TRANSFORMING FOREST MANAGEMENT IN GUYANA THROUGH AN EFFECTIVE AND SUSTAINED MONITORING REPORTING AND VERIFICATION SYSTEM

PROGRESS REPORT
REPORT PERIOD: 1 JANUARY 2017 TO 30 JUNE 2018
(with update through 30 September 2018)

1. Introduction

Conservation International Guyana (CI-Guyana) with funding from the Norwegian Agency for Development Cooperation (Norad) is supporting the Guyana Forestry Commission (GFC) to continue development and implementation of the national forest Monitoring Reporting and Verification System (MRVS). This second phase of implementation of the MRVS includes activities for Years 6 to 9 of the MRVS, covering the following periods:

Project proposal Assessment Year	Assessment Year	Assessment period
Year 6	2015- 2016	24 months
Year 7	2017	12 months
Year 8	2018	12 months
Year 9	2019	12 months

This project aims to contribute to the realization of Guyana's green development pathway by improving forest management within Guyana. More specifically, it seeks to ensure that:

1. Guyana's Forest Carbon Monitoring System is strengthened in fulfilment of the MRVS Roadmap Phase 2 and reporting on forest area change and emissions from forests is completed for Years 6 to 9 (01 January 2015 to 31 December 2019) of the Guyana-Norway agreement.
2. The MRVS more precisely accounts for the forest carbon dynamics.
3. MRVS data and results inform improvements in forest management policy and practice.
4. A third phase of MRVS operation is assured.
5. Key technical and non-technical audiences are informed on the relevant aspects operation of Guyana's MRVS.
6. Guyana maintains sound forest monitoring systems, in particular, as it relates to the regulatory frameworks for responsible forest management.

The project will support the establishment and sustaining of a world-class MRVS as a key component of Guyana's national REDD+ programme. This system will provide the basis for verifiably measuring changes in forest cover and resultant carbon emissions from Guyana's forests as an underpinning for results-based REDD+ compensation in the long-term. Critically, the MRVS will also inform improved policies and practices for forest management, including for the operation of the logging and mining industries, to proactively address their impacts on forests. Transformation of forest management will be achieved primarily through the establishment of mechanisms and capacity for use of MRVS results and data as key elements of the evidence basis to design solutions for current inefficiencies in forest management.

This project will, beyond maintaining and expanding the capacity of the GFC to reliably provide assessment of forest cover change and forest emissions, build the capacity of agencies and entities with mandates for the management of forests to utilize this data to improve the management of Guyana's forests. This capacity is also critical to sustaining the impact beyond the life of this project by improving management of Guyana's forests, a significant part of its natural patrimony, and

ensuring adequate REDD+ compensation, which are essential to securing Guyana's Green Development path.

This progress report outlines the progress made on implementation of the project over the period January 1, 2017 to June 30, 2018. Section 3, "Summary Discussion of Progress and Impact", however also includes consideration of the achievements made through September 30, 2018.

2. Progress on Achievement of Outcomes

2.1 Outcome 1: Guyana's Forest Carbon Monitoring System is strengthened in fulfilment of the MRVS Roadmap Phase 2 and reporting on forest area change and emissions from forests is completed for Years 6 to 9 (01 January 2015 to 31 December 2019) of the Guyana-Norway agreement.

The MRVS Interim Measures Report for Year 6 (2015- 2016) was completed and work commenced on preparing the analysis for Year 7. The year 6 report provides a summary of the 'Interim Measures' that report on Guyana's progress towards implementation of REDD+ continuing to utilize the framework of the REDD+ Interim Indicators, as well as the reporting requirements as had been outlined in the 2009, 2011, and 2012 and 2015 versions of the Joint Concept Note (JCN). However, because completion of forest cover change assessment for Year 6 commenced late and was due by December 31, 2017, only deforestation change mapping was done for the period. Degradation was measured using a sample-based approach from the datasets captured for the accuracy assessment. The report can be found here.

For MRVS Year 6, a combination of Sentinel 2A (10m) and Landsat7 and 8 (30m) imagery were collected mostly in September 2016 and used to map and monitor forest to non-forest change by driver. Additionally, the image data was used to classify the non-forest areas into the five IPCC non-forest classes (cropland, grassland, wetlands, settlements & other land). This approach allowed for land cover change greater than one hectare in size to be tracked through time and attributed by its driver (i.e. mining, shifting agriculture etc.). A series of refinements to the image processing chain have been implemented to facilitate the use of higher resolution Sentinel imagery at a national scale.

