives/ disincentives at the national and local level
   d. Inadequate capacity (technical, institutional & human
II. Socio-economic
   a. Market forces
   b. Poverty
   c. Livelihood enhancements
   d. National development plans
III. Demographic Shifts
   a. Spatial
   b. Population increase
IV. Cultural
   a. Customs &Belief systems (use of firewood & spirituality)
   b. Agricultural practices
V. Technological
   a. Efficiency & effectiveness in natural resources utilization & management
VI. Ecological
   a. Natural & spontaneous fires
   b. Dieback
   c. Forest regeneration

Direct drivers: Formally, the definition of deforestation is summarised as the long-term or permanent conversion of land from forest use to other non-forest uses (GOFC-GOLD, 2010). An important consideration is that a forested area is only deemed deforested once the cover falls and remains below the elected crown cover threshold (30% for Guyana). In Guyana's context forest areas under sustainable forest management (SFM) that adhere to the forest code of practice would not be considered deforested as they have the ability to regain the elected crown cover threshold. The five historic anthropogenic change drivers that lead to deforestation include:

a) Forestry (clearance activities such as roads and log landings)
b) Mining (ground excavation associated with small, medium and large scale mining)
c) Infrastructure such as roads (included are forestry and mining roads)
d) Agricultural conversion
e) Fire (all considered anthropogenic and depending on intensity and frequency can lead to deforestation).

Formally, the definition of deforestation is summarised as the long-term or permanent conversion of land from forest use to other non-forest uses (GOFC-GOLD, 2010). An important consideration is that a forested area is only deemed deforested once the cover falls and remains below the elected crown cover threshold (30% for Guyana). In Guyana's context forest areas under sustainable forest management (SFM) that adhere to the forest code of practice would not be considered deforested as they have the ability to regain the elected crown cover threshold. The main sources of degradation are identified as:

a) Selective and illegal harvesting of timber (not reported spatially in the current MRVS)

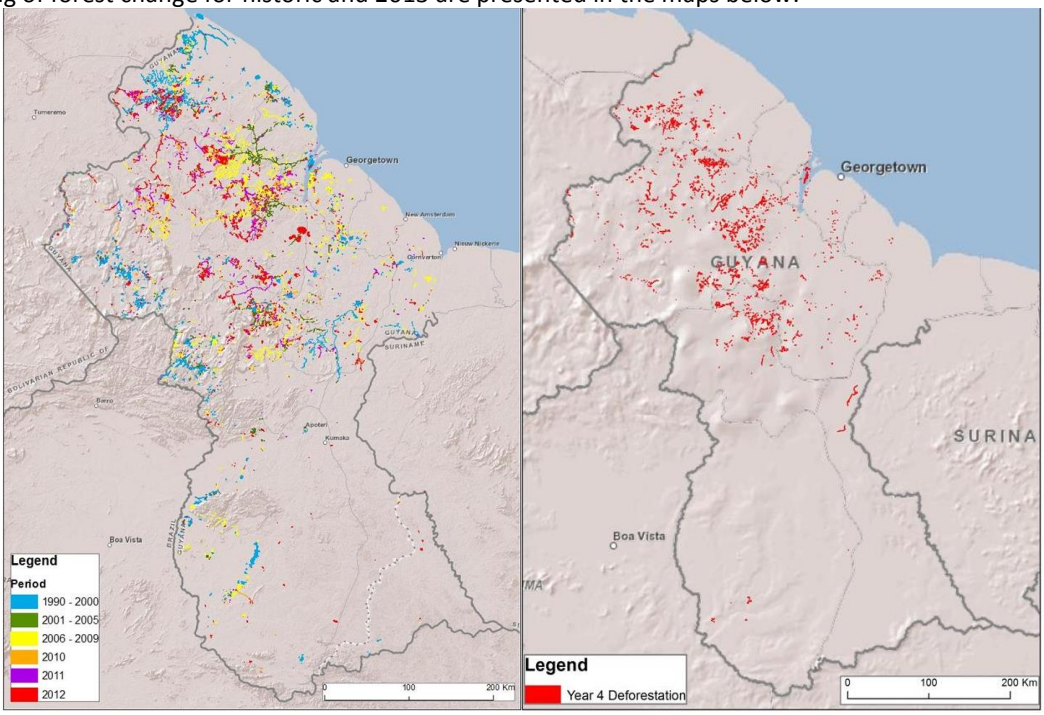
[3] http://www.forestry.gov.gy/Downloads/Guyana_MRV_workshop_report_Nov09.pdf
[4] http://www.forestry.gov.gy/Downloads/Terms_of_Reference_for_Guyana's_MRVS_Final.pdf

b) Shifting cultivation (prototype method developed in 2012)
c) Fire
d) Associated with mining sites and road infrastructure

Guyana's definition of forest: Land classified as forest follows the definition as outlined in the Marrakech Accords In accordance with the Marrakech Accords (UNFCCC, 2001), Guyana has elected to classify land as forest if it meets the following criteria:

- Tree cover of minimum 30%
- At a minimum height of 5 m
- Over a minimum area of 1 ha

Mapping of forest change for historic and 2013 are presented in the maps below:



Historical & 2013 Forest Change

Forest Change Area by Period & Driver from 1990 to 2013

Driver	Historical Period			Year 1	Year 2 2010-11 (15 months)		Year 3 2012		Year 4 2013	
	1990 to 2000	2001 to 2005	2006 to 2009	2009-10	Deforestation	Degradation	Deforestation	Degradation	Deforestation	Degradation
	Area (ha)									
Forestry (includes forestry infrastructure)	6 094	8 420	4 784	294	233	147	240	113	330	85
Agriculture (permanent)	2 030	2 852	1 797	513	52	N/A	440	0	424	N/A
Mining (includes mining infrastructure)	10 843	21 438	12 624	9 384	9 175	5 287	13 516	1 629	**11 251	2 955
Infrastructure	590	1 304	195	64	148	5	127	13	278	112
Fire (deforestation)	1 708	235		32	58	28	184	208	96	395
Settlements									23	20
Year 4 Shifting Agriculture										765
Year 2 forest degradation converted to deforestation							148		67	N/A
Year 3 forest degradation converted to deforestation									200	N/A
Amaila Falls development (Infrastructure Roads)					225				64	20
Area Change	**21 267**	**34 249**	**19 400**	**10 287**	**9 891**	**5 467**	**14 655**	**1 963**	**12 733**	**4 352**
Total Forest Area of Guyana	18 473 394	18 452 127	18 417 878	18 398 478	18 388 190		**18 502 531**		18 487 876	
Total Forest Area of Guyana Remaining	18 452 127	18 417 878	18 398 478	18 388 190	18 378 299		18 487876		18 475 143	
Period Deforestation (%)	0.01%	0.04%	0.02%	0.056%	0.054%		0.079%		0.068%	

**Forestry infrastructure accounts for the full total of deforestation from forestry activities.

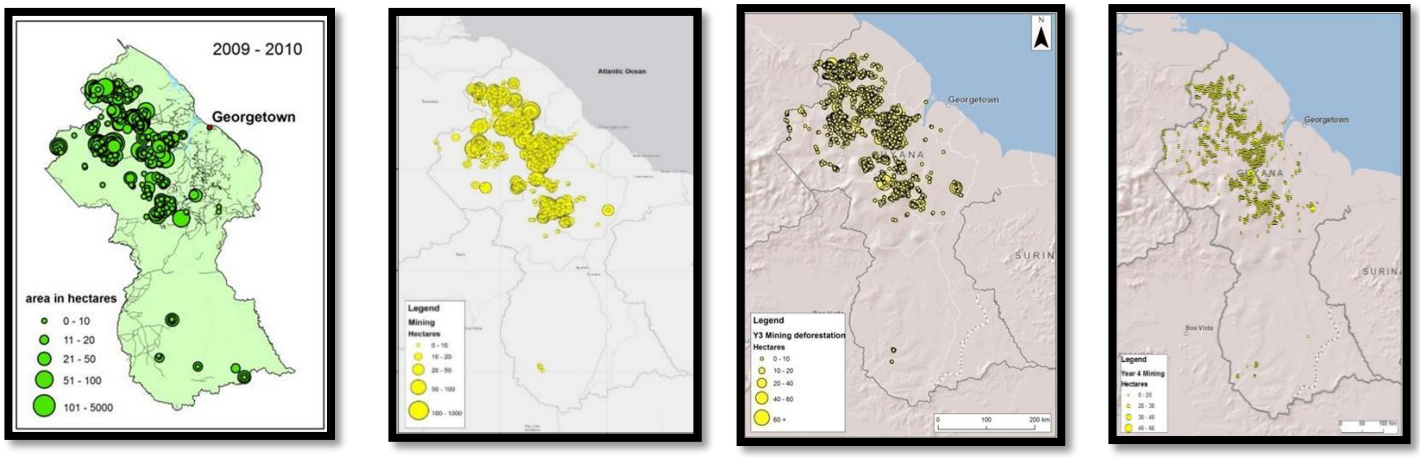
**Mining Infrastructure accounts for 918 ha in 2013 out of the total deforestation driven by mining of 11 518 ha, when Year 2 & 3 transitional areas are taken into account.

***Amaila Falls Development has been split from other infrastructure driven change for reporting purposes.

In general the following trends by driver are observed:

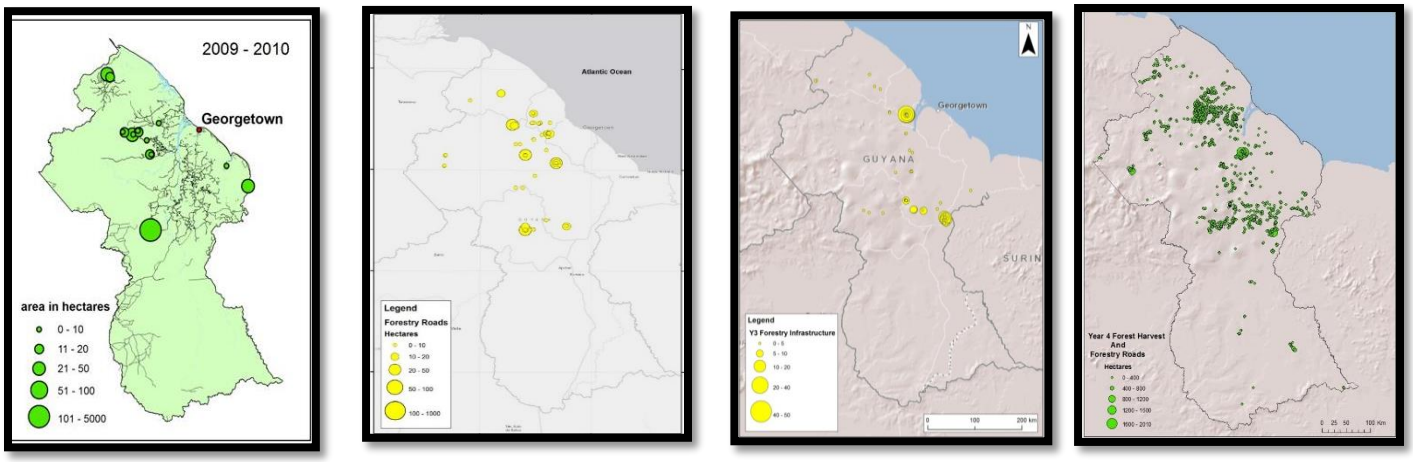
- Forestry related change has remained relatively stable between Years 1 to 4. As in the case of earlier assessments, these are attributed to a forestry driver rather than attributing this change to Infrastructure.
- Agricultural developments causing deforestation have remained stable between Years 3 & 4 and are in line with historical levels.
- Mining remains the largest contributor to deforestation. The area of deforestation also includes roads used to access mining sites and areas of degradation that have been converted to deforestation. This includes roads that lead direct to mining sites. Mining deforestation has decreased slightly between Years 3 and 4.
- Deforestation from fire events has increased relative to the post 2000 period. The area deforested and degraded from fire over the first four years has remained relatively stable.

Mining: Forest change related to mining includes mining sites and any infrastructure associated with the operation, and historical degraded areas that have been converted to deforestation. This includes any roads that lead directly to mining.



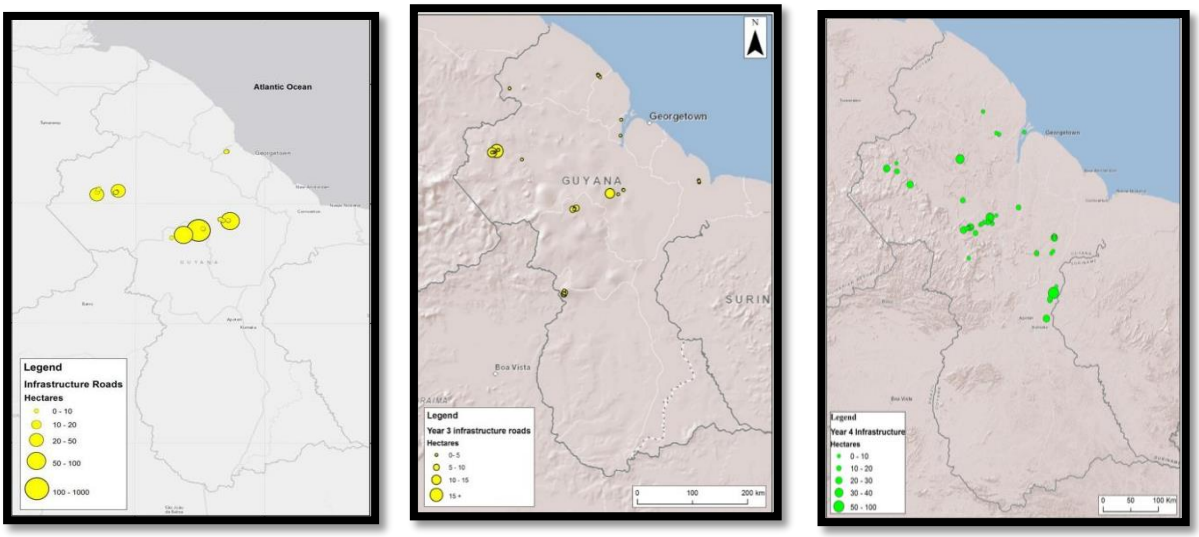
Mining Spatial & Temporal Distribution Year 1 to Year 4

Forestry the map below shows that the majority of the forestry activities are located inside the SFA. During the Year 4 period, all deforestation events are associated with forestry harvest operations. The main causes of forest clearance include road and log market construction. The area detected is relatively stable (at <300 ha /year) if compared to the last three years.

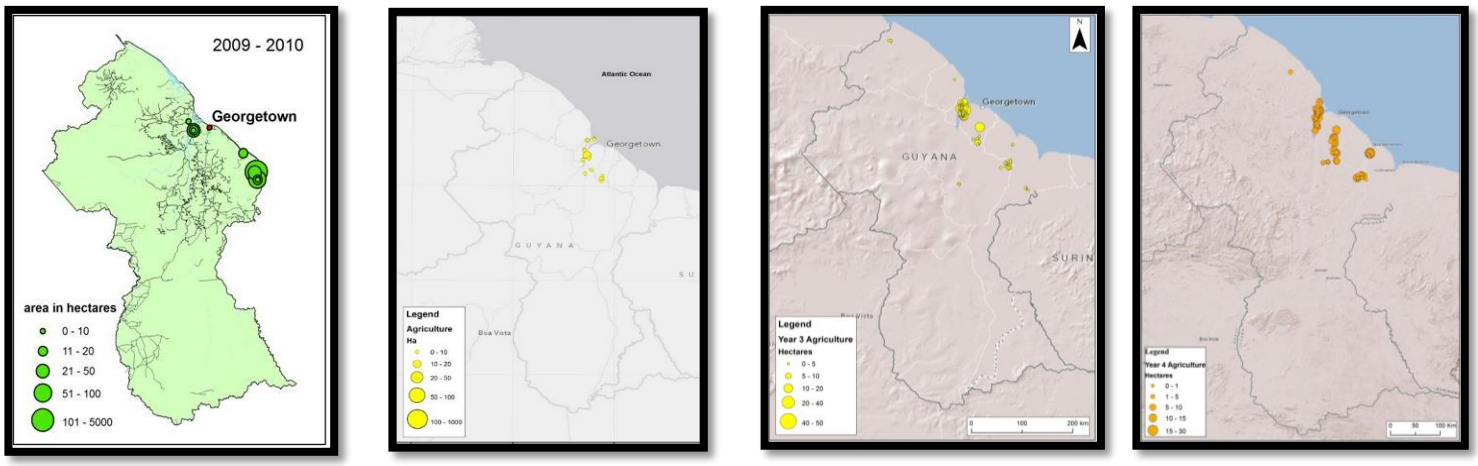


Forestry Spatial & Temporal Distribution Year 1 to Year 4

Infrastructure- In Year 4 infrastructure developments have increased compared to Year 3. The area of clearance is in a similar location. The main change is related to road construction activities which are also observed in close proximity to towns. The maps below**Error! Reference source not found.** shows the distribution of infrastructure developments – note the maps include Amaila Falls Road in central Guyana.

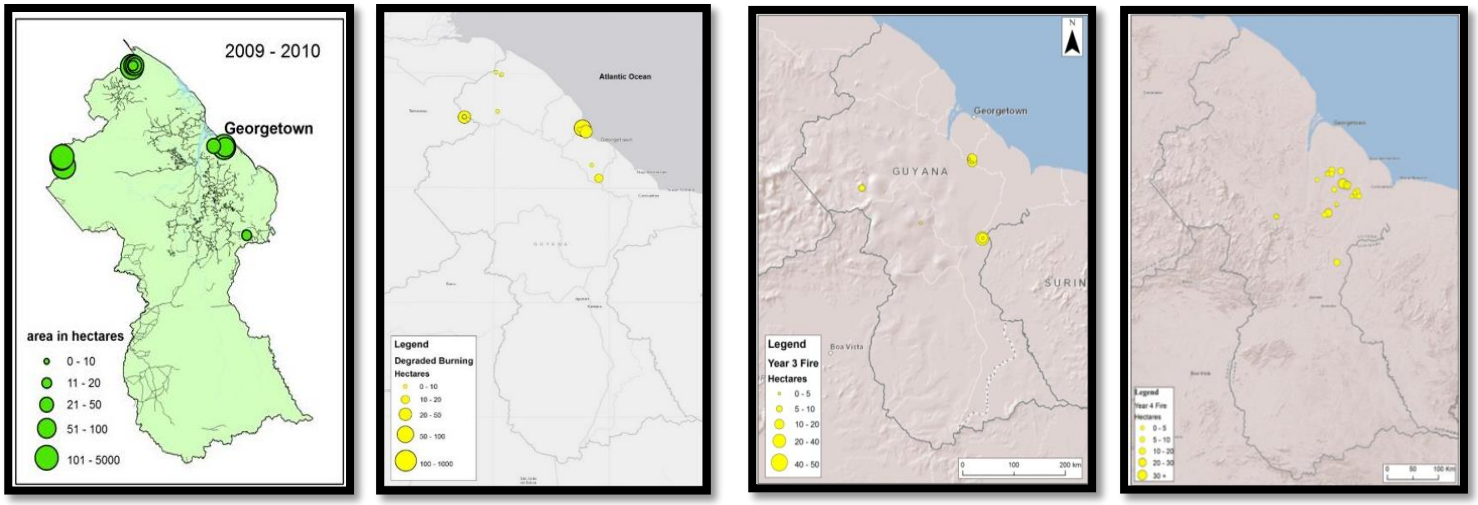


Agricultural Development- In Year 4 agricultural developments leading to deforestation have increased to 424 ha which is in line with 2009-10 levels. The main areas of development are located close to Georgetown and the northeastern regions of Guyana. They are in close proximity to the river network.



Agriculture Development Spatial & Temporal Distribution Year 1 to Year 4

Biomass Burning – Fire- A majority of recurring fire events occur in the white sand forest area surrounding Linden. Burning events can be a precursor to agricultural development, or related to other clearance activities. Fire is also very common in the non-forest savannah areas to the south of the country. The **Error! Reference source not found.**below show the distribution of fires resulting in deforestation.



Biomass Burning - Fire Temporal and Spatial Distribution Year 1 to Year 4

Policies and trends that could contribute to conservation and enhancement of carbon stocks

a) On-going work on sustainable forest management. This includes the implementation of the scope of the recently revised Forest Act as well as the National Forest Plan 2011. This legislative framework is supported by various Codes of Practice that governs forestry activities which will also be continually implemented using local resources.

b) Forest monitoring and maintaining a high level of forest legality in Guyana are also areas that will continue, and which will see the GFC committing approximately 50 per cent of its total staff complement to field monitoring through its 54 forest monitoring stations countrywide. These will result in a maintained low rate of illegal logging which has been established to be less than 2 per cent of total production annually, and a maintained low rate of deforestation and forest degradation.

c) Guyana will continue to examine all sources of energy – fossil fuels, wind, solar, bagasse and, of course, hydropower. Government also plans to explore the further development of alternative energy to meet all needs throughout Guyana.

d) Energy efficient and renewable energy cook stoves have been demonstrated to provide sustainable energy solutions where appropriate. The Agencies will work closely with small farmers to encourage the use of small bio-digesters to reduce waste and produce biogas.

e) Legislation has been amended to remove import duty and tax barriers for the importation of renewable energy equipment, compact fluorescent lamps and LED lamps to incentivize and motivate energy efficient behaviour.

f) Guyana will continue to conduct energy assessments/audits and replace inefficient lighting at public, school, residential and commercial buildings with the objective of reducing energy consumption and attaining higher levels of energy efficiency.

g) Public education and awareness programmes will continue to play a major role in providing consumers with information and tools for reducing energy consumption and expenditure for energy.

h) These unconditional contributions represent about one percent of the current energy mix.

5.2 Assessment of the major barriers to REDD+

a) Capacity & Institutional gaps- REDD+ is a relatively new and evolving concept that requires a multidisciplinary approach to implementation. In doing so, there requires for there to be continuous institutional & capacity building in technical areas to conduct assessments and reporting for REDD+. In some cases, these cannot be sourced in country and as such Guyana has been forced to look within the region and internationally in the past. In the meantime, continuous capacity and institutional strengthening is ongoing.

b) Economic pressures – Guyana is a largely forested country with the forests being among the country's most valuable natural assets; these forests are suitable for logging and agriculture, and have significant

mineral deposits. Should Guyana choose to pursue a development pathway that would lead to increased deforestation from mining, logging and agriculture, this could result in the clearance of large tracts of forest. The benefits to be derived from REDD+ need to be as such that Guyana can be able to pursue its development goals while maintaining its low rate of deforestation.

c) Data gaps – while methodologies and guidance are available for the measurement and monitoring of the drivers of forest change, some methodologies are still being developed. As in the case of shifting agriculture, Guyana is still working along with technical experts to devise the best and most effective way to move this forward.

5.3 Description and justification of planned and ongoing activities under the proposed ER Program

The proposed activities and interventions were preliminarily selected based on the impacts of the drivers described above. It is clear that mining, and associated roads, is the largest emission source during the period 2001 to 2012, followed by timber harvesting activities (if infrastructure created to allow for forestry operations, such as roads and decks are taken into account). This results in a very low impact per hectare as compared to other Drivers, such as mining, which impacts more significantly on a given hectare that is used. The impact per hectare is therefore significantly lower in forest harvest areas than in mining areas. The annual emissions appear to vary only slightly for the first 9 years, but this is an artefact of the way the deforestation data were collected—over about a 4 to 5 year period—thus the annual rate is averaged over the period in question. In the last 3 years there was a large increase in emissions, but at present there is no way to know if this occurred only in the last 3 years or was preceded by larger emissions in the previous year (e.g. 2008 and 2009).

National policies and interventions within the ER Programme have been tailored to address same: Under the ER PIN, the planned activities are as follows:

Sustainable Mining

Under a programme of effective implementation of emissions reductions areas, positive market forces (increase in demand and world market prices) prevailing will still see successful reductions in emissions, and maintained low levels, as higher efficiency practice will be more cost effective for miners than the alternative. These cost savings may see themselves in less infrastructure cost, lower relocation of camp costs, a reduced level of transportation, administrative and logistical expenses, etc.

This Emissions Reductions Programme Area will include:

- The improvement of technology and mining practices will:
  (1) shift miners away from the use of mercury and
  (2) to improve the recovery efficiency of mining operations. New technologies such as centrifuge systems can increase recovery rates in mines from 30% to 80% compared to traditional practices. This means that a mine need only be worked once, after which it can be closed and the forest restored.
- Guyana has prioritized sustainable practices such as land reclamation within the extractive sectors that will provide an effective and replicable solution for increasing forest biomass and carbon stocks, while ensuring sustainable resource consumption.
  The general objective of the program is to promote sustainable natural resources and environmental management by facilitating coordinated remedial land reclamation interventions, aimed towards managing and combatting land and forest degradation from the activities within Guyana`s extractive sectors.

Sustainable Forestry

This Emissions Reductions Programme Area will include:

- Emphasis ranging from the development of the timber potential of the forests to management of the multiple goods and services (including ecosystem services) for the national benefit remain pivotal to the mandate of the GFC.
- Improve added value activities locally. This will assist in creating a higher potential for carbon storage in long term wood products. This could also potentially reduce the pressure on forest resources as a higher value may result in reduced harvest levels.

Further, a key priority for the forest sector is the implementation of sustainable forest management methods of which Reduce Impact Logging (RIL) is a key aspect. RIL, among other advantages, is intended to lower collateral

and incidental damage associated with logging including tree damage from tree felling and logging infrastructure impacts, such as skid trails.

- Reducing the incidental and collateral damage during tree felling by about 10% and the damage from skid trails by about 35% (avoiding mid-size trees during skidding), could reduce the annual emissions by about 13.5% each year. This translates to a reduction of about 430 thousand t CO_2 per year and can target more predominantly the smaller concession category.

Strengthening forest governance is also a high priority for Guyana. The continued implementation of the National Log Tracking System and chain of custody programme, both of which are aspects of Guyana's current negotiation process with the EU on a FLEGT VPA (Forest Law Enforcement Governance and Trade, Voluntary Partnership Agreement.

Community Forestry

This Emissions Reductions Programme Area will include:

- An emphasis on maintaining a low rate of deforestation and forest degradation on community owned and managed areas through working with local stakeholders.
- These partnerships will assist in creating opportunities for a broader range of livelihood options thereby reducing pressure on forest and encouraging multiple use of forest resources, include non-timber forest good and services.
- Developing capacities of communities to monitor and manage impacts on forests.

The ongoing interventions within these strategic areas are:

Through the development of the Strategic Framework for the Natural Resources Sector for the period 2013-2018, a number of recommendations were made, including those that relate directly to the mining sector such as activities to improve reclamation of mined out areas, and initiatives to address impacts on deforestation and forest degradation from mining.

There are a number of activities in various stages of planning and implementation that will contribute to reduced degradation from extractive activities. These activities overlap to varying degrees with the higher level initiatives; they can be divided into four categories (1) Improving reclamation of mined areas (2) Improving compliance (3) Providing technical assistance and raising awareness and (4) Improving technologies.

The Special Land Use Committee (SLUC) was established in 2009 to provide recommendations to Cabinet through a cross-sectoral approach to manage land use conflicts and issues, including aspects of land use as they related to degradation from extractive activities. The recommendations from this committee aimed at addressing key mining issues under broad themes including: (1) Enhanced Land Reclamation, (2) Improved Infrastructure in Mining Districts, (3) Sustainable Land Management in the mining and forestry sector, (4) Strengthening of Land-Use Planning and Coordination and (5) Amendments to the Mining Act and Regulation among natural resource agencies.

In 2012, broad stakeholder discussions resulted in the establishment of the Land Reclamation Committee (LRC) to address specific recommendations/issues of the SLUC within the broader environmental management framework. Building on existing initiatives and recommendations, the LRC has the overarching objective of coordinating national level efforts for the reclamation of mined-out land and to provide guidance to the Government and the GGMC.

At the level of the GGMC, work has advanced in developing and implementing Codes of Practice on Mining. The codes include those relating to avoiding environmental degradation from mining. GGMC is currently revising the codes of practice[5], e.g. on the use of mercury and wastewater management. The draft codes of practices have been reviewed. The drafts have also been shared with the mining community, so that they understand future compliance requirements by the GGMC and the Guyana Gold and Diamond Miners Association.

[5] (Ref. 320; 321;322;323;328;329; 330; 331;332) GGMC Codes of Practice

There has been development at the operational end of mining. The improvement of technology and mining practices are very important to (1) shift miners away from the use of mercury and (2) to improve the recovery efficiency of mining operations. New technologies such as centrifuge systems can increase recovery rates in mines from 30% to 80% compared to traditional practices. This means that a mine need only be worked once, after which it can be closed and the forest restored.

The Mining School was established and incorporated in 2012. The School will offer miners short courses (between one and six months) once the draft curriculum has been approved. The curriculum has been developed in consultation with relevant stakeholders, including EPA and GGDMA and will be further developed through a project with support from the WWF. The School will focus on geology, mining methods, exploration technology, surveying and computer applications for mining operations and mineral explorations.

Guyana has engaged the Extractive Industries Transparency Initiative (EITI) and has commenced the application for candidacy.EITI is a global Standard to promote open and accountable management of natural resources. Guyana has commenced the application process with the conducting of an initial scoping exercise. This exercise examined the scope and implications of implementing the EITI Programme to Guyana's extractive industries (oil, gas, large and small-scale mining). This process is ongoing.

