Guyana Forestry Commission
Avoided Deforestation through Consolidation and Creation of Protected Areas and Carbon Financing Mechanisms in the Guiana Region (Guyana): A KfW/CI/GFC Initiative
Terms of Reference – Ecosystem Services and Carbon Modelling Specialist

1. BACKGROUND /CONTEXT

As the largest remaining block of primary tropical forest on Earth, the Guiana Region has the potential to play a critical role in mitigating climate change. The Region contains both the highest percent of primary forest cover (over 90% is intact tropical forest) and the lowest human population density of any major tropical area.

Guyana's forest covers approximately 85% of the country, contains over 5GtCO_2 in above ground biomass, and is estimated at 18.39 million hectares (Guyana REDD+ Monitoring Reporting and Verification System (MRVS) Interim Measures Report, January 7, 2011.)

On November 9, 2009, the Government of Guyana and the Kingdom of Norway signed a Memorandum of Understanding which set out how the two countries will "work together to provide the world with a relevant, replicable model for how REDD-plus can align the development objectives of forest countries with the world's need to combat climate change." Norway committed to providing financial support of up to US$250 million by 2015 for results achieved by Guyana in generating the capacity to reduce emissions from deforestation and forest degradation. A Joint Concept Note (JCN) accompanies the MoU signed between Guyana & Norway. It describes the mechanism through which financial contributions to Guyana will be delivered and are based on results achieved in keeping its deforestation and forest degradation rates below an agreed level. Guyana's obligations outlined in the JCN relate to a) indicators of enabling activities; b) REDD-plus Performance Indicators; and c) efforts to support the acceleration of REDD Plus efforts in 2010.

The Guyana Forestry Commission (GFC) being the State Agency to plan and manage the State Forest Estate, has advanced efforts towards enhancing sustainable forest management and strengthening important areas such as legality, forest industry and training in harvesting practices. The GFC has been designated as the agency to oversee the implementation of key technical aspects of REDD+ including the development and implementation of the national Monitoring Reporting & Verification System (MRVS). A REDD Secretariat was created within the GFC to deal specifically with these areas. Guyana prepared a Road Map (Annex 1) in 2009 for the development of a national Monitoring, Reporting and Verification System (MRVS). Subsequently, Terms of References (ToR) for the technical work of the core components of the MRVS were prepared. Since that time, two aspects of technical work under the MRVS have commenced in (i) forest area change assessment (referred to as Bid 1 of the MRVS) and

(ii) forest carbon stock assessment and monitoring system (referred to as Bid 2 of the MRVS).

As is consistent with the framework of the MRVS, the main deliverables of the Forest Area Change Assessment (Bid 1) undertook a local capacity building approach and focused on: (i) historic forest area assessment and change mapping for the period 1990 to 2009; (ii) forest and non forest mapping, (iii) development of benchmark forest map as at September 2009, (iv) forest area assessment and change monitoring for the annual period October 1, 2009 to September 30, 2010, (v) independent accuracy assessment of area change estimates, and annual reporting on REDD+ interim indicators as set out in the Memorandum of Understanding (MoU) between the Governments of Guyana and Norway.

The Forest Carbon Stock Assessment and monitoring System (Bid 2) aspect was also designed to undertake a capacity building approach and the main deliverables are (i) implementation plan and sample design including protocols for forest carbon stock assessment, (ii) capacity building and field training for conducting forest carbon stock assessment and monitoring, (iii) field implementation of forest carbon assessment and monitoring, (iv) development of carbon conversion and expansion factors suitable for Guyana, (v) assessment of key drivers causing change in forest carbon in Guyana, and (vi) development of a long term measurement and monitoring plan for forest carbon. The work of Bid 2 commenced in August 2010 and extends until December 2011.

Through the "Avoided Deforestation though Consolidation and Creation of Protected Areas and Carbon Financing Mechanisms in the Guiana Region" supported by KfW, the KfW/CI/GFC contract is supporting, in part, the overall design and implementation of the national forest carbon stock assessment and monitoring system and the establishment of the carbon conversion and expansion factors (Component 2 of the KfW/CI/GFC workplan). So far, the KfW/CI support has financed the initial design of the draft Standard Operating Procedures Manual (SOP), and the initial capacity building work that has taken place in October-November 2010 including work on forest carbon field assessment and work on the development of forest carbon conversion and expansion factors.