The Year 7 analysis is progressing utilizing the same mapping processes and standards as in Year 6, with some necessary improvements made to the image processing. The high-resolution imagery being used is Sentinel 2A and degradation mapping done using a sample-based approach instead of wall to wall mapping. The Mapping Standard Operating Procedures document has also been updated accordingly, and a Standard Operating Procedure created for assessing Degradation. These improvements ensure that the forest change boundaries continue to be accurately positioned and delineated.

A total of 127 processed tiles of Sentinel 2B, Landsat, PlanetScope and GeoVantage imagery were acquired to be used in the MRVS Year 7 assessments. Multiple tiles over the same location for many areas were processed to assist the analysis over areas of persistent cloud. PlanetScope and Geovantage imagery were acquired to aid the conduct the degradation mapping. PlanetScope will be used as the primary image source, and Geovantage and Sentinel as supplementary image sources for this analysis.

Year 6 MRVS Results

The annualized deforestation rate (change of forest to non-forest), excluding degradation, for Year 6 (24 months) was estimated at 0.050% - 18 416 ha over the period. This represents a reduction from the Year 5 (2014) rate (0.065%) and is the lowest of all annual periods since 2010.

The change continued to primarily be situated near the footprint of historic change, and the main deforestation driver continues to be mining (sites), which accounts for 74% of the deforestation in this period. The large fire events which have increased in this reporting period are tied to prolonged dry spells and more commonly observed on the drier sand and grassland areas. The majority (94%) of the deforestation was observed in the State Forest Area.

As part of the Accuracy assessment, independent assessments of deforestation, forest degradation and forest area change were conducted following the Global Observation of Forest Cover and Land Dynamics (GOFC-GOLD) guidelines. This analysis helped identify and quantify uncertainty in the level and rate of deforestation and quantify the amount of degraded forest area in Guyana over Year 6. It was conducted using high resolution ESA Sentinel-2 and PlanetScope imagery. It estimated the total area of change from forest to degraded forest (between Year 5 and Year 6) to be 13 068 ha (6 534 ha annually). Of the total degraded area, 5 679 ha (or 77%) was associated with changes relating to new infrastructure with the largest contributor being mining, followed by roads and settlements. Forest area change resulting from anthropogenic forest fires account for 762 ha whilst shifting cultivation contributes 93 ha of degradation, both as annualised rates.

The annualised Rate of Forest Change by Period & Driver from 1990 to 2016 are detailed in the table below:

Change Period	Change Period (Years)	Annualised Rate of Change by Driver						Annual Rate of Change (ha)
		Forestry	Agriculture	Mining	Infrastructure	Fire	Settlements	
		Annual Area (ha)						
1990-2000	10	609	203	1 084	59	171	-	2 127
2001-2005	5	1 684	570	4 288	261	47	-	6 850
2006-2009	4.8	1 007	378	2 658	41	-	-	4 084
2009-10	1	294	513	9 384	64	32	-	10 287
2010-11	1.25	186	41	7 340	298	46	-	7 912
2012	1	240	440	13 664	127	184	-	14 655
2013	1	330	424	11 518	342	96	23	12 733
2014	1	204	817	10 191	141	259	71	11 975
2015-16	**2**	**313**	**379**	**6 782**	**217**	**1 509**	**8**	**9 208**

The Accuracy Assessment for Year 6 was conducted using Planet Lab 3m resolution data collected in 2017. This data was also used to inform degradation assessment using a sample-based approach. The Accuracy Assessment conclusions include:
1. The estimates of deforestation based on the mapping undertaken by GFC based largely on interpretation of Landsat and Sentinel-2 imagery is of a good standard.
2. The methods used by GFC, and assisted by IAP, follow the good practice recommendations set out in the GOFC-GOLD guidelines and considerable effort has been made to acquire cloud free imagery towards the end of the census period January 2015 to December 2016 (Year 6).