To facilitate the objective of having readily available and accurate spatial data to inform decision making, the Geospatial Information Management Unit (GIM) was established. This Unit was convened to provide services and support to all Agencies under the purview of the Department of Natural Resources & the Environment. Additionally, the lessons learnt will be shared with other Government Agencies to create and maintain an online portal that can facilitate the collection, dissemination and integration of spatial data to improve decision making nationally. The Unit utilizes technology innovation, capacity building and training sessions, development of specific applications and decision support systems to achieve its objectives. The GIM comprises staff that have been seconded from the GFC as well as other natural resources management agencies. The physical office of the GIM is hosted by the GFC and shares data amongst the agencies based on agreed protocols.

The National Forest Plan 2011 embodies ideals for enhanced development and wider opportunities for the management of Guyana's forest estate. Programme areas of the Plan cover the Low Carbon Development Strategy (LCDS), increased value-added production, additional guidelines for sustainable forest management (including non-timber forest products), improvements in marketing strategies, meeting training and human resource capacity needs, ensuring community development is satisfied, and forest resources equitably shared; all of which are enshrined in the National Forest Policy Statement 2011.

One of the main programme areas of work of the forest sector is to improve added value activities locally. This will assist in creating a higher potential for carbon storage in long term wood products. This could also potentially reduce the pressure on forest resources as a higher value may result in reduced harvest levels.

Following close to 13 years since its initial launch, the GFC's community forestry programme continues to expand its programme of work. This programme has gained significant support from stakeholders and has encouraged the GFC to move forward and continue its efforts towards community forestry. The overall objective of the programme as outlined in the Forest Act (2009) is to: "*provide communities with a means of acquiring clear and secure rights to benefit from their local forests on a sustainable basis in order to help meet local needs, stimulate income generation and economic development and enhance environmental stability*."

More specifically through this initiative- Village Councils, communities or groups of individuals may apply for and be awarded State Forest Permission concessions to operate on a commercial basis to improve their livelihood and contribute to community development. Within the Programme there are 70 Community Forestry Organizations (CFOs) operating on 128 State Forest Permissions which occupies 488,015 hectares of forest. These groups provide direct membership and employment for approximately 2,500 and 4,000 persons respectively; thus, providing direct and indirect means of earning a livelihood for members of the various Associations and others residing in and around the respective concessions issued to these Associations. Contribution to community development in the form of tangible donations is one of the main objectives of CFOs. This component is addressed by most groups who over 2013 made significant contributions to schools, hospitals and rehabilitation of roads and construction of homes for the less fortunate. With the

increased interest in the Community Development Programme and the successes that this Programme has been showing so far in directly impacting on the livelihoods of community members, it is expected that this Programme will continue to be a priority area under the Commission's Work Programme.

GFC recognizing the importance of all stakeholders complying with the Forest Legislation, has conducted numerous capacity building initiatives with CFOs in the areas of sustainable forest management practices, community governance and administrative management and forest resource planning. Through these sessions over 500 participants from 60 communities were trained. Additionally, some other initiatives undertaken by the GFC included establishment of community extension programme in an effort to build capacity of Community Forestry Organizations to manage their forest resources and to take advantage of forest based employment opportunities near their communities. Training on operational procedures and forest regulations are done on a consistent basis by extension officers.

Reducing and even stopping illegal logging, although at low levels, is also a high priority for Guyana. In this regard, the continued implementation of the National Log Tracking System and chain of custody programme, both of which are aspects of Guyana's current negotiation process with the EU on a FLEGT VPA (Forest Law Enforcement Governance and Trade, Voluntary Partnership Agreement), will likely result in the finalization of a bilateral agreement that certified forest legality for exports of forest products.

Negotiations with EU FLEGT with the aim of entering into a Voluntary Partnership Agreement (VPA) - In March 2012, the Governments of Guyana and the European Union announced the decision to enter into formal negotiations on a Voluntary Partnership Agreement (VPA). The VPA is the mechanism under FLEGT that outlined the ambits of the trade and forest governance agreement that Guyana and the EU jointly agree to. EU FLEGT is the EU's global programme to curb illegally logging worldwide by putting a programme in place to prevent timber logged from illegal sources not to enter into the EU market. This includes timber sourced directly from Guyana as well as timber that is sourced from other country that may have originated from Guyana. EU FLEGT therefore addresses the compliance of forest legality at the point of origin of that timber. Legality in each country case is with respect to the laws that govern that country.
There have been three negotiation meeting to date between the EU and the GoG:

- December 2012
- July 2013
- April 2015

By the end of the process there will be at most 3 additional negotiation sessions. The negotiations are aimed as discussing and agreeing to the contents of the VPA and includes aspects such as the definition of legality, the wood tracking system, the list of products that will be included in the scope of the agreement, and the legality assurance system. The process of negotiation is guided by a Roadmap which charts the path forward for the negotiation process.

5.4 Risk/benefit analysis of the planned actions and interventions under the ER Program

Based on discussions in section 5.3 it was noted that the choice and prioritisation of activities were made based on the impact of the mining and forestry on Guyana's forest. In proceeding with the implementation of the EP Programme, Guyana acknowledges that:

- Implementation of best practices in Logging and Mining: The program acknowledges that there will be challenges in acceptance by stakeholders in overcome the opportunity costs of illegal logging and mining activities. Effective addressing of these areas have a significant likelihood of boosting Guyana's natural resources trade both regionally and internationally, as well as the long term development of these resources.
- MRV/Data Management: Guyana is in the process of developing aspects of its MRVS in areas such as the measurement and monitoring of shifting cultivation, as international guidance and best practices for such areas are still being developed. Building and maintaining capacity within the organisation is ongoing.
- Policy reforms: There are a number of policies being implemented to ensure that mining and forestry activities are conducted in compliance with international best practices that have minimal impact on

the environment. The risk that exists is that the process may take longer than projected and may not be implemented within the time frame or the ER Programme.

- Stakeholder Engagement: the ER PIN identifies a possible risk being the quality of stakeholder engagement sessions in relation to REDD+. Deficiencies in the quality of stakeholder engagement process can significantly diminish the success and efficiency of the Emissions Reductions Programme implementation. At the same time, an appropriately designed, and effectively implemented stakeholder engagement process can bring about numerous benefits for the ER programme and REDD+ on the whole. This emphasizes the point that effective and high quality of stakeholder engagements are essential to the ER PIN implementation and his been prioritised for early action. These actions will be given an early impetus with IDB and, as of now, a third of the FCPF budget for Guyana has been identified specifically for stakeholder engagements.
- A detailed Risk/Benefit analysis associated with land and resource rights in the ER programme area will be essential as an initial first step.
- Land/ resources issues: The programme acknowledges that there may be challenges regarding the resolution of existing and emerging g issues relating to land / resource tenure matter. These may relate to titled and untitled issues including customary rights of access by indigenous peoples. In this regard, cognizance must be given to an outstanding land claim issue regarding six Amerindian Villages and the Government of Guyana. These Amerindian Villages have filed the court matter against the Government. This case is currently at the level of the High Court of Guyana. The communities that are involved in this case are Phillipai, Jawalla, Kako, Kamarang, Wamaradong, and Paruima of Region 7 in the Upper Mazaruni District. This matter is currently within the judicial process.
- REDD+ Strategy development: preliminary work has been done on identifying REDD+ Strategies for Guyana under an initial assessment coordinated by the GFC. However, as the full REDD+ Strategy may likely embrace new and different areas, or possibly additional aspect of these areas already identified. Whilst this preliminary assessment brings notable benefits to the start of the process, there is the likely risk that the final REDD+ strategy areas may include other areas for which new design and development may be required, outside of what has been completed under the studies already done by the GFC.

6. Stakeholder Information Sharing, Consultation, and Participation

6.1 Stakeholder engagement to date on the proposed ER Program

Overview of Stakeholder Engagement in Guyana

Stakeholder engagement have been consistently held over the past 4 years, in the context of LCDS and with support from the Guyana Shield Facility. The areas that have been covered by these engagements include: REDD+, sustainable forest management, EU FLEGT, MRVS, Reference level, and related areas. The session held over the past 4 years are summarised below:

Year	Clusters	# of Communities engaged
2012	Region 1	6
	Region 7	3
	Region 2	3
	Annai (Region 9)	10
	Moraikabai (Region 5)	1
	Mahdia (Region 8)	5
	Lethem (Region 9)	8
	Shulinab (Region 9)	11
	Warawatta Village, Region 7	12
	Mabaruma (Region 1)	13
	Santa Rosa	17
	Charity (Region 2)	6
	Mainstay (Region 2)	3
	Region 1	6
	Region 7	3
	Region 2	3
	Annai (Region 9)	10
	Moraikabai (Region 5)	1

Year	Clusters	# of Communities engaged
2013	Mabaruma (Region 1)	11
	Kwebana (Region 1)	4
	Santa Rosa (Region 1)	12
	Anna Regina (Region 2)	9
	Parika (Region 3)	5
	Linden (Region 10)	10
	Kamarang (Region 7)	12
	Soesdyke (Region 4)	7
	Georgetown (Region 4)	22
	Annai (Region 9)	12
	Kwakwani (Region 10)	8
	Mabaruma (Region 1)	11
	Kwebana (Region 1)	4
	Santa Rosa (Region 1)	12

	Anna Regina (Region 2)	9
	Parika (Region 3)	5
	Linden (Region 10)	10
	Kamarang (Region 7)	12

Year	Clusters	# of Communities engaged
2014	Region 1	6
	Region 7	3
	Region 2	3
	Annai (Region 9)	10
	Moraikabai (Region 5)	1
	Mahdia (Region 8)	5
	Lethem (Region 9)	8
	Shulinab (Region 9)	11
	Warawatta Village, Region 7	12
	Mabaruma (Region 1)	13
	Santa Rosa	17
	Charity (Region 2)	6
	Mainstay (Region 2)	3
	Region 1	6
	Region 7	3
	Region 2	3
	Annai (Region 9)	10
	Moraikabai (Region 5)	1

COMMUNITY CLUSTER Session held in 2015	LOCATIONS
Mabaruma (Region 1)	Mabaruma, Hobodeia, Barimonodo, Bunbury, Wainina, Hosororo, Hotoquai, Yarakita, Wauna, Kamwatta, Barabina (11)
Moruca (Region 1)	Assakata, Karaburi, Waramuri, Kamwatta, Parakese Island, Huradiah, Moruca, Warapoka, Kumaka Santa Rosa, Waikarebi, Rincon, Santa Cruz, Wallaba, Muraco, Kwabanna, Santa Rosa (16)
Charity (Region 2)	Akwani Village, Charity, Abrams Creek/Warapina, Kabakaburi, Butakari, Santa Monica (7)
Bartica (Region 7)	River View, Dogg Point, Potelma, Agatash, Two and a Half Mile Bartica Potaro, 10-Miles Bartica Potaro, Agatash (7)
Kamarang (Region 7)	Chinoweing, Jawalla, Quebanang, Kamarang village, Warawatta, Imbamadai, Waramadong, Paruima, Wayalayeng, Kako, Phillipi (11)
Annai (Region 9)	Annai, Rewa, Crashwater, Aranaputa, Rupertee, Massara, Yakarinta, Toka (8)
Kwakwani (Region 10)	Aroima, Laderns Ville, Amelia's Ward, Kwakwani Park,, Hururu (5)
Linden (Region 10)	47 Miles Mabura, Coomaka, Silver Hill , Kairuni Soesdyke, Maria Elizabeth, Great Falls Upper Demerara, 17 Miles Rockstone, Wismar, Silverballi Linden, Blueberry Hill, Three Friends (11)

Preparation of the ER-PIN

In the initiation of activities on the development of the ER Programme, stakeholder sessions were undertaken to garner feedback. These sessions were conducted in November 2013 through the support by the Guiana Shield Facility and led by Indufor (the consultant).The focus groups were: Government, NGOs & Academia, Indigenous Representatives, Civil Society Organisations. Although these sessions did not support the development of this ERPIN, their results were used to inform its development by highlighting preliminary focal areas.

The outcomes of this process are preliminary to the development of final REDD+ strategies, and are mainly intended to inform the development of Component 2b of the FCPF. These may form the general structure of the REDD Strategy but there is also the likelihood, given that Component 2b is now being implemented by Guyana, that these may take on different forms in the final design.

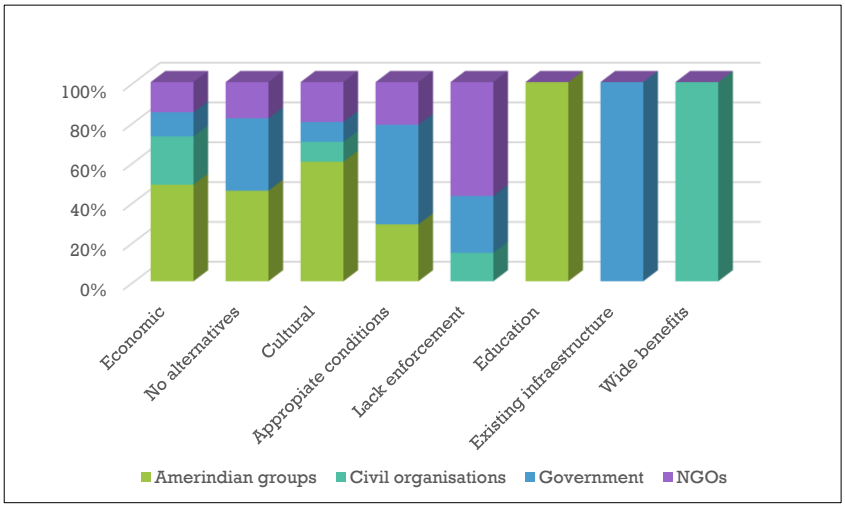
The participants were asked what they considered were the main factors influencing deforestation and forest degradation drivers. In other words what were the causes or why were the drivers attractive. The results are presented in the figures below, presenting the factors in order of relevance for participants from left to right.
In the case of both mining and forestry, economic reasons were considered as the main cause by all the groups. The reasons given could be classified as direct, if they are linked to policies or activities occurring domestically in Guyana, or indirect if they are independent.

For instance, in the case of indirect causes, the price of gold and its demand were considered as indirect causes for mining. On the other hand, mining as an employment, business or poverty alleviation opportunity is considered a direct cause. Some participants considered that while there where economic benefits from mining, if the full extent of costs and benefits were accounted for, mining would not be as significant in the GDP as currently.

In the case of mining, participants considered that the limited or complete lack of alternative economic activities to mining was the second most important reason why people in Guyana were involved. This was either because of lack of knowledge of other activities or because the conditions for the development of mining in Guyana were suitable for its ongoing activity.

All groups concurred that cultural reasons also contributed to the development of mining. This was either because mining was considered as an activity of longstanding tradition, or because of Guyana's lack of long term planning. Participants mentioned that some of the right conditions for the development of mining were available in Guyana. These are relevant to the fact that mining in Guyana is not sustainable mining, some of the factors mentioned were: low skill required, availability of lowly paid labour force (including foreigners), low capital investment, existing policies, and limited monitoring and enforcement.

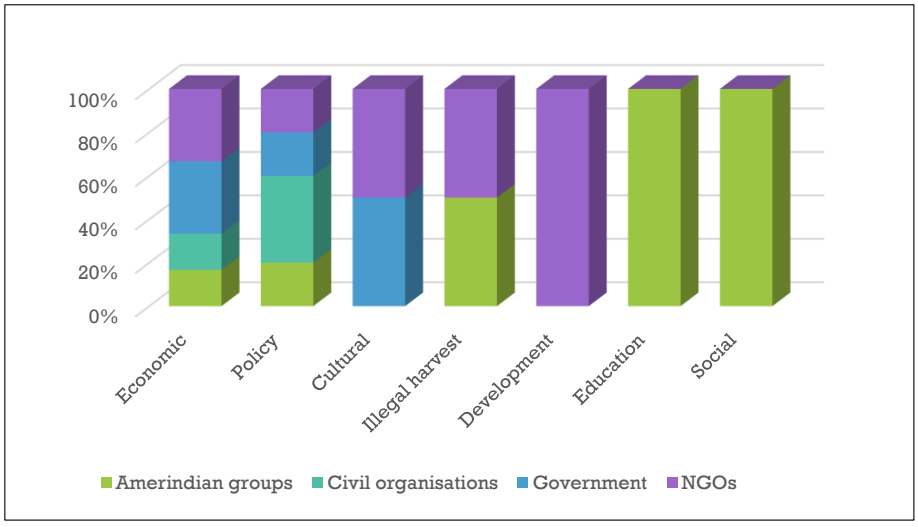
Other factors, in order of importance, were the lack of enforcement of existing regulations, limited education, use of existing infrastructure and wide benefits sharing.



Underlying Causes of Deforestation & Forest Degradation Due to Mining

With regards to forestry, most participants considered that forestry did not lead to deforestation, but to forest degradation, as with selective harvesting the forests are depleted of valuable species. In terms of policy, many considered forestry activity in Guyana was well regulated and some considered overregulated. Participants considered that the regulations limited deforestation due to forestry activity, and that any deforestation and most forest degradation was mainly occurring in existing large concessions. It was considered that the use of forests by local communities is traditional in Guyana and may also contribute to some forest degradation. Participants agreed that illegal harvest is limited and mainly confined to remote areas

Underlying Causes of Deforestation &Forest Degradation Due to Forestry



Expected Outcomes from Strategy & Discussion on Candidate Activities

Although the expected outcomes and potential candidate activities were discussed separately, the conversation on expected outcomes led to the participants expressing not only what they would expect to see from the strategies, but how this could be achieved. In that sense, this section presents the results of both the desired outcomes and perception on the proposed candidate activities.

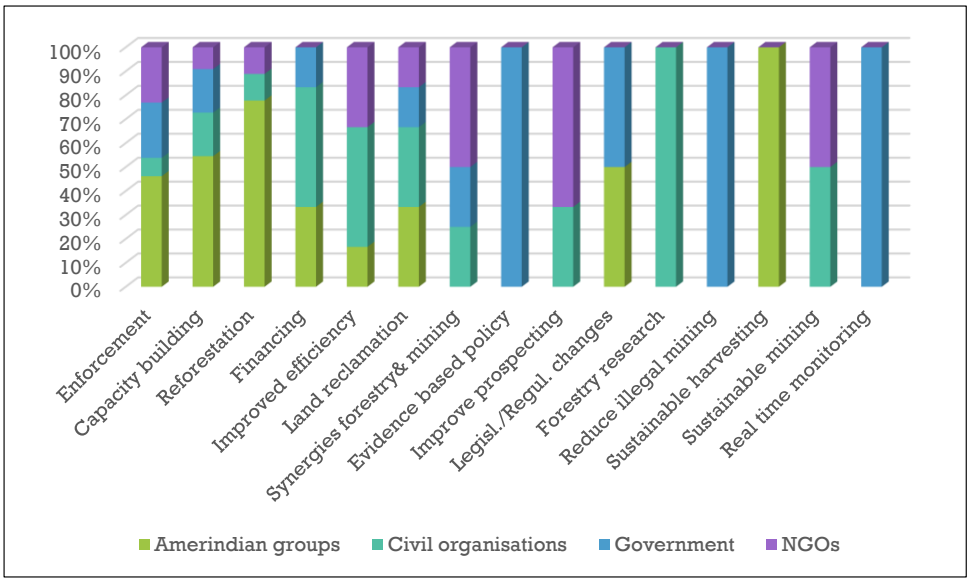
With respect to a time scale for the outcomes, as a reference to frame their proposals, it was indicated to the groups that a short to medium term could be 1 to 5 years, medium term 5 to 10 years and longer term above 10 years.

In the following sections the outcomes and/or candidate activities are outlined and a brief explanation of those most frequently mentioned in each category is provided.

Short to Medium Term

Most participants from all groups agreed that short to medium term, more **enforcement actions** on mining activities could be achieved. The enforcement referred to is to ensure compliance with current regulations and legislation that govern the mining sector including the land reclamation requirements. In some cases the participants mentioned insufficient staff are available to be able to achieve both monitoring and enforcement of the miners' obligations. Some participants were also concerned at the seeming lack of integrity of some of the officers which further complicated the enforcement issues.

Short & Medium Term Expected Outcomes/Candidate Activities



The second most expected outcome and/or strategy was capacity building. This is seen as a need for stakeholders in many respects. Some of the proposed uses of capacity building were:

- Mining practices and technologies
- Legislation (e.g. Mining Act)
- Development of alternative revenue streams
- Improve forestry practices
- Low Carbon Development Strategy (LCDS)

Reforestation activities were also considered relevant, these were either through mine sites reclamation, or forest enrichment or restoration. Closely linked to capacity building, and in general all possible strategies, was financing. Participants felt that funds from Government and from external parties should be used in capacitation. Some participants considered that there is a need to maximize the use of natural resources with improving the efficiencies of the forestry and mining sectors. For instance, in mining, technologies to enhance the level of mineral recovery and the use of mercury were mentioned, while in forestry, processing forest products was discussed.

Participants talked about **land reclamation** activities, mainly after mining, It was understood that such activities would be part of the enforcement procedures for mining. In addition, some participants suggested alternative mechanisms to achieve the reclamation. One of these was the increase of environmental bonds to reflect a more real market value of the cost of forest restoration and incentivize miners undertake the reclamation and recover their bond. Alternatively GGMC will have enough funds to do a proper restoration of the mines. Another proposal was to have an independent or semi-autonomous agency to oversee land reclamation.

In relation to **synergies between forestry and mining**, some participants suggested that improved mechanisms for collaboration could be investigated through the strategy and activities.

Mining **prospecting** refers to the physical exploration for minerals. Participants pointed out that an option for minimizing deforestation due to prospecting is the use of non-invasive technologies before mining activities commence. Prospecting could be done through the GGMC to identify where the gold is and tell the miners where to go, rather than the miners excavating independently.

Medium to Long Term

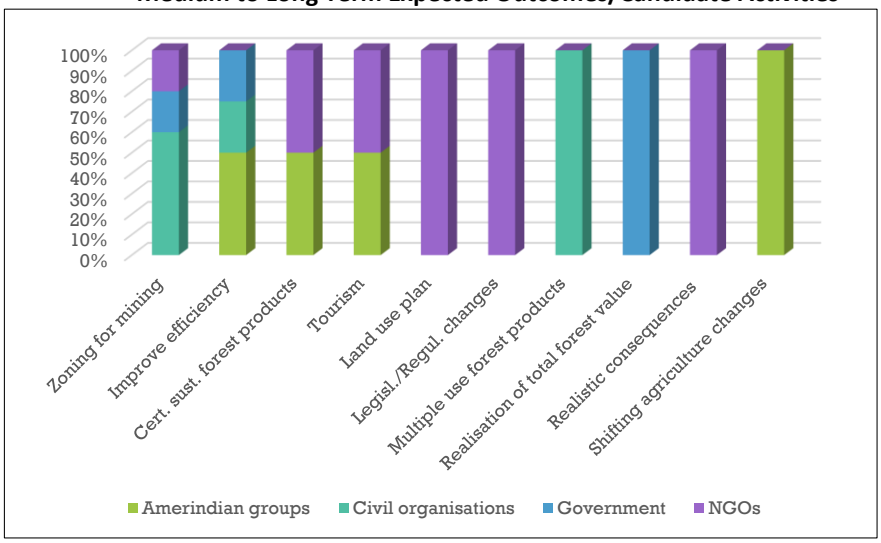
For the medium to long term, participants mentioned that **zoning for mining** will be a good alternative. This would be closely linked with the proposals for improved prospecting as this would provide the basis to establish zones for concessions or permits. The approach of zoning areas was also seen as a way to facilitate monitoring and enforcing the mining regulations, as it will clearly define the areas permitted for mining.

Participants also considered that **improving efficiencies** in the use of natural resources, both forests and mineral, would help reducing the rate of deforestation. This will represent, for instance, improving the recovery of gold and forest products processing.

Within the same topic, a **certification system for forest products** was considered an option to accredit sustainable harvesting methods and forest products in Guyana.

Tourism was considered as a forest based economic activity for Guyana that could provide options to mining and forestry.

Medium to Long Term Expected Outcomes/Candidate Activities



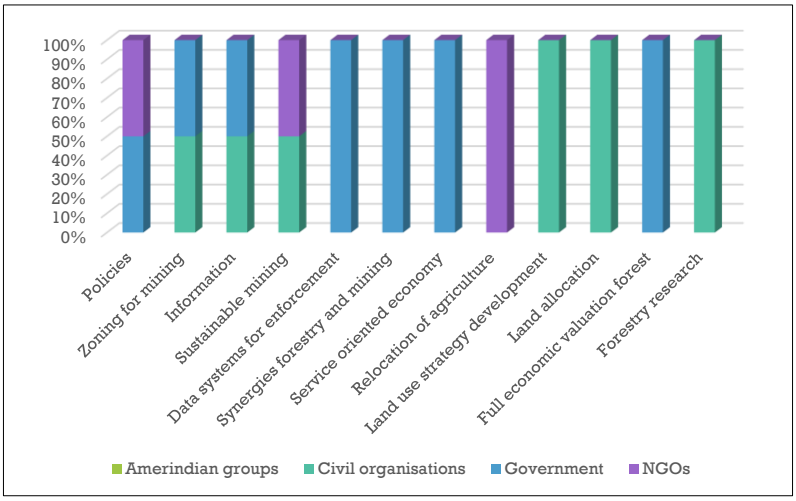
Long Term

Participants considered that some changes in **policies** that govern or influence forestry and mining activities would be required in the long term. For instance it was mentioned that a national land use plan would help in the proper management of natural resources, especially as the economic activities overlap.

In the long term, some of the comments are considered under the same broad categories covered in the previous two sections, however, the proposals for this time frame are different. For instance, in the case of **zoning for mining**, the participants indicated that while ideally it will be the GGMC that does the mining prospecting to define zones for the activity, realistically this will only occur over the long term.

Some participants indicated that improvements in **information** gathering and information sharing are important and would facilitate and improve resource management.

Long Term Expected Outcomes/Candidate Activities



The following activities were discussed and/or formulated through the stakeholder sessions, and may address one or several of the indirect drivers. In the following paragraphs, the application of these activities in developing strategy options is analysed.

Enforcement of Mining Regulations / Reclamation

Status quo

a) Mining legislation and regulations are enforced by the GGMC. The functions of the Commission range from the promotion of mining development, to technical assistance, research, collection of fees as well as the enforcement of the conditions of Mining Licenses, Permits, and Concessions and Prospecting Licenses and Permits.

b) Mining regulations define the environmental requirements for mining. The environmental bonds are requested to ensure miners fulfil the reclamation and closure plans submitted with the permit or license application.

Problem definition

c) Currently, the enforcement of mining regulations is based on the ground work of Mining Officers. It would require a considerable number of staff to be able to monitor all the mining concessions and perform all the duties the officers are tasked to do. Considering that medium and small mining operations are numerous, many of these operations are not monitored leading to the production of gold being under-reported. Commentary from stakeholders pointed out the need for there to be significant strengthening of monitoring capacity by Mining Officers, including addressing issues such as influencing of mines officers in their execution of duties

d) The bond fees paid by miners is not proportional to the real cost of reclamation. Consequently miners may elect to forfeit the bond.

e) From the perspective of reducing deforestation, it is important to reduce the emissions or increase carbon sequestration to mitigate those emissions. The land reclamation and recovery of vegetation at mine closure can ensure that some of the negative effects of soil degradation and deforestation are reduced and overcome in the long term. Besides the fact that the environmental bond payment will not cover the actual costs of reclamation, some argue that miners will not have the capacity or knowledge to do the land reclamation themselves.

Options

Options for Activities: Enforcement of Mining Regulations / Reclamation

Options	Key Features
Status quo	Environmental bond fees as per current rates, as well as GGMC monitoring.

Change environmental bonds fees to be consistent to actual reclamation cost	Update the regulations and fees to encourage miners to undertake the reclamation to recover the bond. This may be feasible in medium to large scale mining.
Separate dedicated unit, independent of the GGMC, takes charge of land reclamation with environmental bonds	This will ensure that the reclamation takes place and that it is effective. This could be implemented with option 1, and also needs to prevent re-entry to the mined site once reclamation is finished
Separate dedicated unit, independent of the GGMC, in charge of land reclamation with environmental bonds and other funds	As option 2, but organisation will have the environmental bonds and additional funds from either GoG budget or external funds.

Reclamation/Re-vegetation/Reforestation Projects

Status quo

1. Re-vegetation and/or reforestation activities in Guyana are limited to natural regeneration following a forest change event. This occurs at different rates after the abandonment of a site after mining, abandoned roads, log markets or fallow period after agriculture.
2. GFC has been developing the options for land reclamation. There is also a reclamation pilot project funded by WWF in Mahdia. Reclamation includes backfilling pits and levelling mined lands, and replanting native trees after the site has been reclaimed to enable a regeneration of other plants (GGMDA, 2013).

Problem definition

3. There are limited land reclamation activities performed to recover those sites. Regeneration occurs at different rates depending on the soil conditions and intensity of the activities performed. There are cases where miners re-enter the sites, removing any natural regeneration.
4. Progressive human-induced re-vegetation (non woody species) could lead to the re-establishment of forest tree species and reforestation with woody species could assist in increasing the carbon sequestration on the abandoned sites. The reforestation activities will have more impact if they are undertaken once the sites have been abandoned.