Assessment of forest degradation, monitoring requirements for ecosystem services and exploring methods for establishing reference levels are critical elements of a robust MRVS and are closely related to the work of Bids 1 & 2. They are outlined as priority areas in the MRVS Roadmap, as activities in both Years 1 & 2 of the MRVS development. These elements also are a main part of the KfW/CI/GFC work plan – Component 1 which aims to develop methodological issues regarding the integration of ecosystem services assessment of forest degradation and design of reference level. Execution of Component 1 of the workplan aims to fulfil the other key components of the MRVS, building on Bids 1 & 2. It is also closely linked to the project 'Strengthening Guyana's Capacity to Manage Forest Resources and Environmental Services through Resources Assessment and Monitoring Changes in Deforestation and Degradation' that conducted

initial work on the exploration of ecosystem services in Guyana and, supported by the ITTO, aimed to:

- Assess the potential and feasibility of market based and other remuneration systems for compensating environmental services through the assessment of available market mechanisms,
- Assess the incentives programmes and remuneration systems for environmental services appropriate for Guyana
- Evaluate the requirements that are necessary to access identified markets and remuneration systems appropriate for Guyana.

The above referenced study focused on carbon markets, watershed services and biodiversity (both direct & indirect) and provides a good basis for the work on Component 1.

This Terms of Reference (ToR) aims to contract the services of an Ecosystem Services and Carbon Modelling Specialist to conduct the activities outlined in the KfW/CI/GFC work plan, building on the previous studies to:

I. Explore methods and approaches for establishing reference levels;
II. Explore methodological issues regarding integration of ecosystem services;
III. Assess the drivers of forest degradation.

Activities identified under this ToR are being financed by KfW and will be implemented by the Government of Guyana in coordination with Conservation International Guyana.

2. OBJECTIVE/PURPOSE

The outputs proposed under this ToR will link closely with the monitoring aspect of the MRVS, as it will provide:

- Important baseline information on reference level that will be used as the basis for future assessments;
- Guidance for any future inclusion of other ecosystem services in the MRVS;
- Causes of forest degradation and the likely impacts on carbon stocks as well as quantification of degradation of carbon stocks by forest fire.

3. SCOPE OF WORK OF THE TERMS OF REFERENCE: ECOSYSTEM SERVICES AND CARBON MODELLING SPECIALIST

The following tasks are expected to be competed:

I. Explore methods and approaches for establishing reference levels:

This aspect of the work shall focus on forest carbon and is outlined as a priority area in the MRVS Road Map for Year 1 of the MRVS development (highlighted in Annex 1).

The Norway Guyana performance-based agreement stipulates the use of a “combined reference level” methodology. This methodology was used to determine Guyana’s provisional reference level of 0.275%. This reference level (RL) was calculated using the Guyana’s average deforestation rate for the period 2000 - 2009 and the global average

deforestation rate of developing countries[1] for the period 2005 – 2009. This provisional reference level will be used pending the determination of a reference level methodology at the UNFCCC.

This consultancy therefore aims to explore various methods and approaches to establish RL specific to Guyana's national circumstance and to provide guidance for the establishment of a national RL after an outcome at UNFCCC. In executing this activity the consultant shall pay attention to (i) land cover change; (ii) forest carbon density and deforestation; and (iii) forest degradation. Moreover, the assessment should include the three land-use categories as described by the Good Practice Guidance of the Intergovernmental Panel on Climate Change namely: forests converted to other lands (covering deforestation); other lands converted to forest (covering expansion of forest carbon stocks by afforestation or reforestation); and forests remaining as forest (covering forest degradation, sustainable management of forests, and conservation of forest carbon stocks).[2]

