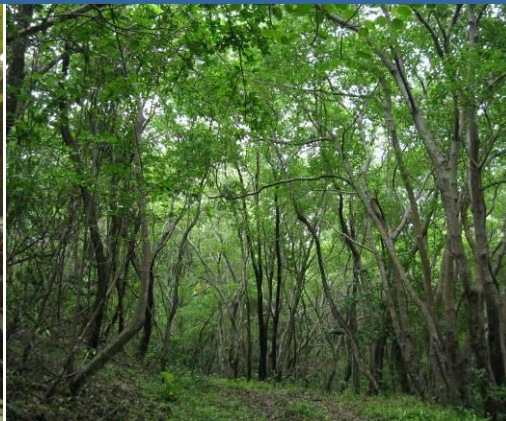


Presented to the European Commission and
Banana Industry Trust



**NATIONAL FOREST DEMARCATION AND BIO-PHYSICAL
RESOURCE INVENTORY PROJECT**

CARIBBEAN – ST. LUCIA

SFA 2003/SLU/BIT-04/0711/EMF/LC

FOREST MANAGEMENT GUIDELINES

By

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Acronyms

ACP	African, Caribbean and Pacific
A/R	Afforestation/Reforestation
BA	Basal area
BM	Blue Maho
CAR	Climate Action Reserve (California)
CCB	Climate, Community and Biodiversity
CCBA	Climate, Community and Biodiversity Alliance
CDM	Clean Development Mechanism
CEP	Country Environmental Profile
CER	Certified Emission Reductions
CFO	Chief Forest Officer
CIDA	Canadian International Development Agency
CIF	Climate Investment Funds
COP	Conference of Parties
Dbh	Diameter at breast height
DNA	Designated National Authority
ERU	Emissions Reduction Unit
ETS	Emissions Trading System
EU	European Union
FAO	UN Food and Agriculture Organisation
FCG	Finnish Consulting Group
FCPF	Forest Carbon Partnership Facility
FD	Forestry Department
FIP	Forest Investment Programme
FMCP	Forest Management and Conservation Plan
FR	Forest Reserve
FRA	Forest Resources Assessment
GHG	Greenhouse Gas
GIS	Geographical Information System
HM	Honduras Mahogany
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IUCN	World Conservation Union
JI	Joint Implementation
MRV	Measurement, Reporting and Verification
NGO	Non Governmental Organisation
PA	Prohibited Area
PDD	Project Design Document
PF	Protected Forest
PM	Project Manager
REDD	Reducing Emissions from Deforestation and Forest Degradation
R-PIN	Readiness Plan Idea Note
SFA	Special Framework of Assistance
SSC A/R	Small-scale Afforestation/Reforestation

tCER	temporary Certified Emission Reductions
UNCBD	United Nations Convention on Biological Diversity
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Climate Change Convention
UK	United Kingdom
US	United States of America
VCS	Voluntary Carbon Standard
VER	Verified Emission Reductions
VITO	Flemish Institute for Technological Research
WB	World Bank

Executive Summary

The present report is the final output of a two-month consultancy in forest management and silviculture to the National Forest Demarcation and Bio-Physical Resource Inventory Project. The main focus was on providing guidance to the Forest Department in the development of a National Forest Management and Conservation Plan, an exercise that is planned to be carried out in 2010, making use of the several outcomes and findings of the surveys conducted under the Demarcation and Inventory project.

The first more descriptive and analytical part of the report focuses on the present situation regarding the existing forest resources, policy objectives, legislation in force, organisation of the forest administration, forest management practices & silvicultural interventions and the use and marketing of forest products.

Forest resources: Over 35% of the land area is covered with some type of forest. Following the new vegetation classification system, 9 forest classes can be distinguished in Saint Lucia: 8 of them are considered as natural forest types and 1 as semi-natural. The timber inventory results show an average stocking in the Forest Reserves of 540 trees per ha and an average standing volume of 305 m³ of timber per ha, totalling appr. 2.8 million m³ of timber. When compared to figures from 1992, stocking as well as volume have increased showing a good recovery capacity of the forests. Generally, the forest cover in the mountainous interior of the country - where most of the Forest Reserves are situated - has been well preserved. In terms of biodiversity and vegetation classes, the Lower Montane Rainforest, Montane Rainforest and Cloud Montane Forest forest types are still well-represented but problems have been identified at the level of the Semi-evergreen Seasonal Forest, the Deciduous Seasonal Forest, the Mangrove Forest and the Freshwater Swamp Forest. Some tree species and other plants have become rare/threatened, predominantly due to habitat loss and/or degradation. Over-exploitation plays a minor role in observed declining populations. The issue of alien wildlife is of great concern for some of Saint Lucia's (endemic) animal species.

Forest policy: Saint Lucia clearly recognises the important value of its forest resources and their outspoken multipurpose character. There is a clear political will to manage these forest resources in a sustainable way, hence ensuring a balanced consideration of economic, ecological and social criteria when taking management decisions and planning concrete field interventions.

Forest legislation: The main legislative document dealing with forest resources and currently in force is the "Forest, Soil and Water Conservation Act" promulgated in 1946. It is by this act that the establishment and functioning of the Forestry Department (FD) is regulated. Three categories of land/forest are by law under management and/or control of the FD: the Forest Reserves, the Protected Forests and the Prohibited Areas. Currently, there are 10 Forest Reserves with a total area of 7,295 ha, 18 Protected Forests and 2 Prohibited areas. Other categories of protected areas are established under the Fisheries Act and the National Trust Act.

Forest Administration: The principle agency responsible for managing forest, soil and wildlife resources on all Crown lands is the Forestry Department and it does so through legislative authority granted by the Forest Act. Apart from the central FD level, the forest management is organised in 5 Forest Ranges.

Forest management and silviculture: Saint Lucia has a tradition of multipurpose forest management with a clear emphasis on soil and water conservation, biodiversity protection and recreation/tourism. Over the last 30 years, two major forest management and conservation plans (FMCP) were developed, both in the frame of long-term technical assistance financed by the Canadian International Development Agency (CIDA). The first FMCP covered the period 1984 – 1994, and the second one the period from 1992 to 2002. The FD has been

very active in a diversity of areas: addressing encroachment issues, ensuring watershed and riverbank protection, exploring opportunities for expanding the FR system, environmental education programmes, organisation of eco-tourism activities, wildlife protection and management and nursery production. Yet, in the area of silviculture and, more generally, timber production, little has been done. Only limited follow-up has been given to the very detailed and elaborate recommendations on silviculture included in the FMCPs.

Forest-based economies: Between 1999 and 2006, the admission fees to the forest trails counted for 78% (EC\$ 1,763,183) of all revenue to the FD. In the same period a further 20% of revenue was generated from the sale of forest produce, with the remaining 2% from rental and registration fees. But analysis of the different economies reveals that, over the last few years, the costs of the touring activities exceeded the revenue and the Christmas tree production and sale resulted to be a break-even operation. In the Anthurium business, the costs clearly exceed the selling price; the local Mauby bark has a quality problem and the production of Latanye brooms suffers from resource shortage. As for the timber production, the current marketing conditions prove to be unfavourable.

The second part of the report focuses on guidelines, orientations and suggestions related to forest management and silviculture.

When developing the forest management plan for Saint Lucia, the FD will need to take basic decisions regarding the general approach and specific role that it wishes to assume as administration in charge, regarding the subdivision of the expanded Forest Reserve System into smaller manageable units and, thirdly, regarding the subdivision of the management units into functional zones according to specific management objectives. In the report, a system of 8 management units and a zonification that takes the existing forest zones or categories as a starting point are proposed and explained in detail.

On the issue of management practices and silvicultural interventions, main emphasis has been given to the production potential of the forest as this aspect had been somehow neglected over the past few decades in favour of conservation objectives. A silvicultural system to enhance the productivity of the forest is described in detail. To become a successful activity, however, silvicultural interventions will have to be combined with substantial efforts in the fields of timber processing and marketing. Throughout the chapters the limited availability of manpower and funds has been taken into account.

Further, suggestions in relation to the operational mechanisms and structure of the Forestry Department include enhancing the communication and coordination between the central and range levels, refraining from engaging in commercial activities like Christmas tree production, solving the issue of the double mandates of central activity leaders and range officers, getting started with the revitalisation of the timber processing and marketing sector, and setting up a technical advisory service for rural communities, chainsaw operators, individuals interested in reforestation or forest management activities.

The third and last part discusses the current situation in the forest-based carbon credit market and the several opportunities that this market and the wider framework could provide for Saint Lucia. The main conclusions are:

- The most attractive and feasible option for the Forestry Department to participate in the current carbon credit business seems to be the development and implementation of offset projects (afforestation, reforestation, avoided deforestation, sustainable forest management) in the voluntary market. Establishing

contacts with forest project developers/investors will be the main first step in the process, a step that is to be taken on the FD's own initiative.

- Engaging in the development of a CDM A/R project at this point does not seem to be an appropriate option. Besides the many existing constraints, it would be very unlikely that an acceptable amount of tCERs could be generated before the end of the current Kyoto commitment period (2008-2012) given the delays of time that will be needed for project design, approval and implementation (which would be tree planting and tending). However, participation in the CDM for the next commitment period should be considered and explored as soon as the new agreements, rules and modalities have been made public. In this respect, it is recommended that the FD takes charge of ensuring follow-up on the negotiations, preferably in collaboration with Saint Lucia's DNA.
- Participation in one of the established REDD-Readiness Programmes could result in the implementation of an externally financed REDD programme & strategy, and therefore in the generation of REDD-carbon credits. Two important issues, however, reduce the attractiveness of this option: (1) the present lack of funds in the existing programmes and (2) the uncertainty regarding the status of REDD-carbon credits in the post-Kyoto framework. Regarding the latter issue, the upcoming COP in Copenhagen might yield some decisions. To get access to the REDD-Readiness Programmes, the Forestry Department is recommended to ensure a close follow-up through establishing direct contacts with the concerned persons and/or through regular consultation of the respective websites.
- The Climate Change Adaptation Funds currently under discussion and construction (also awaiting more clarity in relation to the post-2012 Climate Change Framework), tend to prioritise the specific needs of small island development states such as Saint Lucia. Therefore, it would be good for the FD to check whether REDD and/or A/F could be linked to adaptation measures as soon as these funds become operational. If links can be established and made acceptable within the regulatory framework of the concerned Adaptation Funds, these could provide another very interesting opportunity.

Introduction

Saint Lucia is one of the 12 ACP countries benefitting from the Special Framework of Assistance (SFA) which was established by the European Union (EU) to support the traditional banana supplying countries in adapting to the new market conditions following the amendments made to the common organisation of the banana market. As required by the SFA procedures, Saint Lucia prepared its national adaptation strategy, entitled the “Strategy for the Banana Industry, Agricultural Diversification and the Social Recovery of Rural Communities” and received significant funding for its implementation. Being well aware of the importance of its natural resources for the national economy and for the quality of the livelihoods of its inhabitants, Saint Lucia included the issue of improved natural resource management as a priority under the agricultural diversification component of the strategy. Within the category of natural resources, forest resources represent a major asset, requiring an adequate management so that the multiple products and services they provide can be sustained for the sake of all Saint Lucians. After all, the forests in Saint Lucia cover over 35% (FRA, 2005) of the land area, they have a crucial stake in soil and water conservation, supply the country with a diversity of timber and non-timber forest products, accommodate an impressive diversity of fauna, flora, and ecosystems and offer attractive landscapes and sceneries which form an important asset for the tourism sector.

The major part of the rainforest area, mainly located in the central ridge of the island, is legally classified as Forest Reserve (FR) and as such under public ownership and managed by the Forestry Department (FD). In 1993, Saint Lucia counted 10 such legally declared Forest Reserves with a total area of 7,295 ha. Since then, however, expansion of the existing FR has been high on the agenda. The FD in collaboration with the Crown Lands Division of the Ministry of Physical Development and National Mobilization identified all the lands adjacent to the FR and made recommendations for their vesting and/or acquisition in view of their eventual incorporation into the existing Forest Reserve System. As a result, a total area of 1,901 ha of additions has been officially proposed to the Cabinet in 2008. Yet, for an effective incorporation in the FR System, these lands would need to be surveyed, demarcated on the ground with standard physical markers, vested in the Crown - or acquired from private owners - and declared legal Forest Reserves. Furthermore, some boundaries were in need of (re-)establishment and, in view of an appropriate management, the timber and biodiversity resources within the extended FR System would need to be assessed as the existing information proved to be obsolete and incomplete.

Against this background, Saint Lucia decided to allocate part of the available SFA funds to a project with the objectives to “survey and demarcate the physical parameters of the public forest reserve and conduct a comprehensive biophysical inventory/assessment and management system of forest resources”. The project is referred to as the *National Forest Demarcation and Bio-Physical Resource Inventory Project*, funded by the European Community under the Saint Lucia SFA 2003 Programme of Economic and Agriculture Diversification and Poverty Reduction through Integrated National Resources Management. The main components are (1) boundary survey and demarcation; (2) assessment of biodiversity and biodiversity management; (3) timber inventory and forest management and (4) GIS-based data management and mapping. The project was designed to be implemented over a period of 18 months; the starting date being the 1st of July 2008.

Objectives and scope of the report

The present report is the final output of a two-month consultancy in silviculture to the National Forest Demarcation and Bio-Physical Resource Inventory Project, carried out towards the end of its implementation period, i.e. from mid September to mid November 2009. According to the terms of reference (Annex 1), the consultancy was to produce a “comprehensive report on the current silvicultural methods used in Saint Lucia, including recommendations for silvicultural methods to be used for sustainable forest management practices”, hence delivering *Result 7* of the project’s general work plan which is “silvicultural and utilization prescriptions provided”. However, upon arrival in Saint Lucia and following some discussions with the Chief Forest Officer (CFO) and the Project Manager (PM), it was agreed not to limit the report to silvicultural aspects but to additionally address general forest management issues, thereby shifting the main focus of the report from silvicultural prescriptions to “*providing guidance to the FD for the development of a full-fledged National Forest Management and Conservation Plan*”. This major exercise, that will include extensive stakeholder consultations, is planned to be carried out in 2010, possibly with financial assistance from the FAO. As such, the present report also covers *Result 6* of the project’s general work plan, being the Result that relates to management strategies and the development of a draft management plan.

The first part of the report is a more descriptive and analytical part, focusing on the present situation regarding the existing forest resources, policy objectives, legislation in force, organisation of the forest administration, forest management practices & silvicultural interventions and the use and marketing of forest products.

The second part presents a number of guidelines, orientations and suggestions related to forest management and silviculture. Rather than listing detailed and stand-level prescriptions, the aim has been to stimulate and guide internal discussion and decision-making at the FD during the envisaged development of the National Forest Management and Conservation Plan (2010) and also to make some concrete recommendations in view of improving the current forest management practices. On the one hand, time constraints and lack of quantitative data and records on the forest stands would simply not allow the correct elaboration of such detailed and stand-level prescriptions and, on the other hand, experience has shown that the interest in implementing a ready-made management plan prepared by outsiders without the necessary stakeholder consultations and without a process of active participation of all FD staff, is quite low, mainly due to “zero local ownership”, a result that by all means should be avoided.

The third and last part extensively discusses the current situation in the forest-based carbon credit market and the several opportunities that this market and the wider framework could provide for Saint Lucia. Related recommendations are included.

Methodology

The consultancy was carried out in 3 phases: a home-based preparation phase, a field phase in Saint Lucia and a home-based desk phase.

During the *preparation phase*, most of the time was used to go through the reports already prepared by the project, to collect and consult other relevant documents from the internet, to establish the first contacts with the PM and other project staff and to draw up a preliminary work plan.

The *field phase* in Saint Lucia was mainly focused on the collection of information and on discussing forest management issues and options with FD staff. This was done through field visits to the respective Forest Reserves and the proposed additions, by interviewing selected resource persons and by searching for and consulting relevant documents (maps, reports, archives, data registers, etc...). As regards the consulted persons, a clear emphasis was put on FD staff - both at central and at range levels - and on the consultants involved in project implementation. Obviously, the data and findings from the various surveys and inventories conducted in the frame of the project have been a major source of information. This to ensure that the resulting management suggestions are based on up-to-date knowledge. Throughout the report, reference has been made to the other project reports for more background, detail and/or further reading. Field visits have been conducted to all Forest Reserves and included areas of special interest such as nature trails, plantations, newly acquired parcels where reforestation will be needed, water intakes, areas with special biodiversity interest, etc.

The final *desk phase* was dedicated to analysing and structuring the collected data and information, to conducting further internet research on topics related to e.g. silvicultural characteristics of certain tree species, newest developments in CER and VER markets, progress in REDD and REDD+ negotiations,..., to continued exchange of information with the other consultants on the project and to actually write up the present report.

Lists of consulted documents and persons are presented in Annexes 2 and 3 respectively.