Options

Options for Activities: Reclamation / Re-vegetation / Reforestation Projects

Options	Key Features
Status quo	Re-vegetation and/or reforestation activities in Guyana are limited to natural regeneration with limited land reclamation activities undertaken
Create incentives for miners to undertake the reclamation of mined sites	This option is aimed at encouraging miners to fulfil the environmental bond requirements in the short to medium term. The incentives could be grants, technical assistance, or help in other aspects of mining, such as training to improve recovery, etc.
Community projects to do reclamation/ re-vegetation/ reforestation on local abandoned sites which could not be re-entered	Funded projects with monetary or other incentives for communities could achieve the reclamation and benefit local communities. This could be mixed with the development of other economic activities in part of the land (i.e. chicken farms, farming, etc.)

National Mining Zones

Status quo

1. GGMC determines which areas in Guyana are open for mining exploration. There are currently six mining districts: Berbice (1), Potaro (2), Mazaruni (3), Cuyuni (4), Northwest (5), and Rupununi (6)(GLSC, 2013).
2. The exploration phase is the start of the mining cycle. The determination of where the mineral deposits are located can be made through techniques such as geological mapping, geochemical and geo exploration. The exploration may not lead to the development of a mine, if mineral deposits insignificant.
3. The GGMC website presents a Mineral Exploration Map[6] based on a 1984 map which has been updated with field work between 1999 and 2002. It is understood the Mineral Exploration Map for Guyana is not a guide for where mining licenses or permits are granted in Guyana. The National Land Use plan assists in defining

[6] http://www.ggmc.gov.gy/Documents/PDF/GeoServices/min_map.pdf

areas that are suitable for several economic activities in Guyana considering physical capability, ecology, etc.(GLSC, 2013).

Problem definition

4. In Guyana, miners undertake the initial exploration phase which involves the removal of forest vegetation leading to deforestation. From the mineral production perspective, this is an inefficient process considering the man-hours spent in a process that may not lead to a development or production phase.

Options

Options for Activities: National Mining Zones

Options	Key Features
Status quo	The Mineral Exploration Map from Guyana should be updated.
National Mining Exploration Map update as a basis for concessions	A more thorough exploration national mapping and land use classification process could be undertaken with the aim to be used as the basis for mining in Guyana. External funding and technical support could be sought considering the environmental and economic merits the application of this process could provide.
Land use zones or classification to regulate extractive industries at a national level [potentially addressed in National Land Use Plan]	Ideally in conjunction with Option 6, prepare and approve a national land use zones including mining production areas to be used for the allocation of concessions, taking into account the interaction with other economic activities and land use capacity. Having specific mining areas will help authorities in monitoring of mining regulations and compliance of the zones.

Improve Efficiencies: Mining & Forestry

Status quo

1. The developed Mining School aims to improve technology and mining practices to increase the efficiency of mining and forestry is dependent on the technologies used in the activities. The level of efficiency in mineral or timber extraction is directly reflected in the levels of deforestation and degradation. Sustainable Forestry Management Practices have been developed through the implementation of a Code of Practice for harvesting operations, although wider compliance with this Code is required. GFC through the Community Forestry Development programme is conducting continuous programmes in the implementation of the Code of Practice.
2. Likewise, the recently efficiency of mining operations. In addition, outreach activities on mining regulations and best practices with miners have targeted specific requirements linked to compliance.

Problem definition

3. Wider extension programmes may be required to share experiences and train users on forestry and mining techniques, continuing on the initiatives already started in Guyana. As experienced in some cases (i.e. Forestry Code of practice) compliance may be an issue, as using or opting in to the use of improved techniques is voluntary. As such, the effort of building capability may not deliver the desired benefits or outcomes.

Options

Options for Activities: Improve Efficiencies in Mining & Forestry

Options	Key Features
Status quo	Efficiency in mining and forestry are directly linked to the level of deforestation and degradation. Guyana has some good initiatives that could be more widely applied.
Follow up on existing projects and strengthening efforts	Assessment of current needs and improvements for existing or past initiatives in this area (if not already assessed) and implementing changes to build on these efforts

6.2 Planned outreach and consultation process

In planning for the upcoming outreach & consultation activities on the ER Programme:

a) Sessions will be executed through collaborations among but not limited to, the following: the Office of Climate Change, the Ministry of Indigenous Peoples' Affairs, the Guyana Forestry Commission, Guyana Geology and Mines Commission, Guyana Lands and Survey's Commission, other Government agencies and

Ministries, Regional Administrative offices, National Toshaos' Council and Amerindian NGOs; civil society organisations;

b) and local communities. Resource persons within local and indigenous communities such as business owners are also a vital link for communication and assistance with logistics.
c) The process will be built upon the principle of Free, Prior and Informed Consent (FPIC);
d) Information materials will be developed in a user friendly format to target a wide range of national stakeholders;
e) Every effort will be made to send relevant materials to stakeholders at least 30 days prior to the session being held;
f) The activity will be fully documented and analyzed to determine how stakeholder input will be used, what strategies should be put in place, and which ones should be amended;
g) The NTC, Amerindian NGOs (Amerindian Peoples Association (APA), The Amerindian Action Movement of Guyana (TAAMOG), and Guyanese Organisation of Indigenous People(GOIP))., civil society groups and other partners will be engaged to disseminate information amongst stakeholders, ensuring involvement of non-governmental and state parties in the process;
h) Translators, and/ or interpreters will be available during sessions with indigenous communities;
i) An appropriate feedback mechanism will be developed to allow for sufficient exchange of views, opinions and recommendations.

The process of stakeholder engagement will be executed as follows:

a. **Cluster Session Approach to Sub-National Consultations -** a sub-national cluster approach will be adoption for the conducting of outreach sessions. In this, host villages, urban or rural centres, village offices, etc., will serve as cluster catchments for the sub-district or sub-regional sessions. These will be selected based on logistical rationality, based on accessibility, centrality, capacity and suitability of facilities. These sessions will target an average of between ten and thirteen members per community to participate, to achieve a broad spectrum of participation by elected leaders as well as other community leaders, women, youth and elders. Achieving gender balance is another important consideration, and likewise proportional representation of youth and elders.
b. **Planning for Stakeholder Consultation Sessions**- Planning for stakeholder consultation sessions will be done using the lessons learnt from past consultation sessions along with continuous guidance from the UN-REDD Programme Guidelines on Free, Prior and Informed Consent (FPIC). Invitation letters for will be distributed at least three (3) weeks in advance of the dates outlined for the engagement session. Consent will be solicited from Regional Executive Officer, community leader or resource persons such as business owners to distribute the invitation letters to communities. Where applicable, the cluster session approach will be adopted for outreach and capacity building activities as described in 5(a) directly above. Transportation and accommodation for participants will be arranged, and associated costs either paid or refunded, where necessary. Apart from the formal channels of communication every other means of mobilization must be used when mobilizing local communities
    - Talking with local leaders e.g. Toshaos, councillors, youth and women leaders, and teachers explaining what the activity is and asking them to help to mobilize. It is important that they understand the purpose of the activity as sometimes (most times the invitation letters do not say it all and do not reach the intended target group). Important also to include business persons to assist since they too have a lot of influence in these communities.
    - Every means of communication must be used HF radio, cell phones and word of mouth. Experience has shown that when an activity is well advertised in a community the community is more receptive and comes to the activity with some sort of expectations.

a. **Modes of Promoting Stakeholder Feedback and Participation** - To achieve optimum participation and enable effective discussions and results, the programme will use the following:

- Workshops
- Interviews
- Surveys
- Formal and informal discussions
- Advisory groups
- Training
- Community Planning Groups
- Education outreach and school outreach programs.

c. **Target Audiences** - Stakeholders are defined as those groups that have a vested interest in Guyana's REDD+ mechanism. Stakeholders play important roles as advocates, partners and agents of change. The participation and feedback from stakeholders at all levels is critical to the successful implementation of the national REDD+ programme. Along with Indigenous groups, participation by wider stakeholder groups such as loggers, miners, business owners, civil society, local NGOs and international organisations, are also important to this process. Please see Annex 3 for a detailed compilation of the various stakeholder group clusters and Amerindian communities. The following stakeholder groups will be targeted for participation during these sessions:

i. Amerindian villages and communities: are identified as having collective attachment to geographically distinct habitats or ancestral territories and to the natural resources in these habitats and territories; and depend on forests or other biomes such as savannahs and wetlands for their customary spiritual and cultural well-being, as well as economic and social livelihoods.

ii. The National Toshaos Council is also a major stakeholder within this grouping and has been engaged by the GoG to conduct consultation and outreach activities with Amerindian communities on REDD+ and Readiness Preparation, in coordination with the Amerindian NGOs (the APA, TAAMOG and GOIP). The NTC is a democratically elected body that advocates on behalf of Amerindian communities and villages.

iii. Women, youth and the elderly: Represents vulnerable groups in many communities, and are often marginalised due to gender related issues. Albeit the latter, women and the elderly fulfil essential roles in the operations of many communities and are often centrally involved in communities' economic activities. Youths and young professionals constitute the future population of the country and will be the portion of society benefiting from the outcomes of current governmental decisions. The active participation of these groups in the process would result in increased interest in developing professional skills in the Climate Change and REDD+ arena ultimately working towards Guyana's success in REDD+.

iv. Other forest dependent communities: Recognised as those not qualifying as an Amerindian community but are nonetheless as dependent on the forest ecosystem services such as miners. They foster the design of project proposals & implementation of pilot projects;

v. Internal stakeholders: This stakeholder group comprises staff of the Guyana Forestry Commission and its REDD Secretariat (RS) which are responsible for national implementation of key technical aspects of REDD+ activities, including the readiness activities under Guyana's R-PP under the Forest Carbon partnership Facility (FCPF), and the National REDD+ Working Group (NRWG) that will be coordinated and chaired by the GFC and involve the input of key stakeholders from across the various stakeholder groups.

vi. National Agencies: Comprising a cluster of government lead agencies closely involved in climate change mitigation and adaptation, natural resources management etc which provide political leadership and strategy setting on climate change issues and agenda for Guyana, oversee the implementation of the LCDS and execution of activities under the GRIF and other initiatives related to REDD+ among other roles. These agencies include the Office of Climate Change, Ministries of Natural Resources & Environment, Agriculture, Amerindian Affairs, Public Works, Housing, Finance, Local Government, as well as, the Energy, Land Administration, Mining, and Environmental Management sectors;

vii. Private Sector Bodies: Essentially comprising small business entities and large corporate organisations such as loggers and Miners Associations, Forest Producers Association, Guyana Gold and Diamond Miners Association, Private Sector Commission (PSC), etc, that facilitate investment and employment in Guyana's extractive industries sector and aid in the financing and implementation of REDD+ activities within sectors (e.g. forestry, mining, agriculture, tourism etc.);

viii. Civil Society Organizations and community organizations & NGOs: Support and advise on REDD+ projects design and implementation, as well as participate in the NRWG, foster awareness raising and information dissemination. This stakeholder group also supports the implementation and management of community-based conservation, sustainable management and development projects, and assist in conducting national REDD+ consultations. Those included in this group are Trade Unions Congress (TUC), Federation of Independent Trade Unions of Guyana (FITUG) and several indigenous NGOs among other groups.

ix. Academia: Support the training and education of personnel at the secondary and tertiary level. Moreover, academic institutions and researchers are responsible for conducting research into specific REDD+ related activities as well as disseminating information to the future generation;

x. International Organisations and NGOs: Provide expert advice and (technical) support to the Government of Guyana and aid in project implementation within Guyana. Moreover, collaborations

with international organizations and NGOs allows for sharing of best practices, identifying gaps in communication and engagement, and enable knowledge transfer and capacity building. In addition, other possibilities include the contribution of news feeds, articles, reports, lessons learnt etc to the revised website;

d. Native Languages Translations - Bi-lingual translators or interpreters will be catered for during these sessions where necessary. Several languages are spoken among the four main indigenous peoples of Guyana, namely Warraus, Arawaks, Wapisians and the Caribs. Several sub-tribes exists under the Caribs such as the Arrecunas, Akawaios, Patamonas, and the Makushis. The Wai-Wais are also included in the Carib-speaking group. Even within these distinct language groups, different local dialects exists. For example, in the Rupununi, there are several different versions of "Makushi" spoken. The Ministry of Indigenous Affairs, local communities and indigenous NGOs will play an integral role in facilitating this. Cognisance must be given to the complexity of translating written texts, as these are oral languages and the majority of Amerindians are not familiar with the recently developed orthography and the written form of their languages. So that even if these are translated into written documents, they will not be easily read by most. It is also recommended that quality checks and peer approvals of these translations be done so as to ensure acceptability of same. This is an important role that will be undertaken by the Ministry of Amerindian Affairs, indigenous NGOs and local communities. It makes much better sense to incorporate indigenous NGOs and communities here. Plus it ensures a decentralised documents i.e. it doesn't come across as solely government focused. For the workshops where we had to use translators/interpreters, local persons were used. Additionally, consideration will be given to oral translations, using culturally appropriate audio-visual films (short documentaries – Videos or DVDs) of bi-lingual translators presenting key concepts and components of REDD+ Implementation would be an effective way of getting the message across in a direct and interactive way. Most villages have access to video machines, so use of audio-visual media would be quite suitable.

An important update to the implementation of the LCDS is that it is currently being updated to reflect new activities and priorities. This has implications for the Multi Stakeholder Steering Committee, in terms of its constituency, whereby a broader range of stakeholders will be engaged. The clear intent is to ensure that participation is strengthened and boarded to include all levels of stakeholders

7. Operational and financial planning

7.1 Institutional arrangements

The Ministry (now Department) of Natural Resources and Environment was established in early 2012 and has an oversight and coordinating function for agencies with responsibilities for the various natural resources sectors in Guyana, i.e. forestry, mining, environmental management, wildlife, protected areas, land use planning and coordination,. With focuses on strengthening national, regional and local environmental governance, the Ministry aims to address issues such as national development planning; national and international policy setting and technical assistance; sustainable national development and strengthened and harmonized national laws and institutions.

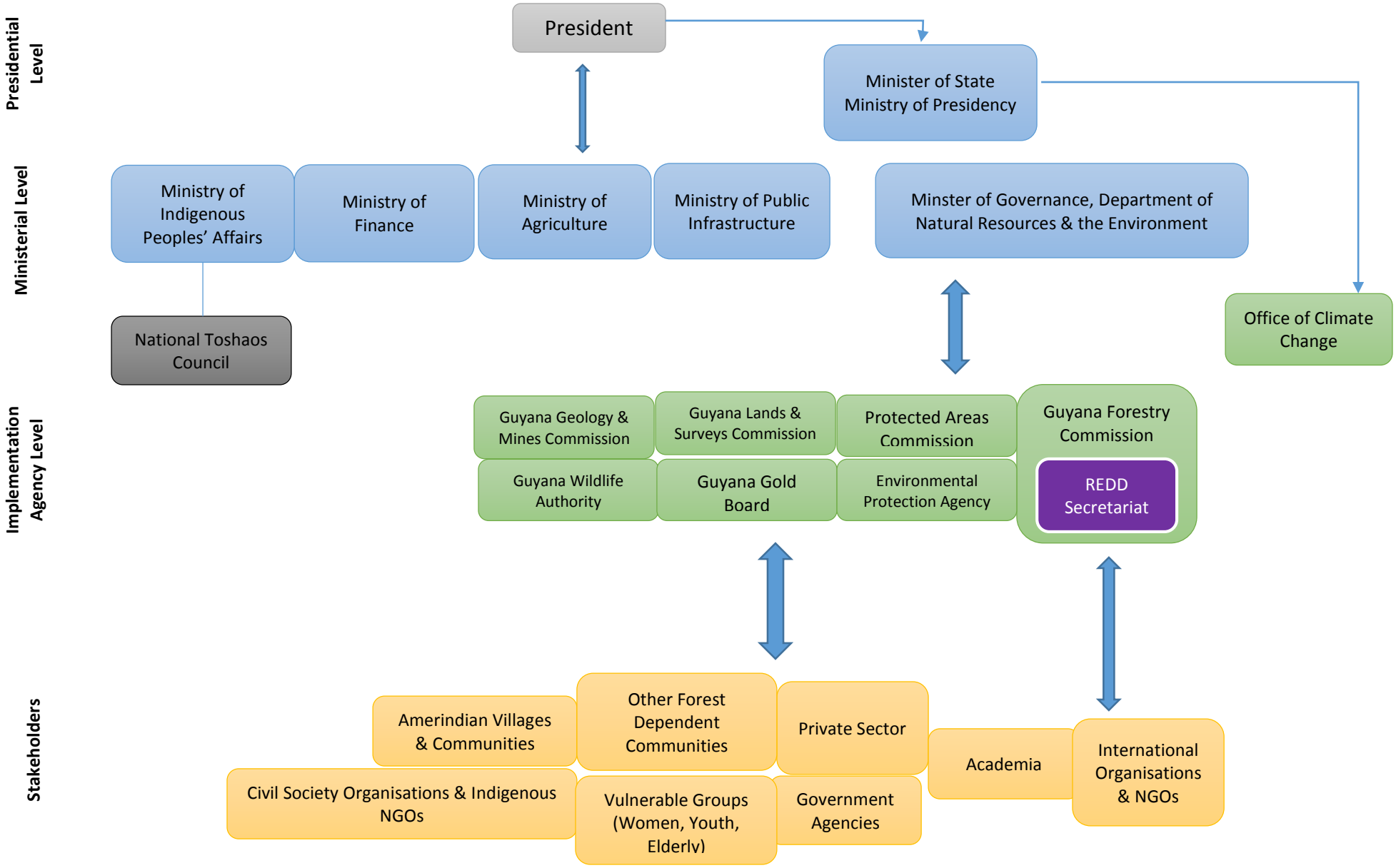
With the implementation of REDD+ readiness activities, there will be the convening of the National REDD+ Working Group (NRWG). This group will be tasked with overseeing the preparation and implementation of REDD+ activities as it related to stakeholder engagement and consultation and will comprise the representation of a number of key agencies and stakeholder groups. Along with the NRWG, these agencies are also part of the MRVS Steering Committee. Overarching responsibility of this committee is that of overseeing the development of the MRV system, coordinating MRV datasets and overseeing the technical progress under the MRV system. Additionally, the Technical Committee which is a Sub Committee of the Steering Committee, advises the Steering Committee on crucial technical issues, including land use, mining regulations and sustainable environmental practices, all in the context of monitoring, reporting and verifying land area, forest change and carbon impacts, among others. These structures, both coordinating and decision making, will allow for there to be constant flow and exchange of information and decisions.

Further, there may be need to expand the physical and technical capacity of each of the institutions responsible for implementing and maintaining the LCDS and REDD+, inclusive of the R-PP and ensuring that implementation is internationally accepted and scientifically supported. This determination will be made as part of the readiness process.

Table 1- The Roles & Responsibilities of Key Parties Involved in National REDD+ Activities

Institution/ Body	Role	Responsibilities	Members & Partners
Ministry of Natural Resources & Environment	To facilitate the continued focus on expanding and diversifying the economy on the basis of rationale use of Guyana's natural resources. Tasked with overseeing activities in the following sectors: forestry, mining, environmental management, wildlife, protected areas, land use planning and coordination, and climate change.	Facilitating strengthened coordination and collaboration amongst agencies involved in REDD+ implementation.	GFC, GGMC, GL&SC, EPA, National Parks Commission (NPC), Guyana Gold Board (GGB), Guyana Wildlife Authority (GWA), Protected Areas Commission (PAC),
Office of Climate Change	Guide the implementation of the REDD+ Activities under the Low Carbon Development Strategy (LCDS) through the Office of Climate Change	Support Guyana's involvement in the international REDD+ dialogue and partnerships; Guiding GFC and nomination of REDD+-related Boards, committees and working groups.	The President; Members of the Cabinet; MSSC; Ministries and Government entities; Non-Government entities, Members of Civil Society
Guyana Forestry Commission(GFC)	Coordinate national technical REDD+ activities in Guyana	Oversee operations of the REDD Secretariat; Monitoring of RS performance; Overseeing of REDD+ Activities, Committees, Working Groups and activities; Oversee design and implementation of MRV System.	MNRE, GFC's Board of Directors; Staff of the GFC; Multi Stakeholder Steering Committee of the LCDS; Forest Producers Association (FPA); NTC; MoAA; forest dependent communities.
REDD Secretariat (RS)	Established by the GFC to implement national REDD+ activities and to advise the Government of Guyana on policy formulation under the LCDS framework. Reports to GFC and other relevant bodies. The RS has been identified as the permanent secretariat of the NRWG	Manage permanent operational team for REDD+ activities; Prepare a Consultation and Outreach Plan; Organize and Manage the National REDD Working Group (NRWG); Perform regular quarterly meetings and other meetings as needed. It is the permanent secretariat of the NRWG.	OCC; MSSC; GGMC; GL&SC; EPA; MoAA; MNRE; NTC; MRVS Steering Committee & Technical Sub Committee, NRWG
Amerindian & other Civil Society NGOs	Advocacy of the views of Amerindian and other civil society groups	These groups will be engaged throughout the REDD+ development and implementation process. Along with providing input and feedback into the development of the components of REDD+ such as the MRV System and Community MRV project, these groups will be actively involved in the development and execution of the REDD+ consultation and outreach.	GOIP, TAAMOG, APA, NADF, North Rupununi District Development Board (NRDDB), NTC, GoG, MoAA
National Toshaos Council	The NTC is the democratically elected body tasked with the responsibility of representing the rights and views of Amerindian communities and villages at the national level.	The NTC has been identified to support the consultation and outreach activities with Amerindian communities and villages on REDD+. Further, the NTC has been identified to be integrally involved in REDD+ implementation, including the MRV System. The Chairperson of the NTC holds a seat on the MRVS Steering Committee.	Toshaos Government & Non-Government partners including indigenous NGOs

7.2 Linking institutional arrangements to national REDD+ implementation framework



7.3 Capacity of the agencies and organizations involved in implementing the proposed ER Program

The implementation of REDD+ has involved a multi stakeholder approach to implementation. The implementation of the ER Programme also will follow this approach. From the outset, the development of institutional arrangements for REDD+ called for the development of the capacities of the partners involved. To this end, capacity building and institutional strengthening have been ongoing in areas related to REDD+.

Through bodies such as the MRVS Steering Committee that oversees the implementation of the MRVS, targeted capacity building sessions have been ongoing to ensure that all members are fully empowered to fulfil their functions on the committee. What has been achieved to date, is a pool of technical personnel within the partners entities involved in REDD+ implementation that have been subject to capacity building both locally and internationally in REDD+ and related areas. This is an ongoing process.

With the development and implementation of the ER Programme, this approach will also be used to ensure that all implementing partners are fully empowered to participate. A capacity needs assessment will be conducted to identify areas where gaps in capacity exist and in new development areas. This will inform a capacity building and sustainability plan for the way forward in implementing the ER Programme.

7.4 Next steps to finalize the proposed ER Program implementation design (REL/FRL, ER Program monitoring system, financing, governance, etc.). Provide a rough timeline for these steps.

Next Steps*	Jan – Jun 2016	Jul- Dec 2016	Jan – Jun 2017	Jul- Dec 2017	Jun – Dec 2018
Establish process, milestones, partners to lead to full design and ERPD					
Continued stakeholder consultation					
Design of Monitoring System for ER Programme					
Implement development areas of National Forest Monitoring System as defined in MRVS Roadmap Phase 2					
Refine Program REL and Expected ERs					
Define Program's Benefit Sharing Plan					
Define Grievance Redress Mech.					
Develop Financing Plan					
Explore establishment of Registry					
Submit R-Package					
Complete ERPD					

*This is dependent on progress in readiness and subject to confirmation with IDB.

7.5 Financing plan (in US$ million)

The development cost for the programme is expected to be met by FCPF and FIP in the areas of the GRM, Communications and Consultations and SESA. This is expected to be done in the period 2016-2017 to a total cost of US$1.1 million.

Guyana is one of the countries that currently in the pipeline in applying of FIP financing.

Programme Development Financing Sources			
Source	***Amount (US$)***	***Context***	***Timeframe***
FCPF	0.8	Support development of Feedback and Grievance Mechanism, Communications and Consultations, and SESA, among other Readiness areas.	2016
FIP	0.3	Support design of ERPD	2017

Implementation Sources			
Source	***Amount (US$)***	***Context***	***Timeframe***
FIP	20	FIP funds will support the implementation reductions programme in the areas of sustainable forestry and community forestry	2018 - 2022
Private Sector	19	Support to implementation of emission reduction programme in areas	2018 - 2028
Carbon Fund	56	Payments for emissions reductions	2018 - 2028

The programme implementation cost is expected to be met by FIP, Private Sector and Carbon Fund. These costs will be expended over the period 2018 to 2028. Guyana's proposal makes a case for concurrent payments based on performance from the Carbon Fund with reporting being in parallel over this period. Guyana is one of the countries that currently in the pipeline in applying of FIP financing.

The main private sector body in the forestry sector is the Forest Products Association (FPA). The FPA will be engaged in the developing of the Project Activities and will involve the specific identification of areas of support that will be contributed by the private sector. In the plan, so far, the contributions by the private sector will cover areas of infrastructure development and creating access to project site, use of private sector human resources in capacity building for project implementation, and use of capital equipment and physical resources.

At the time of the development of the ER PIN a second bilateral agreement has not been finalised.

8. Reference Level and Expected Emission Reductions

8.1 Approach for establishing the Reference Emission Level (REL) and/or Forest Reference Level (FRL)

Overview

Guyana's forests cover approximately 85% of the country, contain an estimated 19 billion ton of CO2 in biomass, and cover an estimated 18.5 million hectares (Guyana Forestry Commission, 2013.) In addition to being one of Guyana's most valuable natural assets, these forests are suitable for logging and agriculture, and have significant mineral deposits. Should Guyana choose to pursue a development pathway that would lead to increased deforestation from mining, logging and agriculture, there would be significant negative consequences for the world, as the critical ecosystem services that Guyana's forests currently provide both locally and globally – such as biodiversity, water regulation and carbon sequestration – would be lost. If an effectively designed and appropriately resourced Reducing Emissions from Deforestation and Degradation (REDD+) mechanism is agreed by the Parties to the UNFCCC, Guyana will be able to decide whether to place its forest under long-term protection by establishing an agreed level of forest based greenhouse gas emissions.

The RL for Guyana, developed at the National scale, rather than developing subnational RLs due to its relatively small size and relatively centralized government structure. The advantage of a national approach is that the integration of separate subnational RLs and MRV systems is not necessary. Therefore, the process of developing a RL is simplified and can happen more quickly than if common standards and agreements had to be developed for subnational jurisdictions to use.

It is based on the detailed and robust analysis of historic emissions from deforestation from all causes and from degradation due to timber harvesting, and includes the following:

- The key drivers of deforestation, including conversion to agriculture, mineral extraction, and infrastructure expansion (mining and logging roads);
- Degradation from timber production, representing a source of emissions;
- Forest are defined as having a minimum area of land of 1 ha with tree crown cover (or equivalent stocking level) of more than 30% with the potential to reach a minimum height of 5 m at maturity in situ;
- All five IPCC recognized carbon pools are included and the key GHG selected is CO2;
- The historic period selected is from 2001 to 2012, a total of 12 years;
- The collection and analysis of activity data (AD) and field data on forest carbon stocks are consistent with good practice in that they neither over- nor under-estimate as far as can be judged; and
- And all data are at Tier 2 and 3 levels for the following reasons:
    - Wall-to-wall coverage of satellite imagery is used to obtain the AD related to conversion of forest lands to other uses and such data are combined and co-registered with other key spatial data bases in a GIS such as roads, rivers, settlements, vegetation class, location of logging concessions, location of mining concessions, and topography.
    - A comprehensive, peer-reviewed, field sampling system was designed and implemented to attain a required precision target of a 95% confidence interval of <+/-15% of the mean total carbon stock of forests.

In keeping with the principles of Guyana's Reference Level for REDD+, the ER Programme will be:

- transparent, with full documentation and highly sufficient for reviewers to assess the extent to which good practice requirements have been met;
- complete, whereby all relevant emissions categories are estimated and reported;
- consistent, whereby the methodologies used over the historic period are the same and use the same implementers so the differences from year to year are real and not an artifact of change in methodology; and
- accurate and with low uncertainty so that results are neither under or over-estimated.

Application of UNFCCC Modalities to Guyana's RL

Within the context of the United Nations Framework Convention on Climate Change (UNFCCC or Convention), REDD+ REL/RLs serve two purposes. First, RLs establish a business-as-usual (BAU) baseline against which actual emissions are compared, whereby emission reductions are estimated as the difference between RLs and actual emissions. In this sense, RLs depict what the emissions scenario would be in the absence of REDD+ implementation, and thus provides the basis for measuring its success. Second, RLs are needed to determine the eligibility of UNFCCC

Parties for international, results-based support for REDD+, and to calculate that support on the basis of measured, reported, and verified emission reductions.

The creation of forest RLs as benchmarks for assessing performance are guided by modalities contained in UNFCCC Conference of Parties (COP) decisions, most notably decision 12/CP.17 and its Annex. These modalities state that when establishing forest RLs, Parties should do so transparently taking into account historic data and adjusting for national circumstances in accordance with relevant decisions of the COP 4. Forest RLs can be developed sub-nationally as an interim measure while transitioning to a national scale, but Guyana has chosen from the outset to develop its RL at a national scale. A step-wise approach is allowed that enables Parties to improve the forest RL by incorporating better data, improved methodologies and, where appropriate, additional pools. Forest RLs are expressed in units of tons of CO2 equivalent per year and must maintain consistency with a country's greenhouse gas inventory (according to 12/CP.17, Paragraph 8). In response to the guidelines for submissions of information on RLs provided in decision 12/CP.17, a summary of Guyana's decisions on these modalities is given in the Table below.

