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

PROGRESS REPORT

REPORT PERIOD: 1 JANUARY 2021 TO 31 DECEMBER 2021

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 is supporting the establishment and sustaining of a world-class MRVS as a key component of Guyana's national REDD+ programme and wider forest governance and management. This system provides 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 is being 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 is, beyond maintaining and expanding the capacity of the GFC to reliably provide assessment of forest cover change and forest emissions, building the capacity of agencies and entities with mandates for the management of forests to utilize MRVS 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 advancement made on implementation of the project over the period January 01, 2020 to December 31, 2020. The ninth national annual assessment of Guyana's deforestation and forest degradation has been completed, which serves as the final assessment year under Phase 2 of the MRVS project.

During the reporting period, Guyana like the rest of the world was affected by the novel coronavirus disease (COVID-19). As a result, strict measures were put in place, amended or extended to avoid the continued transmission of the disease. In addition to the circumstances surrounding the pandemic, the country also experienced a contested national general election on March 2 which resulted in a five month wait on the declaration of the elected government. On August 2, 2020 the new government was instated, and the transitions of responsibilities begun. Generally, the risks associated with the implementation of activities were categorised as low to moderate. This is because desktop and research-based work could be facilitated while outreach and engagement activities, which required more direct personal contact, were affected.

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 first version of Guyana's REDD+ MRVS Report for Year 9 (2019) was completed during the reporting period. The report was released for a six-week period to allow for extended stakeholder review. This second version is subject to independent third-party verification. The full report for Year 9 can be found here.

The Year 9 analysis utilized the same mapping processes and standards as in previous years, which focused on the use of freely available satellite imagery. With the completion of the emission factor development, Guyana has moved beyond reporting on REDD+ Interim Measures (which have in previous assessments focused on activity data) to full Emissions Reporting. The Mapping Standard Operating Procedures document was also 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.

The primary dataset for monitoring deforestation remained the use of a combination of Sentinel (2A/2B -10m) multispectral imager (MSI), supplemented by Landsat (30m) and fire monitoring datasets. Over the 2019 period, one hundred and thirty-six tiles (136) were acquired spanning from August to December. Forest degradation was not mapped directly but estimated from a sample of high-resolution aerial imagery (GeoVantage, 4 band multispectral data) and PlanetScope multispectral satellite images.

Year 9 MRVS Results

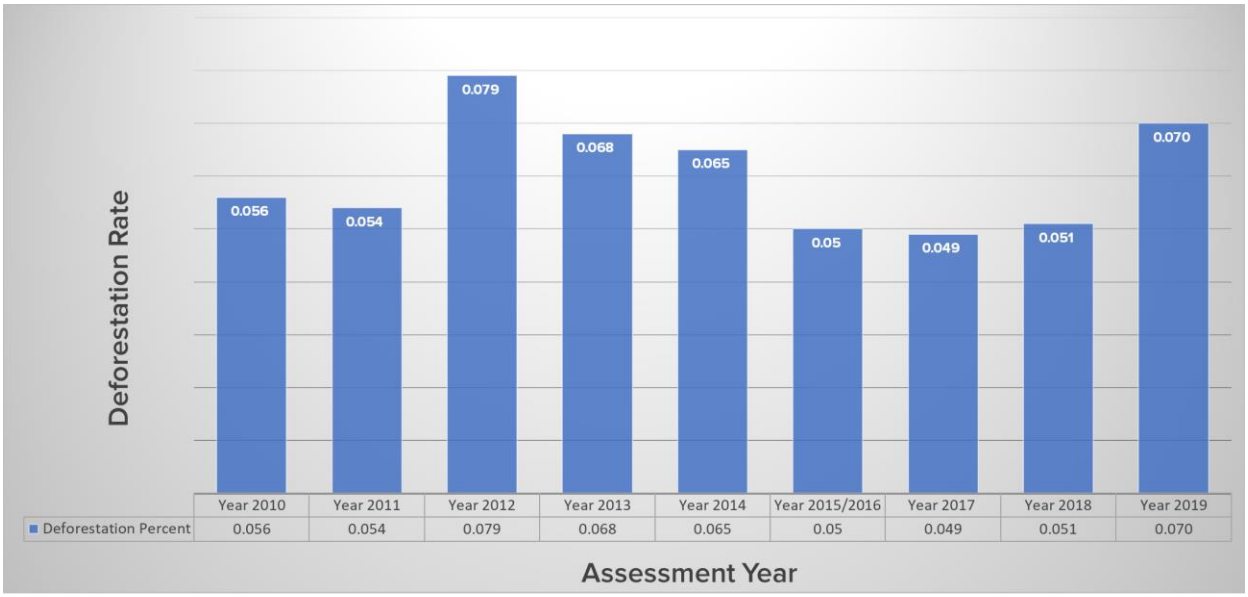
The annualized deforestation rate (change of forest to non-forest), excluding degradation, for Year 9 (2019) was estimated at 12,738 ha (0.070%). The 2019 rate is the highest when compared to previous years (0.051% in Year 8 and 0.049% in Year 7). The main deforestation driver was fire, which accounts for 50% of the deforestation in this period. This is the first period in which a driver other than mining and mining infrastructure contributed to the most change. The majority (57.9%) of the deforestation was observed in the State Forests Area then followed by State Lands (31.4%). The total emissions from Guyana's forest sector were 13,627,486 tCO_2. Of this 11,792,369 tCO_2 due to deforestation activities, and 1,835,117 tCO_2 due to degradation.