Description and Analysis of the Current Situation

1 Forest Resources: current state and threats

1.1 Some general statistics according to forest type and ownership

Saint Lucia, the second largest of the Windward Islands of the Caribbean archipelago has a total land area of 616 km² or 61,600 ha. Despite its relatively small size, Saint Lucia is endowed with a high degree of ecosystem diversity and significant forest resources. Over 35% of the land area is covered with some type of forest.

The Country Environmental Profile of Saint Lucia - a planning document used by the European Commission – indicates the following statistics by forest type:

Forest type	Area in ha	Percentage of total forest cover
Natural Forest	12,088	55
Mangrove	355	2
Scrub Forest	7,514	35
Grass & Open Woodlands	1,302	6
Plantation	505	2
<i>TOTAL</i>	<i>21,764</i>	<i>100</i>

Table 1: Forest cover in Saint Lucia per forest type (source: CEP, 2004)

Table 2 shows the distribution of the total forest area in Saint Lucia per forest type as well as per ownership class.

Forest Class	Forest Reserves	Crown Lands	Private Lands	Total
<i>Natural Forest</i>	8.0	0.2	5.5	13.7
<i>Scrub Forest</i>	0.1	0.2	7.2	7.5
<i>Open woodlands</i>	0.0	0.0	1.3	1.3
<i>Total</i>	<i>8.1</i>	<i>0.4</i>	<i>14</i>	<i>22.5</i>

Table 2: Forest cover in Saint Lucia per forest type and per ownership class (in 1,000 ha). (source: FAO Global Forest Resources Assessment, Saint Lucia, 2005 – the data are based on surveys carried out in 2000)

The classes shown in Table 2 are defined as follows:

- The ownership classes:
 - Forest Reserves are Crown Lands so declared under the Forest, Soil and Water Act, 1964;
 - Crown Lands are all lands owned by the state minus the Forest Reserves;
 - Private lands are all lands not owned by the state.
- The forest type classes:
 - Natural Forest: primary and secondary forested areas that are used primarily for forestry; also mangrove and tree plantations are included in this category.

- Scrub forest: areas with shrubs or stunted trees covering more than 20% of the area, not primarily used for agriculture or non-forestry purposes.
- Open woodlands: lands with scattered trees or shrubs over a graminaceous layer.

The FAO Global FRA statistics indicate that approximately 20% of the total land area of the island is covered with natural forest. In 2000, about 58% of this natural forest was found in the forest reserves and 40% on private lands. Scrub forests (and mangroves) are mainly situated on private lands.

1.2 Forest types in Saint Lucia following the new vegetation classification system

The new classification system of the vegetation in Saint Lucia represents one of the important outputs of the Demarcation and Inventory Project. The system has been developed on the basis of an island-wide botanical survey. All details on this survey and the resulting classification system are described in the Technical Report No. 3 to the project, written by R. Graveson, the Consultant in Botany.

For the purpose of characterising the forest resources of Saint Lucia, the 9 forest-based classes of the system are briefly presented here. Eight of them are considered as natural forest types and the 9th class of “Tree Plantations” as semi-natural forest.

1.2.1 Littoral Evergreen Forest and Shrubland

Behind sandy beaches, rocky cliffs and pavements, an evergreen forest or shrubland is found, especially on the Atlantic coast. The harsh conditions caused by wind, salt-spray, often a thin soil and a water deficit even during most of the wet season, favour an evergreen arborescent flora with thick leathery leaves. *Coccoloba uvifera* (wézen, siwiz, sea grape) and *Tabebuia pallida/heterophylla* (white cedar, poyé) are commonly present in this vegetation class.

Current state: In some areas, this evergreen woodland has clearly been degraded by charcoal production and also by subsequent grazing by goats and fires.

1.2.2 Mangrove

Mangrove is an evergreen forest of brackish water. This well-known vegetation class contains only a few widely distributed, salt-tolerant species. In Saint Lucia, mangroves are mainly on the Atlantic coast and contain four tree species, namely *Rhizophora mangle* (manng wouj, red mangrove), *Avicennia germinans* (manng salé, black mangrove), *Avicennia schaueriana* and *Laguncularia racemosa* (manng blan, paltivyé, white mangrove). On the edge of the Mangrove, several mangrove-associated species are found. The most important are *Conocarpus erectus* (paltivyé wouj, button wood) and the shrubby vine *Dalbergia ecastaphyllum*.

Current state: Much of Saint Lucia’s mangroves have disappeared and the rest are still being damaged, sometimes by clearing, more often by drainage. Even a slight drying out makes it easier for charcoal makers to move into the area, exacerbating the mangrove’s destruction.

1.2.3 Freshwater Swamp Forest

Freshwater Swamp Forest occurs in flat areas close to sea-level, with a permanent or seasonal freshwater flow and no inflow of salt water. Trees are evergreen and there is a tendency for more or less monotypic (single-species) stands to form.

The classic Freshwater Swamp Forest is swamp redwood forest where *Pterocarpus officinalis*, with its sinuous plank buttresses, forms monotypic stands.

Current state: Formerly, this forest would have covered large areas in the flood plains of large rivers, such as Cul de Sac, Roseau and Fond D'Or, but much of it has been destroyed and replaced by banana plantations or Herbaceous Swamps. Relics remain at Fond d'Or and Cul de Sac. A more pristine area remains along the Ger River, Micoud. Small stands can sometimes be seen along estuaries of smaller rivers.

Another form of secondary Freshwater Swamp Forest can occur between the Littoral Evergreen Forest and the Mangrove. *Hippomane mancinella* (manchineel, medsinnyé modi) is common here, along with the naturalized *Thespesia populnea* (maho bòd lanmè), *Terminalia catappa* (West Indian almond, zamann) and *Morinda citrifoli* (kòsòl chyenn, noni). The presence of the naturalized species indicates the secondary nature of this forest, mainly due to prior cultivation of sugar. Planted coconuts may also be present.

These areas are seasonally muddy. The trees are evergreen and the forest class is therefore easily distinguishable from the Deciduous Seasonal Forest. An almost monotypic stand of *Tabebuia heterophylla* (white cedar, poyé) is often found in these flat muddy areas. It seems that this species has dominated the regrowth after sugar cane cultivation was abandoned. Although *Tabebuia* is often deciduous, it usually keeps its leaves in these areas due to the high water table and, in this habitat, can be considered a type of swamp forest tree.

Where the drainage pattern has been disturbed in more recent times, a newly muddy area or drying swamp may become dominated by an invasive species from Asia, the glue tree *Cordia obliqua*, a member of the sip family.

1.2.4 Deciduous Seasonal Forest

This vegetation class covers large areas in Saint Lucia from the coast to the summit of Petit Piton, although it is virtually all secondary and much of it degraded. It merges inland with the Semi-evergreen Seasonal Forest: the upper slopes of high hills are often covered by Deciduous Seasonal Forest and their lower slopes, leading to ravines, covered by Semi-evergreen Seasonal Forest.

This class is defined as deciduous because the taller trees tend to lose all their leaves in most dry seasons, although the smaller trees and shrubs are evergreen. Its overall appearance during a normal dry season is of a more or less leafless canopy.

The only large tracts of pristine Deciduous Seasonal Forest are on Petit Piton on the lower and middle slopes of Gros Piton, and the upper slopes of other steep dry hills such as Mount Grenier. The main canopy of dominant trees such as *Bursera simaruba* and *Lonchocarpus punctatus* are deciduous and give these slopes a barren appearance during the dry season. However, the understory trees and shrubs, such as Myrtaceae and Celastraceae, keep their leaves. Plant diversity is high, with many rare species of trees, shrubs and vines.

Current state: While large areas of Deciduous Seasonal Forests remain on both coasts, virtually all is secondary, with disturbances still common. The result is often a patchwork, with small gardens, recently coppiced areas, shrubs, small trees and larger trees. The first, massive disturbance to Saint Lucia's Deciduous Seasonal Forests was caused by sugar cane cultivation and the need to collect wood as fuel. Subsequent coconut cultivation and the practice of charcoaling, clearing for seasonal gardens and creating pasture for livestock, has continued the disturbance, but to a lesser extent, so that there is more dry forest now than a century ago. A new and continuing threat is the clearance of dry forest for tourist developments, including golf courses.

Deciduous Seasonal Forests can recover if left undisturbed for decades: the mature secondary forest is less diverse than the primary form, but has a similar physiognomy.

1.2.5 **Semi-evergreen Seasonal Forest**

Semi-evergreen Seasonal Forest occupies the zone between Deciduous Seasonal Forest and Lower Montane Rainforest. It is characterized by upper canopy trees with rather thin, often broad, and quite often compound leaves, which may lose some, but not all, of their leaves during a dry spell. There are no, or very few, epiphytes, ground ferns and mosses. Elevation ranges from almost sea-level in ravines to the summit of Gros Piton.

In comparison with Deciduous Seasonal Forest, this forest class has a higher canopy and greater canopy cover and trunks with a greater girth. It occurs in less windy areas, and generally at a higher elevation.

Current state: This rare forest has almost been completely destroyed for agriculture: most of the areas currently occupied by banana plantations would have had Semi-evergreen Seasonal Forest.

Semi-evergreen Seasonal Forest is now mainly found in small pockets among fields, by roads and as a thin line along rivers, and is virtually all secondary, with the possible exception of the upper third of Gros Piton, Mount Parasol and the northern slope of Mount Souf. These habitats are steep and rocky, and therefore not necessarily typical of the main Semi-evergreen Seasonal Forest zone as it used to be.

1.2.6 **Lower Montane Rainforest**

Lower Montane Rainforest is in fact a suite of many different types of forest and defies a simple description: the canopy height varies from 4m to more than 45m; canopy cover is often quite complete on gentler slopes, but broken on steep slopes; ferns, mosses, ground anthuriums, vines, and epiphytes vary from absent to abundant; trees with buttresses and prop roots are present in some areas and absent in others. At ground level, it varies from humid, quite dark and still, to rather breezy and bright. This variation results from natural factors, especially slope gradient, exposure to the prevailing wind, altitude (and therefore rainfall), and recent climatic disturbances.

Lower Montane Rainforest merges with Semi-evergreen Seasonal Forest at lower elevations and with Montane/ Cloud Montane Rainforest at higher elevations. Trees are evergreen because there is no water deficit most years in any month. In general, trees of all heights are found, without clear divisions into separate canopy layers. Although there may be a shrub, fern and herbaceous (mainly *Anthurium*) ground cover, this forest class is easy to walk through (if one ignores the incline) except where the canopy has been destroyed and ferns, vines and shrubs colonise the clearing. In comparison to Semi-evergreen Seasonal Forest, the mean canopy height, wind, and incline are greater and there is a greater abundance of vines, epiphytes, ferns and mosses. The trees are more tightly packed, and the trees can be much wider in girth. This forest class has been recorded from 100-680m above sea level.

The exterior zone of the Lower Montane Rainforest has a characteristic rather ‘clean’ appearance, with little of the profusion of ferns, mosses, epiphytes and vines of more interior and higher parts. Lauraceae, particularly *Ocotea eggersiana* (lowyé ti fey) and *Ocotea leucoxylon* (lowyé mabwé) are common, along with *Ormosia monosperma* (dédéfouden) and with smaller trees such as *Faramia occidentalis* (ti kafé) *Gymnanthes hypoleuca* (bwa sadinn) and *Eugenia coffeifolia*. Also common are trees such as *Myrcia deflexa* (bwa kwéyòl) and *Guapira fragrans* (mapou) which are also found in other vegetation classes. *Sterculia caribaea* (maho kochon) is often the most common tree.

Away from the edge of the forest, on comparatively gentle slopes without much wind, occasional very tall trees, reaching 45m, are found among the main 30-m canopy. This distinctive forest is often called the *Dacryodes-Sloanea* alliance and is often over-emphasised as being the ‘typical’ rainforest. In fact it occupies

just a part of Saint Lucia's forest reserves. Despite its name, *Tapura latifolia* (bwa kot wouj) and *Licania ternatensis* (bwa dimas) are also important members of this alliance.

Higher slopes, which are usually steeper, tend to have a more vines, moss, ground ferns, ground anthuriums and epiphytes. Species that are rare or absent at lower elevations, such as *Micropholis guyanensis* (fey dowé), *Byrsonima trinitensis* (bwa tan wouj) and *Chrysobalanus cuspidatus* (kaka wat), become more common. *Prestoea montana* (palmis), although present at all elevations, becomes very common along with the tree fern *Alsophila muricata*.

Steep, unstable slopes, favour species with prop roots, particularly *Tovomita plumieri*, (*paltivyé jonn*) and *Chrysochlamys caribaea* (bwa manng).

On high ridges, the same tree species dominate and vines, moss, ground ferns, ground anthuriums and epiphytes become even more evident. Exposed ridges often have a dwarfed vegetation because of high winds. Landslides are a natural phenomenon in Lower Montane Rainforest and can be seen at various stages of recovery.

Current state: Extensive forest destruction was caused by Hurricane Allen (1980), mostly canopy-level destruction by Hurricane Dean (2007), and numerous, occasionally massive, and still very obvious, landslides were caused by Tropical Storm Debby (1994).

1.2.7 Montane Forest

Montane Rainforest is mainly situated on the western side and sheltered eastern slopes of the Mount Gimie Range, including Piton Troumassée, above 650m. Slopes are extremely steep, rainfall is very heavy, there is little wind and landslides are very common. The steepest areas are covered with tree ferns and palms, with canopy height of about 4-6m, with some scattered taller trees on slightly less steep areas.

This class is poorly differentiated from Lower Montane Rainforest in terms of species, but it has a very characteristic appearance. It is found only on very steep slopes at high elevation: where the slope is gentler Lower Montane Rainforest replaces it.

The dominant species are *Prestoea montana* (palmis) and *Alsophila* and *Cnemidaria* tree ferns. The spiny *Alsophila imrayana* is a good indicator of this forest class. On slightly less steep slopes, trees typical of higher elevation Lower Montane Rainforest such as *Byrsonima trinitensis* (bwa tan wouj) and *Micropholis guyanensis* (fey dowé) can reach 8m tall. Terrestrial ferns, anthuriums and bromeliads are very common and there is a large quantity of slowly rotting organic material.

1.2.8 Cloud Montane Rainforest

This vegetation class is found on the high summits of the Mount Gimie range, including Piton Troumassée (although not in the most windy spots), at an elevation of 700m or higher and possibly the eastern interior end of Mount Tabak ridge and a small area on the western end of the La Sorciere ridge. The canopy is about 8m high with occasional much taller trees of *Freziera undulata*. Terrestrial ferns, anthuriums, bromeliads, and epiphytes are very common; moss cover is often several centimetres thick. Cloud and mist cover, with heavy rainfall, is predominant, with only occasional and short periods of sunshine.

Some species found in Montane and Lower Montane Rainforest are also found here, e.g. *Byrsonima trinitatis* (bwa tan wouj) and *Micropholis guyanensis* (fey dowé). However, other species appear almost unique, e.g. *Podocarpus coriaceus* (lowyé woz), *Freziera undulata*, *Schleffera attenuata* (fijé di mon), *Miconia globulifera*

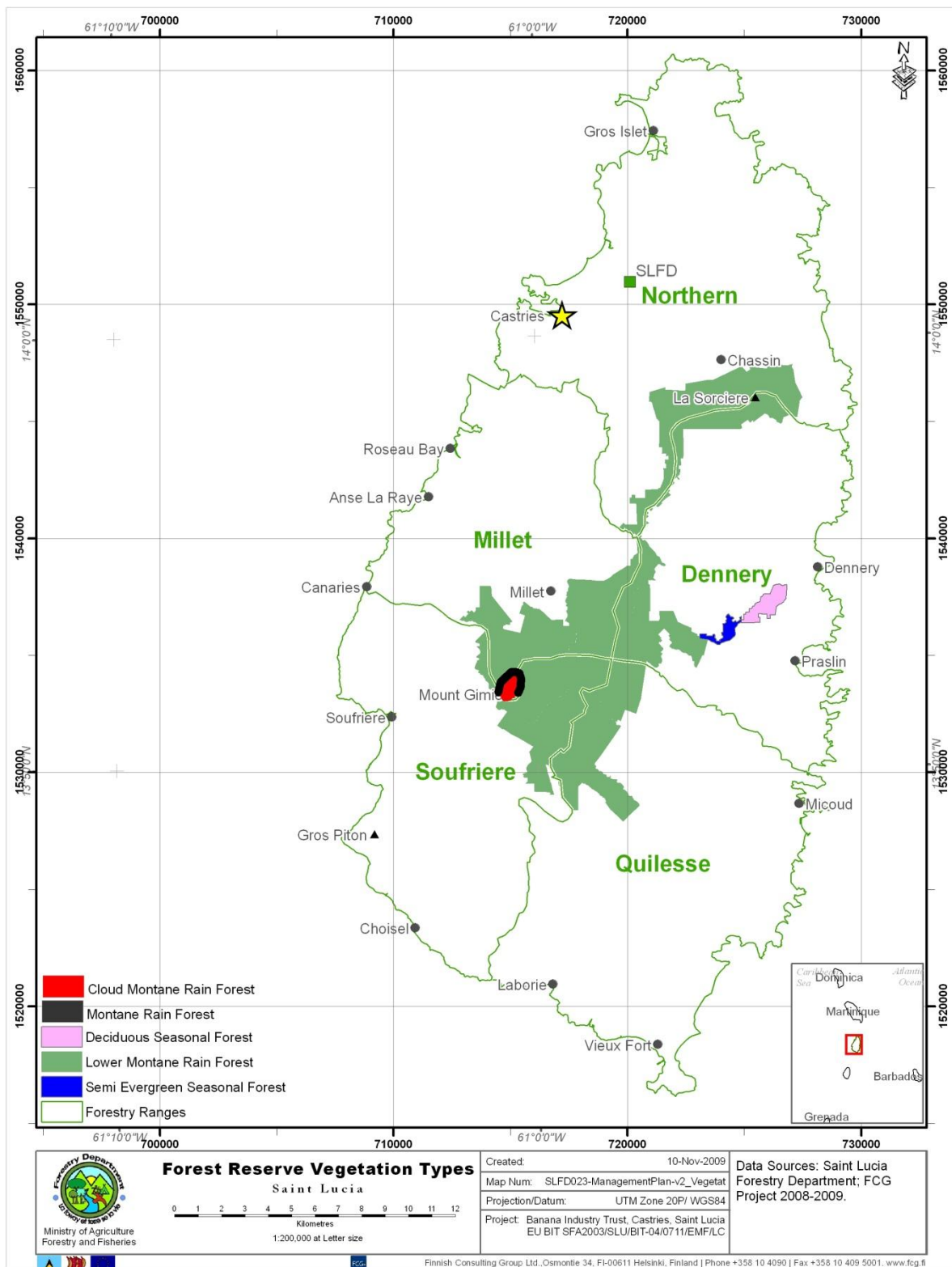
and *Guettarda crispiflora*. The steeper slopes are often covered in monotypic stands of small, stocky *Prestoea montana* (palmis).