Specifically the consultant shall:

a) Develop historical trend reference scenarios and models to reflect future development plans for Guyana;
b) Examine the appropriateness of various methodologies and approaches such as compensated reductions; adjusted reference levels; stock flow approach; combined incentives among others to establish reference levels;
c) Determine and recommend the approaches and methodologies most suitable to Guyana's context as a HFLD country and its national circumstance taking the full scope of REDD+ into consideration to establish its national RL;
d) Develop guidelines and/or criteria for the establishment of RLs in keeping with UNFCCC discussions to:
    - Contribute to the mitigation of climate change
    - Use historical emissions and removals for national baselines
    - Ensure overall environmental integrity
    - Adjusted as required by national circumstances to improve accuracy
e) Provide guidance on the establishment and use of compensation baseline (crediting baseline) to ensure additionally, enhance effectiveness, efficiency and equity and avoid international leakage;

This component will be supported by the forest area change assessment (Bid 1) conducted by Poyry Management Consulting (NZ) Limited, the results of which can be found in the report 'Guyana MRVS Interim Measures Report 2010 Final - January 2011'.

[1] Global average deforestation rate was calculated using data from 85 developing forested countries taken from the Forest Resource Assessment 2010.
[2] Modalities for REDD+ Reference Level. Prepared for the Govt. of Norway, Meridian Institute. June 2011.

II. Explore methodological issues regarding integration of ecosystem services:

This activity has been highlighted in the MRVS Road Map as an area for Guyana to explore in the development of its national MRVS (see Annex 1). It will be supported by an ITTO funded project, "Reducing Deforestation and Forest Degradation and Enhancing Environmental Services in Tropical Forests (REDDES)". Outside of forest carbon markets, the ITTO project identified the following ecosystem services as viable for Guyana to engage in:

i. Watershed service market
ii. Biodiversity (direct) service market
iii. Biodiversity (indirect) market

Specifically, the consultant shall:

a) Identify ecosystem services relevant for national well-being, inclusive of those identified in the ITTO study, using desk review as the primary source of data;
b) Prioritise the identified ecosystem services according to relevance and in discussion with national stakeholders, inclusive of Conservation International Guyana;
c) Evaluate the requirements necessary for the development of a monitoring system for the priority ecosystem services;
d) Examine the requirements of integrating the monitoring of priority ecosystem services into the proposed existing framework of the national MRVS;
b) Recommend a measurement based upon practicability and available historic data;
c) Recommend a monitoring scheme for ecosystem services that is compatible with Guyana's MRVS design.

The results obtained from this overall activity will allow for the Government of Guyana to be better informed on the requirements of engaging in markets for key or priority ecosystem services, provide a solid basis for decision making and assess the feasibility of incorporating relevant ecosystem services into the MRVS.

III. Assess the drivers of Forest Degradation

Monitoring forest degradation is an important part of the MRVS framework as well as the interim process of reporting on REDD+ Performance indicators. The revised Joint Concept Note between Guyana and Norway specifically requires an assessment on forest degradation to inform the interim indicators on new infrastructure as well as to satisfy an essential component of MRVS framework.

Specifically, the consultant shall:

a) Complete an assessment of the drivers of forest degradation examining impacts on forest carbon stocks and priority ecosystem services (as identified in Section 3(II));
b) Design a framework for monitoring forest degradation within Guyana's forests and:

i. Complete an assessment of monitoring forest degradation from relevant drivers (including from selective logging, and other drivers where relevant: mining, infrastructure, fire, agriculture, etc.) for the 2009-2010 period
ii. Investigate the usefulness of Landsat-type data or other higher resolution data over selected areas (study of feasibility to see whether forest degradation can be detected accurately using remote sensing techniques). This study will require field data which will primarily be obtained from the forest carbon stock assessment work currently being executed by Winrock International.
iii. Assess the spatial extent of the forest degradation and the impact on carbon stock, concluding on the statistical significance of the results on the impact zones and on the level of carbon loss.

b) Provide support for the integration of findings from the study in (i) to inform the MRVS, and annual reporting in the interim and longer term period.
c) Provide recommendations for the integration of forest degradation and impacts on priority ecosystem services into the MRVS framework.