All fire events are considered anthropogenic and depending on intensity and frequency leads to deforestation. The large fire events were tied to a prolonged dry spell and were most observed on the drier sand and grassland areas. The mining related change continued to primarily be situated near the footprint of historic change, clustered around existing road infrastructure and navigable rivers.

The annualised Rate of Forest Change by Period and Driver from 1990 to 2019 are detailed in the table below:

Reference Period	**Change Period**	**Change Period**	**Annualised Rate of Change by Driver**						**Annual Rate of Change (ha)**
			Forestry	**Agriculture**	**Mining**	**Infrastructure**	**Fire**	**Settlements**	
		(Years)	**Annual Area (ha)**						
Historic	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
MRVS Phase 1	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
MRVS Phase 2	2015-16	2	313	379	6 782	217	1 509	8	9 208
	2017	1	227	477	7442	195	502	7	8851
	2018	1	356	512	7624	67	661	7	9227
	2019	**1**	**226**	**246**	**5821**	**52**	**6371**	**22**	**12738**

The graph below shows the annual percentage change in forest area for each assessment year.



As part of the Accuracy Assessment, independent reviews of deforestation and forest degradation were conducted following the Global Observation of Forest Cover and Land Dynamics (GOFC-GOLD) guidelines. In Year 9, this involved the collection of 324 sample units randomly selected from three forest strata organised by risk of deforestation (each with 300 ha and a direct correspondence with Year 8). The reference data selected for the High-Risk and Medium-Risk strata were GeoVantage, PlanetScope and Sentinel-2 imagery and for the Low-Risk Stratum Sentinel-2 and Landsat. The approach used in 2018 involved the initial interpretation being carried out by the GFC Mapping Team and checked by the independent accuracy assessment team. Due to the Covid-19 pandemic outbreak and the resulting lockdown on the staff of the GFC mapping team, the degradation and accuracy assessment were completed by the Durham University team.

The Accuracy Assessment conducted for the assessments completed in the reporting period included the following conclusions[1]:

1. The estimates of deforestation based on the mapping undertaken by the GFC using largely the interpretation of Sentinel-2 MSI may be overstated.
2. The methods used by the 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 October-December 2019 (Year 9).
3. The estimate of the total area of change in the 12-month Year 9 period from forest to non-forest and degraded forest to non-forest is 8,202 ha, with a standard error of 1,413 ha and a 97.5% confidence interval (5,433 ha; 10,972 ha).

[1]Accuracy Assessment Report Year 9 (2019) Guyana REDD+ MRVS, Indufor Asia Pacific Ltd, Guyana Forestry Commission and Durham University,2020

4. The estimate of the total area of change in the 12-month Year 9 period from forest to degraded forest between Y8 and Y9 is 9,883 ha, with a standard error of 1,614 ha and a 97.5% confidence interval (6,720 ha; 13,046 ha).

5. Three changes totalling two (2) ha was detected within samples that fell within the boundary of the Intact Forest Landscape. The change was interpreted as forest degradation associated with shifting agriculture.

6. The GeoVantage (aerial survey) and PlanetScope data provided sufficient detail (spatial resolution) to assess the Sentinal-2 deforestation mapping as provided by the GFC. It would be difficult to make a precise assessment of degradation without access to high resolution imagery. Sentinel-2 MSI or Landsat ALI data are not sufficient for this purpose.

7. It was reported that the reason for the difference in area between the accuracy assessment and GFC mapped area for year 9 is likely due to the increase in fire. In general terms, this may not have been identified in the accuracy assessment samples as most samples fall within actively mined areas.

The methods and results of the Year 9 assessment have not yet been verified by an independent third party. This review is contracted through NORAD and was scheduled to commence in January 2021. The full report of the Accuracy Assessment can be found in the Year 9 MRVS Report Appendix 4.

Refining Forest Degradation and Reforestation/Regrowth

In Year 8, (2018), a refined approach was developed to report on mining and infrastructure degradation. This approach was developed using the findings of two studies by Winrock International (2019) and Brown, S., A. R. J. Mahmood, and K. Goslee., (2015) "Degradation around mined areas: Methods and data analyses for estimating emission factors".

Application of these studies indicated that emissions associated with mining forest degradation are small (much smaller than estimated in the Guyana- Norway Agreement) and thus do not warrant high ongoing measurement costs. However, in keeping with Guyana's desire for completeness in its reporting, the emissions from forest degradation associated with mining are reported. This methodology has resulted in efficiencies to the MRVS whereby aerial surveys are no longer required for reporting of degradation. As such there were no requirements for aerial surveys for the Year 9 reporting of degradation.

The current details of forest degradation accounting in Guyana including the approach used, the sources of activity data and emission factors, the current emission factors and plans for stepwise improvements are documented in the report, "Accounting for GHG Emissions from Forest Degradation in Guyana". This report was prepared in October 2020.

Specifically related to reforestation and regrowth activities, the current MRVS includes spatial monitoring of reforestation on previously deforested sites. However, Guyana's current reporting does not include carbon removals from reforestation or afforestation. Incorporation of both emissions and removals would allow Guyana to have full REDD+ accounting. Research has shown that many instances of natural reforestation in Guyana take a significant amount of time, given that most abandoned deforestation sites are comprised of mined

areas, which greatly compact and deplete soils and render the area ill-suited for tree growth. Further questions remain on the timeframe for reforestation in Guyana, and determination of whether natural regeneration occurs and whether replanting is viable, both ecologically and economically. Thus, for accounting removals in Guyana through the MRV system, a thorough analysis is needed of the potential for removals and the sequestration rates in each stratum.