1.2.9 Tree Plantations

This class has mature trees that have been planted in an organized manner, mainly in and around the forest reserves, with smaller wild trees and shrubs growing between them. Substantial but widely scattered areas of the rainforest reserves have been replanted primarily with *Talipariti elatum* (blue maho) (= *ex-Hibiscus elatus*), *Swietenia macrophylla* (Honduras mahogany) and *Pinus caribaea* (Caribbean pine). Other species planted in lesser amounts include *Eucalyptus* spp., *Leucaena leucocephala* (leucaena), *Tectona grandis* (teak) and *Gmelina arborea* (gmelina). A timber plantation inventory carried out in 1989 estimated that there was a total of 326 ha of plantation but exact figures on the breakdown by species are not readily available. The establishment of plantations of exotic timber species dates back to 1938, and has continued since then though at smaller scale. In the early plantings, natural forest was clear-felled and re-planted with the objective of enhancing timber production. Since the '80 this practice has been abandoned and plantations are only established in reforestation activities of deforested areas.

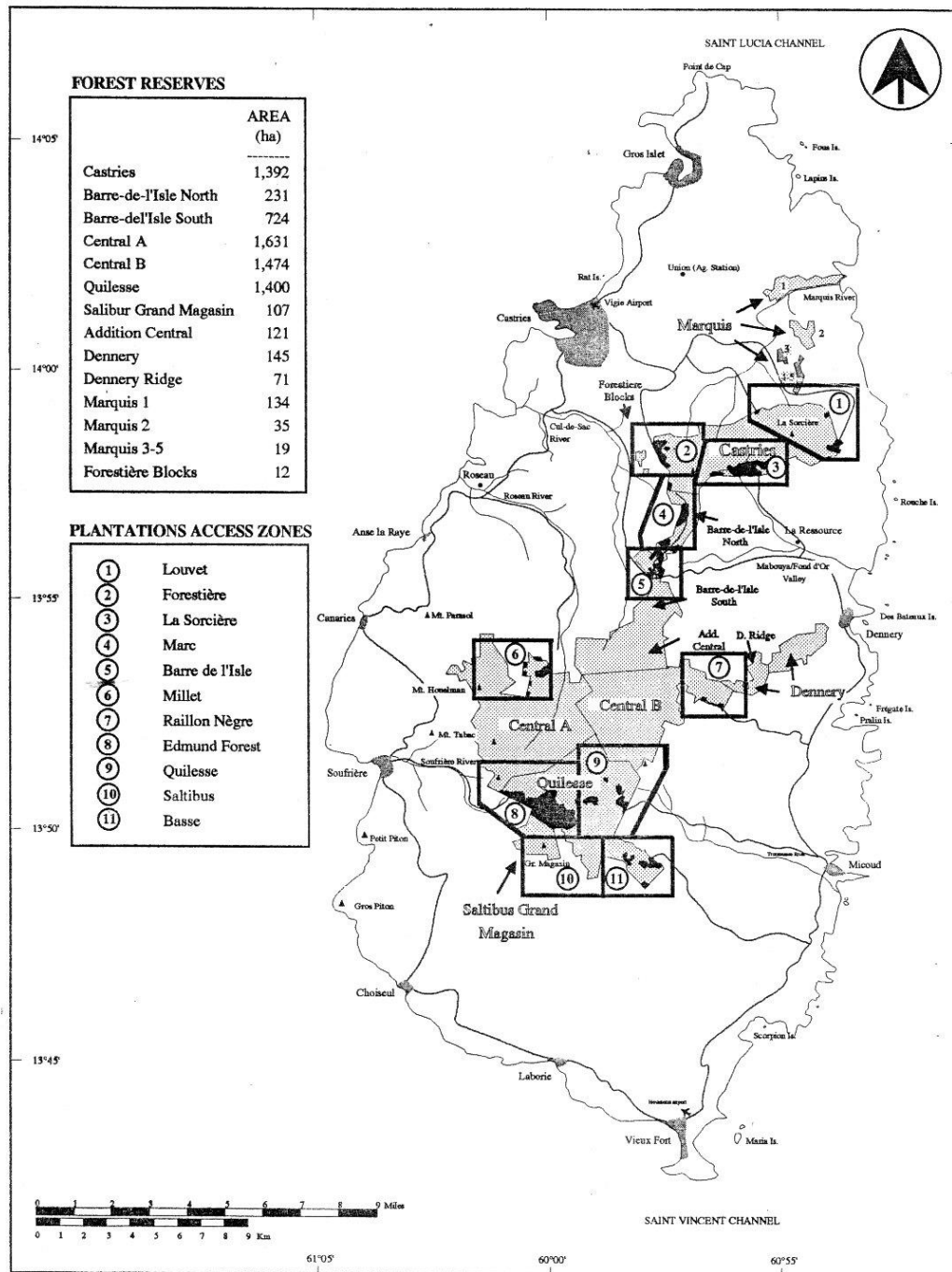
The tree plantations are considered as semi-natural forest as most of them have never been treated as plantations with regular thinning and rotational clear-felling, rather the natural forest has been allowed to grow through and they appear now as multi-species and uneven-aged stands.

Map 1 shows the preliminary distribution of the prevailing forest vegetation types in the Forest Reserve system. Map 2 also pictures the Forest Reserve system but indicates the location of the major tree plantation zones within the system. Map 2 has been produced by the CIDA Forest Management and Conservation Project (1983).



Map 1: Distribution of forest-based vegetation classes in the Forest Reserves – Preliminary version.

MAP 2 : SAINT LUCIA FOREST RESERVES AND PLANTATIONS



1.3 Timber Resources available in the Forest Reserves

Another major component and output of the project has been the timber inventory. This inventory has updated the information, previously only available from inventories carried out over twenty years ago. In contrast to the biodiversity surveys, the timber inventory was limited to the Forest Reserves and their proposed additions. In total, 416 plots were sampled located along appr. 65 kilometres of strip lines, with measurements collected from 12,636 trees.

Details on the inventory design, the results and their analysis are presented in the Technical Report No. 5 to the project, written by Dr. R. B. Tennent, the Project Leader and Consultant in Forest Inventory.

The main features of the timber inventory are:

- Stratification was done on the basis of administrative management units. Forest units were defined to be the individual forest estate blocks identified for the boundary survey exercise associated with the timber inventory. Areas were taken from the FD's area figures as developed by the FD GIS Unit. Only one level of strata was applied. Annex 4 presents an overview of the selected strata and forest units, as well as their respective areas and number of sample plots.
- The sampling units were strip plots located on either side of a strip line. They were sized to ensure that an average of at least 20 trees was measured within each sampling unit within each stratum. The sample intensity was set at 0.25%
- Forest areas with a slope greater than 30 degrees were excluded; these areas are classified as protection forest and are not to be harvested. As a result it should be noted that the results derived from this inventory reflect only land with a slope below 30 degrees.
- The forest plantations were not sampled as a separate stratum or forest unit; they have been considered as fully integrated in the Forest Reserves.
- The data recorded included the species and the dbh of all trees over 10 cm dbh. Tree heights, quality and tree dominance were not recorded. The volume of trees (Total volume) was calculated using the volume functions developed during the 1982 forest inventory, when 6 local volume functions were produced for defined species groups.

The overall inventory results are summarised in the table below.

Stratum	Total Area	Area Sampled	No. Plots	Mean BA	Mean Stocking	Mean DBH	Mean Volume
Areas not sampled	7.8						
Barre de l'Isle	1212.8	1065.6	64	41.6	597	29.8	386
Castries Waterworks	1425.1	1396.8	106	40.3	555	30.4	380
Central Forest A	2069.3	2037.3	50	22.1	478	24.3	201
Central Forest B	1959.1	1959.1	72	35.3	525	29.2	321
Dennery	392.5	392.5	20	38.4	588	28.8	357
Marquis	193.8	182.8	7	26.0	699	21.8	212
Quillesse	1925.3	1676.7	97	33.5	567	27.4	299
Totals	9185.9	8710.7	416	33.4	542	28.0	305

Table 3: Overall summary of inventory results (Source: Technical Report No.5 to the project, 2009, R. B. Tennent)

The results show that the Saint Lucia FR have an average of 540 trees and 305 m³ of timber per ha, totalling appr. 2.8 million m³ of timber. These are overall estimates, though, being of limited value for detailed forest management planning as will be explained later.

Tables 4 and 5 present data by species and dbh class. Table 4 indicates the species that are best represented in terms of volume; Table 5 focuses on a number of local species that were listed by Goodlet (1970) as species in demand in Saint Lucia at the time of the study.

Table 4 reveals that 60% of the timber volume is contained in 10 species, with 17% contained in *Sterculia caribaea*, mainly in smaller size classes, and an additional 10% contained in *Dacryodes excelsa*, mainly in large size classes. Or, 4% of the timber volume in the FR of Saint Lucia is contained in large *Dacryodes excelsa* trees. This amounts to a total resource of approximately 120,000 m³ of large size *Dacryodes excelsa*.

Over 40% of the standing timber is contained in the 15 species identified as previously in demand by Goodlet (1970). (Table 5) However, two of the species have almost been eradicated (*Aniba ramageana* and *Beilschmiedia pendula*), and a further four species show less than 2 cubic metres of timber volume per hectare on average.

Four species from Table 4, the high volume species, are included in Table 5, the species in demand. These are the two identified above, *Sterculia caribaea* and *Dacryodes excelsa*, with *Pouteria pallida* and *Sapium caribaeum* in addition, each contributing approximately 10 m³ per ha to the average total volume.

Species	Volume within dbh classes (m3)								Total Volume (m3)
	< 15	15 - < 25	25 - < 35	35 - < 45	45 - < 55	55 - < 65	65 - < 75	> 75	
Sterculia caribaea	3.7	8.8	11.3	11.9	9.8	4.0	2.1	1.5	53.1
Dacryodes excelsa	0.1	0.8	1.3	2.8	3.2	3.7	4.9	13.2	30.0
Hibiscus elatus	1.5	5.3	6.9	4.4	3.6	1.2	0.2	0.4	23.5
Licania ternatensis	0.3	1.0	1.7	2.7	3.4	1.4	1.6	0.7	12.8
Ocotea leucoxydon	0.6	2.0	3.0	3.2	1.4	1.0	0.6	0.3	12.1
Swietenia macrophylla	0.5	1.6	2.2	2.0	2.4	1.5	0.1	0.6	10.9
Sloanea caribaea	0.1	0.4	0.5	0.6	1.1	1.9	2.1	4.2	10.9
Pouteria pallida	0.1	0.4	0.6	1.1	1.8	1.5	1.5	3.1	10.1
Sapium caribaeum	0.2	1.0	1.2	2.3	1.8	1.1	0.9	1.3	9.8
Guatteria caribaea	0.5	1.4	2.4	2.1	1.5	0.7	0.9	0.2	9.7
All other species	10.7	25.8	26.4	18.8	14.8	8.9	6.1	10.9	122.4
Total Volume	18.3	48.5	57.5	51.9	44.8	26.9	21.0	36.4	305.3

Table 4: Mean total volume by species and dbh class

Species	Volume within dbh classes (M3)								Total Volume (m3)
	< 15	15 - < 25	25 - < 35	35 - < 45	45 - < 55	55 - < 65	65 - < 75	> 75	
Hieronyma caribaea	0.0	0.1	0.2	0.8	0.5	0.6	0.3	0.5	3.0
Aniba ramageana	0.0	0.1	0.1	0.0	0.0	0.3	0.2	0.0	0.7
Pouteria pallida	0.1	0.4	0.6	1.1	1.8	1.5	1.5	3.1	10.1
Simarouba amara	0.2	0.8	2.4	1.4	1.0	0.6	0.3	0.3	7.0
Chimarrhis cymosa	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.0	1.6
Byrsonima martinicensis	0.0	0.2	0.3	0.6	0.3	0.0	0.0	0.0	1.4
Pithecellobium jupunba	0.3	0.5	0.9	1.0	0.4	0.2	0.1	0.0	3.4
Dacryodes excelsa	0.1	0.8	1.3	2.8	3.2	3.7	4.9	13.2	30.0
Beilschmiedia pendula	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.3
Ocotea eggersiana	0.1	0.2	0.3	0.1	0.4	0.0	0.0	0.0	1.1
Tabebuia heterophylla	0.0	0.2	0.3	0.5	0.2	0.1	0.0	0.0	1.3
Sapium caribaeum	0.2	1.0	1.2	2.3	1.8	1.1	0.9	1.3	9.8
Sterculia caribaea	3.7	8.8	11.3	11.9	9.8	4.0	2.1	1.5	53.1
Byrsonima spicata	0.3	0.9	1.4	0.7	0.6	0.1	0.4	0.0	4.4
Tovomita plumieri	0.6	1.8	0.6	0.0	0.1	0.0	0.0	0.0	3.1
All other species	12.5	32.4	36.2	28.5	24.4	14.5	10.0	16.5	175.0
Total Volume	18.3	48.5	57.5	51.9	44.8	26.9	21	36.4	305.3

Table 5: Volume of species previously in demand (after Goodlet, 1970)

In the timber inventory report (Technical Report No 5), the 2009 results were compared with the ones yielded in the previous inventory carried out by Piitz in 1982, leading to the following discussion:

“The average timber volume per ha in 1982 was approximately 187 m³. The 1982 timber inventory was carried out using slightly different management classes and methodologies than the 2009 inventory. The 2009 inventory did not sample steep land, and as such comparison with the 1982 inventory may best be made with the results for the Exploitation or Protection/Production forest management classes, which had estimated volumes of 205 and 194 m³ respectively. Assuming an approximate average volume in 1982 of 200 m³, versus an approximate average volume of 300 m³ in 2009, the forest can be seen to have increased by at least 50% in volume over the past 27 years. This is an average increase of approximately 2% per year. It should be noted however that this is a net increase, and does not include any loss of timber volume via mortality over the past 27 years.

Further, the present data show an average stocking in the forest of approximately 542 stems per hectare, ranging from a low of approximately 480 to a high of approximately 600. Piitz (1983) reports a mean stocking of 289 stems per hectare, ranging from 275 to 344 by forest management class. The 2009 inventory results show an average increase in stocking of approximately 85%.

This increase in stocking and volume between the 1982 and 2009 inventories shows that the forests of Saint Lucia have recovered strongly from the effects of Hurricane Allen in 1980. Hence, the forests seem to be capable of relatively rapid recovery from disturbance, indicating that selective logging could be considered a viable forest management alternative.”

Further to the above, the following table (Table 6) compares the in 1982 estimated total volumes of the then top volume species with the estimates obtained the same species in 2009.

Most 2009 estimates are higher than the corresponding 1982 estimate, although the estimate for *Dacryodes excelsa* is essentially the same. The 1982 estimate for *Sloanea caribaea* is much higher than the 2009 estimate, which is contrary to expectation. However, seven of the top eight species by estimated total volume in 1982 are found in the top ten species by estimated total volume in 2009.