UNFCCC modalities relevant forGuyana's national REL

Reference to Guideline	Description	Guyana's Proposal
Decision 12/CP.17 Paragraph 10	Allows for a step-wise approach	• REL is at national scale, and includes all drivers of deforestation, forest degradation due to selective logging only, but not removals or carbon stock enhancements in the initial stage.
Decision 12/CP.17 Annex, paragraph (c)	Pools and gases included	• Pools: (activity specific) - Aboveground and belowground biomass - Dead wood - Litter - Soil carbon - Wood products (timber harvesting only) • Gases: - Include CO_2 - Include N_2O and CH_4, converted to CO_2e, for biomass burning due to wildfires
Decision 12/CP.17 Annex, paragraph (c)	Activities included	• Include deforestation caused by agriculture, mining, forestry infrastructure, and other infrastructure • Include forest degradation from timber harvesting only • Include sustainable management of forests (SMF) in timber concessions
Decision 12/CP.17 Annex, paragraph (d)	Definition of forest used is same as that used in national GHG inventory	• Minimum tree cover: 30% • Minimum height: 5 m • Minimum area: 1 ha[7]
Decision 12/CP.17 Annex	The information should be guided by the most recent IPCC guidance and guidelines,	• All data are gathered using best practices and integrated to estimate emissions using IPCC 2003 and 2006 guidelines
Decision 12/CP.17 II. Paragraph 9	To submit information and rationale on the development of forest RLs/RELs, including details of national circumstances and if adjusted include details on how the national circumstances were considered	• Being a high forest cover and low deforestation country, Guyana proposes to make adjustments to allow for national circumstances likely future emissions are not well captured by historical ones.

Many of the critical elements of REDD+ and establishing a REL do not have strict guidance from the UNFCCC, leaving the analysis and final decision-making up to the country. At the Conference of Parties (COP) meeting in 2013[8],

[7] Based on the Marrakech Accords.
[8] The text developed at the 2013 COP is available at http://unfccc.int/resource/docs/2011/cop17/eng/09a02.pdf#page=16

additional guidelines and procedures were discussed regarding technical assessment of REL submissions. Such additional guidance provides more clarity regarding how to proceed with submission of a Reference Level.

Guyana's Reference Level for REDD+

Scope of Activities

Guyana has chosen to include emissions from deforestation and forest degradation in its RL but not removals from carbon stock enhancements at the initial stage. This recommendation is made given that more than 80% of Guyana is forested, and historically there have been few activities related to enhancing forest carbon stocks from which a reference level could be developed.

Deforestation

There are several drivers of deforestation, including conversion to agriculture, mineral extraction, infrastructure expansion, and Guyana intends to include deforestation as a REDD+ activity.

Forest Degradation

There are several sources of forest degradation in Guyana, each of which should be considered separately to determine whether potential emissions are significant to include in the RL, whether they can be included at reasonable cost, and whether it is likely that interventions can be implemented to reduce such emissions.

Potential causes of forest degradation in Guyana include:

1. Selective logging
2. Human-induced fires
3. Small scale land-use change (e.g., mining that does not qualify as a deforestation event)
4. Expanding shifting cultivation and/or shortened fallow periods

Selective Logging

Because the timber industry is active in Guyana and emissions from this form of degradation represents a proportion of emissions, degradation from selective logging is included in the RL.

Pools/Gases

Pools for Guyana were selected separately for each activity included in the RL. The selection of pools was based on the expected magnitude of the change in stock in a given pool as a result of deforestation as well as the resources required to collect accurate and precise data. For degradation caused by timber harvesting, the soil carbon pool was not included because it has been shown that selective logging has no impact on soil carbon over a large concession because of the small area impacted[9]. Litter was also not included in degradation because like the soil pool the impact is very small due to the small area impacted by timber harvesting.

The selection of greenhouse gases for Guyana includes CO_2 only. The exception is the non-CO2 gases (nitrous oxide, N_2O, and methane, CH_4) that are included in the estimates of emissions from fire based on the IPCC 2006 AFOLU method and factors and converted to CO_2e.

Carbon pools selected to include in the RL according to activity.

Activity	AG Biomass	BG Biomass	Dead Wood	Litter	Soil Carbon	Harvested Wood Products
Deforestation	x	x	x	x	X	
Degradation from Timber Harvesting	x	x	x			x

Establishment of Guyana's National Forest Monitoring System

UNFCCC decisions[10] requests developing country Parties to establish, according to national circumstances and capabilities, robust and transparent national forest monitoring systems (NFMS) and, if appropriate, sub-national systems as part of national monitoring systems that:

[9]Johnson, D. W. and P. S. Curtis. 2001. Effects of forest management on soil C and N storage: meta analysis. Forest Ecology and Management 140:227-238

[10] Decision 4/CP.15 paragraph 1d and Decision 1/CP.16 paragraph 71(c)

- Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, as appropriate, anthropogenic forest-related GHG emissions by sources and removals by sinks, forest carbon stocks and forest area changes
- Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities
- Are transparent and their results are available and suitable for review as agreed by the COP

Guyana's NFMS (referred to within Guyana as the Monitoring, Reporting, and Verification System –MRVS), which is composed of the Forest Area Assessment System and the Forest Carbon Monitoring System(FCMS), has been developed for data and information collection, such as information on historical forest cover changes and emission factors, to inform the assessment of national forest RLs. In this way, the MRVS forms the link between historical assessments and current/future assessments, enabling consistency in the data and information to support the implementation of REDD+ activities. The MRVS details the methods required to quantify the changes in forest cover and changes in forest carbon stocks in Guyana, develop driver-specific emission factors by forest strata, and monitor emissions from land cover/land use change over time based on a variety of management activities.

The activity data and emission factors generated from the MRVS for key categories are combined to estimate total CO_2 emissions by source or driver under Guyana's REDD+ programme. The table below provides an overview of each key category addressed by Guyana, including the associated drivers and the pools included in each IPCC required category.

Overview of the IPCC categories, drivers, and pools used to estimate emission factors for each key category.

IPCC Category	Driver(s) as defined in MRVS	Pools included		
		Biomass	Dead organic matter	Soil
Forest Land Remaining Forest Land	Degradation caused by logging	AG & BG tree	Dead wood caused by logging	Not included
Forest Land Converted to Cropland	Agriculture	AG & BG tree, saplings	Standing and lying dead wood, litter	Based on conversion to permanent agriculture
Forest Land Converted to Settlements	Infrastructure including mining roads and forestry Infrastructure	AG & BG tree, saplings	Standing and lying dead wood, litter	Based on conversion to unpaved roads
Forest Land Converted to Other Land	Mining (bare soil)	AG & BG tree, saplings	Standing and lying dead wood, litter	Based on conversion to mining
Biomass Burning in Forest Lands	Fire-Biomass burning	AG, saplings	Standing and lying dead wood, litter	Not included

Estimating Activity Data

Deforestation

Activity data (AD) are developed by estimating the extent of forest change measured by area in the case of deforestation. In the case of degradation, where it can often be difficult to accurately relate changes in carbon to changes in area, activity data may employ units other than area.

Forest area change has been estimated for forests converted to other lands (deforestation) for all drivers, based on IPCC Approach 3. The Guyana Forestry Commission, with the services of Pöyry and Indufor, has completed an historical assessment of forest area change—from forest to non-forest—for six periods: 1990-2000, 2001-2005, 2006-September 2009, October 2009- September 2010, October 2010- December 2011, and January to December 2012. The analyses for these six periods were done by the same team of people using consistent methods. For the first four

periods Landsat imagery was used, for the fifth period it was a combination of Landsat and Rapideye, and for the sixth reporting year wall-to-wall high resolution Rapideye imagery was used[11]. The use of higher resolution imagery in the most recent time frame allowed for higher accuracy of interpretation in this period and for a re-evaluation of the total forest area for the previous years. All remote sensing products have been assessed for accuracy (accuracy on forest area of >97%) and verified independently by a 3rd party and all steps certified by an external auditors.

For each of time period up to September 2010, 30 meter resolution satellite imagery was used to quantify deforestation resulting from various drivers including mining, agriculture, forestry infrastructure, road infrastructure, and fire. For the October 2010 to December 2011 period, 5 meter resolution RapidEye imagery was also used for half of Guyana's land area with the 30 m imagery, and full wall-to-wall coverage with RapidEye for 2012. GFC will conduct future monitoring of deforestation with medium/high resolution imagery and a product that gives similar quality and detail in functionality.

One driver of forest degradation, selective logging, is included in the MRVS at present, whilst work is ongoing to collate data for the other drivers of forest degradation. These activity data were estimated from two sources: (1) the areas cleared for forestry infrastructure (roads and log decks) from the analysis of remote sensing imagery and (2) the volume of timber removed during commercial logging and the length of skid trails, based on records available from GFC. The MRVS does not currently address other lands converted to forest (reforestation), though this may be included in the future. Activities used to determine forest area and area change and the findings are described in complete detail in reports by GFC and Pöyry (2011) and GFC and Indufor (2012, 2013)[12].

Degradation

The additional activity data for selective logging were obtained from records from the GFC. The GFC reports on volume of timber extracted, by the primary product class (Table 4) from its concessions and the length of the skid trails planned to extract the timber to the logging decks[13]. All timber data are converted to cubic meters over bark using a variety of factors, and summed to give a total timber production for each year.

Total Forest Carbon Stock in Guyana's Forest

Forest Carbon Sampling strata		Area (ha)*	C stock per stratum t C/ha	Total stock tC
High potential for change	**More accessible**	3,165,731	259.8	822,456,914
HPfC	**Less accessible**	3,096,270	351	1,086,790,770
Medium potential for change	**More accessible**	960,633	300	288,189,900
MPfC	**Less accessible**	4,267,988	300	1,280,396,400
Low potential for change	**More accessible**	262,014	300	78,604,200
LPfC	**Less accessible**	5,872,574	300	1,761,772,200
TOTAL		**17,625,210**		**5,318,210,384 (19,517,302,109CO2)**

[11] GFC and Indufor 2013, Guyana REDD+ Monitoring Reporting & Verification System (MRVS); Year 3 Interim Measures Report 01 January 2012 – 31 December 2012.

12GFC and Indufor 2013, Guyana REDD+ Monitoring Reporting & Verification System (MRVS); Year 3 Interim Measures Report 01 January 2012 – 31 December 2012. Available from the GFC. Indufor, 2012. Guyana Forestry Commission Guyana REDD+ Monitoring Reporting & Verification System (MRVS) Interim Measures Report, 01 October 2010 – 31 December 2011. Joint report between Indufor and the Guyana Forestry Commission. Pöyry Management Consulting Ltd (Pöyry).2011.Guyana Forestry Commission REDD+ Measurement Reporting Verification System (MRVS) Interim Measures report. Joint report between Pöyry and the Guyana Forestry Commission (GFC).

[13] See section 9.7 in GFC and Indufor 2013, cited above in footnote 12, for more details.

A complete description of the methods used for data collection is available in Brown et al. (2014) and the field data used to estimate emission factors are described in Goslee et al (2014)[14].

Degradation

Emissions due to degradation from selective logging were estimated through the development of emission factors related to the volume of timber extracted (in m^3 over bark). Sampling was conducted on active concessions across Guyana to determine the loss of carbon stocks through harvesting and collateral damage in the gaps and skid trails. Losses were assessed with data collected from "logging plots" and skid trails.

The carbon emissions from logging in Guyana can vary as a function of different logging intensities and practices, defined by stand re-entry, extraction rates, and reduced impact logging practices. These differences are captured in the types of concessions, classed as large, medium, and small scale concessions. The main difference between these different concessions is related to the amount of timber extracted per hectare and the re-entry period.

The goal of this component was to develop emission factors relating total biomass carbon damaged, and thus carbon emissions, to the volume of timber extracted and based on the method in Pearson et al[15]. This method allows for the estimation of the total emissions generated by selective logging for different concession sizes across the entirety of Guyana, and was implemented by:

1. Measuring, on a sample of logging gaps (183 plots across four large scale commercial concessions), the extracted volume and carbon in the timber tree and the incidental carbon damage to surrounding trees;
2. Estimating the carbon impact caused by construction of skid trails. (Although selective logging clears forest for roads and decks, their emissions will be estimated under the deforestation component.)

Estimating the total impact of selective logging on carbon stocks involves quantifying a number of different components:

- Volume and biomass removed in the commercial tree felled – emission;
- Dead wood created as a result of tree felling – emission;
- Damage from logging infrastructure – emission;
- Carbon stored in long term wood products from extracted timber – removal;

Historical emissions

Deforestation

Activity Data

It is clear that most of the past deforestation has occurred in the HPfC stratum where about 75.5 thousand ha have been cleared between 2001 to 2012 compared to 7.5 thousand ha in the MPfC stratum, and only 1.1 thousand ha in the LPfC stratum during the same time period (Table below). Moreover, annual amounts of clearing have generally been increasing over the same time period.

For the HPfC stratum about twice as much deforestation occurred in the MA stratum than in the LA (50 thousand ha vs 25 thousand ha). However, in the MPfC stratum, more than twice as much deforestation occurred in the LA area than in the MA area, and this is likely due to the much larger area of inaccessible forest in this stratum.

The period selected for developing the historic emissions is 2001 to 2012.

[14]Goslee, K., S. Brown, and F. Casarim, 2014. Forest Carbon Monitoring System: Emission Factors and their Uncertainties, Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

[15] Pearson, TRH, S Brown, and FM Casarim. 2014. Carbon emissions from tropical forest degradation caused by logging. Environ, Res. Lett 9 034017 (11 pp) doi:10.1088/1748-9326/9/3/034017

Historical Emissions

The activity data and emission factors for deforestation were combined to provide estimates of the historical emissions for the period 2001-2012 (Table below). The total emissions from deforestation between 2001-2012 were **97.1 million t CO_2**. The average annual CO_2 emissions from deforestation over the whole period were **8.09 million t CO_2 yr^{-1}**. To provide estimates of annual emissions for each year, the total emission for 2006-2009 were divided by 4 yr instead of the 4.8 yr covered by the remote sensing data and the emissions for 2010-2011 were divided by 1 yr instead of 1.25 yr covered by the remote sensing data, resulting in a total emission period of 12 yr.

About 90% of the total emissions were from deforestation in the HPfC stratum, with 9% occurring in the MPfC and only 1% in the LPfC strata. Emissions from medium and large scale mining and mining infrastructure accounted for 76% of the total emissions, followed by forestry infrastructure (13%) and agriculture (8%); emissions from fire are insignificant at <0.3%.

Total emissions for historical period 2001-2012, by driver and stratum.

Stratum	Drivers	Emissions (t CO_2)				
		2001-2005	2006-2009	2009-2010	2010-2011	2012
Number of years		5	4.8	1	1.25	1
HPfC-MA	Forestry infrastructure	6,695,548	3,074,194	265,675	191,303	170,168
	Agriculture	1,081,277	77,404	17,173	35,248	293,654
	Mining (medium and large)	12,827,064	7,100,024	3,996,875	4,173,189	6,546,647
	Mining infrastructure	1,698,452	809,206	325,515	344,839	505,368
	Infrastructure	2,018,657	109,086	9,160	133,610	22,038
	Fire-Biomass burning	68,698	-	-	-	
HPfC-LA	Forestry infrastructure	937,592	406,748	49,098	34,273	88,867
	Agriculture	2,558,320	2,490,724	716,580	29,236	240,979
	Mining (medium and large)	4,435,916	3,534,430	5,116,731	4,839,022	6,147,347
	Mining infrastructure	135,047	252,822	262,369	714,141	991,025
	Infrastructure	60,917	-	-	209,702	38,649
	Fire-Biomass burning	48,709	-	-	-	-
HPfC TOTAL		32,566,197	17,854,639	10,759,178	10,704,562	15,044,742
MPfC-MA&LA	Forestry infrastructure	255,182	413,694	3,357	28,900	12,901
	Agriculture	133,928	13	0	1,798	18,720
	Mining (medium & large)	2,436,338	1,405,499	1,135,599	564,663	1,316,720
	Mining infrastructure	28,651	83,760	36,838	144,074	237,824
	Infrastructure	106,481	106,866	62,386	102,391	66,910
	Fire-Biomass burning	88,292	0	28,551	4,996	37,684
MPfC TOTAL		3,048,871	2,009,832	1,266,732	846,821	1,690,758
LPfC-MA&LA	Forestry infrastructure	0	1,590	0	1,242	878
	Agriculture	32,535	0	0	0	0
	Mining (medium & large)	366,907	242,215	325,889	170,481	122,196
	Mining infrastructure	0	7,952	0	11,275	19,417
	Infrastructure	344	0	1,804	4,451	25,096
	Fire-Biomass burning	0	0	0	0	0
LPfC TOTAL		399,787	251,758	327,693	187,449	167,587
ALL	Forestry infrastructure	7,888,322	3,896,227	318,131	255,718	272,815
	Agriculture	3,806,060	2,568,142	733,753	66,282	553,353
	Mining (medium & large)	20,066,226	12,282,167	10,575,095	9,747,355	14,132,909
	Mining infrastructure	1,862,151	1,153,740	624,723	1,214,329	1,753,633
	Infrastructure	2,186,400	215,953	73,351	450,153	152,693
	Fire-Biomass burning	205,698	0	28,551	4,996	37,684
TOTAL		**36,014,856**	**20,116,229**	**12,353,603**	**11,738,832**	**16,903,087**
ALL	Forestry infrastructure	1,577,664	974,057	318,131	255,718	272,815
	Agriculture	761,212	642,035	733,753	66,282	553,353
	Mining (medium & large)	4,013,245	3,070,542	10,575,095	9,747,355	14,132,909
	Mining infrastructure	372,430	288,435	624,723	1,214,329	1,753,633
	Infrastructure	437,280	53,988	73,351	450,153	152,693
	Fire-Biomass burning	41,140	0	28,551	4,996	37,684
ANNUAL TOTAL		**7,202,971**	**5,029,057**	**12,353,603**	**11,738,832**	**16,903,087**

Average annual emissions have increased over the period 2001-2012 at a rate of approximately 0.96 million t CO_2 per year. The upward trend is statistically significant but is limited and is driven by the large increase in mining activity after the unprecedented increase in the price of gold following the global financial crisis. No significant upward pressure was exerted by other drivers, for example by agriculture or large scale infrastructure development – despite the existence of opportunities to permit these drivers.

Total Historic Emissions

Combining the historical emissions from deforestation with those from degradation from timber harvest gives a total emission estimate of **140.0 million t CO_2** for the period 2001-2012. Using the error propagation method proposed by IPCC (2003 GPG), the **95% CI is ±9.6 million t CO_2 or ±7% of the mean**.

Total historic emissions from deforestation and timber harvesting between 2001 and 2012.

Drivers	2001-2012	
	t CO_2e	% of total
Forestry infrastructure	12,631,213	9%
Agriculture	7,727,589	6%
Mining (medium and large scale)	66,803,751	48%
Mining infrastructure	6,608,576	5%
Infrastructure	3,078,549	2%
Fire-Biomass burning	276,929	0%
Timber harvesting	42,886,201	31%
Total	**140,012,808**	**100%**
Annualized	**11,667,734**	

It is clear that mining, and associated roads, is the largest emission source during the period 2001 to 2012, accounting for 53% of the total emissions, followed by timber harvesting activities (if infrastructure created to allow for forestry operations, such as roads and decks are taken into account), accounting for another 40% of the total. Thus, mining and timber harvesting together account for 93% of the total emissions. Conversion to agriculture and other infrastructure account for about 8% of the total. Emissions from fire are insignificant, and indicate that emissions from degradation due to fire will be even less so as less biomass will be burned.

It should be noted that the total impact of timber harvesting is spread over a large area of utilization, that is, on an annual period approximately 2 million hectare. This results in a very low impact per hectare as compared to other Drivers, such as mining, which impacts more significantly on a given hectare that is utilized.

Proposed Reference Level for Guyana

Guyana proposes its reference level at the established historic level plus 0.1% adjustment to this level that will be based on justification.

This approach is congruent with existing internationally accepted methods, such as those established for the FCPF Carbon Fund which allows for 0.1% of total carbon stock, as adjustments to emissions over the historic level.

Therefore, Guyana's Reference Level is: 31,184,936 tCO2e annually (computed by Historic Emissions + 0.1% of carbon stocks = 11,667,734tCO2/year + 19,517,302 CO2/year).

Development Sectors to be considered in Determining Adjustment to Historic Level

a. Mining & Guyana's Forests

Guyana is ranked as the 14th largest gold producer in Latin America and the 34th largest globally in 2013 (SNL, 2014). The Guyana Geology & Mines Commission (GGMC) reports gold production in Guyana to have increased from 305 thousand ounces in 2009 to 481 thousand ounces in 2013. Guyana is still in the early stages in the development of its mining sector, with bauxite extraction being the only large scale mining activity in the country. Gold and diamond mining are carried out by artisanal, small and medium scale operations, as are sand, loam and crushed rock.
Mining is an important part of the Guyanese economy, with gold playing a central role, accounting for 9.6% of GDP, 24% of exports, and 78% of the mineral production values of the country in 2013.
Over the period 2010 to 2013, mining is estimated to have contributed 93% of total deforestation from Guyana. The emissions due to deforestation occurs as mines expand, as prospectors try to find new deposits, and as roads are built to ship materials into and out of new mining sites.

Guyana's Reference Level takes account of the continued prominent place that gold mining will play in Guyana's economy whilst identifying programmes to ensure that this limits the impact on forests.

Guyana's Mineral Production 2009-2013

	2009	2010	2011	2012	2013
Gold ('000 oz)	305	308	363	439	481
Bauxite ('000 tons)	1,448	1,100	1,827	2,210	1,694
Diamond ('000/carats)	144	50	52	41	56
Quarry stone ('000 tons)	340	506	534	484	655
Sand ('000 tons)	478	652	675	1,478	2,334
Loam ('000 tons)	2	-	12	92	94

Source: Guyana Geology & Mines Commission, 2014

The gold mining sector has been playing an increasingly important role in the national development of Guyana, with production reaching unprecedented levels in 2012. The growth of the industry has resulted in significant job creation and stimulated economic activity in remote communities and across the country. Increased investment in the sector has resulted in innovative technology being utilized to effect more efficient recovery and production. With this in mind, progressive and continuous development and improvement in mining practices are seen as a phased undertakings to be executed through a strategic programme of work in the short to medium term.

Overall in 2012 gold and bauxite exports represented 50% and 10% respectively of total export revenues[16]. Gold export earnings were US$716.9 million, 38.7% higher than the 2011 level, reflecting favourable world prices and the higher volumes exported. The average export price per ounce of gold increased by 6.0% to US$1,575.4 per ounce from US$1,486.5 per ounce in 2011.

Declared gold production of 438,645 ounces was the highest recorded in the entire history of the gold industry (excluding one of the largest producers – Omai's production), and was 20.8% higher in 2012 than 2011. The bauxite industry recorded growth in value added of 12.5%, with production of 2,213,972 tonnes with the highest rate of increase achieved in the production of cement grade bauxite.

The mining industry is also one of the principal contributors for Foreign Direct Investment (FDI) in Guyana, with several large scale investments in the sector. The demonstrated level of investor confidence and anticipated continued high price levels for gold on the world market augur well for the sector. The mining and quarrying industry recorded 14.8% growth in 2012 over 2011.

Guyana's capital account also reflected a surplus in 2012 and this was driven by significant growth in foreign direct investment (FDI), mainly investments in the mining and quarrying, among two other sectors, resulting in total FDI increasing for Guyana by 19% to US$293.7 million in 2012. Net domestic credit by the banking system expanded in 2012 with strong contributions from the mining sector of 51.5%.

In 2011, it was estimated that 13,800 people are directly employed for the small and medium scale mining of gold and diamonds, and 19,000 indirectly employed in mining support industries. For bauxite an estimated 2,070 are directly employed[17]. It was shown that up to 15% of Guyanese citizens are economically dependent on small-scale mining[18].

The mining sector has also contributed to the development of hinterland infrastructure. A large number of mining companies develop infrastructure for areas in which they operate and allow multiple use of these access ways, for not only mining operators but also for forestry activities, as well as other uses. This results in the opening up of previously inaccessible areas for commercial as well as community level utilization.

Foreign direct investments will be the dominant driver for mining in the next two decades. These large scale foreign investments are expected to generate 700-2,000 direct employment opportunities over the next decade. FDI is expected to raise Guyana's profile in international markets, creating scope for more investments in the extractive sector.

There are a number of large scale gold mining activities expected to commence in 2015-2017, that could potentially double the country's gold output. These new mines will be operated by foreign multinationals, bringing in distinctive mining practices, investments and technologies[19].

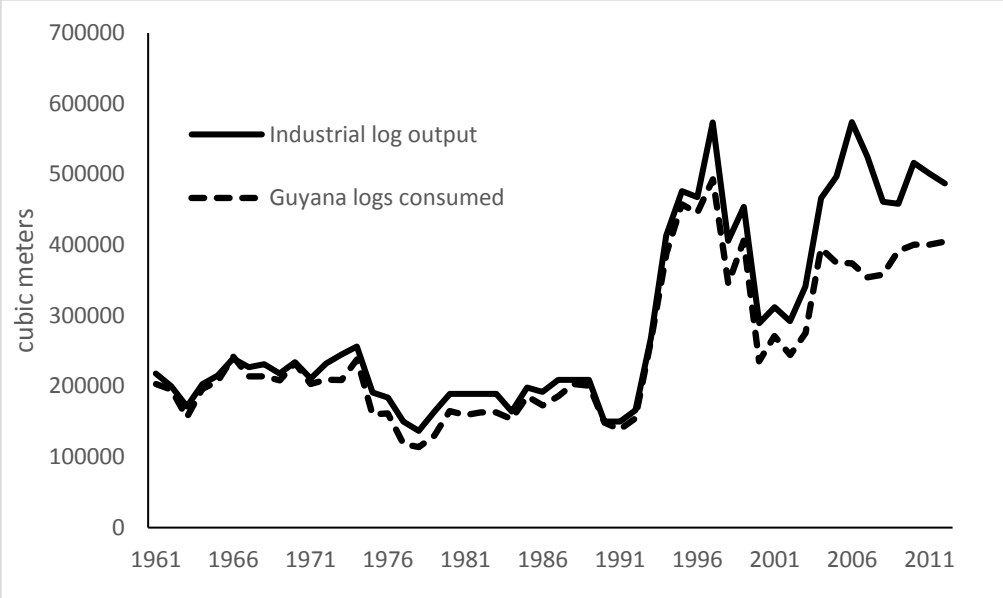
b. Logging & Guyana's Forests

[16]Guyana Bureau of Statistics; Bank of Guyana
[17] Guyana's Gold & Diamond Mining Sector (2005-2010)_May 2011_ GGMC
[18]Small Scale Mining - World Bank - 2010
[19] Ministry of Natural Resources & the Environment of Guyana, 2015

The forest sector has been a strong contributor to Guyana's economy. Over the past 15 years, the forestry sector recorded 403,000m^3 to 537,000m^3 per annum in production of timber, plywood and fuelwood based products. Export value from forest products range between US$32M to US$62M over the past decade and include both primary timber exports and added value forest products. Total employment in the forestry sector is estimated at approximately 20,000 persons with the larger majority of these being in interior locations.
State forests administered by the Guyana Forestry Commission (GFC) account for about 12.6 million ha of which 54% had been allocated for timber harvesting. Access for commercial timber removal on State Forests is controlled by the GFC through the allocation of temporary concessions and permits as follows:

1. Timber Sales Agreement (TSA) covers concessions of more than 24,000 hectares and is allocated for a period of more than 20 years.
2. Wood Cutting License (WCL) is issued for 3 to 10 years, and covers forests of between 8,000 and 24,000 hectares.
3. State Forest Permissions (SFP) are given for two years and cover areas of less than 8,000 hectares. SFPs are generally issued to individual small-scale operators and community-based associations.
4. State Forest Exploratory Permits (SFEPs), which is the precursor stage to TSA and WCL.

There has over the past five years, been growing interest in forest concessions for timber harvesting and export of forest products. Whilst this sector has traditionally recorded low rates of deforestation, there continues to be economic and social pressures that may lead to increases to this rate as well as the forest degradation level.



Industrial log production (output) and consumption within Guyana (Data from UN FAO, 2014)

c. Infrastructural Development & Guyana's Forests

Alternative Energy

Exploring alternative energy is a key part of Guyana's development and this emphasizes Guyana's priority of decarbonising its energy needs. The country's energy policy, recognizing the importance of clean, reliable, sustainable and affordable energy for development and the improved welfare of its people, is focused on developing and utilizing its own energy sources, improving efficiencies and energy conservation. Over the next five years, Guyana will continue to examine alternative sources of energy – hydro power, wind, and solar.

Guyana has a large hydropower potential of approximately 4.5-7GW. The Guyana Energy Agency (GEA) has compiled an inventory of the hydropower potential in Guyana and has identified 67 potential hydropower sites (GEA 2011) across four major river basins; the Cuyuni, Mazaruni, Potaro and Essequibo basins. The Amaila Falls Hydro Project is a fundamental component of Guyana's Low Carbon Development Strategy, and can potentially, significantly lower the Guyana's carbon footprint while reducing the country's long term energy costs and exposure to imported oil price volatility. It is expected to eliminate over 92% of the country's energy-related emissions, after the emissions associated with its construction are accounted for. The hydro power option is located where the Amaila and Kuribrong rivers meet, and can likely deliver to Guyana's capital, Georgetown, and its second largest

town, Linden, by 270 km high voltage electric transmission line. Construction of the hydro facility is currently under review, with plans cleared for advancement in 2015, on the Access Road to the Facility. This involves the building of new roads and the upgrading of existing roads. Construction of access roads began in 2010 and will be completed soon.