Improvement of Emission Factors and Reference Level

The Revised Emission Factors for Deforestation in Guyana was completed in September 2019. This report provided an update to the 2016 deforestation emission factors**,** incorporating revisions to the stratification used in the Forest Carbon Monitoring System (FCMS) and additional plot data. From data collected during the restratification exercise in 2018-2019, there were found to be decreases in the differences in carbon stocks based on their potential for change and accessibility. An assessment of whether it remains appropriate and necessary to continue using the existing stratification led to the decision to proceed with a single carbon stock for forests in Guyana. This method was used for the calculation of carbon stocks in Year 9.

Currently in the MRVS, Guyana has a single emission factor for timber harvest. A single emission factor is highly limiting as it allows no differentiation in practices, permitting emissions reductions to be reported only where there are reductions in harvest volumes. This system gives no incentive to improve forest management. In the first quarter of 2020, a review of the following methodologies for subsequent piloting in the fields was performed:

- Non-Commercial Biomass and Skid-trail Impacted Biomass
- Emission Factor for Small Roads
- Emission Factor Small Log Decks
- Emission Factor Skid Trails

Given the restrictions associated with the pandemic, these field exercises were not completed. In a next phase of the MRVS an approach is proposed to develop emissions resulting from all logging-related activities, and to account accurately for emissions from both Reduced Impact Logging (RIL) and non-RIL concessions.

Concerning Guyana's Reference Level Proposal for REDD+, the first version was submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2014 for review. The document proposed the use of a combiner reference level approach, in keeping with that of the Guyana Norway Agreement. It proposed the period 2001 to 2012 and used the information available at the time on the drivers of deforestation and forest degradation. The process of updating the Proposal has commenced, taking into account new and updated spatial data, forest carbon emission data and driver data.

Three alternative approaches to deriving Guyana's revised Reference Level were considered, noting the need to account for the country's national circumstances and status as an HFLD country:

- Combined Reference Level
- Architecture for REDD+ Transaction (ART) Standard Crediting Level
- ART Crediting Level for HFLD countries (based on draft guidance)

The Architecture for REDD+ Transactions (ART) is an international voluntary initiative with the aim of providing a means for countries to develop highly credibly and transparent emission reductions that attract large-scale financing. The REDD+ Environmental Excellence Standard (TREES), provides rigorous guidance to quantify, monitor, report, and verify greenhouse gas emission reduction from REDD+ activities.

The ART TREES approach described above does not account for adjustment for national circumstances or the need to establish unique incentives for HFLD countries. Version 2.0 of TREES (currently in draft form for consultation) includes an approach specific to HFLD countries. The first two approaches use a constant level of annual emissions, while the third is derived as an upward trend.

Capacity Development

Over the reporting period a series of virtual trainings was organised based on the plan for continuous capacity building for the GFC's team. The objective was to ensure that GFC staff have a comprehensive understanding of all elements and can conduct analysis independently. An output of the trainings were the resources and materials that GFC can utilise in the future to train new staff, and revisit requirements with existing staff. The training areas covered the following topics:

- Overview of the Forest Carbon Monitoring System (FCMS); its role in REDD+ and Reference Level development
- Emission factor calculations
- Logging; data collection and calculations
- Minor sources of degradation
- Fire and wetlands
- Database and database management
- Uncertainty; overview and approach to calculations
- Reference Level development
- Estimates of annual emissions

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

Non-REDD+ Payment Options

New opportunities continue to emerge with the onset of new programs and technologies available through international suppliers of Geographic Information System software. One such initiative which the GFC is aligned to benefit from is the Land Administration Modernization Program (LAMP) developed by Environmental Systems Research Institute, Inc. (Esri).

LAMP is a four-year programme that entitles eligible applicants to the full Esri platform, an estimated two million, five hundred thousand dollars (US$2.5 million) worth of software for a forty thousand dollars (US$40,000) administrative fee for five (5) years of supported technology. Under LAMP, more than eighty (80) countries including Guyana were eligible to apply and the programme targeted legally mandated cadastral organizations such as the GFC. The licences obtained under this programme are perpetual, in that they do not expire. The specific benefit to the GFC is entitlement to

a bundle of ArcGIS platform software that run across online, desktop, server and mobile environments, to facilitate the modernization of their land administration.

Relating to the technology options being utilised, the use of freely available Sentinel imagery, coupled with the current Agreement with Google Earth Engine, the GFC is positioned to continue work on the forest area and carbon mapping without financial constraint. This can be achieved while maintaining its internationally recognised levels of accuracy and precision. The package offered under LAMP would be another pillar in the future sustainability of the MRVS.

New Development Areas

Specific research from the GFC and partners have found that for the long-term monitoring of emission factors, Guyana needs a sustainable approach to carbon stock monitoring that will allow costs to be spread evenly across years. In this way staff are engaged on a regular basis and thereby diminishes the need for retraining. Regular data collection across the forest will keep the inventory current. A proposed approach is a rolling re-inventory, which adds new plots annually, replacing the same number of existing plots. This will ensure the inventory is updated regularly and no significantly outdated plots are included. The full approach was proposed in a Recommendations Paper called" A Sustainable Long-Term Monitoring Plan for Guyana[2]".