Species	Volume 1982 (m3)	Volume 2009 (m3)
Sterculia caribaea	11.4	53.1
Dacryodes excelsa	29.8	30.0
Licania ternatensis	11.0	12.8
Sloanea caribaea	19.6	10.9
Pouteria pallida	14.5	10.1
Sapium caribaeum	6.8	9.8
Guatteria caribaea	7.5	9.7
Talauma dodecapetala	7.1	3.5

Table 6: Top volume species from 1982 inventory (after Piitz, 1983) with 2009 estimates

1.4 Main threats observed

In general terms, the forest cover in the mountainous interior of the country - where most of the *Forest Reserves* are situated - has been well preserved. Undoubtedly, the limited accessibility of these areas and their unsuitability for agricultural purposes have been major factors in this matter. Yet, they also owe their good conservation status to the high level of national awareness regarding the need for watershed protection and to the continuous patrolling efforts of the Forestry Department.

As a matter of fact, the problem of squatters invading the Forest Reserves – representing a serious threat some decades ago – is now largely under control and limited to a special kind of squatting, namely marihuana cultivation, particularly in the Quillesse Forest Reserve and to a lesser extent also in the Central A Forest Reserve. Illicit harvesting of posts, bamboo, lianas, incense, and other smaller forest products continues to occur in the Forest Reserves (mainly Castries Waterworks, Quillesse and Central B) but – though remedial measures should be taken by the FD in the form of organising, regulating and better controlling the harvesting of minor forest products – these activities do not represent a major threat to the forest cover. Another and more recent problem is the growing population of feral pigs in the Forest Reserves as they cause considerable damage to the forest vegetation and endanger a variety of wildlife. A strategy on how to address this problem has been developed by the FD in collaboration with local hunters.

In terms of *biodiversity and vegetation classes*, the Lower Montane Rainforest, Montane Rainforest and Cloud Montane Forest forest types are still well-represented in Saint Lucia. On the other hand, the vegetation survey identified problems at the level of the Semi-evergreen Seasonal Forest, the Deciduous Seasonal Forest, the Mangrove Forest and the Freshwater Swamp Forest:

“The Semi-evergreen Seasonal Forest is already very depleted because much of this class was cleared to make way for banana plantations and other crops. However, there are signs that it may be increasing in area as a result of the recent decline in agriculture. ... With the exception of the Pitons, which are protected, Deciduous Seasonal Forest is under threat. Most of it is already secondary, disturbed and often degraded. The purchase of plantations for tourist developments threatens huge areas of the Atlantic coast. ... Mangrove forest is under great threat despite its apparent protection. (Note: the larger part of the mangrove forests have the legal status of “Protected Area” but in practice these areas lack the required control, management and protective measures – see also map 3) The main reason is the deliberate modification of the flow of water in rivers, thus reducing or cutting off the flow of freshwater to mangrove. For example, the rerouting of the river between Escap and Micoud may be the cause of the dead mangrove now visible from the highway. ... The Freshwater Swamp Forest is also rare and at risk, and impacts of drainage projects must be minimized. Important swamp redwood forest relics exist at Fond D’Or and Cul de Sac estuary.”

Predominantly due to habitat loss and/or degradation, some *tree species and other plants* have become rare and should be considered as threatened. Over-exploitation only plays a minor role in the observed declining populations.

Examples of species that warrant special attention in this respect include: akoma (*Sideroxylon foetidissimum*), arkokwa (*Zanthoxylum flavum*), balata (*Manilkara bidentata*), bois rouge (*Carapa guianensis*), lowye kannel (*Aniba ramageana*), pencil cedar (*Juniperus barbadensis*), and *Bernardia laurentii*. As for, arkokwa (*Zanthoxylum flavum*), lansan (*Protium attenuatum*) and latannyé (*Coccothrinax barbadensis*) these species are currently widely harvested and should be protected from possible over-exploitation through appropriate regulation and control.

As reported by the biodiversity team, the *issue of alien wildlife* is of great concern for some of Saint Lucia’s (endemic) animal species. Particularly the reptiles and some bird species are badly affected by introduced animal species, the main ones being feral pig, opossum, black rat, mongoose, green iguana and Watt’s anole. Though a variety of exotic trees has been introduced and planted in many parts of Saint Lucia, they are not really behaving as invasive aliens and so far the natural forest has not been seriously impacted by them.

Quite a number of fauna and flora species occurring in Saint Lucia figure on the IUCN Red List of threatened species at global level. The biodiversity assessment reports provide a list of these species, considering thereby the IUCN categories “vulnerable”, “endangered” and “critically endangered”.

2 Forest Policy and Legislation

2.1 National Forest Policy

Saint Lucia's forest policy has been revised in 2008. During the revision process, a participatory approach was adopted whereby the views of stakeholders throughout the country were obtained and discussed in view of reaching consensus on the major issues. The resulting policy framework is therefore truly national in scope and supported by the main interest groups. Further, the framework also embodies the commitments made by Saint Lucia by its ratifying the various bi-lateral and multi-lateral agreements and conventions relevant to the conservation and sustainable management of the country's forest resources.

The National Forest Policy Vision:

“The vision is for the effective protection and management of Saint Lucia's forests, soils, water supplies and biodiversity resources to ensure their sustainable contribution to the social and economic development of present and future generations.

This vision recognises the forest resource as a national asset of major importance that occupies some 38% of the island's land area and provides natural habitats for wildlife, protective cover for conservation of water and land resources, sources of wood and non-wood materials (including charcoal and natural economic products), attractions that enhance the country's vibrant tourism industry, and the basis for educating the society to raise awareness about forestry and environmental values in a small island economy.”

The National Forest Policy Objectives:

- Conserve and enhance the quality and productivity of the country's forest resources (natural and man-made) for ensuring a sustained flow of goods and services;
- Encourage and foster the participation of stakeholders in planning and decision-making for effective protection, management and development of the forests and wildlife;
- Educate and maintain a high level of public consciousness regarding the functions of and benefits to be derived from appropriate forest and wildlife conservation (wise use and protection);
- Conduct research and investigation into all aspects of the flora and fauna of the forests and the influence of forest cover on maintenance of water and soil resources, so as to provide the basis for informed management and development action.
- Establish and maintain effective institutional arrangements and innovative financial structures to ensure the efficient implementation of this policy and relevant legislation, plans and programmes that emanate from it.

The above policy makes it abundantly clear that Saint Lucia recognises the important value of its forest resources and their outspoken multipurpose character. There is a clear political will to manage these forest resources in a sustainable way, hence ensuring a balanced consideration of economic, ecological and social criteria when taking management decisions and planning concrete field interventions. In the same sense, Saint Lucia wishes to take its international responsibilities (UNFCCC, UNCBD, et al). by fully participating in the concerned programmes and frameworks. Another remarkable feature of the new policy is its focus on strengthening links with the civil society to seek synergies and to establish collaboration arrangements.

2.2 National Forest Legislation

The main legislative document dealing with forest resources and currently in force is the “*Forest, Soil and Water Conservation Act*” promulgated in 1946 and amended in 1957 and 1983. It is by this “Forest, Soil and Water Conservation Act” that the establishment and functioning of the Forestry Department (FD) is regulated. In addition, a number of important forest-related issues are regulated through the “Wildlife Protection Act” (1980). And to some extent, forest conservation and management is also assisted and guided by:

- The Saint Lucia National Trust Act (1975)
- The National Conservation Authority Act (1999)
- The Fisheries Act (1984)
- The Land Conservation and Improvement Act (1992)
- The Crown Lands Ordinance Cap. 108
- The National Development Corporation Act (1971) and
- The Water and Sewerage Act (2005)

In the context of the present report, it is considered useful to enlarge here a little on the *areas legally under management and/or control (law enforcement) of the FD*. Actually, the Forest, Soil and Water Conservation Act foresees in 3 such categories of land/forest areas. They are:

1. Forest Reserves (FR).

“The Forest Reserves can be considered as a special category of Crown land. Every FR must be surveyed and a map thereof published in the Gazette at the time of the proclamation of the Reserve. Upon the proclamation, the boundaries of the FR are to be marked out, defined and maintained in such manner as to be visible clearly at all times and thereafter no land shall be granted, devised or sold within the FR. (art 19 and 20)”

2. Protected Forests (PF).

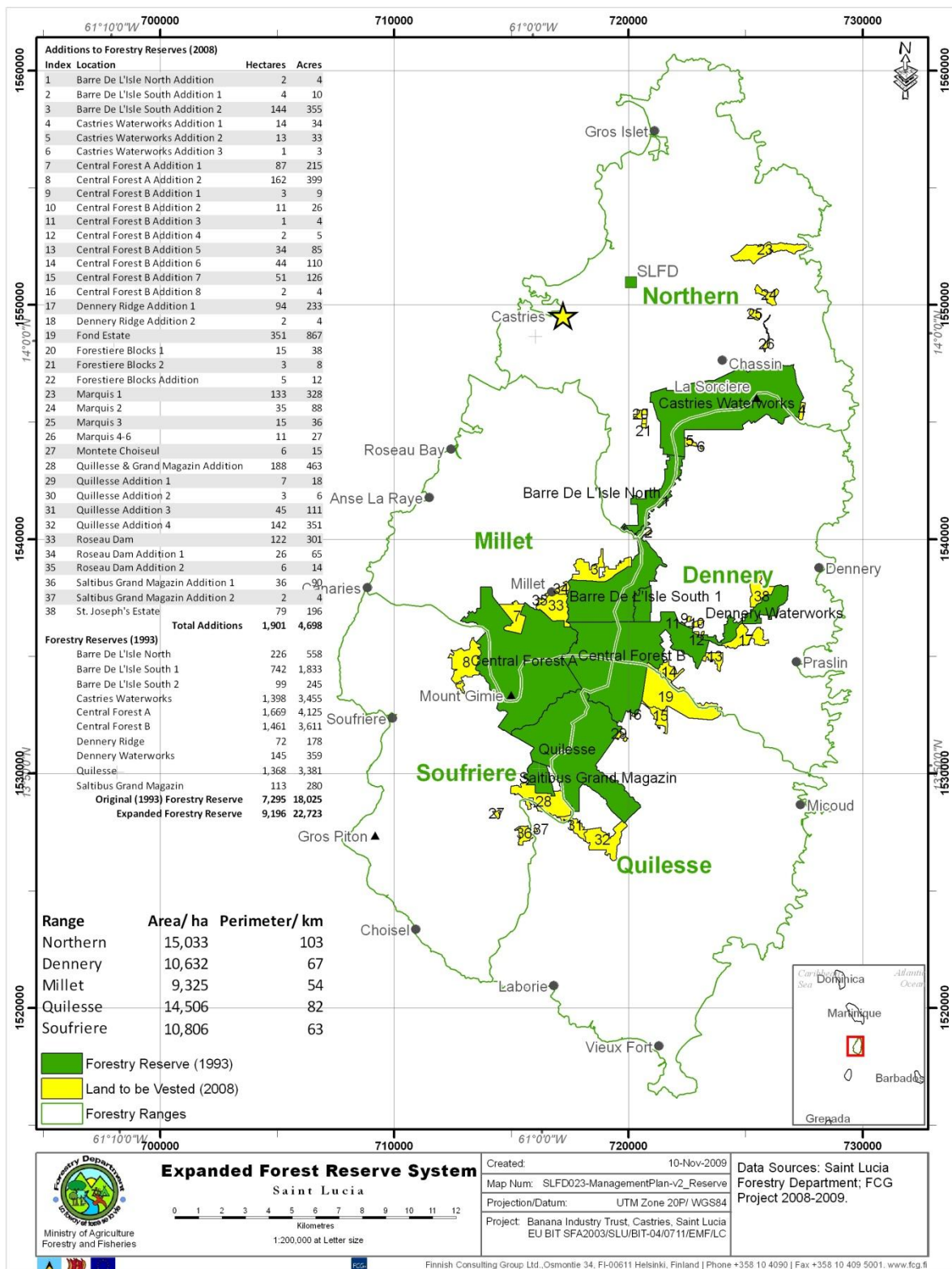
“Any lands other than Crown lands can be declared by the Governor General to be “Protected Forest”. Moreover the Governor General may by order make rules to regulate or prohibit certain activities in the Protected Forests. Forest Officers can enter any Protected Forest to inspect the area and to carry out surveys or works as directed by the Governor General. Upon the proclamation of any private land as a Protected Forest, the Chief Forest Officer (CFO) shall cause the area to be marked out and kept defined and shall have right to access for this purpose.”

3. Prohibited Areas (PA).

“The Governor General can declare any Crown land to be a prohibited area whenever in his or her opinion this appears to be necessary for any of the purposes set out in section 21 (declaration of protective area on private lands).”

Concretely, the existing Forest Reserve proclamations are based on the Statutory Instruments 48/1946, 55/1951, 10/1952, 53/1984 and 77/1985. So far, 10 Forest Reserves with a total area of 7,295 ha have been legally proclaimed. They are the “green areas” presented on Map 3. (Note: the 38 “yellow areas” are the proposed additions. They have a total area of 1,901 ha and comprise Crown Lands as well as private lands.)

Further, 18 areas in Saint Lucia have been legally declared as Protected Forests. They are situated in the following locations: two in the Quarter of Praslin; three in the Quarter of Anse-la-Raye; one in the Quarter of



Map 3: Expanded Forest Reserve System

Castries; one in the Quarter of Soufriere; one in the Quarter of Dennery; 5 in the Marquis Estate Area; one at Monier Plateau; one at Balata – Girard; one at Forestiere – Chassin; one at Derniere Riviere and one at Ravine Poisson. Some of these areas, for instance the Marquis Estate Area, are included in the proposed additions to the FR (the “yellow areas” in Map 3).

And two significant areas have been declared as Prohibited Areas. They are:

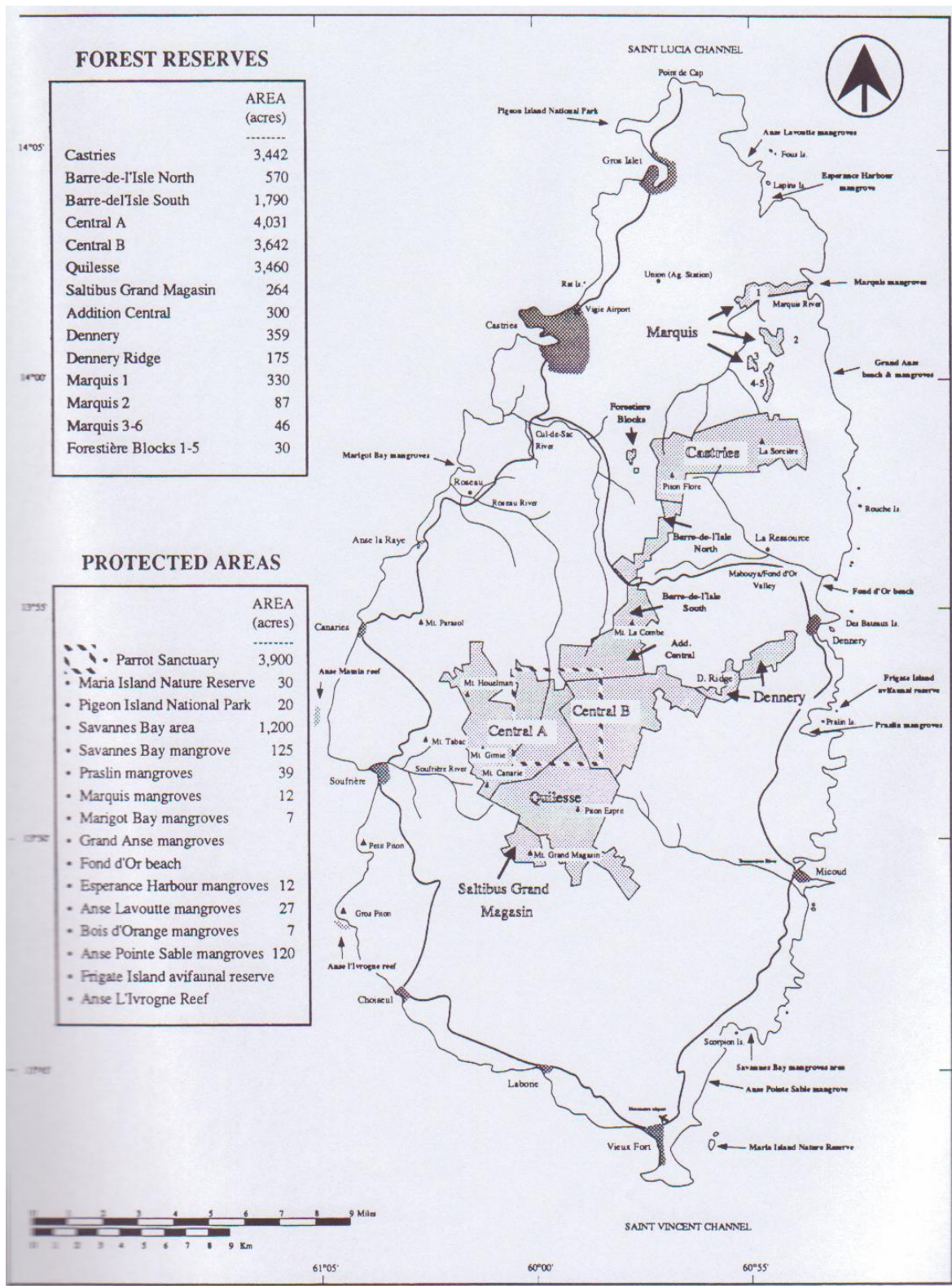
1. All that area of Crown Lands comprising 2600 acres more or less in the Quarters of Castries, Dauphin and Dennery which, forming the gathering grounds of the Castries Water Supply, was declared to be a Forest Reserve under the Castries Water Supply Act which is shown on a plan marker “A” lodged in the Crown lands Department. The said Reserve is known as the Castries Water Works Reserve.
2. All that area of Crown lands in the Quarter of Dennery comprising 365 acres more or less and forming the gathering grounds of the Dennery Water Supply which was escheated in 1899 and 1900 and is shown on the plan marker “B” lodged in the Crown lands Department. The said Reserve is known as the Dennery Water Works Reserve.