3. The estimate of the total area of change in the 24-month Year 6 period from forest to non-forest and degraded forest to non-forest is 16 239 ha, with a standard error of 1 940 ha and a 95% confidence interval (12 436 ha; 20 041 ha).
4. The estimate of the annualised rate of deforestation that occurred over the Year 6 (24 month) period is 0.0548% with a standard error of 0.0064% and a 95% confidence interval (0.0423%; 0.0673%).
5. The estimate the total area of change in the 24-month Year 6 period from forest to degraded forest between Y5 and Y6 is 13 068 ha, with a standard error of 1 850 ha and a 95% confidence interval (11 046 ha; 18 297 ha).
6. No changes were detected with samples located within the boundary of the Intact Forest Landscape.
7. The PlanetScope data provided sufficient detail (spatial resolution) to assess the Landsat and Sentine-2 mapping as provided by GFC.

The methods and results of the Year 6 assessment have also been favourably verified by an independent third party. The report of this verification can be found here.

Forest Restratification

Restratification was completed and a total of 54 new Carbon Plots identified to be established within the following strata:

- Low Potential for change, More Accessible
- Medium Potential for change, Less Accessible
- High Potential for change, Less Accessible
- Savannah forest

The locations of these new plots are illustrated in the Map below:
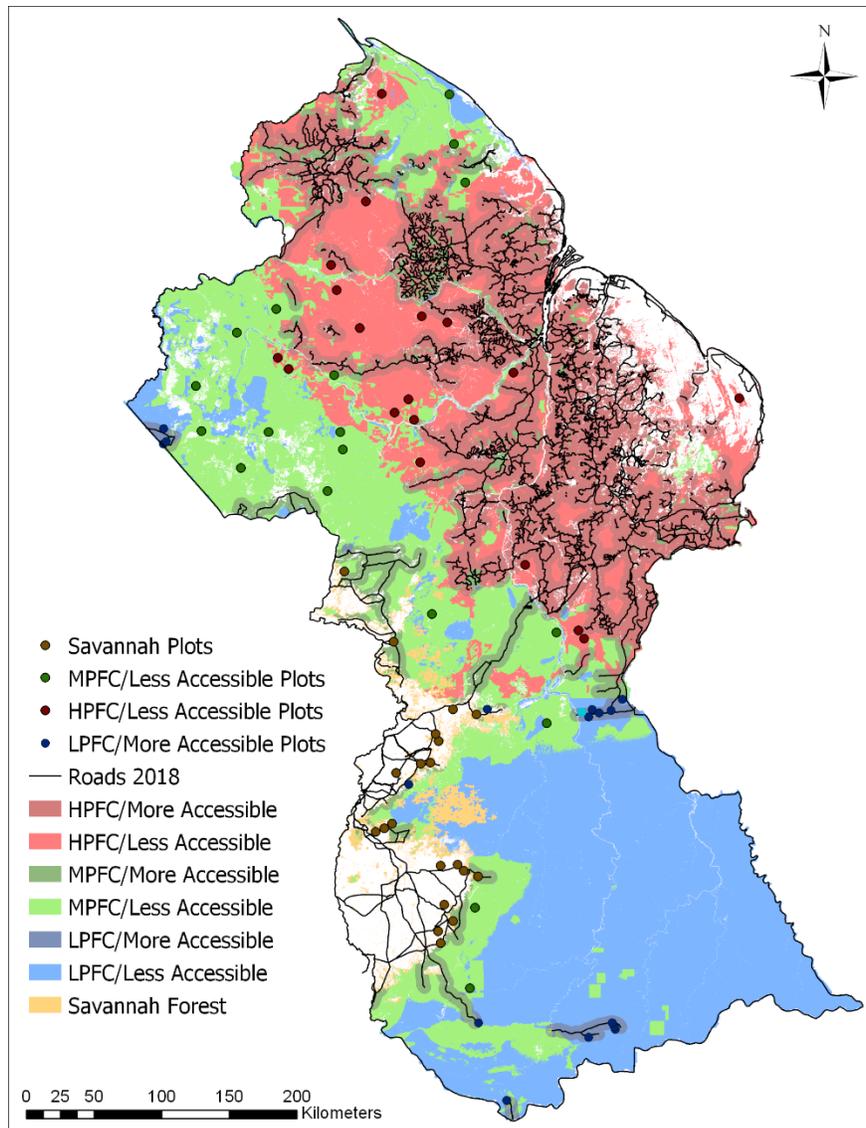
Capacity Development

A Draft Standard Operating Procedure (SOP) has been developed to guide the improved mapping of degradation. The Guyana REDD MRV Statistical Change Assessment Standard Operating Procedure Guide gives practical advice and examples of how to assess forest change from a stratified random sample. It identifies the drivers for change in forest land cover and the time period for when the change took place. The guide covers the following topics:

- definitions of deforestation, degradation and forest change
- detailed change and change driver category descriptions
- rules for identifying and quantifying change
- illustrated examples for identification of the drivers of forest change
- how to identify the time that change took place
- how to assess the certainty of the interpretation

GFC staff also benefited from a training exercise on use of the sample-based methodology for conducting degradation mapping for the MRVS change assessments.