This assessment will also be informed by the "Reducing Deforestation and Forest Degradation and Enhancing Environmental Services in Tropical Forests (REDDES)"work conducted by ITTO, as well as, the work outlined in Component 2 (forest carbon stock assessment and monitoring system and the establishment of carbon conversion and expansion factors) of the KfW/CI/GFC project "Avoided Deforestation though Consolidation and Creation of Protected Areas and Carbon Financing Mechanisms in the Guiana Region".

IV. Dissemination of results

The consultant shall present the results of this ToR through workshops or seminars.

4. SCHEDULE & DURATION

The work of the Ecosystem Services and Carbon Modelling Specialist is expected to be conducted over a 12 month period, commencing September 2011.

5. EXPERIENCE

The Consultant/firm must have a minimum of 5 years experience in work relating to environmental services management, GIS and Remote Sensing, or carbon modelling, with a first degree (BSc) in an environmental or natural resource-based subject and an advanced degree (MSc and/or PhD) in an appropriate field. S/he will have been closely involved in similar exercises in forest carbon and ecosystem services monitoring, in tropical forest areas. S/he will ideally have experience with projects of a similar nature.

6. AUTHORITY AND RESPONSIBILITY

Role of the GFC - The GFC has full authority and responsibility for this contract which includes oversight over service provider and of the procurement process.

Logistic support, approval of work plan etc - The Consultant will receive full logistical support from staff of the GFC. All work plans developed must be approved by the GFC, prior to implementation.

The Guyana Forestry Commission The GFC is a semi-autonomous organization formed in 1979 with a legal mandate to manage and control the utilization of the State Forest Estate. It main role is to ensure the sustainable utilization State Forest Estate in keeping with sustainable forest management principles and guidelines. The GFC also has a development mandate to ensure that that there is a balance among the pillars social, economic and environmental development. The recently passed Forest Act 2009, by Parliament outlines these pillars and outlines key legislative requirements for the Commission work.

The GFC has, over the past 10 years, undergone rapid development in the implementation of sustainable forest management, legality, and environmental standards. It has also expanded it geographic scope to 26 field stations and a number of mobile stations on forest concessions and has a total staff complement of 260 employees. Of more recent, are the modern and dynamic forest legislation and suite of Forest Management policies, guidelines and practices that guide the operation of the Commission that have been developed, with many of these already successfully implemented. The GFC also has a strong community forest programme through which it extends implementation of sustainable forest management practices and overall development support, at the community level.

7. REPORTING & TIMELINES

Outputs / Deliverables -

I. **Methods and approaches for establishing reference level:** Report on the various options and approaches available for the establishment of reference level with recommendations on options appropriate for Guyana's context. The report should include:
   - outline of the approach/methodology used to conduct this assessment;
   - historical trend reference scenarios and models to reflect future development plans for Guyana;
   - various methodologies and approaches such as compensated reductions; adjusted reference levels; stock flow approach; combined incentives among others to establish reference levels;
   - approaches and methodologies most suitable to Guyana's context taking the full scope of REDD+ into consideration;
   - recommendations on suitable approaches and/or methodologies to be used to establish national RL;
   - guidelines and/or criteria for the establishment of RLs in keeping with UNFCCC discussions;
   - guidance on the establishment and use of a compensation baseline.

   Timeline for Delivery: December, 2011

II. **Methodological issues regarding the integration of ecosystem services:** Report on requirements necessary for the development of a monitoring system for ecosystem services outside of forest carbon for Guyana, and addressing the integration of monitoring of such services into the proposed existing framework for the national MRVS for Guyana. The report should include:

- outline of the approach/methodology used to conduct this assessment;
- ecosystem services relevant for national well-being;
- priority ecosystem services
- requirements necessary for the development of a monitoring system for the priority ecosystem services;
- requirements of integrating the monitoring of priority ecosystem services into the proposed existing framework of the national MRVS;
- recommendations of a measurement based upon practicability and available historic data and a monitoring scheme that is compatible with the MRVS.

A separate report outlining the ecosystem services prioritization process with national stakeholders, inclusive of criteria used.