In addition, other categories of protected areas are/can be established under the Fisheries Act, 1984 and under the National Trust Act, 1975. These are listed below in Table 7.

Name of the Protected Area	Area (in ha)	Name of the Protected Area	Area (in ha)
The Parrot Sanctuary	1,578	Marigot Bay Mangroves	3
Maria Island Nature Reserve	12	Esperance Harbour Mangroves	5
Pigeon Island National Park	18	Anse Lavoutte (Cas-en-Bas) Mangroves	11
Anse-la-Liberte	56	Bois d’Orange Mangroves	3
Savannes Bay Area	486	Anse Pointe Sable Mankote Mangroves	49
Savannes Bay Mangrove	51	Fregate Island Nature Reserve	-
Praslin Mangroves	16	Anse Galet	71
Marquis Mangroves	5	Total area	2,362

Table 7: Protected areas in Saint Lucia other than the Forest Reserves
(source: The Forest Management and Conservation Plan, CIDA, 1992)

Map 4 indicates the location of the FR (existing and proposed though not all the presently proposed additions are included) and protected areas.



Map 4: Location of Forest Reserves and other Protected Areas in Saint Lucia.
(Source: CIDA Forest Management and Conservation Project, 1983)

Along with the development of a new forest policy, also the forest legislation has been revised. A *draft Forest Act* was finalised in June 2008 and submitted to the concerned authorities for approval. Apart from some general sections, the newly proposed Act comprises major paragraphs related to Forest Administration, Forest Management, Forest Protection, Harvesting of timber and non-timber forest products, Operation of a Forest Fund and Forest Law Enforcement.

As this report is specifically dealing with forest management, it is relevant *to briefly recall the main articles and prescriptions with regards to forest management plans*, being articles 11 and 17.

- Article 11: Forest Management Plans, stipulates:
 1. The Chief Forest Officer shall, once every ten years, prepare and submit to the Minister for his or her approval a forest management plan.
 2. A forest management plan shall contain such particulars and proposals as shall be prescribed in relation to:
 - (a) the land to which the plan relates;
 - (b) the forests and other natural resources on that land;
 - (c) the determination of an allowable annual cut and the production of other forest products in relation to the forests mentioned in paragraph (b);
 - (d) forest plantations proposed to be established and other silvicultural practices to be carried out;
 - (e) a conservation and protection programme;
 - (f) portions of the land proposed to be leased, the purposes for which the leased area is to be used and the terms and conditions of the lease;
 - (g) the role of the Department and other government agencies or statutory authorities in the implementation of the plan.
 3. Where the Minister has approved a forest management plan, the Chief Forest Officer shall ensure that the forest reserve and forest management area to which it relates are managed in accordance with the plan.
- Article 17: National Forest Management and Conservation Draft Plan, mentions:
 1. Within two years of the commencement of this Act, the Chief Forest Officer shall prepare a draft national Forest Management and Conservation Plan.
 2. The draft plan shall contain:
 - (a) a statement of the forest resource management and conservation policy;
 - (b) an inventory and description of forest lands;
 - (c) provision for the protection, conservation and production of forest resources;
 - (d) proposals for the protection of [watersheds], soil, [water], wildlife and other forest resources;
 - (e) an outline of the economic objectives for the sustainable development of wood-based industries in Saint Lucia;
 - (f) programmes for social forestry, community development and forest related education;
 - (g) proposals for implementation of the plan.
 3. In preparing the draft plan, the Chief Forest Officer shall consult with such statutory authorities, government departments or agencies, private conservation organizations and community based organizations as, in the opinion of the Chief Forest Officer, may be relevant, having regard to the contents of the draft plan.
 4. The draft plan shall, in such manner as the Chief Forest Officer thinks appropriate, be made available for public comment.

3 Forest Administration

As previously indicated, the *principle agency responsible for managing forest, soil and wildlife resources* on all Crown lands is the Forestry Department and it does so through legislative authority granted by the Forest Act currently in force: “The CFO is in charge of the management of all lands belonging to the Crown. Crown lands include (1) the waste or vacant land of the Crown within Saint Lucia and (2) all lands vested in her Majesty, whether by forfeiture, escheat, purchase or exchange. (art 3 and 2)”. Furthermore, the Forestry Department controls private lands if they are declared by law protected forests and/or prohibited areas. (see Chapter 2)

The Forestry Department forms part of the Ministry for Agriculture, Lands, Fisheries and Forestry (MALFF). The *senior executive team* of the Forestry Department consists of the Chief Forest Officer (CFO), the Deputy Chief Forest Officer (DCFO) and two Assistant Chief Forest Officers (ACFO). They are based at the main office in Union, together with some *technical and support units* that operate nationwide. They include the Education and Ecotourism Unit, the Wildlife Unit, the Watershed Management Unit, the Forest Research Unit, a Library, the Herbarium, the GIS & Mapping Unit, and the Financing Unit.

Geographically, the island has been divided in 5 *operational units or “Ranges”*: the Northern range, the Millet Range, the Dennery Range, the Soufriere Range and the Quillesse Range. Their boundaries are indicated on Map 3. Management and conservation interventions at range level are carried out by range teams, consisting of a Range Officer, 1 or 2 Forest Officers and 1 or 2 Forest Workers. On average, the range teams count 4 to 5 persons. If the need arises, e.g. when reforestation work has to be undertaken, additional forest workers can be employed on a temporary basis.

Many Range Officers or range-based Forest Officers have been assigned an additional task as activity leader in one of the central technical units. For example, the Range Officer of Quillesse is also the activity leader for the Wildlife Management and Wildlife Research Units, a Forest Officer of the Dennery Range is also in charge of the Watershed Management Unit and in the near future he might be assigned the additional task of Forest Management activity leader, and the Millet Range Officer also leads the Forest Research Unit.

The recurrent *budgets* allocated to the FD between 2005 and 2007, were:

Year	Total recurrent budget	Personnel costs	Operational costs
2006-2007	2,604,690	2,376,240	228,450
2005-2006	2,166,260	1,957,147	209,113
2004-2005	1,992,536	1,783,644	208,892

Table 8: Recurrent budgets to the FD between 2005 and 2007.

The Forestry Department had no capital projects during this period, and hence no special capital budgets.

4 Forest Management / Silviculture

4.1 Forest management objectives

Saint Lucia has a *tradition of multipurpose forest management* with – at least over the last few decades – a clear emphasis on soil and water conservation, biodiversity protection and recreation/tourism. Given the ecological (topography, hydrology, biodiversity), economic (small island economy, priority on tourism development, competition in the timber market, low investment in the timber sector) and institutional (limited financial and human resources at the FD) situation, this choice has been quite appropriate and has enabled Saint Lucia to preserve a good forest cover on more than 35% of its total land area. Still, it must be admitted, the production potential and role of the forest – be it for timber or non-timber products – seems to have been neglected to some extent.

4.2 Previous forest management plans

Over the last 30 years, two major forest management and conservation plans (FMCP) were developed in Saint Lucia, providing overall guidance to the FD staff in the detailed planning and implementation of management interventions and operations. Both these plans were developed in the frame of a long-term technical assistance programme, financed by the Canadian International Development Agency (CIDA). The first FMCP covered the period from 1984 to 1994 and the second one – equally a 10-year plan - from 1992 to 2002.

Forest Management and Conservation Plan I (FMCP I): 1984 - 1994

The outspoken multifunctional character of the forests in Saint Lucia was already emphasized in the 1984-'94 management plan. This is, for instance, clearly reflected in the three distinct management categories that were introduced and which are still in use (though the second category is now called “multifunctional forest”). These management categories are:

- Protection forest (67% of the FR at that time)

This category consists of areas with slopes greater than 30 degrees, areas with unstable soils, critical watersheds, banks of major rivers, and areas with unique species of flora and/or fauna. These areas for protection were primarily defined on the basis of their location in the water catchments - the main ones being concentrated in the central forested areas of the island. Additional areas requiring protection were determined during the forest inventory, and were sites with extremely broken terrain (short, steep slopes and ridges intersected by deep straight-sided ravines). Also the Parrot Sanctuary, an area of some 1606 ha mainly within the Central Forest Reserve, is included in this category. The Sanctuary was created under the Wildlife Act of 1980 but has never been gazetted.

- Protection/production forest (28% of the FR at that time)

Protection/production forest comprises areas with slopes less than 30 degrees which require special management attention due to their importance as wildlife habitats and/or to their position in the watersheds. In short, they have an important protection function but limited harvesting of selected commercial species is considered possible.

- Exploitation forest (only 5% of the FR at that time)

This third and minor category represents all forest lands without any of the above-mentioned constraints. These areas of natural forest are available for more extensive harvesting operations.

It should be noted that these categories only relate to the natural forest and do not include tree plantations.

For each of these categories, rather general guidelines were given for silvicultural interventions and harvesting. The few figures and quantitative indications of e.g. annual allowable cuts were based on a timber inventory carried out in 1982. At the time, also *provisional* volume functions were developed for 6 groups of species. (Table 9). The FMCP emphasises the provisional character of the functions as they are based on data recorded from only 318 trees, all groups included.

In order to refine these volume functions and to collect over the years more (quantitative) data on growth and regeneration in different sites, for different forest types, and under different treatments, a number of permanent sample plots were established in the Forest Reserves. Guidelines and formats for subsequent measuring at 5-year intervals were included in the FMCP.

Group	Tree species
1	Kontwévan (<i>Pouteria semicarpifolia</i>), Pennépis (<i>Pouteria multiflora</i>), Bwa kot wouj (<i>Tapura antillana</i>), Chatannyé (<i>Sloanea caribaea</i>), Kakoli (<i>Inga ingoides</i>), Lansan (<i>Protium attenuatum</i>)
2	Bwa blan (<i>Simarouba amara</i>), Laglu (<i>Sapium caribaeum</i>), Dédéfouden (<i>Ormosia monosperma</i>), Fèy dowé (<i>Micropholis guyanensis</i>), Balata chyen (<i>Pouteria pallida</i>), Lowyé mabwé (<i>Ocotea leucoxylon</i>)
3	Bwa wivyé (<i>Chimarrhis cymosa</i>), Bwa pan mawón (<i>Talauma dodecapetala</i>), Bwa di bas (<i>Myrtaceae spp.</i>)
4	Bwa damand (<i>Hieronyma caribaea</i>), Kas (<i>Swartzia caribaea</i>), Kòsòl mawon (<i>Guatteria caribaea</i>), Maho kochon (<i>Sterculia caribaea</i>)
5	Lowyé spp (other than Lowyé mabwé), Gonmyé (<i>Dacryodes excelsa</i>), Bwa di mas (<i>Licania ternatensis</i>)
6	All others

Table 9: Groups of species for which volume functions were developed (Source: FMCP I, 1984)

Also for tree plantation development, including the management of existing tree plantations and the establishment of new plantations, several tools and guidelines were developed and left:

- Analysed data from a timber plantation inventory whereby the plantations were categorised in 11 strata depending on the species and age class.
- Provisional yield tables were developed for blue maho (*Talipariti elatum*; ex- *Hibiscus elatus*) and Honduras mahogany (*Swietenia macrophylla*). Again “provisional” for the same reason as above in the natural forest.
- Permanent sample plots were established in the plantations.
- Detailed thinning schedules for the Blue maho (BM), Honduras mahogany (HM) and mixed BM + HM plantations at compartment level.
- Plantation register forms were designed allowing for structured and uniform data recording on spacing, survival checks, species, weeding, use of fertiliser, implemented thinnings (volumes, type of product), final fellings and other treatments.
- Plantation site assessment forms were designed.
- Specifications for charcoal making projects using *Leucaena*, including interplanting methods with pine and teak.

- Specifications for Taungya projects for reforestation purposes, including Taungya agreement forms with the farmers to be involved.

And finally, reporting forms to be used at the central and/or range level were designed and presented. A few examples of such forms:

- Form for equipment and material inventory
- Area patrol form
- Forest produce licence
- Timber cutting licence
- Forest report form (offences)
- Illegal occupation form
- Officer's daily report form
- Head Office Report Forms: various administrative and budgeting forms

Forest Management and Conservation Plan II (FMCP II): 1992 - 2002

The FMCP II consisted of a comprehensive 3 volume document of which volumes 2 and 3 unfortunately seemed to have been lost, and thus could not be consulted. The 3 volumes are entitled:

Volume 1: Forest Management Plan (1992-2002).

Volume 2: Support information to the Forest Management Plan

Volume 3: Watersheds of Saint Lucia, including tables and maps with land tenure and land use features and with identified conflicts and recommended treatments for each of the 37 watersheds of Saint Lucia.

Also this FMCP II recognised the multifunctional character of the forests of Saint Lucia and prepared a zoning map for the Forest Reserves which will be further presented in chapter 8. Basically, the management categories as defined under FMCP I were maintained, only the name of the protection/production forest category was changed into "multifunctional forest". The management plan was elaborated on the basis of 16 priority management areas, covering all forests of Saint Lucia and including significant buffer zones on the borders of the existing Forest Reserve System. For each of these areas, the plan indicated management objectives and corresponding strategies. Table 10 provides an overview of the management objectives and strategies that were recommended for these areas that coincide with the existing Forest Reserves and their proposed additions. The level of guidelines and recommendations in this FMCP II, as far as one could gather from the available volume 1, was fairly general. No new inventories were carried out, very few quantitative data were analysed and used, no recommendations on species to use for reforestation and/or enrichment planting were given, no recommendations regarding thinning treatments, etc... On the other hand, extension forestry was given a more prominent place in the strategic approaches.

Being so general and all-encompassing in nature without any suggestions in terms of priority-setting, thereby far exceeding the financial and staff capacity of the FD for its eventual implementation, turned this document in a rather unpractical one.

<u>Forest Reserve / Area</u>	<u>Management objectives</u>	<u>Management strategies</u>
Marquis Forest Reserve (CIDA-area #2)	<ul style="list-style-type: none"> - Low intensity production / protection forestry (Marquis 1) - Recreational and environmental education (Marquis 1) - Recuperation of the invaded lands and reforestation (Marquis 2, 3 and 4-6) 	<ul style="list-style-type: none"> - Extension forestry in the buffer zone - Development of a nature trail - Evacuation of squatters - Reforestation of vacated areas
Castries Waterworks Forest Reserve (CIDA-area #3)	<ul style="list-style-type: none"> - Protection forestry (300 acres) - Production/protection forestry (3000 acres) - Management of existing plantations (270 acres) - Water production (350 acres) - Recreation and interpretation 	<ul style="list-style-type: none"> - Boundary line maintenance and patrolling to prevent encroachment - Eviction of squatters mainly in the southeastern part of the reserve (150 acres) - Plantation of the vacated areas with native or exotic species - Maintenance of plantations - Thinning of existing plantations - Extraction of wood products - Enrichment planting - Construction and operation of a nature trail at Piton Flore - Extension forestry mostly all around the reserve (12 miles) - Road and track maintenance
Barre de l'Isle North Forest Reserve (CIDA-area #4)	<ul style="list-style-type: none"> - Production/protection forestry 	<ul style="list-style-type: none"> - Boundary line maintenance and patrolling - Enrichment planting in degraded forests - Management of the existing and future plantations - Extension forestry all along the boundary (buffer zone)
Barre de l'Isle South Forest Reserve (CIDA-area #6)	<ul style="list-style-type: none"> - Production/protection forestry - Extension forestry - Expansion of the forest reserve - Water production 	<ul style="list-style-type: none"> - Boundary line maintenance and patrolling - Eviction of squatters - Plantation of vacated areas - Maintenance of plantations
Dennery Waterworks Forest Reserve (CIDA-area #7)	<ul style="list-style-type: none"> - Production forestry - Water production - Nature interpretation 	<ul style="list-style-type: none"> - Boundary line maintenance and patrolling - Forest management interventions adapted to this area - Development of nature interpretation activities in a life zone that is very different of the rain forest - Extension forestry in the buffer zone (focused on the northern part, where the pressure is higher)

		<ul style="list-style-type: none"> - Development of awareness and action plans for the Ravine Saut catchment area where land use conflict is high - Development of Crown Lands activities (land use control and reforestation) in the water catchment and in the Pelouze Estate
Central A Forest Reserve (CIDA-area #5 : Roseau Watershed and Parrot Sanctuary)	<ul style="list-style-type: none"> - Protection forestry - Wildlife protection - Recreation and education - Water production 	<ul style="list-style-type: none"> - Surveying and mapping of the boundaries of the Parrot Sanctuary - Boundary line maintenance and patrolling - Census of parrots
Central A Forest Reserve CIDA-area #11 : Central A FR Eastern Access zone)	<ul style="list-style-type: none"> - Protection forestry - Environmental education 	<ul style="list-style-type: none"> - Boundary line maintenance and patrolling: the area can be considered partly self protected due to its difficult topographical conditions and only necessitates a general protection programme of moderate intensity. - Environmental education: there is an interpretative potential in the Mount Gimmie area, which however would need a difficult infrastructure, with access from Millet, far away, for its development.
Central B Forest Reserve (CIDA-area #5 : Roseau Watershed and Parrot Sanctuary)	<ul style="list-style-type: none"> - Protection forestry - Wildlife protection - Recreation and education - Water production 	<ul style="list-style-type: none"> - Surveying and mapping of the boundaries of the Parrot Sanctuary - Boundary line maintenance and patrolling - Relocation of land owners in the Northern part of the Roseau water catchment area and reforestation using native species - Census of parrots - Establishment of a nature trail for wildlife interpretation in the access zone that will be created in the Roseau Dam Project.
Central B Forest Reserve (CIDA-area #6)	<ul style="list-style-type: none"> - Production/protection forestry - Extension forestry - Expansion of the forest reserve - Water production 	<ul style="list-style-type: none"> - Boundary line maintenance and patrolling - Eviction of squatters - Plantation of vacated areas - Maintenance of plantations - Preparation of a plan to include the Ravine Calfourc forest to the Central B Forest Reserve, taking into account its potential use for future water catchment development - Extension forestry in Raillon Nègre and Raillon Disciples to protect the forest where the pressure is high and agricultural encroachment exist - Extension forestry and awareness programme in the lower part of the Ravine Bouceau water catchment area.