2.2 Outcome 2: The MRVS more precisely accounts for the forest carbon dynamics.

Non-REDD+ Payment Options

In Year 6, freely available Sentinel imagery – a land monitoring constellation of two satellites that provide high resolution optical imagery and provide continuity for the current SPOT and Landsat missions – was used as an alternative to RapidEye to capture deforestation. The Sentinel-2 mission is a land monitoring constellation of two satellites for high resolution optical imagery that provides continuity for the current SPOT and Landsat missions. The constellation was commissioned by the European Space Agency (ESA). The two Sentinel satellites 2A and 2B enable repeat imaging of the same spatial location every five days at a spatial resolution of 10 m, combined with the Landsat constellation (L7 and L8) this increases to 6-7 observations per month, making the data a valuable resource for monitoring forest change. The satellites are equipped with the state-of-the-art Multispectral Imager (MSI) instrument that offers high-resolution optical imagery.

The increased revisit of the Sentinel satellite also assists to ensure that change areas are correctly detected, and boundaries defined. The change has affected neither the definition of forest nor the SoP for mapping. The Accuracy Assessment has also confirmed that the switch of imagery has not affected the accuracy of the mapped product. It was also found that the "spatial accuracy and co-registration of Sentinel-2 imagery is considered very good and was found to be better and more consistent than RapidEye."

One disadvantage of the use of this imagery was the inability to assess degradation to deforestation for Year 6 because the shift to lower resolution satellite data which results in loss of detail.

Additionally, the following imagery sources have been identified for further exploration under the "non REDD+ payment" scenario:
- Sentinel-2
- Landsat
- MODIS
- PlanetScope

RADAR development, to be integrated with the multi-temporal analysis:
- COSMO-SkyMed
- Sentinel-1

New Development Areas

Further refinement of methods for quantifying regenerating non-forest areas, and studies of the carbon accumulation rate on abandoned mining sites were implemented as well as tracking of degradation to assess the areas transitioning from degradation to deforestation and those areas that are reforesting. This work is linked to a planned mining reclamation project and the consideration of appropriate emission factors.

New satellite sensors were, such as Sentinel 2A, Planet Labs, and RADAR, were also incorporated into the MRV. As well as deforestation modelling methods to predict future deforestation patterns. The deforestation modelling work builds on previous work on both econometric modelling for mining and timber production and spatial modelling for mining.

Cosmo Skymed satellite imagery is also being explored for the detection of small-scale changes associated with degradation activities – those associated with mining and selective forest harvest. Repeat observations of Cosmo Skymed images have been acquired over several sites and this will

be 'ground truthed' using high resolution aerial imagery collected in November and December 2017.

The next steps are to analyse radar datasets and compare the results against existing mapped forest change detected over the same period. The aim would be to report the detection accuracy at 1 ha minimum mapping unit.

A methodology was proposed for the Refinement of Methods for Determining the Extent and Scale of Shifting Cultivation. The proposed approach builds on work completed in 2013 and includes refinements to the monitoring of shifting cultivation activities. It covers five areas in an effort to quantify the carbon stock reduction in terms of annual area change and carbon stock removals.

1. Review the minimum mapping unit (MMU) for shifting cultivation to matches the degradation definition adopted for Guyana. This is currently under review (January 2018) and focusses on providing a workable country-specific definition for the main degradation drivers.

2. Review of additional time series satellite images to determine the rotation length and extent of shifting cultivation, and through community consultations link the changes in land use.

3. Coordinate with the forest carbon measurement team to understand the carbon loss due to shifting cultivation.

4. Quantify what contribution shifting cultivation makes to national carbon emissions

5. Develop a monitoring plan and MRV reporting outputs

The Google Earth Engine (GEE), a computing platform that allows users to run geospatial analysis on Google's infrastructure, is being used under a non-commercial policy to enable more real time monitoring. The GEE combines a multi-petabyte catalogue of satellite imagery and geospatial datasets with planetary-scale analysis capabilities and makes it available to detect changes, map trends, and quantify differences. The mapping team has received training on the use of this tool and now uses the platform to perform remote sensing tasks.