The Continuous Resource Monitoring System (CRMS) has been developed as a parallel and complementary system to the existing MRVS process which over time has begun to replace less efficient elements of the original MRV. This system was unable to be piloted completely for the Year 9 report but tested elements of the system. The main advantage of the CRMS concept is that it leverages increased data and cloud processing capacity by using a powerful cloud processing engine for computation. The overall goal is to improve the monitoring and long-term management of natural resources.

GFC staff also benefited from training on use of the Google Earth Engine and preparation for the implementation of the Continuous Resource Monitoring System (CRMS) for the Year 9 MRVS change assessment.

The focus of these sessions is described below:

- Use of the Continuous Resources Monitoring System (CRMS) including the demonstration of the latest version of the script. The GFC staff are now proficient in running the script and using its functions.
- Use of the Persistent Cloud Mask Generator which was tested in the Year 8 (2018) mapping and was included in final MRVS Report for Year 9.
- Quick Image Checker Script was developed to provide a quick and easy method for the GFC team to respond to queries brought forward from other departments.
- Further, to work which commenced in Year 8 (2018) the GFC continued to expand its use of Google Earth Engine (GEE) for image processing and EVI's downloads and for cloud masking Sentinel imagery. The GEE platform, made freely available to Guyana, provides

[2] Winrock International. 2019. A Sustainable Long-Term Monitoring Plan for Guyana.

access to significant cloud processing capability, satellite images (optical and radar) and other open-source datasets.

As part of the further promotion and development of the MRVS and CRMS, a session was held by the GFC specifically for representatives of the Ministry of Natural Resources and the Guyana Geology and Mines Commission. This session presented the potential applications of the systems for natural resources management.

Improved Treatment of Shifting Agriculture

A new proposed methodology for the refinement of methods for determining the extent and scale of shifting cultivation was developed over 2018 and 2019 and is reflected in the Year 8 forest cover and emissions reporting. The monitoring system includes the identification on an annual basis of pixels transitioning from natural forest to shifting cultivation – termed pioneer shifting cultivation. In the mapping process these pixels were given a greenhouse gas emission and subsequently will be categorized as non-forest. Based on this assessment an average long-term shifting cultivation carbon stock of 6.1 ± 0.1 t C/ha was adopted.

In Year 9, the treatment of shifting cultivation was guided by the Year 8 considerations:

1. The first conversion of natural forest to shifting cultivation is deforestation. This is termed pioneer shifting cultivation in Guyana's NFMS;

2. Any increases or decreases in length of the fallow cycle or the associated carbon stocks of the fallow cycle are within the agricultural land use and therefore not relevant to REDD+.

Scientific Publications

An Assessment of Global Forest Change Datasets for National Forest Monitoring and Reporting was published on June 2, 2020 in Remote Sensing as part of the Special Issue National REDD+ Monitoring and Reporting (Available online here). This paper assesses the accuracy of the Global Forest Change data against nationally derived forest change data by comparing the forest loss estimates from the global data with the equivalent data from Guyana for the period 2001–2017.

The GFC contributed further to a paper which highlights completeness being an important element for Reducing Emissions from Deforestation and forest Degradation (REDD+) accounting to ensure transparency and accountability. In the publication titled Comprehensive Accounting for REDD+ Programs: A Pragmatic Approach as Exemplified in Guyana, (Available here), Goslee et al. use country forest reference emission level (FREL)/forest reference level (FRL) submissions to the UNFCCC to examine this factor. It noted however, including a full accounting for all emission sources in a REDD+ program is often resource-intensive and cost-prohibitive.

Guyana was used as an example to demonstrate a pragmatic approach where completeness can be achieved in a manner that balances the significance of emission sources with the cost and precision of emission estimates. Since submitting its FREL in 2014, Guyana has made stepwise improvements to its emission estimates so that the country is now able to report on all deforestation and degradation activities resulting in emissions, whether significant or not.

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

The activities under the third outcome were most affected by the circumstances surrounding the global pandemic. Training activities geared toward improving local indigenous communities to perform monitoring were executed in February 2020. However, the sessions scheduled for March and onwards were not completed. Two training sessions were held for the year 2020 prior to COVID 19 restrictions on air travel to the interior.

The first session was done in Annai and Lethem during the period 3 – 9 February 2020. A mixture of both Phase I and Phase II communities were trained during this field visit. Ten new participants were trained along with follow up engagements for eleven persons that were trained in 2018-2019. This totaled sixteen villages which were engaged. Phase I communities that benefited from this follow-up exercise were Kwatamang, Rupertee, Surama, Woweta, Toka, Katoka, Shulinab, Moco Moco, St Ignatius and Kumu. Communities trained in the Phase II process were Karasabai, Yupukari, Nappi, Massara and Yakarinta. A total of eight females and twelve males were engaged during this period.

The second cluster of the CMRV Phase II capacity-building program was done in Paramakatoi during the period 24 – 28 February 2020. Two participants per community were targeted. The communities which benefited from this engagement were Paramakatoi, Bamboo creek, Mountain foot and Taruka. Three females and five males received training across these four communities.

Communication materials were developed for use during the technical sessions on Community MRV, the consultation and outreach sessions on the MRVS as well as on forest management for sessions related to EU FLEGT. These materials include PowerPoint presentations, leaflets and brochures.