Quillesse Forest Reserve (CIDA-area #8 : Western part of Quillesse FR)	<ul style="list-style-type: none"> - Production/protection forestry - Water production - Environmental education - Management of plantations 	<ul style="list-style-type: none"> - Evacuation of squatters in the south-eastern part of the FR (360 acres) - Reforestation of vacated areas - Maintenance of plantations - Development of the Rain Forest Walk and improvement of the existing infrastructures - Awareness and extension forestry activities in the water catchments No 16A, 16B and 17A aiming to reforest as much land as possible on steep slopes and control land use and chemicals on more gentle slopes - Production/protection forestry in the accessible areas - Extension forestry activities in the buffer zone to help preventing encroachment
Quillesse Forest Reserve (CIDA-area #10 : Quillesse, access zone Edmund Forest)	<ul style="list-style-type: none"> - Production forestry and protection - Environmental education - Water production 	<ul style="list-style-type: none"> - Improvement of the access road of Fond St Jacques (in process) - Improvement of the nature trail in view of tourism development (in process). A protection zone all along the nature trail should be considered where no harvesting of the plantations should be done. - Production forestry for most part of the Edmund Forest, except for a small part on the northeastern side of the plantation where steep slopes are present. An experimental small scale harvesting activity should be developed in the Edmund Forest, in order to assess the feasibility of the activity and its impact on the environment. - Evacuation of squatters (appr 70 acres) and reforestation of the vacated areas in the southwest part of the reserve (Mount Grand Magasin) and extension forestry around the same area - Awareness and extension programme in the Woodland water catchment area.

Table 10: Management objectives and strategies according to the CIDA Forest Management and Conservation Plan, 1992 - 2002

4.3 Practical implementation of the FMCP I and II

The FD has been very active in a diversity of areas: addressing encroachment issues (patrolling, identifying squatters, awareness raising, the whole process of eviction and reforestation of the vacated areas), ensuring watershed and riverbank protection, exploring opportunities for expanding the FR system, environmental education programmes, organisation of eco-tourism activities, wildlife protection and management and nursery production, in particular Christmas tree production. Further, FD staff has been heavily engaged in a number of projects and studies carried out in Saint Lucia in the frame of international cooperation. Also active participation in national inter-institutional processes as well as in regional and international forest-related programmes has put a significant burden on the FD staff. In short, many proposed management objectives have been achieved and the joint efforts have resulted in the rather well-preserved and expanded Forest Reserve System of today.

Yet, in the area of silviculture and, more generally, timber production, surprisingly little has been done. All the existing capacity seems to have been channelled towards activities related to the other forest management objectives. Actually, almost no follow-up has been given to the very detailed and elaborate recommendations on silviculture included in the FMCP I.

- Though thinnings have been carried out in some plantations, there has been no systematic implementation of the proposed thinning schedules leading to a commercially valuable end product. This is how most of the timber plantations have turned over the years into the current uneven aged stands with a species composition combining the exotic plantation tree species, predominantly Blue maho and Honduras mahogany, with species from the natural forest regenerating spontaneously in the plantation areas.
- Related to the issue above, almost no use has been made of the Plantation Registers and Plantation Site Assessment Forms. The use of these Registers in the Ranges has been very sporadic, and the last data entries that could be demonstrated, dated from almost 10 years back. In other words, from the few operations that have taken place in the plantations over the last decades, only for a small percentage have the associated data (volumes, number of stems, species, labour input, revenue generated, diseases,...) been recorded. As a consequence, there is no means today to assess for instance the appropriateness of the earlier recommendations related to rotations, stockings and thinning volumes nor of the economic profitability of the interventions. No additional data exist to refine the provisional volume tables developed under the FMCP I. It cannot be overstressed, by not taking records, one loses the opportunity to improve and adapt earlier recommendations on the basis of acquired experience and accumulated knowledge on silvicultural characteristics of the concerned species and of the forest dynamics in response to interventions.
- The Permanent Sample Plots established in 1983 as part of the CIDA Forest Management and Conservation Project and covering tree plantations as well as natural forest were meant to be measured at 5 year intervals. In practice, they have only been measured in 1985, 1991 and in 1997, hence the last measurement dates from more than 10 years ago. Neither preliminary analysis or compilations of the measurements done are available. It was only now, under the impulse of the Forest Demarcation and Inventory Project, that the FD shows renewed interest in collecting data from Permanent Sample Plots.
- When it comes to current practice related to harvesting and sale of timber, this is managed as an “on demand” event. A licensed person who wishes to harvest one or more trees, approaches the Range Office in charge and points out the tree(s) he wants to take down. In most cases, the Range Officer approves and ensures that the correct legal procedures in terms of documents, payments and actual control in the field are complied with. As far as one could observe, the registration of harvesting and

sales data is properly done at the Range Level. There is however no compilation of these data at central level, nor any analysis and feedback of findings into management practice.

The above-described “on demand” harvesting practice has important silvicultural implications. On the one hand, harvesting levels are low to very low and the equipment used is basic and light. In short, low impact harvesting is common practice in the Forest Reserve system of Saint Lucia. On the other hand, it is the “client” who selects the trees to be harvested and he certainly does that on the basis of his own interests, meaning that he will select the tree(s) of the best quality, with the ideal market dimensions and preferably situated in an area with easy access. As such, silvicultural criteria that guarantee the maintenance and even improvement of the productivity of the forest in the long term are not taken into account. As a matter of fact, the forests are being “creamed off”; their productivity – not in terms of biomass but in terms of good quality and marketable timber products – is declining and will continue to do so if the FD does not put an end on this “on demand” harvesting practices and adopts a more proactive approach. The negative effects of this bad harvesting practice like the unfavourable spatial distribution of good quality trees of desired species and the abundance of deformed and otherwise undesirable trees, are clearly visible in many of the stands visited.

- Data on the harvesting of non-timber forest products such as lianas, bamboo, latanye, incense, etc – as far as it concerns legal harvesting – are available at the Ranges. Records are kept on the product, the volume, the fees to be paid, the harvester, and the moment of harvesting. As for the timber harvesting, these data have not been compiled at central level for the last 10 years and they are not capitalised in view of better management decisions and practices. Also with regards to the non-timber forest products, the FD control of the harvesting activities is mainly limited to the issuing of licenses, the collection of the due payments, and the control of the volumes of product removed. More silviculture-oriented management like for example, delimitation of areas where to harvest, application of rotation periods, prescribing appropriate (= sustainable) harvesting levels based on production (not harvesting) data, stimulating re-growth and regeneration, assessment of qualities, etc... all of these being strategies leading to an optimal but sustained use of the concerned forest products. It is worthwhile to refer in this context to the study on the use of incense recently carried out (report in progress) by one of the FD staff. Further such studies on incense and on other non-timber forest products would allow the development of an adequate management of these products, simultaneously improving volumes, quality, sustainability and profitability of the activity.
- Further on the general topic of measuring, recording and analysing data related to management activities and their impacts on the resource, the FD Unit on Environmental Education and Eco-tourism should be commended for its discipline in this respect. The Unit has developed a good database which is kept up-to-date and whose data are analysed at a regular basis. Thanks to this effort and discipline, this Unit is now in the comfortable position of making rational and sound decisions on their strategies to follow. Hence, the analysed data, showing bottlenecks, critical sites, operational inefficiencies, main assets, etc..., readily reveal them crucial knowledge on the quality of their activities and on the level of achievement of their management objectives. Being aware of these issues means a first essential and necessary step towards improved (and sustainable) management.
- Outside the Forest Reserves, charcoal projects were initiated under the CIDA Forest Management and Conservation Project. On private unproductive scrub woodlands and marginal agricultural lands, plantations were established for the production of charcoal, using mainly *Leucaena leucocephala*, a tropical legume species with a wide variety of uses and capable of growing rapidly on neutral to alkaline soil. However, there has been no follow-up on these plantations and the intended charcoal production has never materialized.

5 Some notes on forest-based economies

In 2008, PKF Consulting carried out an economic study for the Forestry Department, culminating in the “Strategic Business Plan for Saint Lucia’s Forest Sector”. The business strategies recommended by the study are based on an economic analysis of the different revenue generating activities that the FD undertakes. The forest products/services concerned are: timber, Christmas trees, cut flowers, Latanye brooms, Mauby bark and tour guiding activities on the various forest trails. The summary findings of PKF Consulting - presented below - provide a relevant background for further recommendations in the next chapters. For a more complete discussion on the timber production sector, also findings and conclusions generated by the “Investigation of the revitalisation of the local timber industry in Saint Lucia” carried out by the Forestry Department in 2002 have been used.

5.1 Timber

Table 11 provides information on the volumes (in cu ft) of timber sold between 1990 and 2002 from 3 timber producing ranges, being Dennery, North and Soufriere as well as on the revenue (EC\$) obtained from the sales. The figures include timber extracted from both Crown Lands and private lands. Attention should be drawn to the fact that the industry has been on a steady decline where revenues have been cut by more than half in the period 1996 – 2001. In 1996, EC\$ 10,568.05 was generated whereas in 2001 only EC\$ 5,147.20 was gained from timber sales within the top three timber producer ranges on the island.

Year	Volume (cu ft)	Revenue (EC\$)	Year	Volume (cu ft)	Revenue (EC\$)
1990	4,796.69	6,786.69	1997	5,373.7	7,370.7
1991	5,131.42	7,122.42	1998	2,667.15	4,665.15
1992	8,008.4	10,000.4	1999	4,294.47	6,293.47
1993	8,419.37	10,412.37	2000	4,214.31	6,214.31
1994	5,931.47	7,925.47	2001	3,146.2	5,147.2
1995	4,211.98	6,206.98	2002	2,887.04	4,889.04
1996	8,572.05	10,568.05	Total	22,582.87	34,579.87

Table 11: Revenue and Volume from Sale of Timber (1990 to 2002).

(Source: Investigation of the revitalisation of the local timber industry in Saint Lucia, 2002)

In Table 12 some more figures are presented on timber volumes extracted and registered by the Forestry Department over the periods 1983 to ‘90 and 1995 to ‘98. Contrary to table 11, these figures cover all ranges. The data are extracted and computed from the FD Timber Removal Permits.

COMMON NAME	SCIENTIFIC NAME	VOLUME 1983-90 (in m ³)	VOLUME 1995-98 (in m ³)	TOTAL FOR 12 YR PERIOD (in m ³)	ANN. AV. (in m ³)
A. Natural Forest					
Gommier	<i>Dacryodes excelsa</i>	407	34	441	38
Lowye Mabwe	<i>Ocotea leucoxyton</i>	175	57	232	19
White Cedar	<i>Tabebuia pallida</i>	546	632	1178	98
Bwa Blan	<i>Simarouba amara</i>	467	17	484	40
Bwa Damand	<i>Hieronyma caribaea</i>	188	13	201	17
Red Cedar	<i>Cedrela odorata</i>	223	20	243	20
Bwa Kweyol	<i>Myrcia deflexa</i>	0	1	1	Insignificant
Bwapen Mawon	<i>Talauma dodecapetata</i>	45	8	53	4
La Glu	<i>Sapium caribaeum</i>	88	0	88	7
Total Natural Forest					243
B. Plantation					
Mahogany	<i>Swietenia macrophylla</i>	375	164	539	45
Blue Maho	<i>Hibiscus elatus</i>	131	18	149	12
Caribbean Pine	<i>Pinus caribaea</i>	0	26	26	2
Total Plantation					59

Table 12: Forestry Department Timber Removals

The table shows that of the estimated annual allowable cut of saleable standing timber of 610 m³ (FMCP, CIDA) only 145 m³ (excluding white cedar, which occurs in the Dry Forest outside the Forest Reserves) were extracted. Of the estimated annual plantation wood supply of 1,516 m³, a quantum of only 57 m³ of blue maho and mahogany was extracted. Or, one can conclude that *the existing timber potential has been (and is being) seriously underutilized*.

Low priority given by the FD to the productive role of the forest together with unfavourable market conditions seem to be the main contributing factors to this underutilisation of the available timber resources. As a matter of fact, the market is characterised by a *fierce competition of cheaper imported wood products* causing less demand for locally produced timber. Over the years, Saint Lucia experienced a gradual increase in imported timber volumes, supplying the local furniture makers and woodcraftsmen with cheaper alternatives, and in 2002, timber was imported from 29 different countries.

In the first place, locally harvested timber is considerably more expensive due to higher extraction costs caused by the difficult terrain conditions (steep slopes), limited accessibility of the forest stands (forest road network), the required licences and expensive royalties to be paid at the FD, and the small-scale of the enterprises. Secondly, furniture operators claim that – apart from the market price – some other reasons make them prefer the imported wood. For instance, for the processing of locally produced wood, they need more expensive equipment, more skills and more time as more manipulations need to be done. In addition, they report regular problems regarding the quality. And finally, they find themselves at times demotivated to purchase local timber because of the often difficult and lengthy procedures to obtain wood from the forest through the FD.

Another important element having impact on the market price is the small scale of the timber harvesting operations whereby investment in sophisticated logging equipment is not warranted. Though the use of the chainsaw is the norm for felling and bucking, no mechanisation is used in extraction. Extraction is done manually and for this reason, round-wood is sawn at the stump with Alaska mills.

5.2 Christmas trees

The growing and sale of Christmas trees started in Soufriere in the 1960s with only a few trees, but the industry has developed into a substantial revenue earner for the FD. In 2004 the earnings of the industry, at EC\$ 28,356, were second only to revenue derived from nature trail visitation. The species used is the Cypress (*Cupressus lusitanica*) which is raised in the Union nursery from seed imported from Holland. Presently there are four sites, totalling just under 2 ha devoted to Christmas tree growing – Union, Forestiere, Fond D’Or and Patience. Despite the considerable earnings, the production and sale of Christmas trees is more or less a breakeven business for the FD. For, *profitability is limited, not so much by prices in the market, but by high production costs associated with weeding, pruning/shearing, fertilizing, drainage and irrigation.*

5.3 Anthurium lilies

Today there are about 2 ha of Caribbean Pink Anthurium lilies in FD plantations, mostly at Edmond Forest, where it is the intention of the FD to propagate up to 3.2 ha. Another small area has been established at Quillesse. FD labour maintains these lily fields by weeding and spraying with insecticide (VIDATE). The principal outlets for these cut flowers are Flower Shops and Hotels. In 2007-08, a total of 1,314 dozen were so delivered at EC\$ 7 per dozen (Growers in the private sector sell at EC\$ 8-9 per dozen). *The cost of production in 2007-08 at EC\$ 7.06 per dozen exceeded the selling price of EC\$ 7 per dozen.*

5.4 Latanye brooms

The principal raw material for latanye brooms comes from a local palm called Latanye (*Coccothrinax barbadensis*), which occurs naturally in the littoral woodland and scrub woodlands on limestone near the coast, from sea level to an elevation of 200m. The Latanye broom industry is based on the harvesting of leaves from wild stock. Broom handles are made from Dry Forest species, mainly Bwa Madam (*Guetarda scabra*).