Relevant assumptions on future changes in domestic policies have been considered in the development of the RL. Policies and plans for both the mining and forest sectors support existing programmes as outlined in this section and are being implemented in a phased manner. These programmes are intended to bring about a maintained low rate or a lowering of emissions where applicable. Plans for the future development for the main extractive sectors have been considered in the development of the RL.

Georgetown Lethem Road Corridor

The potential for infrastructure development is enormous, and it is GoG policy to develop infrastructure to serve the needs of the people of Guyana. This initial development will concentrate on the Linden-Lethem road, for which both pre-feasibility and feasibility studies have been completed, and the advancing work in the area of alternative energy. This will also bring about likely impact on Guyana's emissions level and it is projected to impact on several drivers of forest area change.

Guyana is collaboration with neighbouring Brazil on a number of large-scale projects, including a hydro-electric facility and paving of the Linden/Lethem road. The Georgetown Lethem Road Corridor project provides the only accessible road access to the south of the country form the coast. It further provides the only link between Georgetown and Brazil's federal highway network in the states of Amazonas and Roraima.

The establishment of the Georgetown Lethem Road Corridor is of high importance to Guyana and its immediate South American neighbours; it is recognised as an essential North-South link in the overall national transportation network. The road is divided into two sections:

- Georgetown to Linden: This road is already paved to accommodate traffic at international standards.

- Linden to Lethem: 450 Km of gravel surfaced road which will require upgrading and will require the replacement of some 80 drainage structures. Two major river crossings are included in the project, including the bridge across the Demerara River at Linden, which is in reasonable condition, but only capable of accommodating one-lane traffic and will require extension, and the Kurupukari river mid-way on the route from Linden to Lethem

As a South American nation Guyana is part of a regional integration infrastructure programme to connect countries across the continent. The South American countries identified a list of projects that would connect the continent and it included the Linden to Georgetown Road. In December 2012 a Memorandum of Understanding was signed between the Guyana and Brazil to establish a working group to look at infrastructural projects including the Linden to Lethem Road. In the budget 2014 presentation, it was noted that "Negotiations have advanced substantially between the Brazilian and Guyanese technical working groups regarding the preparation of a design study for the construction of the Linden to Lethem road. The Governments of Guyana and Brazil are in ongoing discussions on the development of this road.

d. Agriculture & Guyana's Forests

Agriculture is an important sector of the Guyanese economy, accounting for around 13% of the national GDP in 2010 (Bureau of Statistics 2011). The vast majority of agriculture occurs on the coastal plain with rice and sugar the main crops.

Rice is the most productive crop in Guyana with an export value in 2010 of US$155m (Bureau of Statistics 2011), double what it was in 2007 and well above the US$57m a year between 2000 and 2008 (Ministry of Agriculture/Scott Wilson 2011). The growing international demand for rice and the recent export agreement with Venezuela indicate that rice production could well drive expansion of the agricultural sector. There are sugar estates and factories on the coastal plain in Regions 3, 4, 5 and 6 covering about 44,500ha, with recent expansion in Region 6 due to the modernisation of the Skeldon plant (which became operational in 2008) and an increase in area and production coupled with increased power production from burning bagasse as part of the co-generation process

Other crops include ground provisions, coconut, fruit and vegetables which are grown in different locations on the coastal plain. Production of these non-traditional agricultural products were 3.25mkg of Copra, 2.7mkg of Dried Coconut, 111,000kg of coconut water, 529,000kg of pumpkin and 365,000kg of watermelon for 2009 (MoA 2009). A

small increase of 3% was seen in the first half of 2011 compared to 2010. There is a potential for development of this sector as set out in the LCDS.

Livestock production in Guyana takes place mainly in the coastal plain and in the Intermediate and Rupununi savannahs in the south. The National Dairy Development Programme estimated a total cattle population of 238,000, the NDS in 1996 estimated a total cattle population for Guyana of 270,000 head and also quoted figures of 300,000 sheep and 150,000 goats. A more recent census for Regions 5 and 6 in 2006 gave a population of 280-300,000 head and based on these figures estimates were made of other regions.

Guyana has identified more than US$1 billion in essential capital projects that can be fully or partially funded through private investment assisted by an in-country infrastructure investment fund built from forest payments. Among other initiatives, these projects will enable future economic growth to be powered predominantly by clean energy (including hydropower), and to make non-forested parts of the country accessible to private investors who can generate low-carbon economic development and employment (largely high-end agriculture and aquaculture). Guyana has identified six priority low-carbon economic sectors: fruits and vegetables, aquaculture, sustainable forestry and wood processing, business process outsourcing, ecotourism, and possibly bio-ethanol. Guyana plans to focus initially on three sectors: fruits and vegetables, aquaculture, and sustainable forestry. In each of these sectors, long-term market demand exists and Guyana has the essential natural resources to operate at scale. Guyana is well-positioned to expand exports of fruits and vegetables as it has major tracts of non-forested arable land that are potentially suitable for commercial agriculture – and the country is close to major fresh fruit and vegetable import markets in the Caribbean and the United States.

Summary of Guyana's Proposal for Reference Level based on Sectors

Policies that are in place to influence projected emissions are foreseen to take effect in limiting emissions in areas where these can be substantially higher in the absence of these policies, or maintain at a low level where these may prevail.

To better inform Guyana's national circumstances across the land use sectors and the emissions that may likely results from these, two parallel tracks of assessment were conducted. Discussion were held with the main land use sectors of forestry, mining and agriculture. These were based on looking at the historic trend of emissions, current and planned developments, and projected future emission levels. The projections of emissions below, have been informed by these discussions. The second track of assessment looked at the infrastructure drivers through the spatial platform available at the GFC as part of the MRVS. Based on the likely spatial impacts for investment in alternative energy (including hydro power), and expanding national infrastructure systems (e.g. the Guyana Brazil road), computations were conducted on likely emissions impacts.

Below is a summary of Guyana's proposal for Reference level based on sectors. It should be noted that the emissions for the Guyana/Brazil Road and Hydro Power projects will be relevant only for those years that development will take place.

Reference Level Emissions by Drivers

Drivers of Projected Emissions Level	***Policies***	***Percentage of Contribution to Reference Level***
Forestry	EU FLEGT, Reduced Impact Logging and SFM, National Log Tracking and Chain of Custody Management.	20
Mining	EITI, Codes of Practice, Reduced Use of Mercury, More Efficient Technologies.	49
Infrastructure, including Brazil/Guyana Road	Scoping of Development, ESIA.	9

Agriculture	Scoping of Development, ESIA.	4
Other Development such as in Alternative Energy	Scoping of Development, ESIA.	18
TOTAL		**100**

The result of this assessment may result in a similar or lower that 0.1% adjustment the historic level and this will be determine following detailed assessment and effective justifications.

8.2 Expected REL/FRL for the ER Program

One of the key considerations in Guyana's Proposal for Reference Level for REDD+ is the integration of a financial incentives baseline and sliding scale mechanism within the payment computation. This will provide Guyana's commitment to ensuring that its REDD+ programme aims at assuring environmental integrity whilst advancing a low carbon pathway. One example of this model is currently in use in the bilateral agreement between Guyana and Norway. Further, key consideration is also extended in ensuring congruence with existing internationally accepted methods, such as those established for the FCPF Carbon Fund which allows for 0.1% of total carbon stock, as adjustments to emissions over the historic level.

Proposed Reference Level for Guyana
Guyana proposes its reference level at the established historic level plus 0.1% adjustment to this level that will be based on justification.

This approach is congruent with existing internationally accepted methods, such as those established for the FCPF Carbon Fund which allows for 0.1% of total carbon stock, as adjustments to emissions over the historic level.

Therefore, Guyana's Reference Level is: 31,184,936 tCO2e annually (computed by Historic Emissions + 0.1% of carbon stocks = 11,667,734tCO2/year + 19,517,302 CO2/year).

Guyana proposes reductions in Emission from the Mining Sector based on Historic Emissions = 2,087,617 tCO2e annually; and Reductions in Emissions from the Forest Sector based on Historic Emissions = 1,268,141 tCO2e annually.

9. Forest Monitoring System

9.1 Description of approach and capacity for measurement and reporting on ERs

Guyana's NFMS (referred to within Guyana as the Monitoring, Reporting, and Verification System –MRVS), which is composed of the Forest Area Assessment System and the Forest Carbon Monitoring System(FCMS), has been developed for data and information collection, such as information on historical forest cover changes and emission factors, to inform the assessment of national forest RLs. In this way, the MRVS forms the link between historical assessments and current/future assessments, enabling consistency in the data and information to support the implementation of REDD+ activities. The MRVS details the methods required to quantify the changes in forest cover and changes in forest carbon stocks in Guyana, develop driver-specific emission factors by forest strata, and monitor emissions from land cover/land use change over time based on a variety of management activities.

The activity data and emission factors generated from the MRVS for key categories are combined to estimate total CO_2 emissions by source or driver under Guyana's REDD+ programme. The table below provides an overview of each key category addressed by Guyana, including the associated drivers and the pools included in each IPCC required category.

Overview of the IPCC categories, drivers, and pools used to estimate emission factors for each key category.

IPCC Category	Driver(s) as defined in MRVS	Pools included		
		Biomass	Dead organic matter	Soil
Forest Land Remaining Forest Land	Degradation caused by logging	AG & BG tree	Dead wood caused by logging	Not included
Forest Land Converted to Cropland	Agriculture	AG & BG tree, saplings	Standing and lying dead wood, litter	Based on conversion to permanent agriculture
Forest Land Converted to Settlements	Infrastructure including mining roads and forestry Infrastructure	AG & BG tree, saplings	Standing and lying dead wood, litter	Based on conversion to unpaved roads
Forest Land Converted to Other Land	Mining (bare soil)	AG & BG tree, saplings	Standing and lying dead wood, litter	Based on conversion to mining
Biomass Burning in Forest Lands	Fire-Biomass burning	AG, saplings	Standing and lying dead wood, litter	Not included

Estimating Activity Data

Deforestation

Activity data (AD) are developed by estimating the extent of forest change measured by area in the case of deforestation. In the case of degradation, where it can often be difficult to accurately relate changes in carbon to changes in area, activity data may employ units other than area.

Forest area change has been estimated for forests converted to other lands (deforestation) for all drivers, based on IPCC Approach 3. The Guyana Forestry Commission, with the services of Pöyry and Indufor, has completed an historical assessment of forest area change—from forest to non-forest—for six periods: 1990-2000, 2001-2005, 2006-September 2009, October 2009- September 2010, October 2010- December 2011, and January to December 2012. The analyses for these six periods were done by the same team of people using consistent methods. For the first four periods Landsat imagery was used, for the fifth period it was a combination of Landsat and Rapideye, and for the sixth reporting year wall-to-wall high resolution Rapideye imagery was used[20]. The use of higher resolution imagery in the most recent time frame allowed for higher accuracy of interpretation in this period and for a re-evaluation of the total forest area for the previous years. All remote sensing products have been assessed for accuracy (accuracy on forest area of >97%) and verified independently by a 3rd party and all steps certified by an external auditors.

For each of time period up to September 2010, 30 meter resolution satellite imagery was used to quantify deforestation resulting from various drivers including mining, agriculture, forestry infrastructure, road infrastructure, and fire. For the October 2010 to December 2011 period, 5 meter resolution RapidEye imagery was also used for half of Guyana's land area with the 30 m imagery, and full wall-to-wall coverage with RapidEye for 2012. GFC will conduct future monitoring of deforestation with medium/high resolution imagery and a product that gives similar quality and detail in functionality.

One driver of forest degradation, selective logging, is included in the MRVS at present, whilst work is ongoing to collate data for the other drivers of forest degradation. These activity data were estimated from two sources: (1) the areas cleared for forestry infrastructure (roads and log decks) from the analysis of remote sensing imagery and (2) the volume of timber removed during commercial logging and the length of skid trails, based on records available from GFC. The MRVS does not currently address other lands converted to forest (reforestation), though this may be

[20] GFC and Indufor 2013, Guyana REDD+ Monitoring Reporting & Verification System (MRVS); Year 3 Interim Measures Report 01 January 2012 – 31 December 2012.

included in the future. Activities used to determine forest area and area change and the findings are described in complete detail in reports by GFC and Pöyry (2011) and GFC and Indufor (2012, 2013)[21].

Degradation

The additional activity data for selective logging were obtained from records from the GFC. The GFC reports on volume of timber extracted, by the primary product class (Table below) from its concessions and the length of the skid trails planned to extract the timber to the logging decks[22]. All timber data are converted to cubic meters over bark using a variety of factors, and summed to give a total timber production for each year.

Primary product classes tracked by GFC and their conversion factors to obtain true volume under-bark in cubic meters. All volumes were converted to over-bark by multiplying under-bark by 1.12 (from IPCC 2006 AFOLU).

Product		Description
Logs 1000 m^3/yr	Production	Log is a main product produced and is not a subset of any category. This volume that is declared is the hoppus volume that discounts a part of the log to provide for the taper factor. To determine the true volume of logs, it is recommended to multiply this by 1.278%.
Sawnwood 1000 m^3/yr*	Production	This category of production is a stand along category and is in addition to Logs. That is, it is not a sub set of the Logs category. This is the case since, Guyana's Forest Act allows for forest concessionaires to declare harvested timber in logs as well as Primary Lumber which is largely Chainsawn Lumber or Portable Mill produced lumber. To derive a total harvested volume quantity, this has to be ADDED to Logs harvested. Note that the conversion rate of Logs to Lumber of 50% therefore, to derive this total of production, it would have taken twice as much of log volume.
Roundwood (Piles, Poles, Posts, Spars) 1000 m^3/yr	Production	This is a separate category. Not a subset of Logs or Primary Lumber. Needs to be added to Logs and Primary Lumber to generate a total of harvested timber.
Splitwood (Staves, Shingles 1000 m^3/yr)	Production	This is a separate category and only includes non factory manufactured splitwood. Not a subset of Logs or Primary Lumber. Needs to be added to Logs, Primary Lumber and Roundwood to generate a total of harvested timber.

Estimating emission factors

Deforestation

Field data have been collected to estimate forest carbon stocks and for use in estimating emission factors for all drivers of deforestation and for degradation resulting from selective logging. Carbon stocks are estimated for all pools using country-specific data and conversion factors, and an allometric equation[23] verified through destructive sampling of four large trees, resulting in emission factors that meet IPCC's requirements for Tier 3.

Stratification of Guyana's forest lands is a key step for developing a cost effective sampling plan and increasing the accuracy and precision of the resulting emission factors for deforestation. Estimating GHG emissions across Guyana as a whole is not possible without consideration of how carbon stocks are distributed across the country with respect to specific drivers or agents of forest land cover/use change and other physiognomic features of the landscape (i.e., forest type, elevation, soils composition, etc.). Often forest carbon stocks vary based on forest type, and because Guyana has diverse forests, initial attempts at stratification incorporated forest type. However, estimates of carbon stocks for different forest types based on measurements collected from preliminary plots were not significantly

[21]GFC and Indufor 2013, Guyana REDD+ Monitoring Reporting & Verification System (MRVS); Year 3 Interim Measures Report 01 January 2012 – 31 December 2012. Available from the GFC. Indufor, 2012. Guyana Forestry Commission Guyana REDD+ Monitoring Reporting & Verification System (MRVS) Interim Measures Report, 01 October 2010 – 31 December 2011. Joint report between Indufor and the Guyana Forestry Commission. Pöyry Management Consulting Ltd (Pöyry).2011.Guyana Forestry Commission REDD+ Measurement Reporting Verification System (MRVS) Interim Measures report. Joint report between Pöyry and the Guyana Forestry Commission (GFC).

[22] See section 9.7 in GFC and Indufor 2013, cited above in footnote 12, for more details.

[23]Chave, J, C. Andalo, S. Brown, M.A. Cairns, J.Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.P. Lescure, B.W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145:87-99.

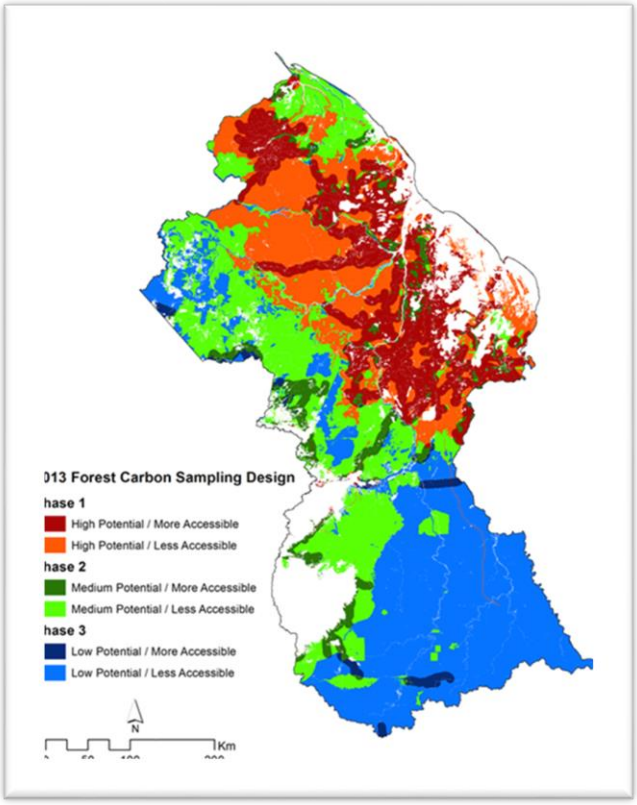
different across the multiple forest types in Guyana[24]. Differences in drivers of forest cover change, however, do result in differences in changes in carbon stocks and thus emission factors. In addition, different land-use histories as a result of accessibility such as proximity to roads and population centres can also lead to different forest carbon stocks and resulting emission factors.

A key first step in estimating emissions factors for deforestation was to use a stratified sampling design applied to the forests of Guyana. A stratified sampling design allows for maximum flexibility in designing a sampling protocol within each stratum that is tailored to the desired level of precision—for Guyana the target is a 95% confidence interval of ±<15% of mean--as well as the time and resources available to collect the data. Stratification criteria for the FCMS include both *ecological considerations* that affect how much carbon is contained within in a given area of land as well as *human pressure considerations* related to how the land is being used (and how it will be used in the future). For example, it is desirable to group all lands of similar carbon stocks together that are under similarly high pressure of future deforestation into one stratum, and other lands that are of similar carbon stocks but under little to no pressure into a separate stratum. In this way, resources can be optimized so that sampling intensity is greater (thus precision is higher) in the areas most likely to undergo change in the future.

An overarching spatial analysis framework, operating in a Geographical Information System (GIS) was used to create a Potential for Future Change (PFC) stratification system that developed a relationship between the historical deforestation pattern and the spatially represented factors of deforestation. This method of stratification aims to understand which forest change factors, or combinations of factors, contribute most significantly to the historical pattern of deforestation. Humans tend to deforest areas that are close to roads and settlements (accessible for clearing), clearly demarcating some areas as having high potential for future change and others low potential. Two recent historical periods, 2000-2005 and 2005-2009, were considered for defining the pattern of forest change. The PFC spatial analysis framework and the specific techniques are discussed in the spatial techniques report[25].This PFC framework resulted in the identification of three strata based on their potential for future change—high (HPfC), medium (MPfC), and low (LPfC) potential for change (Map below).

In addition to stratifying by potential for change, the forests were also stratified by accessibility. A large portion of Guyana's forestland is not easily accessible and the purpose of the sampling stratification is to overcome some operational constraints while maintaining robust sampling results. Therefore, the factor of accessibility was introduced in the sampling stratification methodology to provide a forest carbon sampling framework that allows for efficient collection of data. The accessibility strata were also included, because, given the long history of logging in Guyana, our initial working assumption was that areas near roads would have been disturbed and have lower carbon stocks than those areas far from roads. The more accessible (MA) stratum is defined as 5 km straight-line distance from both sides of roads for a total of 10 km, a distance which allows a field team of 4 or 5 people to travel to the sampling point and return to the road within one day. The less accessible (LA) stratum is defined as all forestland outside the 5 km road buffer were likely little disturbed (Figure below).

[24] Section 3.7.5 in Brown, S., K. Goslee, F. Casarim, N. L. Harris, and S. Petrova. 2014. Sampling Design and Implementation Plan for Guyana's REDD+ Forest Carbon Monitoring System (FCMS): Version 2. Submitted by Winrock International to the Guyana Forestry Commission.
[25]Petrova S., K. Goslee, N. Harris, and S. Brown. 2013 Spatial Analysis for Forest Carbon Stratification and Sample Design for Guyana's FCMS: Version 2. Submitted by Winrock International to the Guyana Forestry Commission.



Stratification of Guyana's forest area by deforestation threat, or potential for future change.

The number of sampling plots and the design of the plots was determined by a preliminary sampling process that randomly located plots across various forest types identified in the Guyana vegetation map, and across a latitude and longitude gradient. Different sampling methods were tested aiming at the optimum design, balancing data collection with precision, robustness, efficiency and scientific integrity. Single plots and cluster plots (a cluster of four plots) were tested during preliminary data collection. Results from the preliminary field work, indicated that cluster plots were most appropriate because when compared to single plots, results showed improvement in precision across plots, reduction of variability within plots, and reduction in travel time in sampling for reaching the precision target. The results also showed that there were no significant differences in carbon stocks among the main forest types and that stratification by forest type was not necessary[26].

Sampling Design

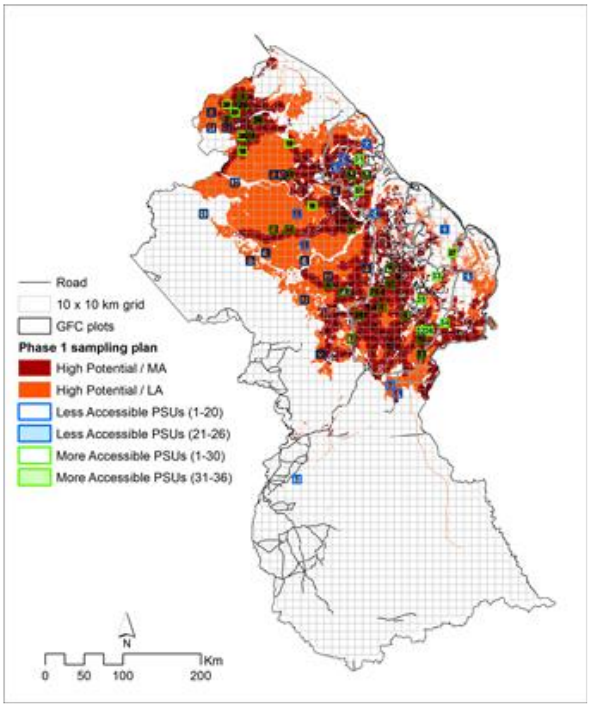
For Guyana's carbon stock assessment, a stratified two-stage list sampling design with clustered plots was used. In this approach, the country is divided into 10 km x 10 km blocks (primary sampling units-PSUs). The PSUs within each stratum are selected using stratified two-stage list sampling design for carbon measurement—referred to as Stage 1. Secondary sampling units (SSUs) designed as L-shaped cluster of four subplots are established within each PSU and carbon measurements are obtained. Stage 2 is the random selection of SSUs within the PSUs. This design allows for the selection of a subset of primary sampling units (PSUs) in which clustered plots (SSUs) can be established. This allows field crews to achieve higher sample sizes at relatively low cost. This approach provides an efficient inventory that is well distributed across the landscape[27]. To implement a stratified approach each stratum should be considered separately and the number of PSUs to be sampled varied by stratum.

Based on the preliminary field data of carbon stock measurements, it was estimated that 35 SSU cluster plots in the HPfC stratum should be measured to attain the selected precision target (95% confidence interval of <15% of the

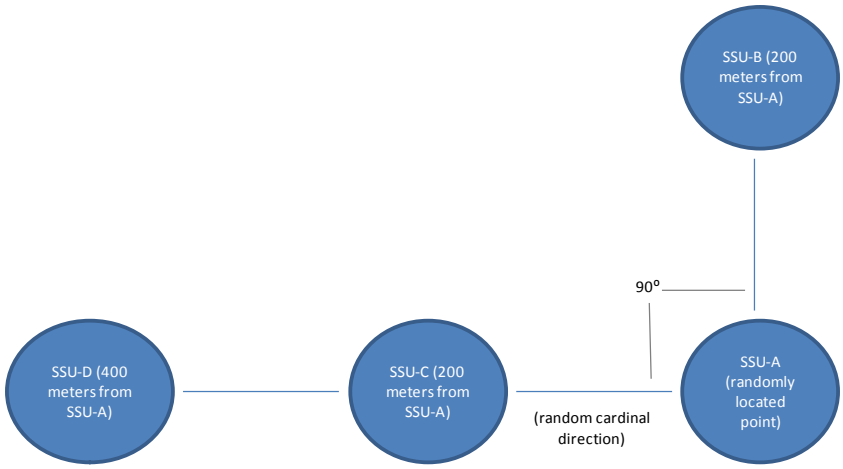
[26]Brown, S., K. Goslee, F. Casarim, N. L. Harris, and S. Petrova. 2014. Sampling Design and Implementation Plan for Guyana's REDD+ Forest Carbon Monitoring System (FCMS): Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

[27]Tomppo, E. and M. Katila. 2008. Comparing alternative sampling designs for national and regional forest monitoring. Appendix 4 in Tomppo, E. and K. Andersson, Technical review of FAO's approach and methods for national forest monitoring and assessment (NFMA), NFMA Working Paper No. 38, Rome, 2008.

mean). However, a total of 36 PSU/SSUs were pre-selected for the MA and 26 for the LA in case the carbon stocks were more variable than originally estimated in the preliminary sampling. These steps were repeated for the MPfC MA and LA strata. No PSUs/SSUs have been selected for the LPfC stratum at this time because this area is under low threat for forest cover change and it is of low priority until that time when significant deforestation (>100 ha) activities are found to occur by the remote sensing monitoring. Further details are given in Brown et al. 2014.



Example of the stratified two-stage list sampling design with clustered plots for the High Potential for Change More Accessible (MA) and Less Accessible (LA) strata.



Layout of the four subplots that comprises a Secondary Sampling Unit (SSU) cluster plot. Each subplot consists of 4 nested plots ranging in size of 2 m radius for saplings, 6 m radius for trees 5-25 cm DBH, 14 m radius for trees 25-50 cm DBH, and 20 m radius for trees >50 cm DBH.

The area of each stratum and number of cluster sample plots actually measured is given in the table below. Based on this stratification system, data collection efforts were divided into three phases: the HPfC stratum first (Phase 1), followed by the MPfC stratum (Phase 2), and then the low priority LPfC (Phase 3). To date all field work has been completed for Phase 1 and 2.

Area of each sampling strata

Forest Carbon Sampling strata		Area (ha)	Number of sample plots
High potential for change	**More accessible**	3,165,731	26
HPfC	**Less accessible**	3,096,270	16
Medium potential for change	**More accessible**	960,633	11
MPfC	**Less accessible**	4,267,988	13
Low potential for change	**More accessible**	262,014	--
LPfC	**Less accessible**	5,872,574	--

Total Forest Carbon Stock in Guyana's Forest

Forest Carbon Sampling strata		Area (ha)*	C stock per stratum t C/ha	Total stock tC
High potential for change	**More accessible**	3,165,731	259.8	822,456,914
HPfC	**Less accessible**	3,096,270	351	1,086,790,770
Medium potential for change	**More accessible**	960,633	300	288,189,900
MPfC	**Less accessible**	4,267,988	300	1,280,396,400
Low potential for change	**More accessible**	262,014	300	78,604,200
LPfC	**Less accessible**	5,872,574	300	1,761,772,200
TOTAL		**17,625,210**		**5,318,210,384**

**Total area of forest in deforestation mapping utilizes updated RapidEye Imagery accounting for the slightly increased total forest area that that recorded in the forest carbon stratification map which utilizes Landsat imagery.*

A complete description of the methods used for data collection is available in Brown et al. (2014) and the field data used to estimate emission factors are described in Goslee et al (2014)[28].

Degradation

Emissions due to degradation from selective logging were estimated through the development of emission factors related to the volume of timber extracted (in m^3 over bark). Sampling was conducted on active concessions across Guyana to determine the loss of carbon stocks through harvesting and collateral damage in the gaps and skid trails. Losses were assessed with data collected from "logging plots" and skid trails.

The carbon emissions from logging in Guyana can vary as a function of different logging intensities and practices, defined by stand re-entry, extraction rates, and reduced impact logging practices. These differences are captured in the types of concessions, classed as large, medium, and small scale concessions. The main difference between these different concessions is related to the amount of timber extracted per hectare and the re-entry period.

The goal of this component was to develop emission factors relating total biomass carbon damaged, and thus carbon emissions, to the volume of timber extracted and based on the method in Pearson et al[29]. This method allows for the estimation of the total emissions generated by selective logging for different concession sizes across the entirety of Guyana, and was implemented by:

3. Measuring, on a sample of logging gaps (183 plots across four large scale commercial concessions), the extracted volume and carbon in the timber tree and the incidental carbon damage to surrounding trees;
4. Estimating the carbon impact caused by construction of skid trails. (Although selective logging clears forest for roads and decks, their emissions will be estimated under the deforestation component.)