A real-time system will assist Guyana to meet its commitments to the United Nations Framework Convention on Climate Change (UNFCCC) as well as Sustainable Development Goals (SDGs). A key focus is to support capacity building on forest monitoring at the GFC and stakeholders, which includes the indigenous Amerindian communities.

2.3 Outcome 3: MRVS data and results inform improvements in forest management policy and practice.

MRVS Data Platform

Two options for sharing the MRVS results have so far been considered. These are:

1. an existing interagency platform available through the Geospatial Information Management Unit (GIMU) of the Ministry of Natural Resources; and
2. linkages with Forest Watcher, a mobile app that allows offline display of forest change alerts

The GIMU's platform is to be used for active communication and feedback between the Ministry of Natural Resources, the Guyana Forestry Commission, and forest owners and managers. The reporting framework for collating MRVS at concession level is to be established.

Additionally, GEE applications to assist the GFC to improve forest monitoring and legality are to be developed to improve the active management of Guyana's forest resources by enabling real-time processing of large volumes of earth observation data that provide analysis-ready forest monitoring products.

Influencing Forest Policy

A report on the "Review of MRVS applications for forest management and land use allocations in Guyana" was prepared following a series of stakeholder consultations. The Report outlines existing uses of MRVS data outside the primary reporting on the Guyana Norway Agreement, including: the MNR and GGMC identifying areas of high intensity mining and forestry use; the PAC using the MRVS data in the analysis for the Protected Areas development strategy; and the GLSC use to assess land degradation on non-forest land.

The report also provides options for broader applications as follows:
Options requiring a relatively low level of effort include:

1. Updating topographic map sheets for Guyana
2. Development of Land Use Plans
3. Monitoring of changes in agriculture in State lands
4. Monitoring 'beneficial occupation' in agriculture lease land
5. Supporting the management and monitoring of Protected Areas
6. Contribution to the Department of the Environment's Environmental Information
1. Monitoring and Management System (EIMMS)
7. Monitoring biodiversity across forested areas
8. Supporting the EPA with conducting compliance assessments
9. Supplementary reporting on MRVS results and findings
10. Preparing information sheets describing MRVS data.

Options requiring a medium level of effort for implementation include:

11. Contribution to the GLSC's Mainstreaming Sustainable Land Development & Management (MSLDM) Project
12. Contribution to the Ministry of Agriculture's Sustainable Agricultural Development Program (SADP)
13. Mapping and monitoring of mangrove ecosystems
14. Provision of information to assist in reporting obligations under the UNCCD
15. Deployment of GFC-MRVS personnel expertise to assist other agencies with technical functions, e.g. in satellite imagery interpretation
16. Integrating Community MRV data into the national MRVS.

The options expected to require a relatively high level of effort for implementation include:

17. Development of a National Forest Inventory of Guyana
18. Contribution to forest monitoring systems to support the FLEGT VPA with the EU
19. Mapping of coastal zones including mangrove forests and non-forest areas
20. Contribution to a national valuation of natural capital.

A series of policy dialogues with stakeholders in government, private sector and environmental NGOs were held. The sessions aimed to discuss data usage and data sharing protocols with the targeted stakeholders.

2.4 **Outcome 4:** A third phase of MRVS operation is assured.

Work under this outcome is programmed to commence in MRVS Year 8 (calendar year 2019).

2.5 **Outcome 5:** Key technical and non-technical audiences are informed on the relevant aspects of Guyana's MRVS.

Local Outreach and Engagement

Consultation and Outreach Consultants were hired to conduct national outreach on REDD+ activities, specifically the MRVS and REDD+ related areas. The consultant is working along with the GFC and relevant stakeholders to plan and execute 12 dialogue and capacity building sessions with national stakeholders. The consultant is also preparing and disseminating non-technical communication materials, including on the MRVS design, results and impact, prior to conducting of sessions with national and community stakeholders.

The GFC has also participated in awareness and capacity building sessions on REDD+ and MRV with students of the University of Guyana community participants and coordinators of a project focused on building capacity for freshwater and biodiversity monitoring in the Upper Mazaruni and South Rupununi regions.