The Saint Lucian Latanye broom is in great demand locally and in other Caribbean islands. This has resulted in *tremendous pressure on the wild resources and a dwindling supply of mature leaves* and hence brooms for the markets. The FD has risen to this challenge by initiating the cultivation of Latanye. The Department secured Latanye wildings from the forest and propagated them in a nursery. The plants were then used in the establishment of research plantations in the Forest Reserves at Marquis and Fond D’Or. The intention was that these plantations would eventually provide adequate stocks of seed for production in the nursery at Union.

The FD with Extension services has assisted farmers to establish about 35 plantations, with an average size of 0.4 ha, of pure and mixed plots of Latanye. In the mixed plots, the Latanye is invariably intercropped with Mauby (*Colubrina elliptica*). Research is being conducted in these plots with a view to the establishment of full-fledged plantations from community nurseries so as to sustain the broom industry, but this is some way off. The supply position for Latanye brooms will continue to be short in the near future.

The making of Latanye brooms has survived many years as a traditional subsistence-type cottage industry. Broom makers are invariably unorganised individual women. However, the FD has encouraged the formation of one association of broom makers in the La Pointe area trading under the name of Superior Brooms. Leaf harvesting and broom production is a year-round activity. Broom makers purchase cut leaves from harvesters but also do their own harvesting for which they pay the landowner by the bundle. It has been reported that most current harvesting occurs illicitly on Crown Lands and absentee-owned private lands.

Raw material constraints have created a situation where producers cannot make enough product to fill the demand in the market. Medium-term projections put broom production at about 30,000 per year (10,000 household and 20,000 children). This is based on a once-per-year harvest of leaves from 16 ha of plantation.

5.5 Mauby Bark

The Mauby bark industry is in its infancy even though the harvesting from the wild of bark and twigs for household use and small-scale vending has been going on for many years. In 2001, however, the FD embarked upon a joint venture with the St. Lucia Rural Enterprise Project, *inter alia*, to explore the cultivation of Mauby (*Colubrina elliptica*) as a mixed crop with Latanye. It was felt that the project would guarantee the survival of both species while offering farmers and landowners the chance to reap economic benefits in an environmentally friendly manner.

Experimental plots of Latanye and Mauby have been established and bark and twigs harvested from 3-yr old Mauby trees. Samples of the product have been tried at Baron Foods Limited, a well-developed local agro-processing enterprise. *The results were not encouraging, for the local bark proved to possess only one-tenth of the strength of bark originating in Haiti.* Baron imports this bark bone dry and of the highest quality from Barbados at about EC\$8 per lb. This is then used in the manufacture of Mauby syrup for the overseas ethnic market that is the Caribbean Diaspora. Vendors in the Castries market pay EC\$6 per lb. for a lower grade product from Barbados. They retail it in small plastic bags at EC\$5 per bag.

As far as is known, commercial plantations of Mauby, intercropped or not with Latanye, have not yet been established. Production in commercial quantities is projected to commence in 2012 when about 270,000 lbs per year of bark and twigs will come on stream. This is based on a plantation carrying 538 trees per acre, each tree yielding 12.5 lb of bark and twigs.

5.6 Eco-tourism services

The Forestry Department is making a major contribution to the eco-tourism product on the island through a system of six forest trails and three hiking trails through the rainforest. The department also provides an eco-lodge and campsite at one of its locations.

The operation of the forest trails has not been considered as purely a business venture: these trails also have a role in fulfilling the FD's mandate to provide the rural communities with sustainable livelihood opportunities. Despite this, the aim is to recoup as much of the expenses associated with the trails as possible from admission fees. These fees are by far the largest contributors (78%) to the total revenue generated by the FD.

Yet, visitation of the forest trails and the related revenue from this business activity, has trended downwards substantially over the past five years. So much so that *for the 2006/2007 financial year, expenditure exceeded revenue, indicating that the viability and sustainability of this economic activity is threatened.* Furthermore, this decline has occurred during periods when annual tourist arrivals to Saint Lucia have been increasing.

5.7 Other non-timber forest products

Apart from the timber and non-timber forest products mentioned above, the following products are regularly harvested / hunted from the forest: lianas or lyenn, segune, bamboo, tanbark, orchids, kuskus grass, kwab, lansan, bak, mannikou, kochon, gom, agouti, yet chyenn and leza. However, no records on these species are available on volumes, exact harvesting places, number of harvesters, whether the harvesting is done for personal or commercial use, etc.

5.8 Conclusions

Between April 1999 and March 2006, the admission fees to the forest trails counted for 78% (EC\$ 1,763,183) of all revenue to the FD. In the same period a further 20% of revenue was generated from the sale of forest produce, with the remaining 2% from rental and registration fees.

Over the last few years, the costs of the touring activities exceeded the revenue and the Christmas tree production and sale resulted to be more or less a break-even operation. In the Anthurium business, the costs clearly exceed the selling price; the local Mauby bark seems to have a quality problem and the production of Latanye brooms suffers from resource shortage. As for the timber production, a good range of marketing and coordination aspects in this sector will need to be addressed in a well thought out, strategic way.

Guidelines for Future Forest Management

6 Role of the Forest Department

The present short paragraph has been included in this report as a reaction against (1) the statement from the Strategic Business Plan for the Forestry Sector that “The goal of the revenue earning segment of the Forestry Department is to maximize the profitability of its commercial operations within the constraints of conservation and sustainability” and (2) the concurrent comment repeatedly heard from several FD staff during the field phase in Saint Lucia that “the FD should/will start operating as a commercial enterprise”.

It should be kept in mind that the FD is and remains a public service operating with public funds and having the mandate to manage and conserve the public forest resources in the best interest of the entire island. As such, the performance of the FD should be assessed not on the basis of its profitability but on the efficiency in the services it renders to the community. In the specific situation of Saint Lucia, crucial services include watershed protection and hence ensuring a steady water supply of clean water; soil conservation and hence preventing landslides, damage to farming lands and crops, houses and other infrastructure; forest landscape and biodiversity preservation on which the for Saint Lucia so important tourism sector partially thrives; and enhancement of the production capacity of the forest so that local jobs and revenue can be generated. Besides its responsibility at national level, the FD also has a role to fulfil towards the international community, e.g. in complying with the commitments Saint Lucia made by ratifying the international conventions on climate change (carbon sequestration/storage) and conservation of biological diversity.

The above is very different from focusing on commercial activities and operating as a commercial undertaking. Furthermore, linking the annual budget for the FD to revenues generated – another statement that has been heard and read during the visit to Saint Lucia – is by no means a correct nor an acceptable approach. If linked to merits and performance, the annual budget for the FD should be coupled to its contribution in the economic/monetary values of water supply, soil stability, tourism sector enhancement, sustained production of timber and non-timber forest products, job creation, and local livelihood enhancement. Contributions that are difficult to measure but undoubtedly very significant, much more so than revenue generated from the production of cut flowers, tour guiding, etc.

From this perspective, it does for instance not make sense for a FD to engage in commercial Christmas tree production, using public resources in terms of manpower, land and materials, for a commercial activity which is, by the way, not even run in a very profitable way. It would be relevant though - and more coherent with the FD’s policy vision of “contributing to the social and economic development of present and future generations” - if the FD would support the private sector by using its knowledge and experience in training and providing technical and organisational advise to private nursery producers so that they can take over Saint Lucia’s Christmas tree production and turn it into a profitable activity and hence a viable livelihood. The same line of thought applies to other potentially commercial activities currently undertaken by the FD.

Well, thus far the plea against the FD starting to focus on generating monetary revenue and to operate as a commercial enterprise. By the way, the decision on the matter is a major management decision and will have consequences for all further management choices.

7 Proposed Management Units

Though some activities might be undertaken outside the Forest Reserve system, the core business of the FD is situated within the existing Forest Reserves and the several proposed additions. As was agreed, the present report and the forest management guidelines it comprises, would focus on this core area clearly shown in Map 3.

One of the first things to decide upon when developing a nation-wide forest management plan is the division of the total area into smaller manageable units, which are to be treated as independent units with management plans of their own. This division of the core area to be managed, this is the existing 10 FR and the 38 proposed additions, into smaller units has been discussed with relevant FD staff during a workshop held in Saint Lucia. Though there would be certain operational advantages to take the ranges as management units, it was preferred to build further on the existing FR system as names, boundaries, statutory documents, etc. all follow this logic.

As such, consensus was reached on a system of 8 Forest Reserves recombining the 10 “old” Forest Reserves and the 38 additions. The detailed composition of each of these 8 Forest Reserves or management units is presented below. The reference numbers and names of the additions are taken from Map 3; the respective areas are based on figures collected from the GIS database of the FD combined with figures from the list of parcels of “Crown Lands to be Declared as FR” as proposed to the Cabinet (Cabinet Conclusion Nr 396 of 2008). Final areas and boundaries will have to be established by surveyors.

7.1 The Marquis Forest Reserve

The Marquis Forest Reserve will be entirely composed of proposed additions with a total area of 194 ha. The concerned additions are:

- Nr 23 - Marquis 1: 133 ha
- Nr 24 – Marquis 2: 35 ha
- Nr 25 – Marquis 3: 15 ha
- Nr 26 – Marquis 4-6: 11 ha

The Marquis Forest Reserve is located at the western side of the Northern Range.

7.2 The Castries Waterworks Forest Reserve

The Castries Waterworks Forest Reserve will cover a total area of 1449 ha, comprising the in 1946 declared and gazetted Castries Waterworks Forest Reserve (1398 ha) and 6 additions with a total area of 51 ha. The concerned additions are:

- Nr 4 – Castries Waterworks Addition 1: 14 ha (Louvét)
- Nr 5 – Castries Waterworks Addition 2: 13 ha
- Nr 6 – Castries Waterworks Addition 3: 1 ha
- Nr 20 – Forestiere Blocks 1: 15 ha
- Nr 21 – Forestiere Blocks 2: 3 ha
- Nr 22 – Forestiere Blocks Addition: 5 ha

Only additions 4 and 5 are adjacent to the original Castries Waterworks Forest Reserve. While the major part of this FR belongs to the Northern Range, a significant portion is situated in the Dennery Range.

7.3 The Barre de l'Isle North Forest Reserve

To the original Barre de l'Isle North Forest Reserve, only one small parcel of 2 ha will be added. The extended FR covers an area of 228 ha and is predominantly situated in the Northern Range with relatively small bits in the Dennery Range. The reference of the addition is:

- Nr 1 – Barre de l'Isle North Addition: 2 ha.

7.4 The Barre de l'Isle South Forest Reserve

The Barre de l'Isle South Forest Reserve has a total area of 989 ha, comprising the in 1946 declared and gazetted Barre de l'Isle South Forest Reserve of 742 ha, the addition acquired in 1982 of 99 ha (on the map indicated as green area and denominated as Barre de l'Isle South 2) and 2 newly proposed additions of 4 and 144 ha respectively. The references of the new additions are:

- Nr 2 – Barre de l'Isle South Addition 1: 4ha
- Nr 3 – Barre de l'Isle South Addition 2: 144 ha

The FR is shared between the Millet and Dennery Ranges.

7.5 The Dennery Waterworks Forest Reserve

The proposal for the Dennery Waterworks Forest Reserve is to combine the in 1946 declared and gazetted Dennery Ridge (72 ha) and Dennery Waterworks (145 ha) Forest Reserves and to extend this combination with the following 3 additions:

- Nr 17 – Dennery Ridge Addition 1: 94 ha
- Nr 18 – Dennery Ridge Addition 2: 2 ha
- Nr 38 – St Joseph's Estate: 79 ha

The entire area of 392 ha is situated in the Dennery Range

7.6 The Central A Forest Reserve

The Central A Forest Reserve will consist of the in 1946 declared and gazetted Central A Forest Reserve of 1669 ha and 403 ha of proposed additions. The FR will hence cover a total area of 2072 ha. The concerned additions are:

- Nr 7 – Central Forest A Addition 1: 87 ha
- Nr 8 – Central Forest A Addition 2: 162 ha
- Nr 33 – Roseau Dam: 122 ha
- Nr 34 – Roseau Dam Addition 1: 26 ha
- Nr 35 – Roseau Dam Addition 2: 6 ha

The northern half of the Central A Forest Reserve falls under the Millet Range, while the southern and eastern parts, including the Addition Nr 8 of 162 ha are situated in the Soufriere Range.

7.7 The Central B Forest Reserve

The Central B Forest Reserve will cover a total area of 1960 ha. The original Central B Forest Reserve declared and gazetted in 1946 (1461 ha) will be extended with 499 ha of Additions. The additions are:

- Nr 9 – Central Forest B Addition 1: 3 ha
- Nr 10 – Central Forest B Addition 2: 11 ha
- Nr 11 – Central Forest B Addition 3: 1 ha
- Nr 12 – Central Forest B Addition 4: 2 ha

- Nr 13 – Central Forest B Addition 5: 34 ha
- Nr 14 – Central Forest B Addition 6: 44 ha
- Nr 15 – Central Forest B Addition 7: 51 ha
- Nr 16 – Central Forest B Addition 8: 2 ha
- Nr 19 – Fond Estate: 351 ha

The Central B Forest Reserve is shared among 4 Ranges: Millet in the North-East, Dennery in the North-West, Soufriere in the South-East and Quillesse in the South-West.

7.8 The Quillesse Forest Reserve

And finally, the Quillesse Forest Reserve will be made up of the original Quillesse (1368 ha) and Grand Magazin (113 ha) Forest Reserves and of a significant area (429 ha) of proposed additions. Hence, its total area will be 1910 ha. The Additions include:

- Nr 27 – Montete Choiseul: 6 ha
- Nr 28 – Quillesse & Grand Magazin Addition: 188 ha
- Nr 29 – Quillesse Addition 1: 7 ha
- Nr 30 – Quillesse Addition 2: 3 ha
- Nr 31 – Quillesse Addition 3: 45 ha
- Nr 32 – Quillesse Addition 4: 142 ha
- Nr 36 – Saltibus Grand Magazin Addition 1: 36 ha
- Nr 37 - Saltibus Grand Magazin Addition 2: 2 ha

The Quillesse Forest Reserve is partly situated in the Soufriere Range and partly in the Quillesse Range (almost 50%-50%).

Table 13 summarises the proposal, presenting the names of the 8 units, their respective areas and the forest ranges concerned.

Nr	Proposed Management Unit	Area (in ha)	Forest Ranges concerned
1	Marquis Forest Reserve	194	North
2	Castries Waterworks Forest Reserve	1,449	North, Dennery
3	Barre de l'Isle North Forest Reserve	228	North , Dennery ¹
4	Barre de l'Isle South Forest Reserve	989 ha	Millet, Dennery
5	Dennery Waterworks Forest Reserve	392	Dennery
6	Central A Forest Reserve	2,072	Millet, Soufriere
7	Central B Forest Reserve	1,960	Millet, Dennery, Soufriere, Quillesse
8	Quillesse Forest Reserve	1,910	Soufriere, Quillesse

Table 13: Proposed Management Units

¹ For the sake of operational efficiency and given the fact that only an insignificant portion of the Barre de l'Isle North FR is situated in the Dennery Range, it is suggested that the Northern Range takes charge of the management of the entire FR in stead of sharing this responsibility with the Dennery Range.

8 Management objectives and zoning

As mentioned before, Saint Lucia is having a tradition of multipurpose forest management with over the last decades an outspoken emphasis on protection and conservation. Yet, given the production potential of the forest which is after all not negligible and in line with the more holistic view of the revised forest policy, the FD should feel encouraged to also pay some attention to the forests' production role. The private sector and rural communities, and by extension the whole nation, would certainly benefit from this widened approach. Though it is understood that the production role of the forest will remain subordinate to conservation for ecological services, giving due attention to the production side would add to the general sustainability of the FD's management efforts.

Even when recognising that the forest as a whole fulfils multiple functions, it is quite clear that not all forest areas in Saint Lucia are equal and provide all products and/or services, certainly not in the same proportions. To cope with such differentiation between forest areas in a management plan, the method of forest zonification is usually applied. This means that the forest is subdivided into smaller areas depending on their main function – and hence management objective - which is related to factors such as topography, species composition, location in the watershed area, timber stocking, accessibility, etc...