Estimating the total impact of selective logging on carbon stocks involves quantifying a number of different components:

- Volume and biomass removed in the commercial tree felled – emission;
- Dead wood created as a result of tree felling – emission;

[28]Goslee, K., S. Brown, and F. Casarim, 2014. Forest Carbon Monitoring System: Emission Factors and their Uncertainties, Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

[29] Pearson, TRH, S Brown, and FM Casarim. 2014. Carbon emissions from tropical forest degradation caused by logging. Environ, Res. Lett 9 034017 (11 pp) doi:10.1088/1748-9326/9/3/034017

- Damage from logging infrastructure – emission;
- Carbon stored in long term wood products from extracted timber – removal;

Carbon loss or change in live and dead biomass between the "before-logging" and "after-logging" scenario is a result of the felling of the timber tree, extraction of timber volume, the damage caused to residual trees from the logging activities, and the extraction of trees due to construction of skid trails. This is expressed in equation forms as follows

Emissions, t C/yr = [Vol x WD x CF x (1-C_{LTP})] +[Vol x LDF] + [Vol x LIF] (Eq.1)
(1) (2) (3)

Where:

Vol = volume timber over bark extracted (m^3yr^{-1})
WD = wood density (t m^{-3})
CF = carbon fraction, the proportion of biomass that is carbon - 0.5 (IPCC 2003 GPG and 2006 AFOLU)
C_{LTP} = proportion of extracted carbon in long term products still in use after 100 yr (dimensionless)
LDF = logging damage factor—dead biomass left behind in gap from felled tree and collateral damage (t C m^{-3})
LIF = logging infrastructure factor—dead biomass caused by construction of skid trails (t C m^{-3})

The proportion of carbon in wood stored at long-term products is given as:

$$C_{LTP,i} = (1 - WW_i) * (1 - SLF_i) * (1 - OF_i)$$

Where:

i	wood product classes of sawnwood, woodbase panels and other industrial roundwood
WW_i	Fraction of biomass effectively emitted to the atmosphere during production of wood product i (wood waste)
SLF_i	Fraction of wood products that will be emitted to the atmosphere within 5 years of production of product i
OF_i	Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years after production of product i

The values of the fractions used to estimate C_{LTP} in this analysis are[30]:

Product class	WW	SLF	OF 100yr
Sawnwood	0.50	0.20	0.84
Woodbase panels	0.50	0.10	0.94
Other industrial roundwood	0.50	0.30	0.99

Field measurements are collected from logging plots to quantify components (1) and (2) in Eq. 1 above. To quantify the biomass carbon that is damaged and dead as a result of constructing the skid trails (component (3) in above equation), measurements of the average width of skid trails and the forest carbon stocks damaged during the construction of trails are made.

Because of the need to collect data at plots located exactly where a tree has been felled, it is not possible to establish completely random plots across Guyana. Rather, plots are located at sites of recently felled trees in concessions, and the volume and biomass removed in commercial logs is determined. In addition, for the measurement of damage that results from tree felling, it is not possible to establish a set plot size. Instead, one or more felled trees that create one gap define a "logging plot", and it is necessary to identify and measure all of the surrounding trees damaged during the felling in a given gap. In this way, it is possible to calculate carbon emissions per unit of volume extracted in commercial trees[31].

[30] From Winjum, J. K., S. Brown, and B. Schlamadinger. 1998. Forest harvests and wood products: sources and sinks of atmospheric carbon dioxide. Forest Science 44:272-284.

[31] Further details of all field measurements and analyses are given in are given in SOPs 17-22 in Casarim FM, K Goslee, S Petrova, S Brown, H Sukhdeo, and C Bhojedat. 2014 Standard Operating Procedures for the Forest Carbon Monitoring System of Guyana. Winrock International; and Casarim F., K. Goslee, and S. Brown, 2014. User Manual for Calculating Emission Factors with Guyana's Selective Logging Tool. Submitted by Winrock International to the Guyana Forestry Commission.

9.2 Describe how the proposed ER Program monitoring system is consistent with the (emerging) national REDD+ monitoring system.

In keeping with the description of Guyana's National Forest Monitoring System described above, the ER Programme will be fully integrated into the monitoring system. Guyana's NFMS has been designed to monitor both emissions and removals by driver and capacity is continuously being built in these areas to ensure that systems are kept up to date and new areas are incorporated. This system was designed in keeping with internationally recommended best practice and continues to be upgraded in new development areas.

The MRVS Roadmap Phase 2 acknowledges the World Bank FCPF Methodological Framework. It is noted in the Roadmap that the World Bank FCPF has developed the Carbon Fund Methodological Framework for carbon accounting of emission reductions programs that are consistent with the UNFCCC guidance on REDD+. The methodological framework provides guidance for the implementation of REDD+ pilot activities in a country.

To this end, Guyana's National Forest Monitoring System and the ER Programme are fully compatible.

9.3 Describe how the proposed ER Program monitoring system is consistent with UNFCCC guidance available to date and with the emerging Methodological Framework of the FCPF Carbon Fund.

One of the key considerations in Guyana's Proposal for Reference Level for REDD+ is the integration of a financial incentives baseline within the payment computation. One example of this model is currently in use in the bilateral agreement between Guyana and Norway.

One of the justifications of integrating this baseline is the clear expression of commitment by Guyana that its programme on REDD+ is aimed foremost at ensuring environmental integrity is maintained whilst advancing a low carbon development pathway.

Further key consideration is also extended in ensuring congruence with existing methods, such as those established for the FCPF Carbon Fund which allows for 0.1% of adjustments to emissions over the historic level. This approach is congruent with existing internationally accepted methods, such as those established for the FCPF Carbon Fund which allows for 0.1% of total carbon stock, as adjustments to emissions over the historic level – which equates to 31,184,936 tCO2e annually (computed by Historic Emissions + 0.1% of carbon stocks = 11,667,734tCO2/year + 19,517,302 CO2/year). In other words, this approach allows the reference level to be easily adjusted to a compensation baseline or maximum level as that established by the Carbon Fund.
Guyana's approach is compatible with the Government of Guyana's declared long-term strategy to maintain the maximum amount of forest cover in Guyana, if an appropriate incentive structure is in place to make Guyana' LCDS viable. This is being done through a balanced mix of maintaining forests under full protection (areas where only small-scale subsistence farming by forest dependent communities is allowed) and sustainable commercial forest management.
This Proposal, at this stage does not indicate final decision on this area, as discussions are still ongoing at the national level on best ways of addressing this matter. As such, thresholds relating to this baseline are not presented in this Proposal.

As part of the application on the financial incentives baseline, Guyana is considering the integration of a sliding scale as part of the incentives mechanism. This may be applied in a similar manner as done in the current Guyana Norway Agreement but with new thresholds and period ranges. The main objective of the use of the sliding scale will be to further elaborate a commitment to ensuring that Guyana's REDD+ programme aims at assuring environmental integrity and in doing so, ensure that emission cannot rise too much from the historical levels before payments are reduced. Through this mechanism, Guyana may only request payment if emissions actually stay low and continue to stay low, whilst still allowing room for development. Further, through this mechanism, Guyana proposes that one-off predictable and controllable deforestation events should be allowed for critical national infrastructure that is part of Guyana's transition to a low carbon development path and not form part of the sliding scale mechanism.

This mechanism will therefore mean:

a) that a ceiling on the level of emissions that can take place within a set period, with incentives still flowing up to
b) that agreed level, b) the accommodation of limited annual upward variations to ensure that the incentive structure still makes REDD+ a positive development choice for Guyana; and
c) that Guyana is incentivized to maintain over 99% of its forest cover as part of its LCDS and REDD+ commitments.

UNFCCC decisions[32] requests developing country Parties to establish, according to national circumstances and capabilities, robust and transparent national forest monitoring systems (NFMS) and, if appropriate, sub-national systems as part of national monitoring systems that:

- Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, as appropriate, anthropogenic forest-related GHG emissions by sources and removals by sinks, forest carbon stocks and forest area changes
- Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities
- Are transparent and their results are available and suitable for review as agreed by the COP

Guyana has chosen to define forest following the definition as outlined in the Marrakech Accords (UNFCCC 2001). Under this agreement forest is defined as having a minimum area of land of 0.05 – 1 ha with tree crown cover (or equivalent stocking level) of more than 10-30% with the potential to reach a minimum height of 2-5 m at maturity in situ. Guyana has elected to classify land as forest if it meets the following criteria:

- Tree cover of minimum 30%
- Minimum height of 5 m
- Minimum area of 1 ha

It was recommended that based on Guyana's forest characteristics, where there is largely undisturbed primary forest and the remaining being sustainably managed forests, where trees are predominantly 5 m in height, the minimum threshold for this variable is recommended to be 5m. From a monitoring perspective. The use of the upper limit (5m) would require the lowest transaction cost with no added value of going down to 2m.

Approximately 50% of Guyana's State Forest Estate is unallocated for commercial utilization. The remaining 50% is subject to sustainable utilization whereby extraction levels are strictly monitored based on approved guidelines. Additionally, in logging activities selective harvesting is practiced, and it is unlikely that the crown cover would diminish to below 30%. An assessment of Guyana's forest land showed that 85% of the forest land has a crown cover of 20% and greater. It is envisaged, that the majority of future planned land use development activities, may involve clearing of areas that are of 10% to 30% canopy cover. In order to adequately provide for this in Guyana's forest definition, an appropriate range for this variable is required to be taken into account. As such, it is recommended for Guyana to adopt a 30% crown cover threshold in the definition of forest. Guyana's national greenhouse gas inventory is being aligned to also utilize this definition.

Guyana's forest management system builds from one (1) hectare area size, to one block (100) hectare to compartments. In this context, the minimum monitoring unit for Guyana is therefore 1 ha. Guyana considered the relative sizes of the resolution of the imagery to be used in monitoring forest area change, (the minimum mapping unit, MMU), and the specified minimum area to be defined as forest. One (1) hectare was thought to be the most ideal size to allow for effective monitoring of forest area change. It is also intended that deforestation be assessed using medium/high resolution image on a routine (annual or biennial) basis. Detecting area change that is 0.05ha to 0.5ha becomes difficult, costly and possibly imprecise at this resolution. In considering the selection of a MMU, it is important to note that the MMU is closely connected with a country's forest definition. It is important to note that Remote Sensing data analyses become more difficult and more expensive with smaller MMU, as this requires an increase in mapping efforts, which usually results in a decrease in mapping accuracy. In keeping with Guyana's consideration of 1 ha for measurement of land area under its forest definition, the MMU should also be 1 ha. This is also appropriate as the optimal option, because it will allow for the consistency in application of the forest definition and the MMU.

[32] Decision 4/CP.15 paragraph 1d and Decision 1/CP.16 paragraph 71(c)

IPCC Guidance

The IPCC 2003 IPCC Good Practice Guidance for Land Use, Land-use Change, and Forestry (GPG-LULUCF) and the IPCC 2006 Guidelines for National Greenhouse Gas Inventories Agriculture, Forestry and Other Land use (AFOLU)[33] were developed for use in preparing a national greenhouse gas inventory. No guidance has been made with respect to preparing and reporting on REDD+ related activities although in 2011 the UNFCCC Conference of Parties agreed[34] that the Biennial Update Reports for non-Annex 1 Parties (i.e. developing countries) should be based on the 2003 GPG including the Tables in Annex 3.A.2. However, Decision 12/CP.17 Annex states that information used to develop a RL should be guided by the most recent IPCC guidance and guidelines; thus Guyana refers to both IPCC reports (GPG and AFOLU).

Key concepts that the IPCC recommends countries address with respect to estimating emissions and removals, and how Guyana applies these concepts in developing their RL are described below:

- **Good Practice**: Inventories consistent with good practice are those that contain neither over- nor under-estimates as far as can be judged, and in which uncertainties are reduced as far as practicable. These requirements are intended to ensure that estimates of emissions by sources and removals by sinks, even if uncertain, are bona fide estimates, in the sense of not containing any biases that could have been identified and eliminated. Good practice entails the following five principles: 1) transparency—that documentation is sufficient for reviewers to assess the extent to which good practice requirements have been met; 2) completeness—all relevant emissions and removal categories are estimated and reported; 3) consistency—differences in emissions and removals between years are real and not an artifact of changes in methodology or data; 4) comparability—so that inventory estimates can be compared among countries; and 5) accuracy—methods used are designed to produce neither under or over estimate. Guyana has applied good practice to all its data collection and analyses efforts by:
    - Building local capacity in all aspects of data collection and analyses
    - Developing and implementing a QA/QC plan, including steps for checking internal self-consistency, checking against other independent estimates, standard operating procedures (SOPs) for field data collection, data analysis, processing remote sensing imagery, and data archiving
    - Establishing and achieving accuracy targets for interpretation of remote sensing imagery used to estimate rates of forest loss (activity data--AD)
    - Establishing and achieving accuracy and precision targets for field data collection and analyses for estimating emission factors (EFs).
    - All documents and data bases are available for inspection

- **Tiers**: A system of tiers has been developed by the IPCC to represent different levels of methodological complexity. Tier 1 is the basic method, Tier 2 is intermediate and Tier 3 is the most demanding in terms of and data requirements.

  The higher order Tier 3 include models and inventory measurement systems tailored to address national circumstances, repeated over time, and driven by high-resolution activity data and disaggregated at sub-national level. Such systems may include comprehensive field sampling repeated at regular time intervals and/or GIS-based systems of age, class/production data, soils data, and land-use and management activity data, integrating several types of monitoring. Parcels of land where a land-use change occurs can usually be tracked over time, at least statistically. All models should undergo quality checks, audits, and validations and be thoroughly documented. Guyana is operating at Tier 2 to 3 levels for the following reasons:
    - Wall-to-wall coverage of satellite imagery is used to obtain the AD related to conversion of forest lands to other uses. For the period 1990 to 2010 Guyana used primarily Landsat imagery with a variety of other sensors. Post-2010 AD is based on practically wall to wall monitoring using high resolution RapidEye imagery.
    - All AD are disaggregated by the strata used for the field sampling design for EF estimation (e.g. threat for land use change, accessibility), and by the drivers (e.g. mining, infrastructure, converted to cropland, converted to settlements,).

[33]Available at http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html. And http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html
[34]See Annex III to Decision 2/CP.17.

- All AD data are combined and co-registered with other key spatial data bases in a GIS such as roads, rivers, settlements, vegetation class, location of logging concessions, location of mining concessions, topography, etc.
- A comprehensive, peer-reviewed, field sampling system was designed to attain a required precision target (95% confidence interval of <+/-15% of the mean carbon stock of forests) and implemented. The location of each sample plot was selected statistically through a series of steps in a GIS[35].
- A field sampling plan has been designed for long-term, repeated measurements of the forest carbon stocks and ongoing monitoring of forest cover change.
- The allometric model of Chave et al.[36] was validated for use in Guyana forests.

Adjust for National Circumstances

According to Decision 12/CP.17 II. Paragraph 9, countries can submit information and rationale on the development of forest RLs, including details of national circumstances and if adjusted include details on how the national circumstances were considered. Being a country with high forest cover and low deforestation, Guyana proposes to make adjustments to allow for national circumstances to take into account:

- Likely future emissions are not well captured by historical ones.
- Mining is a major driver of deforestation and rising mineral prices could create incentives that significantly impact rates of forest cover change caused by this driver.
- Logging is a cause of forest degradation and changes in timber demand and prices could create incentives that significantly impact emissions caused by this driver.
- Need for broad participation by Parties and to assure equity across countries.

Adjusting the historic emissions will be based on the application of empirically-driven economic models to arrive at estimates of supply and demand for timber harvesting (degradation) and mineral production. The supply and demand system identifies critical factors affecting timber harvesting and mineral extraction activities in Guyana during the historical period, and that information is used to project future timber harvests and mineral extraction rates given predictions of the exogenous variables. The outputs of the models are then linked to the CO_2 emission factors to project future emissions for the 10-yr future period of 2013-2023.

9.4 Describe any potential role of Indigenous Peoples or local communities in the design or implementation of the proposed ER Program monitoring system.

Guyana continues to explore options to establish synergies between national and subnational implementation of REDD+, through the MRVS. At the subnational level, two demonstration projects have been developed, in full consultation with the communities involved. The GFC has fully engaged these communities, Annai and Konashen in building capacity on national and local level to establish an exchange of data of information in both directions on:

- Forest change monitoring
- Forest carbon measurement
- Reporting on REDD+ implementation
- Creating synergies between CMRV and national MRVS

At a more strategic level, the following were explored:

a. Engaging members of the community in the determination and measurement of drivers/processes of forest change
b. Building capacity for community-based monitoring in order to demonstrate an approach that could contribute to the National MRVS
c. Integration of Community MRV Demonstration within National Framework

In continuing these activities, the MRVS Roadmap Phase 2 aims to: Build capability of local communities and stakeholders to monitor forests by

[35]Brown, S., K. Goslee, F. Casarim, N. L. Harris, and S. Petrova. 2014. Sampling Design and Implementation Plan for Guyana's REDD+ Forest Carbon Monitoring System (FCMS): Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

[36]Chave, J, C. Andalo, S. Brown, M.A. Cairns, J.Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.P. Lescure, B.W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145:87-99.

- Synthesize previous and experiences and implement a series of pilots for linking and integrating local and national monitoring with key stakeholders (i.e. local communities, forest field officers, miners)
- Develop and test Standard Operating Procedures including. user friendly documentation for non-technical users
- Enable and facilitate to assist in building capacity on national and local level to establish an exchange of data of information in both directions on:
    - Forest change monitoring
    - Forest carbon measurement
    - Reporting on REDD+ implementation
    - Creating synergies between CMRV and national MRVS

These activities will therefore prepare communities for potential implementation of the ER Programme at community levels, should they choose to participate.

9.5 Describe if and how the proposed ER Program monitoring system would include information on multiple benefits like biodiversity conservation or enhanced rural livelihoods, governance indicators, etc.

The ER Programme will seek to build on the SESA process and ESMF being developed under the FCPF REDD+ readiness process, as well as Guyana's Monitoring Reporting & Verification System for REDD+.
The Roadmap of the MRVS Phase 1 details the exploration of non-carbon ecosystem services and the feasibility of incorporating these within the national MRVS (GFC, 2009, GFC and Wageningen University, 2009).

Since 2011, the GoG, alongside the forest carbon monitoring activities, has been exploring options for incentivizing protection of additional ecosystem services, such as biodiversity and water resources, to facilitate the initiation and financing of activities related to Payment for Ecosystem Services (PES). The work on the exploration of these co-benefits has been an inclusive undertaking and incorporated a wide range of stakeholders. These engagements were beneficial in bringing together subject area experts, both nationally and internationally, to characterize market opportunities and specific categories of PES to focus on for Guyana.

Forest carbon was identified as the most viable and readily accessible option because of Guyana's abundance of forests, and because it is the main ecosystem service for which performance based payments are available. This is further supported by the comparatively well-established measurement/monitoring guidelines through the IPCC and UNFCCC as reflected in Guyana's development of the National MRVS for REDD+. Ecosystem services beyond forest carbon that were identified as a national priority were watershed services (water quality, water quantity), biodiversity (flora/fauna diversity, bio-prospecting), and eco-tourism.

A number of studies have been undertaken with support from international partners such as thorough a study funded by ITTO (Bynoe *et al.*, 2011a, b, GFC and ITTO, 2011a, b); support from KfW and CI (2011-2012) followed up this work and led to the development of a project to prioritise ecosystem services in discussion with national stakeholders, and evaluate the requirements for integrating the monitoring system (GFC and Winrock International, 2014). Through the GSF funding (2012-2014), Guyana was able to build on the previously completed work on the exploration of co-benefits for Guyana (Netzer *et al.*, 2014).

The MRV, through assessments of the inclusion of non-carbon benefits, will evaluate means by which environmental and social monitoring can be incorporated into the MRV System in accordance with the national legislation.
From the execution of the various activities above, a roadmap was developed for future implementation of activities regarding non-carbon schemes (Bynoe *et al.*, 2011a). This roadmap considered a number of key areas around governance (REDD+ policy and accounting frameworks, legislative frameworks and interagency coordination), as well as social (continued stakeholder engagement and involvement, public education and participation, human resource capacity building, property rights) and environmental safeguards (Standards and Guidelines, Technical Assistance and Scientific Research). The areas relating to governance and environmental and social safeguards have been identified, in keeping with Guyana's national environmental legislation, the Environmental Protection Act, 1996.

The MRVS Roadmap Phase 2 seeks to continue this progress with the exploration of options to assess and monitor non-carbon benefits (i.e. livelihoods, water quality, biodiversity) for REDD+ implementation.

In development of the ER Program, consideration will be given to indicators to monitor impacts on livelihoods and governance.

10. Displacement

10.1 Description of the potential risks of both domestic and international displacement of emissions (leakage)

Guyana has opted to develop its RL at the national scale rather than developing subnational RLs due to its relatively small size and relatively centralized government structure. The advantage of a national approach is that the integration of separate subnational RLs and MRV systems is not necessary. Therefore, the process of developing a RL is simplified and can happen more quickly than if common standards and agreements had to be developed for subnational jurisdictions to use.

Project level activities are extremely vulnerable to subnational leakage, in addition to which most deforestation is either decided or heavily influenced by national governments and are part of the long-term development strategies of each country. Though national level mechanisms are still subject to international leakage, the mechanism is comprehensive and offers incentives capable of inducing the conservation of standing forests in developing countries in every stage of the conversion process, and thereby minimizes this risk.

The risk of domestic displacement of emissions as a result of the ER Program is also considered to be of low risk as the main drivers that the program are continuously monitored using both wall to wall satellite coverage and ground verification.

11. Reversals

11.1 Activities to address risks of reversal of greenhouse gas benefits

Reversals will be achieved by directly addressing the drivers of deforestation and forest degradation and implementing activities that will reduce their impacts on the forests. The most significant risks include:

- Commodity price volatility—as the price of gold increases or decreases on the international market, this in turn affects the level of mining activity that is undertaken within the country. With the implementation of activities outlined in the ER Programme, this risk would be mitigated.
- Change in political commitment to implementing REDD+- this risk is assessed as low, as the Government of Guyana remains committed to maintaining its forests while seeking to further develop the country.

12. Expected emission reductions

12.1 Expected Emission Reductions (ERs)

Please provide an estimate of the expected impact of the proposed ER Program on the REL/FRL (as percentage of emissions to be reduced). Based on this percentage, also estimate the volume of ERs, as expressed in tonnes of CO_2e, that would be generated by the ER Program:

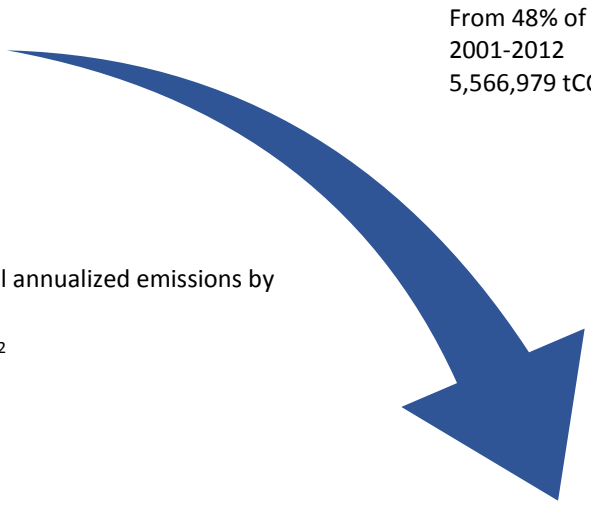
a) up to December 31, 2020 (currently the end date of the FCPF)
b) for a period of 10 years; and
c) the lifetime of the proposed ER Program, if it is proposed to continue longer than 10 years.

The proposed programme areas of Guyana's ER Programme are:

1. **Programme Area (1) – Sustainable Mining**
2. **Programme Area (2) – Sustainable Forestry**
3. **Programme Area (3) – Community Forestry**

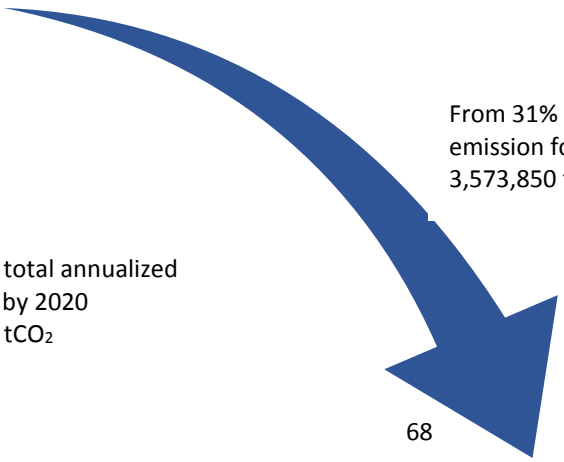
Sustainable Mining

This will result in a 48% of total annualized emission for 2001-2012: *5,566,979 tCO2, being reduced to a* 30% of total annualized emissions by 2020: 3,479,362 t CO2. *This is effectively a r*eduction in Emission from the Mining Sector based on Historic Emissions of 2,087,617 tCO_2e annually.

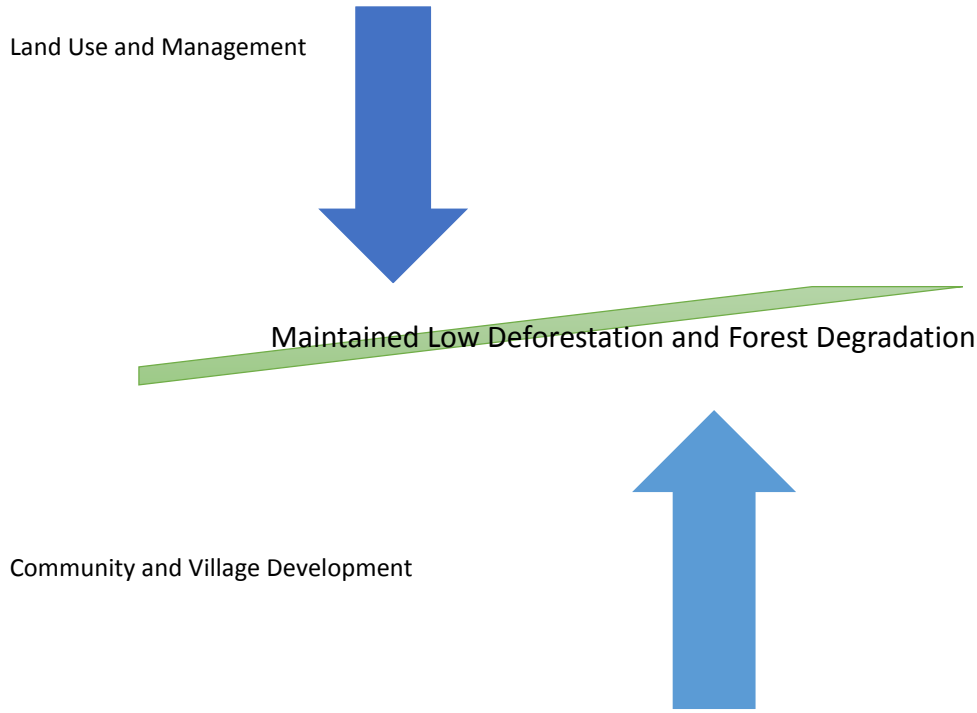


Sustainable Forestry

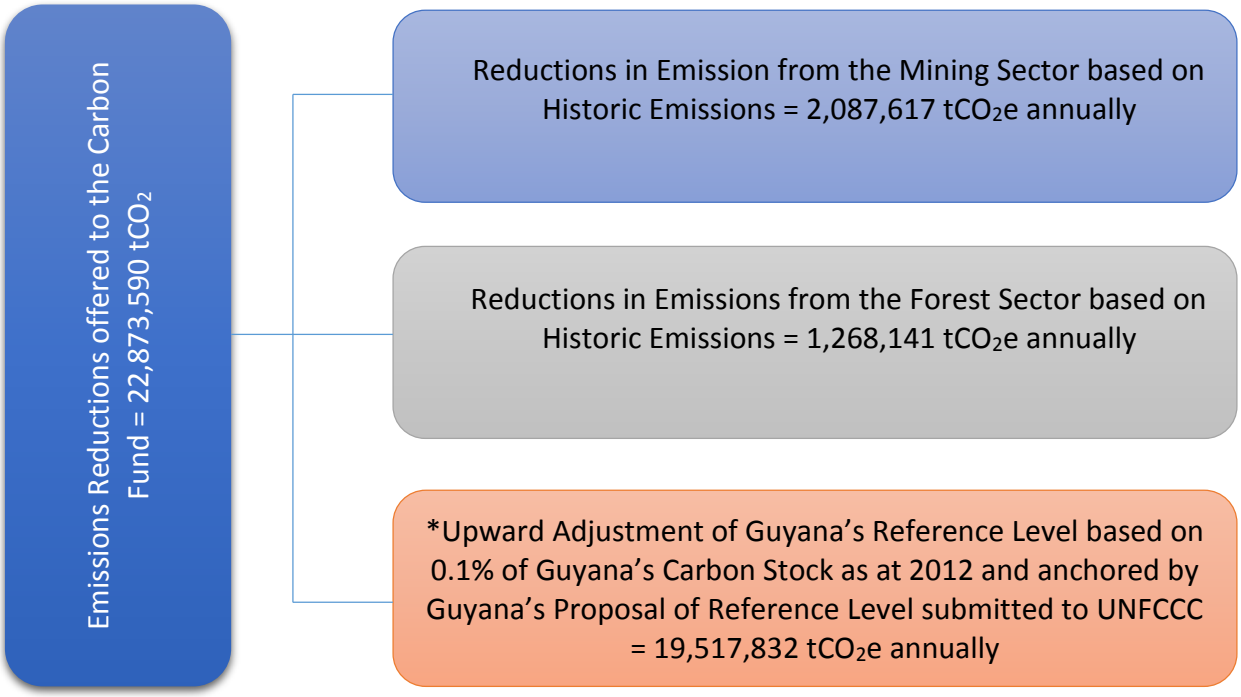
This will result in a 31% of total annualized emission for 2001-2012: *3,573,850 tCO2 being reduced to a* 20% of total annualized emissions by 2020: 2,305,709 t CO2. This is effectively a reduction in Emissions from the Forest Sector based on Historic Emissions of 1,268,141 tCO_2e annually.