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

The MRVS Roadmap for Phase 3 was developed through a process led by GFC, with technical inputs provided by GFC's partners- Indufor Asia Pacific and Winrock International and also support from Dr. Martin Herold of Wageningen University. The Roadmap subsequently underwent validation by several local experts in the areas of academia, forestry, forest management and legality, research and conservation, civil society development, protected areas management and GIS and Remote Sensing. Importantly, policy guidance was provided by the Ministry of Natural Resources.

The overall objective for Roadmap Phase 3 is to maintain an efficiently functioning MRVS that meets international and national requirements and that supports natural resources management in Guyana. This will support Guyana in meeting the evolving international reporting requirements from the UNFCCC as well as continuing to fulfil additional national reporting requirements. The MRVS will address the needs of the Paris Agreement and the guidance of the accompanying Katowice Rulebook on enhancing the transparency framework, the reporting needs related to Biennial Update Reports (BUR) and tracking of Guyana's progress in implementing its NDC commitments. Consolidating and expanding capacities following Roadmap Phase 3 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 MRVS 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 to consolidate and expand capacities:

- Maintain fully operational MRVS and mainstream results at policy, decision making and stakeholder levels locally and internationally
- Consolidate existing REDD+ monitoring and MRVS processes
- Mainstreaming Reporting and Verification Systems for MRVS Applications and Agreements

Within the third phase emphasis will be placed on consolidating existing methodologies to meet annual forest change reporting requirements, while also improving the system to provide regular forest change updates and to make the data layers generated more readily available. This shift is seen as an important step in making the current system more sustainable. After nine years of annual monitoring, of equal importance is the dissemination of MRVS results, engagement in dedicated research (also with international partners), and the communication and sharing of knowledge within and outside of Guyana.

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

Local Outreach and Engagement

Outreach Consultants were hired to conduct national outreach on REDD+ activities, specifically the MRVS and REDD+ related areas. The intention of the 2020 sessions was to focus on forest-based communities, activities related to the drivers of deforestation, and experiences of the consultation and outreach workshops held in 2018. However, owing to the high risk to the staff, the consultancy group and potential target audience, these activities were put on hold until the last quarter of the reporting period. The GFC and consultants met to propose and discuss the way forward in September 2020. Some of the outcomes of the meeting included:

1. To the extent possible, in Regions 2, 4, 6, and 10, in-person sessions with no more than 10 participants (one representative from each community or organization) with special considerations for use of masks and physical distancing and other modalities of engagement based on COVID-19 guidance.

2. The clusters were revised with the following ten workshops:

    - Georgetown: Government agencies
    - Georgetown: CSOs and NGOs
    - Georgetown: GFC Staff
    - Georgetown: GFC Staff
    - Anna Regina, Region 2
    - Charity, Region 2

- Corriverton, Region 6
- New Amsterdam, Region 6
- Annai, Region 9
- Linden, Region 10

The consultant executed two sessions in November 2020 which targeted the staff of the GFC. In December 2020 sessions were hosted for Government agencies as well as NGOs, CSOs and the Private Sector. All sessions were held in keeping with strict COVID 19 protocols, whereby no more than twenty-five (25) persons were allowed in the meeting room at a time to allow for social distancing.

In the continued effort to make the data provided by the MRVS more accessible to wider stakeholders, data sharing MOUs were established with two entities. The Guyana Lands and Surveys Commission (GLSC) aims to utilise the data for the development of a project preparation grant to the Global Environment Fund (GEF). The Iwokrama International Centre of Rainforest Conservation and Development in collaboration with CIFOR are interested in the context of REDD+ in Guyana including the drivers, agents and institutions.

International Exchange and Engagement

Within the first quarter of 2020, staff of the GFC were invited to participate in several REDD+ fora including the GFOI Plenary 2020 in Rome, Italy over the period March 10-13, 2020 and the ASPRS Geo Week in Washington, USA over the period March 22-26, 2020. These events were postponed, or the mode of delivery was changed due to COVID-19 pandemic.

Over the period, the GFC participated in the following webinars:

1. ***Caribbean Nationally Determined Contribution Virtual Exchange Platform, May 26, 2020***

The UNFCCC together with the Regional Collaboration Centre (RCC) and the Caribbean Cooperative Monitoring Reporting and Verification Hub (CCMRVH) organized a webinar for exchanging best practices and experience in developing and strengthening country´s Nationally Determined Contribution (NDC) processes through a collaborative learning approach. The virtual session aimed at enhancing technical capacities of experts from the Caribbean Region in the preparation of new or updated NDCs in 2020 in line with further guidance relevant for the preparation and communication of NDCs.

2. **Oslo Tropical Forest Forum, June 23, 2020**

Guyana was invited to participate in-person to the Oslo Forest Forum to present the work of the MRVS project during a session titled "Financing models for maintaining the integrity of large, intact forests". Due to the pandemic however, the session was updated to a series of virtual events. The webinars focused on the theme of monitoring deforestation, with representatives from Global Forest Watch presenting their analysis of tropical tree cover loss in 2019.

The purpose of the webinar was to provide an opportunity for the Oslo Tropical Forest Forum (OTFF) participants to gain an understanding of what the data tells us about deforestation trends and drivers

across the tropics as well as in key countries. The data was launched by GFW on June 2, allowing OTFF participants to review and submit questions in advance of the webinar.