International Exchange and Engagement

The GFC participated at the Global Forest Observation Initiative (GFOI) session in Bogota, Colombia in March 2018. The GFOI is an initiative founded under the international governmental Group on Earth Observation (GEO) and, with partners, works across four key components: capacity building, methods and guidance, space data and Research and Development (R&D) coordination. These components interact with one another and the individual activities of GFOI partners to provide holistic and specialized support to countries with an ambition to reduce emissions from land use and land use change. The March plenary focused on efforts to ensure that international support is targeted at country needs, delivered in a well-coordinated manner and ultimately contributes towards the operationalization of national forest monitoring systems to address MRV requirements.

A GFC delegation also participated in a South-South Knowledge Exchange Program in Peru over the period May 21-25, 2018. The exchange involved projects and programme that support REDD+ and indigenous people's integration into REDD+. Representatives from Guyana, Guatemala, Peru, the IDB, Indigenous Non-Governmental Organizations (NGOs) from the mentioned countries, as well as Environmental NGOs. The main objective was to harmonize various initiatives, policies, development practitioners, and other major stakeholders; to gain from each other experiences and deduce solutions that may seem suitable for one's context.

In addition to these international interactions the GFC also:

1. Presented on REDD+ governance and implementation to the University of Hamburg's SAFARI project – "Strengthening forest policy coherence by testing SFM approaches to foster FLEGT and REDD+ interactions" – under which a case study on Guyana, among other countries, is to be developed;
2. Discussed various aspects of REDD+ implementation in Guyana, including MRVS, with a team from the International Centre for Tropical Agriculture (CIAT); and
3. Participated in the final meeting of the ACTO Monitoring Project Steering Committee.

2.6 Outcome 6: Guyana maintains sound forest monitoring systems, in particular as it relates to the regulatory frameworks for responsible forest management.

An Independent Forest Monitoring audit, the third such audit, was completed in February 2018 and covered the calendar year 2016. The audit covered the production and sale of logs (including industrial round wood, piles, poles and posts) and lumber. It involved examining all stages of the chain of custody as it relates to logs and lumber for the four concession types issued in Guyana.

The audit was system-based and entailed a combination of desktop review of documents and records; interviews with GFC staff, Forest Sector Operators (FSOs), and independent stakeholders; and field inspections of concession areas, sawmills, lumberyards and GFC field stations, to verify and cross-reference evidence obtained from document reviews and interviews.

The audit found that GFC has a system for monitoring FSOs' compliance with the forestry laws of Guyana, that the GFC staff follow GFC's procedures and guidelines for monitoring FSOs' compliance, and FSOs all follow the GFC procedures and guidelines for complying with the requirements of Guyana's forestry laws. The receiving and reconciling of some compliance information and data at GFC's Head Office was the main area of weakness.

No major or minor non-compliances were identified by the audit, and systems and procedures for 34 of the 45 audit indicators were found to be operating effectively. Findings were not recorded for the remaining 11 indicators as there were no relevant activity around these indicators during the sample period for the audit. The audit also found satisfactory compliance with the specific indicators could be demonstrated.

The audit documented 14 specific observations in relation to the systems and procedures of the GFC; the interaction between the GFC and other agencies of government that are integral to the demonstration of legality; or the Indicators themselves.

3. Summary Discussion of Progress and Impact

The MRVS is a global beacon for its consistent delivery of high quality, reliable and valuable data on the state of Guyana's forests and forest carbon emission. The project has thus far delivered one report on forest loss (Year 6) and assessment completed for the second (Year 7), continuing this trend and status.

Significant strides have also been made in reducing the cost of operation of the system and its impact on forest policy and management. A successful transition of the deforestation mapping from commercially tasked RapidEye imagery to freely available Sentinel imagery over the reporting period and increasing use of local capacity in execution over the years are the major areas where cost efficiencies have been realized. Further, the quality and reliability of the assessments have not been negatively affected by these changes.

An exciting development within the project is the increasing application of the MRVS results to influence forest management and policy. Engagements between the GFC and a variety of entities, primarily government agencies, has resulted in increased interest in the use of the MRVS data to inform decision making. The reach of the LCDS is also being extended to communities through greater synergies being developed between community monitoring efforts and the national MRVS.

4. Factors affecting Project Implementation and Achievement of Results

The implementation of the technical aspects of the project is on track and likely to exceed planned results despite delays in grant disbursements to the GFC and challenges with cloud cover.