Community Forestry



12.2 Volume proposed for the FCPF Carbon Fund



13. Preliminary assessment of the proposed ER Program in the context of the national Strategic Environmental and Social Assessment (SESA) and the Environmental and Social Management Framework (ESMF)[37]

13.1 Progress on SESA/ESMF

As part of the preliminary work done on the initial identification of REDD+ Strategy options for Guyana, a series of activities, which included engagement of stakeholders, formed part of a series of "SESA like" activities. Four focus groups sessions were undertaken on 28 and 29 November 2013 to discuss issues around the development of REDD+ strategy options for Guyana that will target key drivers of deforestation and forest degradation, and as the same time identify possible risks that are associated with each.

In the discussion, the main drivers identified through the MRVS (mining, forestry, infrastructure, etc.) were described and the participants were asked about their perception on what are the underlying causes of deforestation and the risks that are applicable to each.

Participants were also asked about the expected outcomes from the REDD+ strategies and to express those outcomes in the long, medium and short term, and potential candidate activities for the strategy, and additionally, the social and environmental risks that these may be subject to. Among some of the outcomes of this activity that relate to the SESA, are stakeholder's feedback on the following:

Social Issues Linked to Mining

Participants indicated that social safeguards are required within the mining activities as there are impacts affecting communities and workers. Some considered there is not an equitable distribution of benefits between concessionaires and workers, which could merit a department of social issues operating within the GGMC.

Shifting Agriculture

Participants were concerned that shifting agriculture would be considered as a driver for deforestation. They mentioned that the United Nations Framework Convention on Climate Change (UNFCCC) considers the rights of indigenous peoples and that this type of agriculture has been practiced for years by Amerindians. They also considered that as the forest is allowed to regenerate the slash and burn agriculture is not a driver of deforestation.

Permits for Mining & Land Titles

Some participants considered that issuing mining concessions prior to the titling of lands causes conflict and encourages mining. In the case of Amerindian lands, some considered that titling these lands could reduce the levels of deforestation. Also miners need permission from the Amerindian council for mining operations within the community. In practice, however, there are cases where mining operations start without permission.

The desired outcomes or objectives of the strategy options are based on the R-PP:

1) Reduce or maintain low level of emissions
2) Deliver economic development
3) Deliver social development.

The approach used in the identification of preliminary REDD+ strategy also included a number of SESA areas. This is summarised below where the identification of options were assessed across three main objectives:

Strategy's High Level Desired Outcomes/Objectives & Sub-objectives

High level objectives➔	**Objective 1: Reduce emissions**	**Objective 2: Deliver economic development**	**Objective 3: Deliver social development**
Sub-objectives ➔	1.A. Reduce deforestation and forest degradation and associated emissions	2.A. Minimise negative economic impacts in the short term	3.A. Maximise equity between sectors and groups

[37] The SESA is the assessment process to be used in FCPF REDD+ countries during R-PP implementation and REDD+ readiness preparation. The ESMF is an output of SESA that provides a framework to examine the issues and impacts associated with projects, activities, and/or policies/regulations that may occur in the future in connection with the implementation of the national REDD+ strategy but that are not known at the present time.

	1.B. Meet emissions target (current level, less or proposed baseline)	2.B. Maximise long term economic resilience	3.B. Ensure the Amerindian rights and legislation are respected/implemented
		2.C. Ensure administrative efficiency and effectiveness	
		2.D. Minimise costs to government	3C. Improved livelihoods and access to health, educational and social services for all Guyanese
		2.E. Minimise negative environmental impacts and/or promote positive environmental impacts	

To date, the Terms of Reference for the SESA has been developed and will comprise the following activities:

a. **Scoping and Baseline**- this process is expected to determine the most critical issues that the SESA process will focus on as well as conduct initial consultation and stakeholder engagement. The consultant will be informed by key local publications including the MRVS Interim Measures Reports, to ensure that that an environmental baseline is established, taking cognisance of the local context and Guyana's status in REDD+ implementation. This will serve to identify where the main strategic REDD+ interventions will be best placed.

b. **Analytical and Diagnostic Studies-** the Consultant will identify key environmental and social issues associated with land use and forest to inform the definition of the SESA's environmental and social priorities. The consultant will be expected to conduct:

II. **Environmental studies**
   a) Ecological and economic analysis of the status, trends, and drivers of change in environmental goods and services provided by forests and other ecosystems whose management may be affected by a REDD+ programme including the distribution of flows of benefits from these goods and services to different stakeholders (inter alia timber, non-timber forest products, biodiversity benefits, livelihood support, water quality and quantity, and cultural values).
   b) Analysis of the biophysical cycles and changes over time that may affect the management of ecosystems including the El Niño Southern Oscillation and Northern Atlantic Warming and changes in extreme weather events and conditions due to climate change.

III. **Social studies**
   a) Analysis of the uses of environmental goods and services from ecosystems that may be affected by the REDD+ programme including, inter alia, forestry, mining, tourism, hydroelectricity, subsistence use, and cultural values.
   b) Analysis of stakeholders in the use and management of environmental goods and services and REDD+ programme including evaluation of the importance and role of these stakeholders.
   c) Analysis of the frameworks and capacities for the use and management of environmental goods and services and those required for the implementation of a national REDD+ programme.
   d) Analysis of actors and financing for REDD+ including analysis of existing and future markets for carbon and biodiversity.

IV. **Institutional studies**
   a) Documentation and analysis of the relevant international treaties, agreements, instruments, and their interpretation relating to REDD+ programmes including, inter alia, those relating to carbon emissions, benefit sharing, indigenous rights, biodiversity, and resource management.
   b) Documentation and analysis of the relevant national policy, legislation, and their interpretation relating to REDD+ programmes in Guyana including, inter alia, those relating to carbon emissions, benefit sharing, biodiversity, and resource management. A gap analysis should be considered to assess institutional and organizational gaps

V. **Land/ resource tenure** - in consonance with the activities to be undertaken on analysis of land tenure and carbon ownership to inform the allocation of Benefits and Rights, the SESA will seek to examine:
   a. The range of land and resource tenure rights and how rights to territories and land and mitigation benefits from REDD+ are reflected in traditional practices and codified in legal and/or regulatory frameworks**.**

VI. **Analysis of compliance with World Bank and IDB Safeguard and Disclosure Policies including the Common Approach-** Anticipating potential impacts that may result from the implementation of the

REDD+ strategy, the following World Bank safeguard policies appear applicable, at this time; to the proposed REDD+ operation in Guyana:

a. Environmental Assessment (OP 4.01)
b. Natural Habitats (OP 4.04)
c. Forests (OP 4.36)
d. Physical Cultural Resources (OP 4.11)
e. Indigenous Peoples (OP 4.10)
f. Involuntary Resettlement (OP 4.12) (To manage restriction of access to natural resources)
g. Safety of Dams (OP 4.37) *(TBD)*
h. Projects on International Waterways (OP 7.50) *(TBD)*
i. Projects in Disputed Areas (OP 7.60)

In addition, the following IDB policies appear applicable to the proposed REDD+ operation in Guyana:

I. Environment and Safeguards Policy (OP-703)
II. Indigenous Peoples Policy (OP-765)
III. Involuntary Resettlement Policy (OP-710)
IV. Gender Equity in Development Policy (OP-761)
V. OP102 Access to Information
VI. OP704 Natural Disaster Risk Management

c. **Prepare Environmental & Social Management Framework (ESMF)**- this should include the recommendation of an institutional structure for the implementation of SESA activities for future implementation of REDD+ activities. Accompanying the institutional structure should be the identification of resources for implementation. It is expected that operational guidelines will be developed to guide future SESA related activities. The ESMF must be acceptable to the World Bank and IDB that will include specific sections on safeguards policies, including:

a) Environmental and Social Assessment (ESA) to address any potential environmental and/or social impacts as required by the World Bank Environmental Assessment Policy (OP 4.01) and in the IDB Environment and Safeguards Policy (OP-703);
b) Resettlement Policy Framework (RPF) to address any potential land expropriation and/or physical relocation as required by the World Bank Involuntary Resettlement Policy (OP 4.12) and the IDB Involuntary Resettlement Policy (OP-710);
c) Process Framework (PF) for restriction of access to natural resources as required by the World Bank Involuntary Resettlement Policy (OP 4.12), which will also include restriction of access to natural resources outside of parks and protected areas and in accordance with the livelihood restoration provisions of OP-710; and

Indigenous Peoples Planning Framework (IPPF) including a complete evaluation of the potential impacts on Indigenous Peoples, and benefit-sharing arrangements, as required by the World Bank Indigenous Peoples Policy (OP 4.10) and the IDB Indigenous Peoples Policy (OP-765).

Stakeholder involvement in SESA development:

Steps for SESA Consultative Process

Drawing upon the principles of consultation and participation outlined in Component 1b of Guyana's R-PP, the SESA consultative process will specifically guide the analytical and diagnostic studies to be carried out during the Readiness Preparation phase. A specific budget is allocated for the SESA consultative process.

It is imperative that consultations on the SESA during the Readiness Preparation phase involve key stakeholders including Amerindian village councils, the National Toshaos Council (NTC) and the INGOs, and other key stakeholder groups (small-scale logging and mining communities). The SESA will plan, implement and finalize its activities in the following manner:

Phase 1 (First Phase of Readiness Grant)

1. Dissemination of the draft SESA ToR to seek initial feedback from stakeholders;
2. Workshops with representative national stakeholders;
3. Finalization of the SESA ToR integrating the initial feedback received; and
4. Disclosure of finalized SESA ToR.

Part 2 (During Readiness Preparation Phase)

1. Establish clear working relationship between the team preparing and implementing the consultations and the team developing the REDD+ Strategy for Guyana
2. Organization of a series of focused workshops/consultation sessions to share information and seek inputs and feedback on the findings of the analytical and diagnostic studies. The workshops/consultations will be organized at the local, regional, and national levels. Relevant documents will be made available prior to such workshops/consultations. Amerindian People will be consulted in an adequate and culturally-appropriate manner following the international good practices and taking into account their issues of language and gender;
3. Organization of a national workshop to present and discuss the final findings of the analytical and diagnostic studies and to agree on the key findings to be integrated into the REDD+ Strategy; and
4. Public disclosure of the World Bank and IDB environmental and social management framework, for the REDD+ strategy in Guyana and its revision through a series of focused workshops with the Amerindian people and other stakeholders (small-scale logging and mining communities).

National Validation Workshop

The Consultant is expected to prepare a SESA work plan that will include the consultation and participation activities of the SESA. This work plan shall be subject to stakeholder validation through a national workshop. Participation by key stakeholder groups discussed above will be expected.

Feedback received during this workshop will be used by the consultants to finalize the SESA Work Plan. The Work Plan and any other outcomes of the workshop will made publicly available.

13.2 Incorporation of SESA outputs and/or outcomes into the proposed ER Program

With the participatory approach that will be utilised for the development of the SESA, the opportunity is presented whereby the feedback received from stakeholders will be beneficial for the identification and prioritization of key environmental and social issues, and guide the stakeholders to develop risks and opportunities matrices for the REDD+ strategy options. From this, the SESA outputs will contributes to the ER Programme as follows:

it will help to refine the REDD+ strategy options by prioritizing the options in terms of their environmental and social costs and benefits and also by outlining recommendations to enhance socially friendly land use and forest management activities.

Second, the process will lead to the development of an Environmental and Social Management Framework that will outline the procedures to be followed for managing potential environmental and social impacts of specific policies, actions and projects during the implementation of the REDD+ strategy options that are finally selected.

The output will be integrated into Ghana's overall national REDD+ framework and will guide the implementation of all REDD+ interventions in the country including the proposed ER program.

13.3 Feedback and grievance redress mechanisms

Though there has not yet been the establishment of a Grievance and Redress Mechanism for REDD+, there currently exist a number of operational mechanisms in place through which stakeholders can provide feedback and seek redress in relation to REDD+ implementation, including:

- The Amerindian Act, 2006, which provides for redress on governance areas for Amerindian villages and communities.
- The Department of Natural Resources and the Environment (DNRE) and its natural resources management agencies have dedicated resources for feedback and redress across each natural resource sector thereby providing specialized resources for this purpose. The follow of information is facilitated thought the regional and sub-regional offices of the sector agencies.
- The Ministry of Indigenous Peoples Affairs through its Community Officers provides a decentralized framework for the disseminating of information and the receiving of feedback, and subsequent addressing of grievances where these may arise.

Guyana has developed a Terms of Reference for the development of a Grievance & Redress Mechanism to be developed under REDD+ readiness activities. The activities to be conducted include:

- Assessment of existing national formal and informal feedback and grievance mechanisms
- Situation Analysis of the REDD+ Conflict Environment
- Development of a framework for the feedback and grievance redress mechanism
- Develop & implement a plan for information sharing and consultation on the proposed GRM
- Design a registry system for the submission and receipt of grievances and reporting on the grievance resolution processes
- Preparation of the detailed design and Operations Manual for the GRM

Stakeholder involvement in the development of the GRM:

Stakeholder input is integral to the development of the GRM. To this end, the Consultant is expected to host workshops with representatives of stakeholder groups to present, discuss, validate, refine and, to the extent possible, achieve consensus on the GRM. The consultations and stakeholder engagement elements in this Contract are expected to be executed in close synergy with Component 1b & 2d of Guyana's RPP Activities. A report describing the stakeholder workshops will be prepared, including an annex with the names, organization or entity, gender and contact information of participants will be included.

14. Land and resource tenure

14.1 Rights to territories and land, and mitigation benefits

Guyana is one of the few REDD+ countries that allocates absolute grants and titles to Indigenous villages and has clear provisions for extensions to land areas following a standard process. Clear provisions for such is detailed in the Amerindian Act, as well as Forest Act that specifically speak to customary rights and traditional access and recognizes unhindered access to these areas for subsistence use for all Amerindian people

There has been transparent analyses of historical land use and trends, as well as of existing land tenure arrangements, status of the titling of Amerindian lands, and challenges. These have been accompanied by analysis of the main economic activities linked to the forest, and an assessment of national polices and legislation that apply to forest management and their relevance to the implementation of REDD+, have been done.

In proceeding with activities on REDD+ in terms of land tenure and carbon ownership, a Terms of Reference has been developed to analyze land tenure and carbon ownership in Guyana. This activity will be linked to the work on SESA, which seeks to address issues relating to land/resource tenure. The objectives of the consultancy is provide information and recommendations related to carbon ownership and the allocation of benefits and rights related to carbon offset payments. The following will be conducted:

a) Analyze the current situation of carbon rights in Guyana
b) Prepare a comparative review of how carbon rights and benefits are shared in REDD+ countries, identifying the strengths and weaknesses of each.
c) Develop a proposal for a system for the allocation carbon rights and benefits for implementation of REDD+ in Guyana

These activities will seek to inform issues related to land and resource tenure regimes to ensure the successful implementation of the ER Program.

15. Benefit Sharing

15.1 Description of envisioned benefit-sharing arrangement for the proposed ER Program.

A Terms of Reference has been developed for the development of an equitable and mutually agreeable Benefits Sharing Mechanism for REDD+ Implementation in Guyana for Amerindian Communities and for other stakeholders (mining, forestry, etc). The following will be undertaken:

- Examine benefit sharing arrangements in other REDD+ programs around the world that may serve as examples of best practices and lessons learned, and provide a review of applicable mechanisms and tools that have made benefit sharing arrangements from other countries successful.
- Examine and Assess existing models in Guyana for benefits sharing mechanisms and identify models applicable to REDD+ implementation
- Identify any institutional (legal or organizational) changes that may be required to implement the mechanism.
- Conduct Stakeholder Consultation & Engagement Sessions
- Identify financing mechanisms that will ensure long term sustainability
- Identify areas where capacities should be built to ensure the sustainability of the Mechanism
- Roll out a plan for the benefit sharing mechanism
- Design an equitable benefits sharing mechanism for REDD+ in Guyana

15.2 Link between the envisioned benefit-sharing arrangement and the activities in the proposed ER Program.

The benefits sharing mechanism has a direct link to the MRVS and the results there after. In this, the MRVS monitors gains and losses in forest area change as well as forest carbon stock (deforestation and forest degradation). The emissions and removals data are then used as an indicator to calculate the benefits to be derived based on this performance.

Though the design of the EP Programme, the constraints or challenges associated with the benefits sharing system will be recognised.

15.3 Progress on benefit-sharing arrangements.

Work has commenced to pilot the development of a benefits sharing mechanism for Guyana. A Terms of Reference was developed for the contracting of a firm to oversee activities in the implementation. Amerindian communities that choose to participate will essentially be committing their forests to a REDD+ Agreement with GoG and in return receive payments which will be allocated to further Amerindian development through a share of results based payments that accrue to Guyana.

The National Toshaos Council selected the village where the benefits sharing mechanism will be piloted. The community chosen was Muritaro, Region 10. The following will be implemented for the pilot:

i. Implement the pilot. Activities undertaken should be based on those identified under the implementation plan, the Draft Opt-In Mechanism Strategy, and other areas, and include the following:
   - Conduct field visits to the pilot village to conduct planning sessions, trainings, and awareness and engagements sessions village ;
   - Establish a C-MRV system in the pilot village, consistent with the national MRVS. This should include, inter-alia, a baseline of forest carbon, data on required relevant safeguards, and the capacity of villages to meet their obligations for reporting on their annual performance to the GoG;
   - Develop considerations for a draft Financial Mechanism for the OIM outlining the administrative and operational arrangements of the Opt-In Mechanism Fund to be implemented in the pilot. Specific attention should be paid to making the considerations consistent with those of the national mechanism.
   - Prepare a template for Village Management Plans and provide guidelines on the minimum requirements a VMP should satisfy;
   - Develop a Village Management Plan with the pilot community;
   - Propose and pilot process for voting by the village to make decisions regarding Opting-In that is consistent with the Amerindian Act (2006) and FPIC;

Based on the experiences gathered and lessons learned while implementing the pilot OIM process:

- Identify potential risks including but not limited to translation for non-English speaking village members, provisions for early or proxy voting, and engagement of non-Amerindian, non-hinterland stakeholders.
- Recommend options regarding the institutional, framework for the implementation of the OIM
- Provide guidance on how the Opt-In Mechanism can be deployed, on an interim basis, in villages which do not have baseline forest inventories and on how villages with lower forest cover should be treated within the OIM;
- Develop a template for villages to report their performance to the GoG with guidance from the TWG;

ii. Conduct a final meeting with key stakeholders engaged in the project to present the results of the pilot and to consider views and comments received;
iii. Document the lessons learned and experiences in designing and implementing the pilot to help to better inform the implementation of the OIM.

Based on the above activities, revise the Draft Opt-In Mechanism Strategy.

16. Non Carbon Benefits

16.1 Expected social and environmental benefits

Through the implementation of the ER Programme, Guyana seeks to in improving economic and social policies and programmes to enable to creation of a climate resilient economy. In doing so, the expected social and environmental benefits include:

Improve knowledge and awareness of vulnerable groups such as women and indigenous groups on areas of natural resources management, sustainable forest management and REDD+ implementation, to allow for empowerment and more informed decision making and management. The long-term success of national implementation of REDD+, will be best supported by broad-based, inclusive domestic support and participation. In this regard, the citizens, especially vulnerable groups such as women and indigenous groups will continue to be engaged for participation in discussions on key areas such as natural resources management, sustainable forest management and REDD+ implementation. Through will bring about associated benefits on biodiversity protection and other ecosystem services. It is intended for the MRVS to be expanded to include other aspects of eco system services, in addition to forest carbon. This will have direct positive implications for biodiversity as well as fresh water. These two ecosystem, services have been identified as priorities for further advancing in the development of the national MRVS.

The intention is to empower these groups to be more aware of the status of these activities in Guyana, the requirements necessary for their participation, as well as the benefits that will be garnered on an individual level as well as at the national level from such initiatives.

Being a High Forest Low Deforestation (HFLD) country, Guyana in its implementation of REDD, seeks to implement the Plus aspect, in terms of sustainable forest management, conservation and enhancement of carbon stocks. To this end, alternative economic opportunities will be explored for forest dependent communities that will serve to create employment opportunities and improve the income generation potential.

16.2 Diversity and learning value

Guyana's ER Programme aims to demonstrate how community forestry, plus sustainable mining and forestry can contribute to emission reductions, while still allowing the country to pursue economic development. This is doubled with the development of Guyana's National Forest Monitoring System for REDD+, with a 23 year period monitored including 4 consecutive annual national assessment completed (2010, 2011, 2012 and 2013), accuracy assessed, independently verified, and publicly available. Fifth annual assessment currently underway.

Guyana's ER Programme will provide the FCPF a case study of how the country is addressing its drivers of forest change and the manner in which these are monitored and reported, and the international verification processes that are employed.

17. Progress on registries

17.1 National registry

Guyana has not yet developed a national Registry to track REDD+ or other emissions reduction activities. This will be developed in the design of the ER Programme.

In the interim, Guyana maintains a list of REDD+ initiatives being implemented, at both the national and sub-national scale. Accompanying this are the routine reporting exercises that provide specific data and information about donors, recipients, financial commitments, financial disbursement, and associated activities linked to REDD+ in the country. To date, information on activities from 2009 to present are accounted for.

Once in place, this registry will account for both national and sub-national reporting and accounting. This registry will be able to track the investments received through the ER Program and their related social and environmental impacts.

18. List of acronyms used in the ER-PIN

Acronym	Meaning
APA	Amerindian Peoples Association
CMRV	Community Monitoring Reporting and Verification
DNRE	Department of Natural Resources & the Environment
EITI	Extractive Industries Transparency International
ER	Emission Reduction
ERPA	Emission Reductions Payment Agreement
ER-PIN	Emission Reduction Programme Idea Note
ESMF	Environmental & Social Management Framework
EU FLEGT	European Union Forest Law Enforcement Governance and Trade
FCPF	Forest Carbon Partnership Facility
GGMC	Guyana Geology & Mines Commission
GOIP	Guyanese Organisation of Indigenous People
GOG	Government of Guyana
GFC	Guyana Forestry Commission
NFMS	National Forest Monitoring System
NTC	National Toshaos Council
MRVS	Monitoring Reporting and Verification System for REDD+
REL/RL	Reference Emission Level/ Reference Level
SESA	Strategic Environmental & Social Assessment
TAAMOG	The Amerindian Action Movement of Guyana
VPA	Voluntary Partnership Agreement

Annex I: Financing plan summary table

Expected uses of funds	Description	Breakdown per year									
		Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Costs related to developing the ER Program (e.g., monitoring costs)	*Design and Formulation (FCPF & FIP)*	0.5	0.6								
Operational and implementation costs	*Sustainable Forestry*			3	4	5	7	3			
	Sustainable Mining			4	5	7	8	5			
	Community Forestry			1	2	2	2	2			
Financing costs (e.g., interest payments on loans)	*NA*										
Other costs	NA										
	Total uses	0.5	0.6	8	11	14	17	10			

Expected sources of funds	**Description**										
Grants	*FIP (potential)*			3	4	5	5	3			
Loans	*NA*										
Revenue from REDD+ activities (e.g., sale of agricultural products)	*Private sector investment*			3	5	4	4	3			
Revenue from sale of Emission Reductions (contracted)	Carbon Fund			13	15	10	10	8			
Revenue from sale of additional Emission Reductions (not yet contracted)											
	Total sources (before taxes)	0	0	19	24	19	19	14			

Net revenue before taxes (=total sources – total uses)	(0.5)	(0.6)	11	13	5	2	4			

Annex 1 – Background Information on Guyana's Reference Level

Estimating emission factors

Deforestation

Field data have been collected to estimate forest carbon stocks and for use in estimating emission factors for all drivers of deforestation and for degradation resulting from selective logging. Carbon stocks are estimated for all pools using country-specific data and conversion factors, and an allometric equation[38] verified through destructive sampling of four large trees, resulting in emission factors that meet IPCC's requirements for Tier 3.

Stratification of Guyana's forest lands is a key step for developing a cost effective sampling plan and increasing the accuracy and precision of the resulting emission factors for deforestation. Estimating GHG emissions across Guyana as a whole is not possible without consideration of how carbon stocks are distributed across the country with respect to specific drivers or agents of forest land cover/use change and other physiognomic features of the landscape (i.e., forest type, elevation, soils composition, etc.). Often forest carbon stocks vary based on forest type, and because Guyana has diverse forests, initial attempts at stratification incorporated forest type. However, estimates of carbon stocks for different forest types based on measurements collected from preliminary plots were not significantly different across the multiple forest types in Guyana[39]. Differences in drivers of forest cover change, however, do result in differences in changes in carbon stocks and thus emission factors. In addition, different land-use histories as a result of accessibility such as proximity to roads and population centers can also lead to different forest carbon stocks and resulting emission factors.

A key first step in estimating emissions factors for deforestation was to use a stratified sampling design applied to the forests of Guyana. A stratified sampling design allows for maximum flexibility in designing a sampling protocol within each stratum that is tailored to the desired level of precision—for Guyana the target is a 95% confidence interval of ±<15% of mean--as well as the time and resources available to collect the data. Stratification criteria for the FCMS include both *ecological considerations* that affect how much carbon is contained within in a given area of land as well as *human pressure considerations* related to how the land is being used (and how it will be used in the future). For example, it is desirable to group all lands of similar carbon stocks together that are under similarly high pressure of future deforestation into one stratum, and other lands that are of similar carbon stocks but under little to no pressure into a separate stratum. In this way, resources can be optimized so that sampling intensity is greater (thus precision is higher) in the areas most likely to undergo change in the future.

An overarching spatial analysis framework, operating in a Geographical Information System (GIS) was used to create a Potential for Future Change (PFC) stratification system that developed a relationship between the historical deforestation pattern and the spatially represented factors of deforestation. This method of stratification aims to understand which forest change factors, or combinations of factors, contribute most significantly to the historical pattern of deforestation. Humans tend to deforest areas that are close to roads and settlements (accessible for clearing), clearly demarcating some areas as having high potential for future change and others low potential. Two recent historical periods, 2000-2005 and 2005-2009, were considered for defining the pattern of forest change. The PFC spatial analysis framework and the specific techniques are discussed in the spatial techniques report[40].This PFC framework resulted in the identification of three strata based on their potential for future change—high (HPfC), medium (MPfC), and low (LPfC) potential for change (Map below).

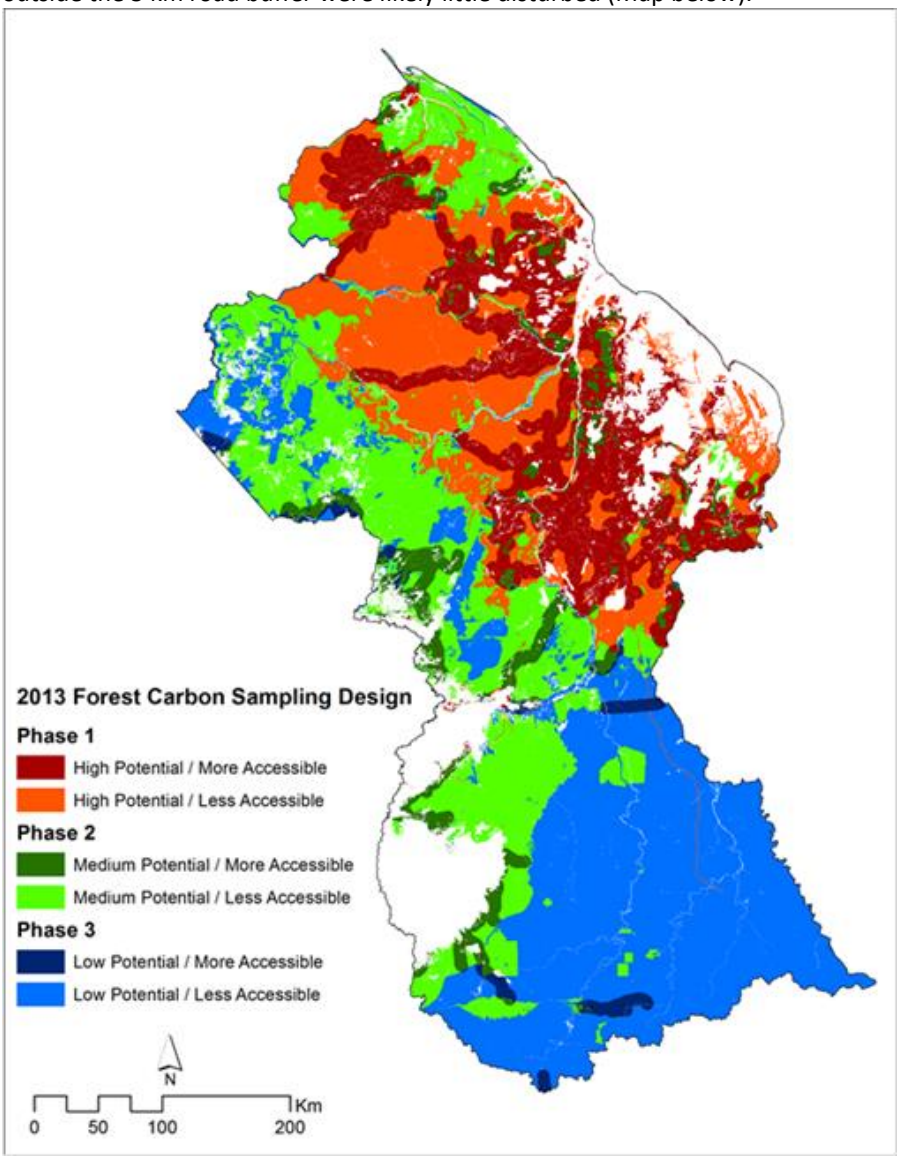
In addition to stratifying by potential for change, the forests were also stratified by accessibility. A large portion of Guyana's forestland is not easily accessible and the purpose of the sampling stratification is to overcome some operational constraints while maintaining robust sampling results. Therefore, the factor of accessibility was introduced in the sampling stratification methodology to provide a forest carbon sampling framework that allows for efficient collection of data. The accessibility strata were also included, because, given the long history of logging in Guyana, our initial working assumption was that areas near roads would have been disturbed and have lower carbon

[38]Chave, J, C. Andalo, S. Brown, M.A. Cairns, J.Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.P. Lescure, B.W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia 145:87-99.