Timeline for Delivery: December 2011

III. **Drivers of Degradation:** Report on the methodology to be used in measuring degradation, the actual quantification of degradation in Guyana by driver and reporting on the following:

- outline of the approach/methodology used to conduct this assessment;
- extent of degradation associated with new land-uses such as mining, settlements and infrastructure such as roads post the benchmark period;
- outline and categorise drivers and impacts on forest carbon stocks and priority ecosystem services;
- integration of findings from the study in task (b)(i) to inform the MRVS, and annual reporting in the interim and longer term period;
- recommendations for the integration of forest degradation and impacts on priority ecosystem services into the MRVS framework.

Timeline for Delivery: December 2011

IV. Workshops/Seminars and preparatory materials

Each activity must be accompanied by training and capacity building sessions for staff of the GFC and REDD Secretariat as well as and other relevant stakeholders.

- Report prepared summarising each capacity building session, number of persons in attendance and stakeholder representations; training method and materials and major outcomes.

ANNEX 1

Table 4: MRV road map – objectives and expected key results for different phase

	National strategy (2010/11) ➔	Country readiness (2011/12) ➔	Implementation (post 2012)➔
Objectives	**Gather and integrate information & fill data gaps for national REDD opportunities, scoping and policy development**	**Develop capacities, conduct historical monitoring, and implement a (minimum) IPCC Tier 2 national forest carbon monitoring, establish the reference level and report on interim performance**	**Establish consistent and continuous MRV supporting national REDD+ actions and international IPCC GPG-based reporting and verification**
Key results and national capacities developed	1. Comprehensive MRV roadmap developed and national MRV steering body operational 2. Improved national capacities on LCDS, REDD, IPCC-LULUCF, and carbon dynamics 3. Framework and capacities to demonstrate REDD implementation and interim performance 4. All data available and accessible (including acquisition of new forest carbon data) on drivers and processes needed for developing a national REDD policy and interim implementation plan 5. Established communication and participation mechanism to involve relevant stakeholders nationally and internationally 6. Approaches for setting reference levels, linking MRV and policy, and MRV co-benefits and synergies are explored and defined	1. Capacities in place for consistent and continuous acquisition and analysis of key data for Tier 2 nationally and Tier 3 for demonstration/activity sites including international reporting using IPCC LULUCF; uncertainty assessment MRV improvement plan developed 2. Reference level established based on historical data, and future developments using internationally accepted methods 3. All data available and accessible for an updated national REDD implementation plan 4. Regular reporting on REDD demonstrations and interim performance 5. Continued engagement with key national stakeholders for REDD implementation and assuring long-term sustainability of MRV capacities (i.e. universities) 6. Monitoring system explored to cover key variables for other ecosystem services	1. IPCC key category analysis and assessment for Tier 3 approaches completed and implemented (if desired) 2. Independent international review of full MRV system completed 3. Capacity in place and implementation to deliver verification and compliance assessment for REDD results-based compensation 4. National data infrastructure of forest greenhouse gas inventory and assessment in place for regular reporting 5. Implementation plan to use new and proven technologies to reduce uncertainties and increase efficiency of MRV system 6. Framework developed that links REDD into LCDS monitoring, reporting and verification system

Table 5: MRV road map – specification of activities for gap filling

	National strategy ➔	Country readiness ➔	Implementation ➔
Objectives	**Gather and integrate information & fill data gaps for national REDD opportunities scoping and policy development**	**Develop capacities, conduct historical monitoring, and implement a (minimum) IPCC Tier 2 national forest carbon monitoring, establish the reference level and report on interim performance**	**Establish consistent and continuous MRV supporting national REDD+ actions and international IPCC GPG-based reporting and verification**
Data gap filling	• Gather, evaluate and integrate existing data sources on the national level • Acquire additional data (if needed) to analyze (the carbon impact) of all relevant historical forest change processes and drivers (i.e. using satellite data, initial carbon stock assessments and ancillary information) • Assessment of historical and current processes of forest carbon change for formulating national REDD policy strategy and related MRV priorities, and respond to an initial set of interim performance indicators	• Establish mechanisms and partnerships with relevant data sources (i.e. satellite data) to facilitate availability to Guyana in a consistent and continuous way • Data gathering and analysis of drivers and factors of forest carbon change to support an assessment of future driver activities and related/projected forest carbon changes • Collect data for a first comprehensive uncertainty assessment of the different measurement and monitoring components	• Conduct an IPCC key category analysis • Assess opportunities and data gaps to move towards Tier 3 on the national or sub-national (if desired) • Foster and support REDD activity-based monitoring by different actors as part of national framework
Eligibility gap filling	• Develop a national REDD strategy • Involvement of all relevant stakeholders at the national and sub-national level – set up a sustained two-way communication mechanism • Participation in international REDD and REDD readiness processes • Scope a framework for immediate demonstration actions and interim performance	• Continued involvement of all relevant stakeholders at the national and sub-national level • Provide an assessment of carbon emissions (and removals) as historical reference level and expectations/forecasting future development • Develop a national implementation plan and related policies to encourage REDD actions by relevant stakeholders •	• Implement an international review of the MRV system • Prepare regular interactions and reporting on REDD implementation activities and on the IPCC LULUCF inventory • Verification and compliance assessment comparing performance against the reference level