3. **Building resilience through nature-positive investment, July 28, 2020**

Hosted by Partnerships for Forests and the Blended Finance Taskforce, the webinar convened leading practitioners and policy makers who shared their insights on how to mobilise capital for regenerative business models and identify nature-based investment opportunities. Panellists from both the public and private sector discussed the critical role of policy and development finance to help incubate regenerative business models that avoid deforestation, help tackle climate change, protect biodiversity and create long-term resilient jobs in communities. They described financial structures which have already mobilised capital for nature-based solutions that should be replicated to rapidly scale investment in the sector.

4. **ART/TREES Overview, August 12, 2020**

The GFC was engaged by the Secretariat for Architecture for REDD+ Transactions (ART) and The REDD+ Environmental Excellence Standard (TREES). A virtual meeting was held to provide more understanding surrounding the mechanism. ART aims to promote national ambition and contribute to Paris Agreement goals and builds upon the significant work of other REDD+ initiatives. It seeks to promote ambition and includes more precise technical, verification, safeguard and registration requirements. ART will issue independently verified, serialized REDD+ emission reductions on transparent registry system.

5. **Caribbean NDC Support Virtual Exchange Platform: 4th Session Accounting and Tracking Progress for NDCs, August 27, 2020**

This virtual seminar aimed at enhancing technical capacities of experts from the Caribbean Region on provisions for the accounting and tracking of NDCs and provide perspective on domestic implications for national GHG accounting and reporting under the ETF. Specifically, the virtual seminar aimed to achieve the following objectives:

- Familiarize participants with Katowice guidance on accounting for NDCs;
- Provide an overview of available tools, approaches and methodologies of accounting and tracking progress of NDCs under the ETF and experience in designing systems in the region;
- Discuss examples on establishing national systems to account for and track progress in implementing and achieving NDCs.

6. **Design of the International Fund for Agricultural Development's (IFAD) new investment project in Guyana, September 18, 2020**

The GFC participated in a national consultation on the design of the International Fund for Agricultural Development's (IFAD) new investment project in Guyana. IFAD began operations in Guyana over 20 years ago with a focus on coastal regions, expanding opportunities for small scale rural producers and strengthening capacity to develop small enterprises. The GFC participated in the session on Climate Change and provided updates on the work and progress on the MRVS.

7. **Caribbean NDC Support Virtual Exchange Platform: Pacific-Caribbean Virtual Exchange on Experience with Application of ICTU Guidance, September 28, 2020**

The virtual seminar aims at enhancing technical capacities of experts from the SIDS in the Caribbean and Pacific Regions in their preparation of new/updated NDCs in line with provisions relevant for preparation, communication, accounting and tracking of NDCs. The session allowed for sharing of the following country experiences on updating NDCs:

- Vanuatu MRV System for NDC tracking from Pacific region
- Trinidad and Tobago on institutional arrangements, capacity building and development of NDC tracking system
- Belize on incorporating Adaptation in NDCs and Monitoring and communication system for adaptation
- Grenada on Country Experience in application of ICTU guidance for structuring the NDCs.

8. Oslo Tropical Forest Forum Webinars, December 9, 2020

The OTFF facilitated two webinars on climate finance as a follow up from an earlier webinar. The first *titled "REDD+ Finance in Action"* provided country-specific experiences from Indonesia and Ethiopia. These parallel sessions focused on how selected countries are using current and prospective REDD+ finance to leverage changes in policies, institutions, and actions on the ground to improve forest management, with a particular focus on benefit-sharing arrangements.

The second, titled *"The Changing Global Landscape of REDD+ Finance" f*ocused on the growing interest of private corporations to invest in so-called "natural climate solutions", and the new policies, institutions, and norms being developed to ensure that this interest is responsibly mobilized as a new source of REDD+ finance.

9. GFOI2020 Series, High Res How-to: for tropical forests, December 15, 2020

High resolution satellite imagery of the tropics was granted free-of-charge to everyone by Norway's International Climate and Forest Initiative (NICFI). NICFI's procurement from Kongsberg Satellite Services (KSAT) with its partners Planet and Airbus provides an unprecedented opportunity to access and use high resolution satellite imagery to complement other earth observations and provide powerful information to inform action on climate change, forest management and sustainable development.

The session sought to enable users to better understand how to use the new freely available satellite datasets for forest monitoring and other climate change research purposes.
The webinar introduced users to the data, helped build their understanding of how to use the data and get inspired by existing applications in tropical countries including using the Food and Agriculture Organization of the United Nation's (FAO) SEPAL platform.

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 fourth and final audit, was completed in March 2019 and covered the calendar year 2018. The audit covered the examination of all stages of the chain of custody as it relates to logs and lumber for the four concession types issued in Guyana. It excluded

non-timber forest products (NTFPs) and placed special emphasis on field work to assess how Guyana's Wood Tracking System (WTS) was being implemented on the ground. Like the Third Audit, sampling was based on the Forest Stewardship Council® (FSC®) formula used for calculating the number of sites to be included in a multi-site certification.

The audit team found that the systems and procedures were operating effectively, and that satisfactory compliance with the specific indicators were demonstrated.

3. Summary Discussion of Progress and Impact

Despite the challenging environment generated by the pandemic, the MRVS has continued to advance a robust system which meets international and national requirements and supports natural resources management in Guyana. The system has taken the experiences and lessons learned over the years to evolve and further develop forest monitoring as a tool for REDD+ implementation. There has been the continued strengthening and empowerment of the local team on all aspects of the operation and management of the MRVS.