[39] Section 3.7.5 in Brown, S., K. Goslee, F. Casarim, N. L. Harris, and S. Petrova. 2014. Sampling Design and Implementation Plan for Guyana's REDD+ Forest Carbon Monitoring System (FCMS): Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

[40]Petrova S., K. Goslee, N. Harris, and S. Brown. 2013 Spatial Analysis for Forest Carbon Stratification and Sample Design for Guyana's FCMS: Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

stocks than those areas far from roads. The more accessible (MA) stratum is defined as 5 km straight-line distance from both sides of roads for a total of 10 km, a distance which allows a field team of 4 or 5 people to travel to the sampling point and return to the road within one day. The less accessible (LA) stratum is defined as all forestland outside the 5 km road buffer were likely little disturbed (Map below).



Stratification of Guyana's forest area by deforestation threat, or potential for future change.

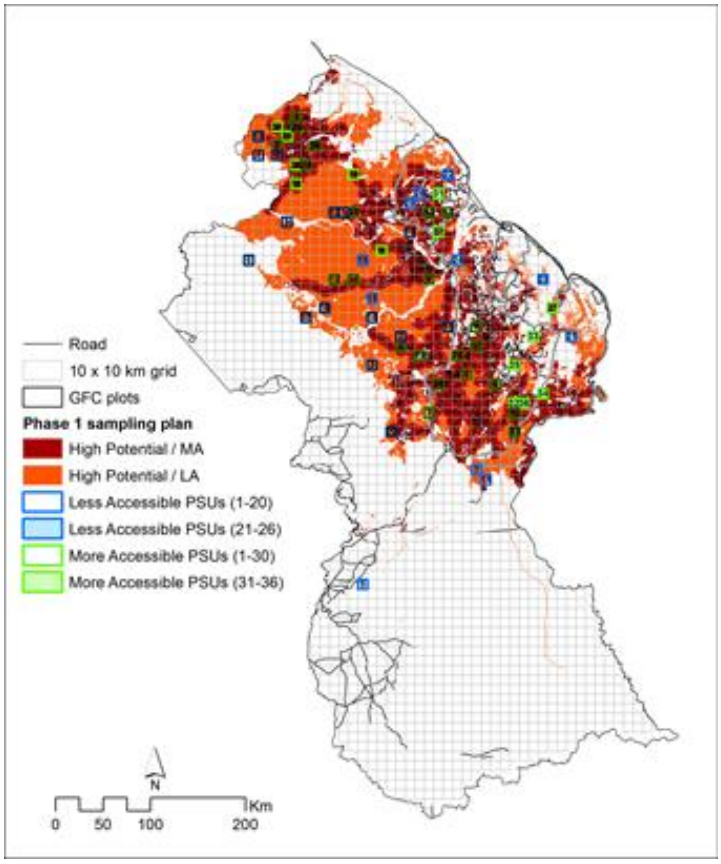
The number of sampling plots and the design of the plots was determined by a preliminary sampling process that randomly located plots across various forest types identified in the Guyana vegetation map, and across a latitude and longitude gradient. Different sampling methods were tested aiming at the optimum design, balancing data collection with precision, robustness, efficiency and scientific integrity. Single plots and cluster plots (a cluster of four plots) were tested during preliminary data collection. Results from the preliminary field work, indicated that cluster plots were most appropriate because when compared to single plots, results showed improvement in precision across plots, reduction of variability within plots, and reduction in travel time in sampling for reaching the precision target. The results also showed that there were no significant differences in carbon stocks among the main forest types and that stratification by forest type was not necessary[41].

[41]Brown, S., K. Goslee, F. Casarim, N. L. Harris, and S. Petrova. 2014. Sampling Design and Implementation Plan for Guyana's REDD+ Forest Carbon Monitoring System (FCMS): Version 2. Submitted by Winrock International to the Guyana Forestry Commission.

Sampling Design

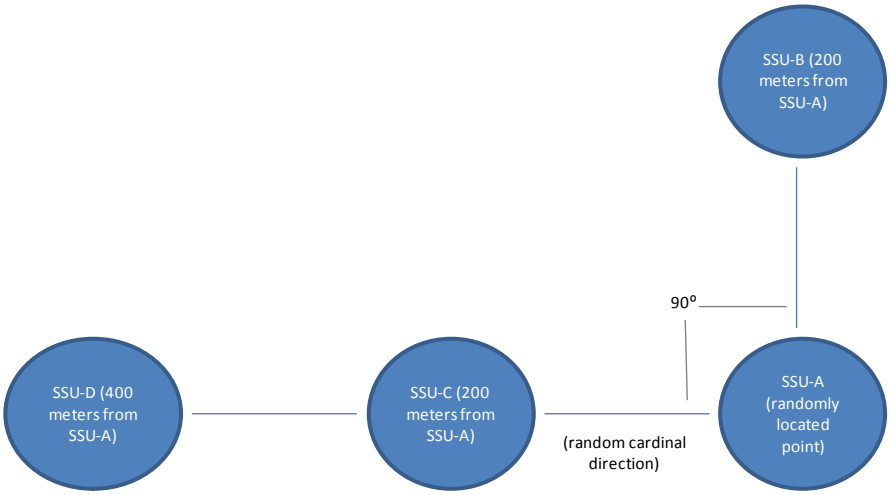
For Guyana's carbon stock assessment, a stratified two-stage list sampling design with clustered plots was used. In this approach, the country is divided into 10 km x 10 km blocks (primary sampling units-PSUs). The PSUs within each stratum are selected using stratified two-stage list sampling design for carbon measurement—referred to as Stage 1(Map below). Secondary sampling units (SSUs) designed as L-shaped cluster of four subplots are established within each PSU and carbon measurements are obtained (Figure below). Stage 2 is the random selection of SSUs within the PSUs. This design allows for the selection of a subset of primary sampling units (PSUs) in which clustered plots (SSUs) can be established. This allows field crews to achieve higher sample sizes at relatively low cost. This approach provides an efficient inventory that is well distributed across the landscape[42]. To implement a stratified approach each stratum should be considered separately and the number of PSUs to be sampled varied by stratum.

Based on the preliminary field data of carbon stock measurements, it was estimated that 35 SSU cluster plots in the HPfC stratum should be measured to attain the selected precision target (95% confidence interval of <15% of the mean). However, a total of 36 PSU/SSUs were pre-selected for the MA and 26 for the LA in case the carbon stocks were more variable than originally estimated in the preliminary sampling. These steps were repeated for the MPfC MA and LA strata. No PSUs/SSUs have been selected for the LPfC stratum at this time because this area is under low threat for forest cover change and it is of low priority until that time when significant deforestation (>100 ha) activities are found to occur by the remote sensing monitoring. Further details are given in Brown et al. 2014.



Example of the stratified two-stage list sampling design with clustered plots for the High Potential for Change More Accessible (MA) and Less Accessible (LA) strata.

[42]Tomppo, E. and M. Katila. 2008. Comparing alternative sampling designs for national and regional forest monitoring. Appendix 4 in Tomppo, E. and K. Andersson, Technical review of FAO's approach and methods for national forest monitoring and assessment (NFMA), NFMA Working Paper No. 38, Rome, 2008.



Layout of the four subplots that comprises a Secondary Sampling Unit (SSU) cluster plot. Each subplot consists of 4 nested plots ranging in size of 2 m radius for saplings, 6 m radius for trees 5-25 cm DBH, 14 m radius for trees 25-50 cm DBH, and 20 m radius for trees >50 cm DBH.

The area of each stratum and number of cluster sample plots actually measured is given in the table below. Based on this stratification system, data collection efforts were divided into three phases: the HPfC stratum first (Phase 1), followed by the MPfC stratum (Phase 2), and then the low priority LPfC (Phase 3) (Figure below). To date all field work has been completed for Phase 1 and 2.

Area of each sampling strata

Forest Carbon Sampling strata		Area (ha)	Number of sample plots
High potential for change	**More accessible**	3,165,731	26
HPfC	**Less accessible**	3,096,270	16
Medium potential for change	**More accessible**	960,633	11
MPfC	**Less accessible**	4,267,988	13
Low potential for change	**More accessible**	262,014	--
LPfC	**Less accessible**	5,872,574	--

Logging

Carbon loss or change in live and dead biomass between the "before-logging" and "after-logging" scenario is a result of the felling of the timber tree, extraction of timber volume, the damage caused to residual trees from the logging activities, and the extraction of trees due to construction of skid trails. This is expressed in equation forms as follows

Emissions, t C/yr = [Vol x WD x CF x (1-C_{LTP})] +[Vol x LDF] + [Vol x LIF] (Eq.1)

(1) (2) (3)

Where:

Vol = volume timber over bark extracted ($m^3 yr^{-1}$)

WD = wood density ($t\ m^{-3}$)

CF = carbon fraction, the proportion of biomass that is carbon - 0.5 (IPCC 2003 GPG and 2006 AFOLU)

C_{LTP} = proportion of extracted carbon in long term products still in use after 100 yr (dimensionless)

LDF = logging damage factor—dead biomass left behind in gap from felled tree and collateral damage ($t\ C\ m^{-3}$)

LIF = logging infrastructure factor—dead biomass caused by construction of skid trails ($t\ C\ m^{-3}$)

The proportion of carbon in wood stored at long-term products is given as:

$$C_{LTP,i} = (1 - WW_i) * (1 - SLF_i) * (1 - OF_i)$$

Where:

i wood product classes of sawnwood, woodbase panels and other industrial roundwood

WW_i Fraction of biomass effectively emitted to the atmosphere during production of wood product i (wood waste)

SLF_i Fraction of wood products that will be emitted to the atmosphere within 5 years of production of product i

OF_i Fraction of wood products that will be emitted to the atmosphere between 5 and 100 years after production of product i

The values of the fractions used to estimate C_{LTP} in this analysis are[43]:

Product class	WW	SLF	OF 100yr
Sawnwood	0.50	0.20	0.84
Woodbase panels	0.50	0.10	0.94
Other industrial roundwood	0.50	0.30	0.99

Field measurements are collected from logging plots to quantify components (1) and (2) in Eq. 1 above. To quantify the biomass carbon that is damaged and dead as a result of constructing the skid trails (component (3) in above equation), measurements of the average width of skid trails and the forest carbon stocks damaged during the construction of trails are made.

Because of the need to collect data at plots located exactly where a tree has been felled, it is not possible to establish completely random plots across Guyana. Rather, plots are located at sites of recently felled trees in concessions, and the volume and biomass removed in commercial logs is determined. In addition, for the measurement of damage that results from tree felling, it is not possible to establish a set plot size. Instead, one or more felled trees that create one gap define a "logging plot", and it is necessary to identify and measure all of the surrounding trees damaged during the felling in a given gap. In this way, it is possible to calculate carbon emissions per unit of volume extracted in commercial trees[44].

Emission Factors

Historical activity data for deforestation by driver and stratum

[43] From Winjum, J. K., S. Brown, and B. Schlamadinger. 1998. Forest harvests and wood products: sources and sinks of atmospheric carbon dioxide. Forest Science 44:272-284.

[44] Further details of all field measurements and analyses are given in are given in SOPs 17-22 in Casarim FM, K Goslee, S Petrova, S Brown, H Sukhdeo, and C Bhojedat. 2014 Standard Operating Procedures for the Forest Carbon Monitoring System of Guyana. Winrock International; and Casarim F., K. Goslee, and S. Brown, 2014. User Manual for Calculating Emission Factors with Guyana's Selective Logging Tool. Submitted by Winrock International to the Guyana Forestry Commission.

Stratum	Driver	Area of forest change (ha)				
		2001-2005	2006-2009	2009-2010	2011	2012
Number of years		5	4.8	1	1.25	1
HPfC-MA	Forestry infrastructure	6,426	2,950	255	184	163
	Agriculture	947	68	15	31	257
	Mining (medium and large scale)	12,310	6,814	3,836	4,005	6,283
	Mining infrastructure	1,630	777	312	331	485
	Infrastructure	1,937	105	9	128	21
	Fire-Biomass burning	89	-	-	-	141
HPfC-LA	Forestry infrastructure	690	299	36	25	65.37
	Agriculture	1,776	1,729	498	20	167
	Mining (medium and large scale)	3,263	2,600	3,764	3,560	4,522
	Mining infrastructure	99	186	193	525	729
	Infrastructure	45	-	-	154	28
	Fire-Biomass burning	47	-	-	-	-
Total across drivers		29,259	15,528	8,917	8,963	12,863
Annual Average		5,852	3,235	8,917	7,171	12,863
MPfC-MA	Forestry infrastructure	117	310	3	11	7
	Agriculture	83	-	-	1	0
	Mining (medium and large scale)	979	222	98	73	149
	Mining infrastructure	-	50	5	8	12
	Infrastructure	90	57	8	26	27
	Fire-Biomass burning	-	-	32	6	37
MPfC-LA	Forestry infrastructure	98	39	-	14	4.08
	Agriculture	21	0	-	-	14
	Mining (medium and large scale)	1,073	962	859	403	961
	Mining infrastructure	24	20	26	113	188
	Infrastructure	-	33	45	60	30
	Fire-Biomass burning	99	-	-	-	5
Total across drivers		2,585	1,693	1,075	715	1,434
Annual Average		517	353	1,075	572	1,434
LPfC-MA	Forestry infrastructure	-	1	-	0	1
	Agriculture	0	-	-	-	-
	Mining (medium and large scale)	57	9	-	6	2
	Mining infrastructure	-	-	-	-	-
	Infrastructure	0	-	-	-	2
	Fire-Biomass burning	-	-	-	-	-
LPfC-LA	Forestry infrastructure	-	-	-	1	0
	Agriculture	25	-	-	-	-
	Mining (medium and large scale)	253	196	275	138	101
	Mining infrastructure	-	7	-	10	16
	Infrastructure	-	-	2	4	19
	Fire-Biomass burning	-	-	-	-	-
Total across drivers		335	212	276	158	141
Annual Average		67	44	276	126	141

Emission factors for deforestation by driver and stratum

Stratum	Drivers	t CO_2 ha^{-1}
HPfC -MA	Forestry infrastructure	1,042
	Agriculture	1,142
	Mining (medium and large scale)	1,042
	Mining infrastructure	1,042
	Infrastructure	1,042
	Fire-Biomass burning	775
HPfC-LA	Forestry infrastructure	1,359
	Agriculture	1,440
	Mining (medium and large scale)	1,359
	Mining infrastructure	1,359
	Infrastructure	1,359
	Fire-Biomass burning	1,043

Stratum	Drivers	t CO_2 ha^{-1}
Medium Potential for Change (ALL)	Forestry infrastructure	1,187
	Agriculture	1,284
	Mining (medium and large scale)	1,187
	Mining infrastructure	1,187
	Infrastructure	1,187
	Fire-Biomass burning	889

The carbon stock of Guyana's forests is high in comparison to many other tropical forests around the world, averaging about 300 t C/ha (Table below), with more than 74% in the aboveground biomass. As expected forests in the MA stratum of the HPfC had the lowest stock, and the LA stratum forests of the HPfC contained the highest stock. There was not statistical difference in forests C stocks between the MA (300.3 t C/ha) and LA (299.9 t C/ha) of the MPfC stratum, thus the two were combined (Table below). No field data have been collected for the LPfC stratum and thus the C stocks for the MPfC stratum will be used for this area at this time.

The total C stock of Guyana forests, excluding soil, is 5.32 billion t C (product of area and C stock by stratum). The vast majority of carbon resides in the tree pool (above- and belowground biomass) and the soil carbon pool (Table below). The carbon stock of all the other biomass pools represents 6-8% of the total biomass pool.

The targeted 95% confidence interval was <+/-15% of the mean total carbon stock, excluding soil. The target was achieved in all strata.

Carbon stocks in the selected pools in Guyana's forests in the high (HPfC) and medium (MPfC) potential for change forests. MA=more accessible stratum and LA=less accessible stratum. The values in parentheses are the 95% Confidence Interval expressed as a percent of the mean

Carbon Pool	HPfC		MPfC
	MA	LA	MA&LA
	Carbon Stocks (t C ha^{-1})		
Aboveground Tree	193.6	267.6	231.1
Belowground Tree	45.5	62.9	54.3
Saplings	4.2	4.1	3.5
Litter	3.3	5.6	3.2
Dead Wood	13.1	10.8	7.9
Total (without soil)	259.8 (7.8%)	351.0 (10.1%)	300.0 (12.1%)
Soil Carbon (top 30 cm)	99.3 (21.6%)	80.3 (17.4%)	96.5 (21%)

The emission factors for deforestation were calculated as:

$$EF_{deforestaton} = \left\{C_{AGB} + C_{BGB} + C_{LIT} + C_{DW} + C_{sap} + [C_{soil} - (C_{soil} \times F_{LU} \times F_{MG} \times F_I)]\right\} \times \frac{44}{12}$$

(Eq.2)

Where:

$EF_{deforestation}$ = gross emission factor for deforestation; t C ha^{-1}

C_{AGB} = Carbon stock in aboveground biomass pool; t C ha^{-1}

C_{BGB} = Carbon stock in belowground biomass pool; t C ha^{-1}

C_{LIT} = Carbon stock in litter pool; t C ha^{-1}

C_{DW} = Carbon stock in dead wood pool; t C ha^{-1}

C_{sap} = Carbon stock in saplings; t C ha^{-1}

C_{soil} = Carbon stock in soil organic carbon pool (to 30 cm); t C ha^{-1}

F_{LU} = stock change factor for land-use systems for a particular land-use, dimensionless

F_{MG} = stock change factor for management regime, dimensionless

F_I = stock change factor for input of organic matter, dimensionless

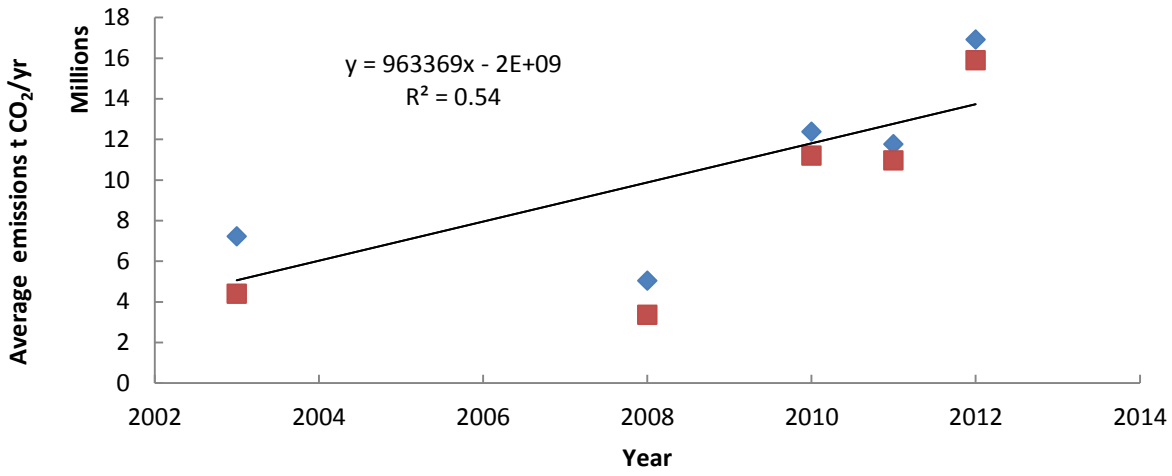
The values of F_{LU}, F_{MG}, and F_I used for different activities in Guyana are as follows[45]:

Converted to	F_{LU}	F_{MG}	F_I
Permanent agriculture	0.48	1.00	1.00
Unpaved roads	0.82	1.00	0.92
Mining	0.82	1.00	0.92

The change in carbon stocks in the top 30 cm of soil was calculated as the difference between the soil carbon stock before conversion and the soil carbon stock 20 years after conversion (time it takes to reach new steady state), where the soil carbon stock after conversion was estimated based on land use, management and input factors as given in above table. All mining and logging roads are unpaved and the same factors were used for both types of roads. For simplicity in accounting, we assume the full emission of soil carbon in the year of clearing, rather than spreading the emission over 20 years as suggested by IPCC 2006 (AFOLU).

The emission factors resulting from the application of Equation 2 are based on the assumption that all of the biomass carbon is emitted in the year of the event—commonly referred to as committed emissions. The emission factor for fire is calculated using equation 2.27 in the IPCC 2006 AFOLU report.

The variation in emission factors (Table below) is based on differences in total C stocks of the forest strata and on the different soil factors.



Average annual CO_2 emissions for the period 2001-2012 caused by deforestation. The midpoint of 2001-2005 was assumed to be 2003, and the midpoint of 2006-2009 was assumed to be 2008. The blue symbols =total emissions; red symbols =emissions from mining & mining infrastructure.

Uncertainty in deforestation emissions

[45] From Table 5.5 in IPCC 2006 AFOLU, Vol. 4, Ch. 5.

The remote sensing products produced by Pöyry, Indufor and GFC team were verified and their accuracy assessed [46] Based on the verification of the remote sensing products, the estimated accuracy was >97% or a conservative uncertainty of 3%.

The uncertainty of the total emissions for deforestation is **a 95% confidence interval of ±9.6%**.This is based on application of the error propagation equation in Ch.5 of the IPCC GPG (2003) applied to each stratum (see the Uncertainty tab and Total Emissions tab in the Excel file:Final historic emission tool). At this stage the uncertainty in soil emissions is not included but the total uncertainty with inclusion of soil is not expected to be too different because the emissions from soil are <3% of the total.

Degradation

Activity Data

As mentioned above, selective logging is the only driver of degradation that is included in the assessment of historical emissions. Robust activity data are available from 2001 to 2012. Selective logging, unlike deforestation, has a number of different data sources used to estimate emission factors and activity data.

These activity data include the volume of wood products and the length of skid trails (Table below).

Activity data for timber harvesting used for developing historic emissions. The volume of logs is reported in Hoppus volume underbark that has been converted to true volume overbark[47].

Product	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Logs 1000 m^3/yr	311.9	297.5	236.2	366.0	323.9	394.0	330.4	275.3	266.2	320.1	294.6	277.5
Sawnwood 1000 m^3/yr*	29.5	31.0	38.2	36.1	57.8	67.4	74.4	67.0	73.1	77.6	76.1	75.6
Roundwood (Piles, Poles, Posts, Spars) 1000 m^3/yr	19.3	14.6	14.7	18.0	19.6	17.2	20.9	18.7	19.4	17.7	14.8	16.6
Splitwood (Staves, Shingles 1000 m^3/yr)	2.0	1.4	3.1	3.0	3.2	3.4	1.1	0.7	0.96	2.3	0.01	0.01
Total true volume overbark logs m^3/yr	536,377	513,190	443,591	628,262	618,626	738,004	664,069	565,861	567,575	654,298	608,730	585,108

The length of skid trails was estimated based on two factors: for 2003 a factor of 4.31 km of skid trails per 1,000 $m^3$of timber extracted and for 2009 a factor of 3.78 km per 1,000m^3 extracted. The 2003 factor was used for the period 2001 to 2008 and the 2009 factor was used for the period 2009-2012. For each year the appropriate factor was multiplied by the total timber over-bark harvested, resulting in the total length of skid trails constructed.

Emission Factors

To estimate carbon impact from readily available indicators, factors were created linking extracted volume with non-merchantable biomass of the felled tree (top and stump), collateral damage, and damage from skid trails left as dead wood in the forest. A total of 183 logging plots were installed across four large scale commercial forest concessions operating on a 25 year cutting cycle. The summary of results is given in the table below:

[46] GFC and Indufor 2013, Guyana REDD+ Monitoring Reporting & Verification System (MRVS); Year 3 Interim Measures Report 01 January 2012 – 31 December 2012.

[47] True volume = 1.278*Hoppus volume; and volume overbark = 1.12*true volume underbark (from IPCC AFOLU 2006). See the Excel Historic Emissions tool for more details.

Extracted volume and estimated emission factors from selective logging on large concessions based on field data from 183 logging plots. LDF=logging damage factor and LIF=logging infrastructure factor

	Extracted Volume (m3 gap^{-1})	Average wood density (t C m^{-3})	Top & stump of Felled Tree (t C m^{-3})	Collateral Damage per Vol. Extracted (t C m^{-3})	LDF Total Carbon Damage per Vol. Extracted (t C m^{-3})	LIF Carbon Damage from Skid Trail (t C/km)
Mean	3.47	0.40	0.57	0.48	1.05	46.87
Std.Dev	2.19	0.03	0.30	0.56	0.68	8.08
95% CI	0.32	0.00	0.04	0.08	0.10	1.91
Uncertainty (CI as % of mean)	9.2%	1.0%	7.5%	16.9%	9.4%	4.1%

Based on the Eq. 1 and factors given in section 4.2.2 above and the mix of product classes (Table below), the amount of wood carbon going into products with a life of >100 yr (C_{LTP}) is estimated to be < 0.5% of the total production of timber.

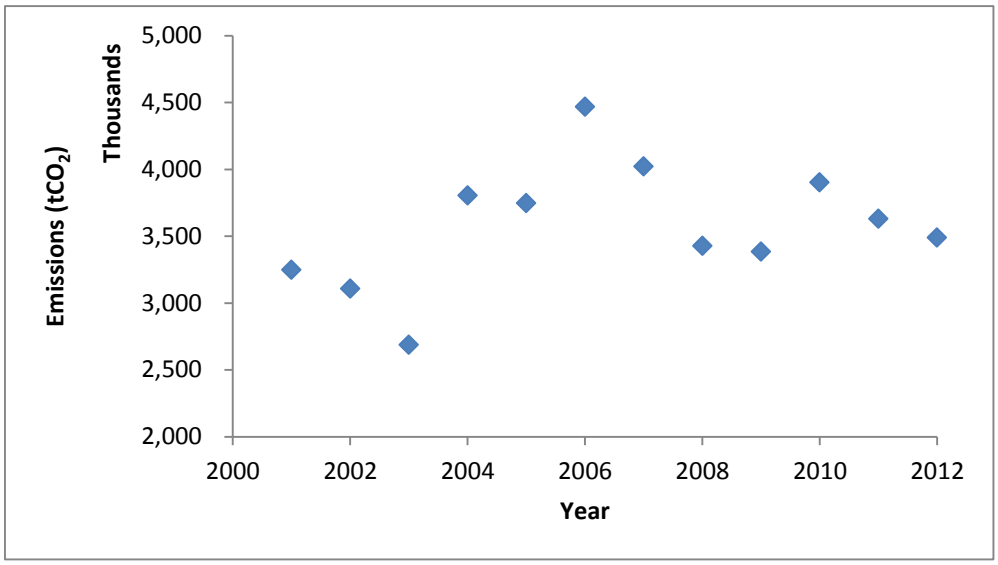
The data in the table below were used to estimate emission factors for selective logging to be used with the activity data on annual timber harvested and length of skid trails constructed.

Emission factors for selective logging. LDF=logging damage factor, LIF=logging infrastructure damage from skid trails, and C_{LTP} = carbon fraction of wood going into long term products

Driver	Emission Factors	
	Unit	t CO2
LDF	per m3	3.85
Wood density	per m3	1.47
LIF	per km	171.84
C_{LTP}**		
Sawnwood	Fraction	0.06
Woodbase panels		0.01
Other products		0.00

Historical Emissions

Combing the activity data with the emission factors in the table above, results in an estimated total emissions from logging during the historical period of **42.9 million t CO_2**. The annual average emissions are **3.57 million t CO_2** and vary between 2.68 and 4.47 million t (Figure below). More than 63.3% of the emissions are due to the logging damage factor (LDF), 8.7% are due to the construction of skid trails, and the remaining 28% from the logs.



Annual emissions from selective logging between 2001 to 2012

Uncertainty in degradation emissions

The uncertainty in the timber production data is assumed to be zero as these data are well tracked by the GFC and monitored at four main levels: forest concession monitoring, monitoring through the transportation network, monitoring of sawmills and lumberyards, and monitoring ports of export.

The uncertainty of the total emissions for logging is a **95% confidence interval of ±6.1%**. This is based on application of the error propagation equation in Ch.5 of the IPCC GPG (2003) and includes the uncertainty of the LDF (95% CI of ±9.4% of the mean), the uncertainty in mean wood density of species logged (95% CI of ±1.0% of the mean, and the uncertainty in the measurements of the width and C stock of damaged trees for skid trails (95% CI of ±14.2% of the mean). As the amount of carbon stored in long lived wood products is insignificant, its contribution to the uncertainty is not included.