	indicators that will respond to an international REDD mechanism	Implement and evaluate REDD implementation activities, and report performance for interim indicators	
Capacity and institutional gap filling	• Complete an comprehensive assessment of existing data and capacities considering international and national MRV requirements • Set up a national MRV coordination mechanism to steer the capacity development and assign roles and responsibilities • Develop capacities to monitor given a set of interim performance indicators • Engage in general capacity building on REDD, IPCC-LULUCF, terrestrial carbon dynamics and key standard methods • Interaction with local actors and key implementation bodies on their role for MRV	• Build sustained capacities to conduct regular and consistent forest and forest area change monitoring using remote sensing and GIS • Establish capacities and implement a systematic national forest carbon measurement and monitoring system, i.e. through permanent sample plots. • Scope and evaluate a sub-national, activity-based measurement program, to monitor key REDD implementation actions • Training and implementation of reporting (IPCC LULUCF) including an institutional framework • Develop and implement an uncertainty assessment and a long-term improvement plan for the MRV system • Scope the involvement of national/regional higher-education institutions	• Continuous training and improvement for institutions and activities providing data and analysis for the REDD MRV system, • Build a national spatial data infrastructure for IPCC LULUCF reporting and REDD implementation • Develop additional monitoring capacities (if needed, to go for Tier 3) • Build a system for verifying REDD actions on the national level using MRV data and other information, link MRV of transactions • Develop and implement an uncertainty assessment and a long-term improvement plan for the MRV system • Implement capacities in higher-education institutions on REDD MRV for university curricula
Methodo-logical gap filling	• Interaction and partnership with national and international research organizations on key issues • Exploration of methods and approaches for establishing reference levels • Evaluate concepts for linking MRV, REDD policy and implementations • Explore potential co-benefits and synergies of the carbon measurements with other monitoring needs	• Interaction and partnership with national and international research organizations on key issues • Develop frameworks for interlinked implementing REDD policies and MRV and linking MRV of actions and MRV of transactions • Exploration of evolving technologies for REDD MRV • Assess the requirements of monitoring carbon variables and relevant information for other ecosystem services	• Foster activities to reduce uncertainties and increase efficiency of MRV system • Implement evolving technologies into regular REDD MRV activities • Finalize exploration of REDD MRV and implementation including broader ecosystem services and environmental accounting procedures and make recommendations.

Evaluation Criteria	Highest Possible Score	Actual Score	Comments
1. Level to which the proposal meets required activities and associated outputs			
Output 1- Explore methods and approaches for establishing reference levels	15		
Output 2 – Explore methodological issues regarding integration of Ecosystem Services	15		
Output 3 – Assess the drivers of forest degradation	15		
Suitability of proposed methodologies	10		
2. Experience of Applicant			
Experience in handling similar projects	5		
Experience in working with systems similar to an MRVS	5		
Staffing schedule and monitoring and coordination mechanisms	5		
3. Bid/Proposal estimate within Project budget *(see below)*			
Execution of activities outlined in Section 3- Scope of Work	10		
Travel & per diem	10		
Workshops & capacity building sessions	10		
Total	**100**		

Distribution of Points: *Technical Evaluation Criteria: 70%, Cost Evaluation Criteria: 30%*