There have been issues with the operational implementation of the grant. CI-Guyana conducted two site visits to the GFC offices in March and April 2018 as part of its grant monitoring activities. The site visits identified accounting and procurement practices that were not compliant with NORAD grant agreement. GFC's unresponsiveness to address the findings of the review resulted in a protracted process and, in accordance with CI grant management policy, the decision to withhold disbursements to GFC was taken to minimize risk, pending the resolution of accounting and procurement issues. However, CI failed to inform NORAD of its decision in due course.

The GFC, in order to minimize impact on project implementation, utilized its own resource and project activities were not seriously impacted. With the support of NORAD, CI-Guyana and GFC are working on setting up remedial measures at the time of reporting. Such measures will be communicated to and discussed with NORAD as soon as an agreement is reached.

In addition, the persistent issue of high cloud cover continues to be mitigated using multiple images for each area. The utility of image stacking is also being investigated to help improve the efficiency of the mapping process.

5. Summary Report Against Project Results Framework

Planned Results	Indicators	Means of Verification (Data Sources) / Comments	Baseline (values)	Targets 2017	Results Summary 2017
GOAL: Guyana's Green Development Pathway secured.	Guyana's Green Economic Strategy exists and includes implementation of a REDD+ or other programme to verifiably reduce emissions from the forest sector	Review of national development documents.	Strategy is being developed	-	N/A
	Level of emissions from Guyana's forests compared to committed levels and thresholds.	Review of MRVS Reports and data	Estimated at 11.7 million ton CO_2 in Mean for 2001 - 2012	< 48.8 million tons	9.98 million ton CO_2
Outcome 1. Guyana's Forest Carbon Monitoring System is strengthened in fulfilment of the MRVS Roadmap Phase 2 and reporting on forest area change and emissions from forests is completed for Years 6 to 9 (01 January 2015 to 31 December 2019) of the Guyana-Norway agreement.	Number of significant capacity or financial gaps exists in the GFC's GIS Unit by 2017.	Assessment of human and other capacity of the GFC's GIS Unit.	Gap for a Reporting Manager/Coordinator	0	0
	Number of MRVS reports published detailing quantification of forest carbon emissions, forest cover, and forest cover change for MRVS Years 6 to 9 following IPCC guidelines and verified by a third party.	MRVS Reports	Last verified report published in 2015 covering January 1 to December 31, 2014. An unverified report is to be published in 2017 covering January 1 to December 31, 2015	1 Verified report for Year 6 published	The report for MRVS Year 6 (1 January 2015 to 31 December 2016) was first published HERE by the GFC on 15 December 2017, and the final version (Version 3) HERE on [DATE] 2018.
	Level of uncertainty in the determination of emission from forests	Assessment of MRVS Report	90% confidence +/-5%	-	95%
Output 1.1. Forest Cover and forest carbon monitoring system implemented with annual assessments of forest cover conducted for Years 6 to 9, key advancements incorporated as appropriate.	Number of assessments of landcover change in Guyana, with drivers of changes from forest to non-forest determined and reported following IPCC criteria, completed.	Assessment of MRVS Report		1 Assessment for Year 6	The report for MRVS Year 6 (1 January 2015 to 31 December 2016) was first published HERE by the GFC on 15 December 2017, and the final version (Version 3) HERE on [DATE] 2018.
	Number of non-carbon NDC commitments, including EU FLEGT, are tracked and linked to MRVS.	Assessment of MRVS Report	No NDC commitments are are tracked in MRVS	-	N/A
	Number of spatial data sets on forest area	GFC GIS		1 for Year 6	The data was produced by the GFC and is housed within its GIS