Given that virtual environments replaced many in-person interactions, this proved valuable for the project in facilitating training, the sharing of information and experiences. The GFC and supporting technical teams continued to build capacity in the new development areas improving the understanding of emissions calculations, reference level development, uncertainty estimation among other topics. In addition, the staff were afforded many opportunities to attend webinars and to share the work of the MRVS. Prior to circumstances of the pandemic, local indigenous communities were engaged in two sub-regional clusters of workshops. Several communities were either provided with new training or updated with knowledge from the Phase 1 exercise.

Specific efforts made in previous reporting years to adjust and improve methodological aspects of forest area and carbon mapping have been finalized in 2020 with further recommendations emanating. The adopted approach and emission factor for the treatment of shifting agriculture, first tested in 2018, created multiple advantages to measurement, reporting and verification of the change driver in Guyana. The critical initial determination was first required on whether shifting cultivation represented a forest or an agricultural land use. The approach removes the risk of incorrectly inflated deforestation numbers where an artificially high emission factor is used, reduces the complexities in having to track the movement of fallow parcels and associated changes in stock and further prevents risks of double counting deforestation from repeatedly cleared pixels.

Notable technological mechanisms have been put in place thereby building efficiencies into the system. The incorporation of technologies such as Google Earth Engine and the continued use of freely available satellite imagery has reduced processing time, introducing time savings and improved the long-term sustainability of the system. GEE for instance has reduced the requirement for local storage and processing capability that a fully desktop-based national scale monitoring system entails. The positive step in the utilisation of the Esri's software licenses suite offered through LAMP is another example of this. The package will be beneficial to the MRVS project especially with the current move towards near-real time monitoring and use of the Continuous Resource Monitoring System (CRMS) prototype, as well as the aim to widen the scope of the MRVS to inform more forest policy and management.

The design of the CRMS prototype started in 2019 and has involved a review of the existing MRV system, identifying bottlenecks as well as assessing current and potential future monitoring needs. Broadly, the CRMS seeks to extend Guyana's MRVS design to provide analysis-ready data that allows proactive management of natural resources. The main advantage is that it leverages increased sources of data and cloud processing capacity by using a powerful cloud processing engine for computation. The overall goal is to improve the monitoring and long-term management with little reliance on commercial satellite imagery and software and create the shift towards a cloud-based processing environment.

Further, research has played an important role to document and share the continued learning and advancements of the MRVS. These reports highlight the accounting of greenhouse gas emissions from forest degradation, the requirements for long-term approach for carbon stock monitoring, the examination of completeness of reference level submissions and more recognisably, uses the MRVS data as part of a comparative study or means of verification to global data. The establishment of a approach for long-term monitoring of reforestation/afforestation to create Guyana-specific removals factors (Tier 3) is positioned to be pursued in the future.

The report, New Development Areas for Guyana's REDD+ Monitoring Reporting and Verification System speaks to increasing the completeness of Guyana's MRVS in a number of areas including Uncertainty. This assessment has taken the form of an IPCC Tier 1 propagation of errors for the sampling errors in field data and uncertainty in the remote sensing. Guyana has already received preliminary training in implementation of a Tier 2 Monte Carlo simulation approach to uncertainty. To foster completeness and applicability to the highest standards and access to advance funding streams (like the Architecture for REDD+ Transactions), requires building the necessary capacity to implement the processes to implement a Monte Carlo simulation uncertainty estimation approach.

The new Architecture for REDD+ Transactions is a new system for high quality verified REDD+ emission reductions. The GFC has been working closely with the team and has already submitted a concept paper to ART. To better support high forest low deforestation countries like Guyana, ART is in the process of writing new requirements such as inclusion of accounting for removals. The GFC have also commenced activities on the way forward with the revision of the Reference Level Proposal. This is guided by the modalities set out in the ART/TREES.

Notably, NICFI, Kongsberg Satellite Services (KSAT) and its partners Airbus and Planet have provided universal access to high-resolution satellite monitoring of the tropics to support efforts to stop the destruction of the world's rainforests. These images will be updated monthly, and users will be provided with access to image archives that include data dating back to 2015, free of charge. The GFC currently utilizes Planet as one of its data sources and sees much benefit to this upcoming opportunity.

4. Factors affecting Project Implementation and Achievement of Results

The challenges surrounding the global pandemic affected the implementation of activities for the reporting period. All field and outreach activities were suspended due to restrictions on domestic travel and the number of persons allowed to gather in one space due to social distancing

requirements. Despite these challenges, the project was able to complete activities by December 31, 2020. Planning and execution of outreach activities were convened in the last quarter of 2020.

The coronavirus disease (COVID-19) was first detected in Guyana on March 9, 2020. From March to December 2020 there have been six thousand three hundred and fifty-one (6, 351) confirmed cases, one hundred and sixty-four (164) deaths and a 1.23% weekly change (See WHO situation dashboard here). Emergency merges took effect from April 9, 2020 and were updated periodically, after an assessment of the prevailing public health conditions. While implementation of activities commenced in accordance with that set out in the Workplan for 2020, activities were ground to a halt in April because of these national measures. Some of these measures included a national lockdown, excluding professions and services deemed as essential, closure of the national and regional airports, as well as bans on domestic air travel. This had a direct impact on the progress of implementation of the project, as stay at home orders were directed.