Planned Results	Indicators	Means of Verification (Data Sources) / Comments	Baseline (values)	Targets 2017	Results Summary 2017
	change, including drivers of change, produced.	database			Laboratory.
Output 1.2 Forest Carbon Monitoring System implementation of key activities advanced, as identified in the MRVS Phase 2 Roadmap.	Number of annual estimates of emissions from forest activities produced using forest carbon data from three risk strata.	Assessment of MRVS Report		1 Estimate for Year 6	The estimate was published in the Year 6 Interim measures report.
	An updated long-term forest carbon monitoring framework is produced	Assessment of project reports	Existing long-term forest carbon monitoring framework completed in 2015	-	N/A
Outcome 2. The MRVS more precisely accounts for the forest carbon dynamics.	Number of new method incorporated into the MRVS to enhance precision of net emission estimates.	Assessment of MRVS Report Assessment of project reports MRVS SOPs	Preliminary exploration of new areas for development	-	N/A
	Methods for the operation of the MRVS in the absence of REDD+ payments are in place.	MRVS SOPs		-	N/A
Output 2.1. Methods for the operation of the MRVS in the absence of REDD+ payment are determined.	Number of methods for non-REDD+ MRVS assessed	Assessment of project reports	Some testing done using free data sources	-	Sentinel imagery has been fully integrated into the MRVS.
Output 2.2. New areas under the MRVS Developed	At least one method for treatment of shifting cultivation tested.	Assessment of project reports		Methods identified	A methodology has been proposed and is to be tested.
	At least one option for near-real-time monitoring for high priority sites tested.	Assessment of project reports		Options identified	Sentinel imagery is an option given the high frequency of availability of imagery.
Outcome 3: MRVS data and results inform improvements in forest management policies.	Number of new or revised forest management policies in Guyana informed by MRVS results and data.	Assessment of Forest Management policies in Guyana	None	-	N/A
Output 3.1. Platform for	A mechanism for the utilization of MRVS	Report describing		Options for	Options have been proposed following engagement of potential and

Planned Results	Indicators	Means of Verification (Data Sources) / Comments	Baseline (values)	Targets 2017	Results Summary 2017
access to and utilization of MRVS data to inform forest management policy and practice developed.	data in forest management is established.	the MRVS Platform. Data sharing protocols		the Mechanism explored	current users of the data.
Output 3.2. Application of MRVS data for decision making tested at a variety of levels and scales.	Number of cases in which MRVS data is used to inform decision making at the policy and programme level across the natural resources sector	Project reports	No cases	1 case	Though not fully documented, the MRVS data is being used by several entities, including for development of the National REDD+ Strategy.
Outcome 4. A third phase of MRVS operation is assured.	GFC's plans and budget for post 2020 includes operation of the MRVS.	Assessment of GFC's Annual plans.	-	-	N/A
Output 4.1. A roadmap for advancement of the MRVS into its third phase is developed.	A guiding document for the continued development and implementation of the MRVS, post-2019 is developed	Project reports		-	N/A
Outcome 5. Key technical and non-technical audiences are informed on the relevant aspects of Guyana's MRVS.	Level of awareness and knowledge of the value of a functional MRVS, REDD+ and related SFM national and international commitments within the public and private sector stakeholders in the logging and mining sectors	Analysis of data from communication and feedback monitoring mechanism. Survey of target audience	Unknown	Establish Baseline	This consultancy is currently being concluded.
	Number of citations of information on Guyana's MRVS in major international publications	Analysis of scientific literature on MRVS and REDD+.	0	-	N/A
Output 5.1. Technical and non-technical knowledge products focused on the development and implementation of the MRVS produced.	Number of communication tools focused on the MRVS and forest management	Project reports and materials produced	0	-	N/A
	Number of scientific papers on the development and implementation of Guyana's MRVS submitted for publication.	Assessment of scientific literature on MRVS and related topics.	0	-	N/A

Planned Results	Indicators	Means of Verification (Data Sources) / Comments	Baseline (values)	Targets 2017	Results Summary 2017
Output 5.2. Stakeholder engagements to improve capacity to understand and utilize MRVS data conducted.	Number of MRVS awareness and capacity building sessions held with stakeholders directly involved in forest management.	Project reports	0	-	N/A
	The percentage of men compared to women who attend the awareness and capacity building sessions	Reports on awareness sessions		+/- 5%	This consultancy is currently being concluded.
OUTPUT 5.3 Lessons from the development and implementation of the MRVS shared globally with key audiences.	Number of south-south exchanges hosted or attended	Project reports	0	-	N/A
	Number of international events at which Guyana's MRVS is featured	Project reports	0	-	N/A
Outcome 6. Guyana maintains sound forest monitoring systems, in particular, as it relates to the forestry sector.	Number of significant negative audit findings.	Assessment of findings of the IFM Audits.		0	No Significant findings were documented in the third IFM audit
Output 6.1 A third (2016) and a fourth (2018) audit for Independent Forest Monitoring (IFM) in Guyana is completed following agreed terms.	Number of final IFM Audit Reports completed.	Assessment of findings of the IFM Audits.	3 (Scoping Audit, 2 Assessments)	1 Report for Year 6	The third IFM audit was completed in February 2018.