With the COVID-19 Emergency Measures of July 30, 2020, all Public and Private Sector employees were directed to work on rotation. These measures were extended to August 15, 2020. During this period, the Cheddi Jagan International and Eugene F. Correia International Airports remained closed to all international flights except for outgoing flights, cargo flights, medical evacuation flights, technical stops for fuel only and special authorised flights. The GFC was able to conduct some activities on a rotational basis in office, as well as from home, however, all outreach and field activities remained suspended. New measures were implemented on August 16, 2020 and saw the introduction of updated restrictions to activities in Regions seven, eight and nine, as these were considered as "hotspot areas". These included restrictions on domestic travel to these areas. The final directive for the year was released on October 1, which extended the curfew period and provided avenues for certain business activities to continue.

Subsequently, fluctuations in the value of the Norwegian kroner resulted in losses to the project. As a result, the budget was revised to reflect these losses, with reductions in allocations to some of the activities. This reduction directly affected the activity focused on building capability of local communities and stakeholders to monitor forests, resulting in the relocation of these funds to other areas.

On November 25, 2020, NIFCI facilitated the GFC's first call with AENOR, the new firm contracted to conduct the verification of GFC's MRVS reporting. It was discussed that verification was required of the MRVS Reports for Years 7 (2017), 8(2018) and 9 (2019). The verification would be undertaken virtually as far as possible, given circumstances surrounding COVID-19. It was indicated that these verifications would be conducted in the first quarter of 2021.

Progressively the GFC has improved the implementation of recommendations related to agreed policies and procedures for financial management set out for the project. Following two site reviews in June and December of 2019, no reviews were conducted in the reporting period due to circumstances surrounding the pandemic. Approval was granted for a no-cost extension of the project to complete the activities of the verification and outstanding engagement activities.

5. Summary Report Against Project Results Framework

Planned Results	Indicators	Means of Verification (Data Sources) / Comments	Baseline (values)	Targets 2020	Results Summary 2020
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	-	Strategy completed in 2019.
	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	Total CO_2 Emissions for Guyana for 2019 from Forest Sector 13,627,486 (t CO_2/ha)
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 Assessment Report for Year 9 published	Version 1 of the report for MRVS Year 9 (1 January 2019 to 31 December 2019) was first published (HERE) by the GFC on 22 December 2020.

	Level of uncertainty in the determination of emission from forests	Assessment of MRVS Report	90% confidence +/-5%	95% 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 9	Version 1 of the report for MRVS Year 9 (1 January 2019 to 31 December 2019) was first published (HERE) by the GFC on 22 December 2020.
	Number of non-carbon NDC commitments, including EU FLEGT, are tracked and linked to MRVS.	Assessment of MRVS Report	No NDC commitments are tracked in MRVS	3	3 NDC Reports completed
	Number of spatial data sets on forest area change, including drivers of change, produced.	GFC GIS database		1 for Year 9	1 spatial dataset on forest change for 2019 produced.
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 9	Estimate of emissions for 2019 published in Year 9 MRVS 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	Update of long-term forest carbon monitoring framework completed	A Sustainable Long Term Monitoring Plan for Guyana was prepared in December 2019.
Outcome 2. The MRVS more precisely accounts for the forest carbon dynamics.	Number of new methods 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	System for near real time monitoring established	The Continuous Resource Monitoring System (CRMS) has been developed as a prototype for near real time monitoring using cloud technology.
	Methods for the operation of the MRVS in the absence of REDD+ payments are in place.	MRVS SOPs		Methods for Non-REDD+ MRVS incorporated into SOPs for MRV	Methodologies utilised for assessment of forest area and carbon are fully documented in MRV SOPs.

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	One preferred option ran in parallel with MRVS.	Freely available 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	-	Report on preferred options completed.	A final report on the preferred option is completed.
	At least one option for near-real-time monitoring for high priority sites tested.	Assessment of project reports	-	Report on preferred options completed.	The final report on the preferred option is completed.
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	-	
Output 3.1. Platform for access to and utilization of MRVS data to inform forest management policy and practice developed.	A mechanism for the utilization of MRVS data in forest management is established.	Report describing the MRVS Platform. Data sharing protocols	-	-	
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	5 cases	Two Data Sharing MoUs established for reporting period.
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.	-	MRVS included in GFC workplan and budget.	
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	-	-	The Phase 3 Roadmap was completed in 2019.

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	7	General outreach in 4 workshops total participants 52.
	Number of citations of information on Guyana's MRVS in major international publications	Analysis of scientific literature on MRVS and REDD+.	0	2	>2
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	10	10 communication tools developed on MRVS and forest management
	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	3	An Assessment of Global Forest Change Datasets for National Forest Monitoring and Reporting, June 2, 2020 Comprehensive Accounting for REDD+ Programs: A Pragmatic Approach as Exemplified in Guyana, November 27, 2020 Accounting for Greenhouse Gas Emissions from Forest Edge Degradation: Gold Mining in Guyana as a Case Study, 2020
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	5	2 clusters of CMRV Phase 2 capacity building programme, 9 new communities trained and 8 follow-up refresher exercises.
	The percentage of men compared to women who attend the awareness and capacity building sessions	Reports on awareness sessions	-	+/- 5%	CMRV trainings had 17M, 11F (60/40%).

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	-	7 events.
	Number of international events at which Guyana's MRVS is featured	Project reports	0	-	2 events. Design of the International Fund for Agricultural Development's (IFAD) new investment project in Guyana. ART/TREES Overview with secretariat.
Outcome 6. To complete the third and fourth audit for Independent Forest Monitoring (IFM).	Number of significant negative audit findings.	Assessment of findings of the IFM Audits.		-	
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)	-	Completed.