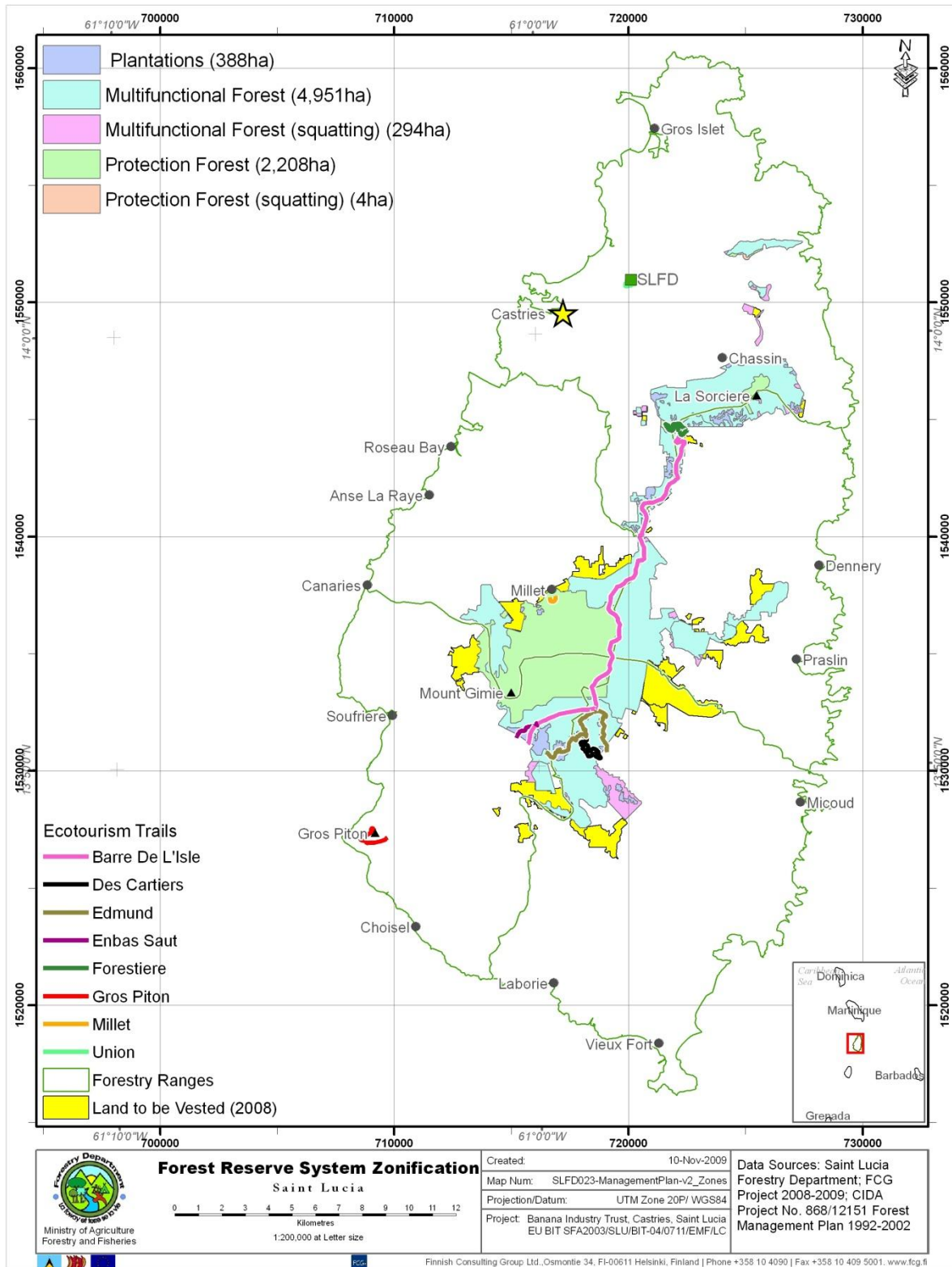
The concept of forest zonification is not new to Saint Lucia. Already under the FMCP I was the forest subdivided in management objective zones, represented by the 3 categories: protection forest, protection/production forest and production forest. (see chapter 4.2.) Also the FMCP II was based on forest zonification, the categories largely coinciding with the ones used in the FMCP I. The main differences relate to the combination of the previous protection/production and production categories into the class “multifunctional forest” and to the newly added classes: “plantations”, “protection forest with squatting” and “multifunctional forest with squatting”. The FMCP II zonification of the Forest Reserve is presented in Map 5. Apart from the forest zones, also the forest trails and the 38 newly proposed additions are indicated on the map, the latter still yellow-coloured hence without having been assigned a specific zone.

Recommendations with regards to the zonification for the next forest management plan, to be developed next year:

- As the main zone-determining factors like topography, location in watershed area, do not change over the years, the FMCP II zonification can be largely maintained unless otherwise specified in the bullets below.
- As the problem of squatting with the Forest Reserve has largely been solved, the classes “protection forest with squatting” and “multifunctional forest with squatting” can be left out with the exception of the marihuana cultivation areas in the Quillesse and Central A Forest Reserves.
- The “Plantations” category should be taken out as the plantations have turned into a semi-natural forest type, composed of exotic as well as native species and representing a range of age classes. In other words, the plantations have lost their aspect of “tree plantation”.
- In line with the suggestion to include the production aspect in the overall forest management and conservation plan, it is proposed that each forest range separates an area of 50 ha of forest for this purpose. The size of the areas proposed is deliberately modest and based on several arguments. In the first place, the improvement of the productivity of the forest stands through silvicultural interventions will have to be combined with significant efforts in the fields of timber marketing and strengthening relationships with the involved private sector (chainsaw operators, furniture makers, et al). Given the

present situation of timber stock and quality in the accessible stands on the one hand and the difficult marketing conditions on the other hand, it will take considerable time and effort to convert timber production in a sustainable and well-organised activity. Secondly, due to the lack of records and even of implementation *per se* of silvicultural interventions, there is currently a big knowledge gap regarding forest dynamics and silvicultural parameters. (see also chapter 4.3) Therefore, all treatments and interventions must preferably be experimental in nature and hence small-scale. For the decade to come and in the particular field of silviculture, emphasis will be on learning by doing and – above all – learning from the analysis of data that will be recorded before, during and after stand treatments. A third important reason for keeping the production/silviculture activities small-scale is based on the concern for available manpower. Even at this proposed experimental scale, the related activities in the forest as well as on the market side will require considerable effort and manpower, the latter having been reported as one of the main constraints in the implementation of both FMCP I and II. The 50 ha of production forest per range must be selected in relatively flat and accessible areas, and if possible areas with productive soils and with favourable stock of timber resources (based on the 2009 timber inventory data). The 50 ha of production forest must not necessarily be adjacent.

- Based on the findings of their various field surveys and from the perspective of biodiversity conservation, the biodiversity team of the project prepared recommendations regarding priority conservation areas in and outside the (expanded) Forest Reserve System. These should also be taken into account when developing the final zonification for the future forest management plan. For easy reference, the maps summarising the conservation proposals are included in Annex 5. Further details on the rationale behind the selections and on recommended management interventions are presented in the biodiversity reports.
- The 38 proposed additions will need to be classified. Most of them – crown lands and/or acquired private lands – are adjacent to the original Forest Reserves and covered with a dense forest vegetation. Generally speaking, they have been proposed to become part of the Forest Reserve out of concern for eventual conversion to other land uses. The additions include critical locations for soil and water protection (additions around the Roseau Dam), some sites suitable as future production forest and extensive areas in need of reforestation (e.g. addition Nr. 19 Fond Estate and the additions south of Quillesse Forest Reserve). In any case, for the purpose of their correct zoning, more detailed field surveys will be required.



Map 5: Zonification of the Forest Reserve System

9 Management practices and silvicultural interventions

In the previous chapters 6 to 8, the higher level decisions that need to be taken when developing a forest management plan were discussed. They concerned the general approach and the specific role that the FD wishes to assume, the subdivision of the expanded Forest Reserve System into smaller manageable units and, thirdly, the subdivision of the management units into functional zones according to the specific management objectives that will apply to them.

The present chapter will focus on the management practices and silvicultural interventions that will have to be included and further elaborated in the National Forest Management and Conservation Plan. As for the management interventions related specifically biodiversity conservation, these are extensively treated in the biodiversity reports and instead of repeating them we would rather refer to these reports.

Limited availability of manpower and funds is taken into account in the following paragraphs and recommendations; the aim has been to keep them at a minimum level.

9.1 Boundary survey, demarcation and maintenance

A first group of management tasks to be carried out relates to the boundaries. So far, only a small part of the proposed additions to the FR system has been surveyed. As a consequence, in order to have a legal expanded Forest Reserve System, surveying must be continued and the legal procedures of gazetting and proclamation must be completed. For the surveying, there is no other option than contracting officially registered surveyors. The job will be very costly and time-consuming (good estimates can easily be obtained from the recent surveying done under the Demarcation and Inventory Project). The responsibility of initiating and close follow-up on the gazetting and proclamation procedures should be assigned to one single person within the FD, preferably somebody from the senior executive team (CFO, DCFO or ACFO). As the additions become legally established, the boundaries must be marked out and made visible to the public, so that eventual trespassing cannot be explained as “accidental”. This boundary demarcation is currently done by clearing a path and by planting a row of – in most cases – ornamental shrubs. It would be worthwhile to consider alternatives for the latter practice, particularly if exotic ornamentals are used as they hold a risk of invading the natural forest. Path clearing combined with signboards at regular intervals, or just leaving dye marks on trees at the boundary, might be cheaper alternatives. Boundary maintenance must be done but kept at a minimum.

9.2 Management for timber production

In Chapter 8 it was suggested that each of the ranges would separate a block of 50 ha as timber production forest following indicated selection criteria. The 50 ha are not necessarily adjacent, they can be scattered over the range, but always in relatively flat and accessible areas with good production potential. As has been described in the earlier sections, whether the selected block comprises old tree plantations or whether it is located in natural forest, in all cases the “starting material” will consist of a mixed species and uneven-aged stand, deprived of any silvicultural treatment over the last 15 to 20 years. The only intervention that might have taken place has been the harvesting of trees, selected according to the buyers’ criteria. Based on such silvicultural history, it is easily understood that the current availability of quality timber in the stands is at the low side. Field visits to a range of forest stands provided ample evidence of this situation. Hence, gradual improvement of the timber production potential in the selected stands will be the main issue over the coming years.

In practice, we suggest to adopt a rotation period of 5 years whereby the selected block of 50 ha will be split up in 5 blocks of 10 ha. The total area of 50 ha must be properly mapped, indicating also the boundaries of the 5 compartments of 10 ha each. The compartments will be provided a serial number, whereby compartment 1 will be intervened in year 1, compartment 2 in year 2 and so on until, by the end of the rotation period, the entire block of 50 ha will have received a first treatment. If the 10 ha of a compartment – e.g. compartment 1 - are scattered over different areas, then these respective areas will be numbered 1A, 1B, 1C, etc.

Following the mapping and subdivision in compartments, a detailed assessment of the forest cover and tree stock will be carried out in compartment nr. 1 whereby several issues at the time must be observed and recorded. A clear emphasis will be on raising the productivity of the stands, gradually increasing the number of good quality trees of commercially desired species and correcting the spatial distribution of the trees. The selection of trees that in this “first round” will be marked for harvesting/eliminating from the compartment will be twofold in nature: on the one hand, there will be a number of trees with good commercial value (representing the harvesting cut) and on the other hand there will be a good number of deformed, diseased and otherwise undesirable trees to be taken out to give space to the more competitive trees (these represent a combined sanitary and spatial thinning). While marking the trees, it will by all means be avoided that significant gaps are created in the forest cover. Though the proposed procedure is different from the traditional approach to thinning and harvesting based on standing volume, annual increments and annual allowable cuts – applicable in well-managed stands - adherence to this principle of not creating important gaps will guarantee that the volume taken out will not exceed the annual increment (which by the way is not known for the stands in their current state).

Now, how to go about this marking of trees to be taken out? In a first instance, all trees of commercial value (based on species and size) should be mapped, using GPS. Some of these, i.e. the most vigorous and best quality specimens, will be preserved in the stand as future seed trees. They should therefore be properly spaced over the compartment. The future seed trees will be marked on the map and in the field! The remaining trees of this category can be marked for harvesting unless their removal creates large gaps. In this case, some of them will be left in the stand for the next intervention cycle. When marking the trees, one should keep in mind that some of the surrounding vegetation/trees will suffer damage from the tree felling and extraction. In a second step, those trees will be marked that are in competition and hamper growth of commercially “promising” trees which will be harvested in one of the next harvesting cycles. Hence, the issue will not be to remove all undesirable trees from the stand, but only the ones that compete with good quality trees of the commercial species. Again, the creation of large gaps will be avoided.

All marked trees will be identified, counted, measured, their volumes estimated and the data will be recorded. The data of the “commercial” lot and of the “thinning produce” lot are to be registered separately. Other data on the compartment that should be recorded comprise information on natural regeneration (species, abundance, distribution over the compartment) and occurrence of diseases and/or damage.

The next step, the actual felling and extraction (or processing on the spot) will have been prepared and organised by an FD Unit in charge of marketing, forest-based enterprises and relations with the private sector/communities. Sale by auction could be tried out... But the main point is that all marked trees, the commercially valuable ones as well as the thinning products have to be taken out. There might be a need to revise royalties to be paid. Hence, if the FD decides to adopt the described system and apply it during a certain transitional period in which the stands are being upgraded and the productivity enhanced, it is important that the required interventions will be carried out at low cost and not putting too much of a burden on the FD staff. So, arrangements with chainsaw operators who are willing to take out all marked trees at a low to zero price (depending on the composition and volume of the lots) might be a good deal. Obviously, range officers must

be around during the felling and extraction to exercise a close follow-up and supervision of the ongoing activities.

In the subsequent years 2 to 5, the same procedure will be followed in the compartments 2 to 5. In year 6, one returns to compartment 1, and so on. Substantial changes in the quality and productivity of the stands cannot be expected so soon, i.e. after only one intervention of combined harvesting and thinning. Impact and progress should however be assessed and the observation data registered in the compartment files. Stands should have improved visibly though shortly after the third rotation.

Also economic data must be kept in the files: all labour requirements to operate the system (including e.g. for supervision), other intervention costs, eventual revenue from the forest products, etc.

If the system has proven to be workable for the FD – which will mainly depend on the success in identifying candidates for the removal of all marked trees and on the extra workload for FD staff – the system can be applied in other forest zones suitable for production forestry.

9.3 Reforestation in some of the additions

Some of the proposed additions comprise important agricultural areas, recently abandoned or still in use. The FD is having ample experience in the process of recovering deforested areas and negotiating with farmers still living and cultivating in the areas. The application of the Taungya system in the past has been a success in many areas and has reduced the overall cost of the reforestation campaigns. Reforestation of the areas to be recovered will not only be costly, but also a labour-intensive undertaking. The Ranges that will be particularly busy with recovery and reforestation activities are Quillesse and Millet. If they do not have sufficient resources available to embark simultaneously on timber production enhancement and on reforestation and if a choice must be made, preference should be given to the latter.

In terms of species selection, if it is practically feasible, it would be recommendable to give exclusivity or at least high priority to local species with commercial value. If not enough planting material of local species can be timely obtained, the traditional exotics Blue maho and Honduras mahogany can be used, the latter though limited in the deeper and fertile soils where it thrives well. *Gmelina arborea* is also an option but the Caribbean pine should be avoided as they have not done very well in the past, almost no natural regeneration and timber quality that cannot compete with the cheaper imported softwood alternatives on the market in Saint Lucia. Rather than experimenting with other exotic species, we would recommend to try out a range of valuable local species that eventually could represent and supply a niche market of good quality local timber in the future. Again, proper data collection, registration and analysis should be part of the game.

9.4 Establishment of new plantations

Though in the time spent with the FD in Saint Lucia nothing pointed out towards prevailing intentions in that direction, it should still be mentioned that clear-felling of natural forest in the Forest Reserves for the establishment of exotic tree plantations is under no circumstances to be considered as an option.

9.5 Management for harvesting non-timber forest products

As indicated in chapter 5, a number of non-timber products are harvested from the forests. Apart from incense, a product that has been under study recently, no much information exists on numbers of people involved, priority harvesting areas, volumes extracted, growth characteristics and regeneration capacity of the concerned resources, or economies of the products concerned. Apart from issuing the required permits and controlling illicit harvesting, there is no further management of these products in place. Still, in view of sustainable forest

production and enhancing livelihoods in rural communities, it is highly recommended to make the collection of non-timber products subject to stricter regulations e.g. as to harvesting areas, volumes, periods of time, harvesting techniques,... based on acquired knowledge of the concerned resource. Proper management should be based on a type of concession agreement with the harvester stipulating the details on the above-mentioned issues. As they are making commercial use of public resources, the concession holders should pay a fee to the state, estimated on the profits they could make from the business. Hence, fees should be correct and not prohibitive.

In this regard, it is recommended that the FD initiates studies and surveys as described above and that the basic information and knowledge required for the elaboration of appropriate management practices, including the details of the concession agreements, is collected. As a matter of fact, this area is ideal for masters and PhD studies and it would be good if the FD would pro-actively “market” this idea and opportunity at national, regional and international level amongst universities and relevant research institutes. The effort could lead to interesting exchanges, offering nice opportunities to students and to an effective and efficient way in collecting quality information on the subject.

9.6 Others

Other activities that must be taken into account when drawing up the forest management plan are: patrolling and law enforcement, environmental education and eco-tourism, tracks and road maintenance, nursery production, involvement in inter-institutional river bank protection & maintenance activities, extension services for the private sector and rural communities (advise on nursery production, tree planting, species selection, undertaking of forest-based commercial activities) and involvement in the protection of endangered forest ecosystems such as the mangrove forests which are legally under the Fisheries Department’s management responsibilities.

10 FD's operational structure

Generally speaking, the current operational structure of the Forestry Department is quite well adapted to its overall mandate. (Chapter 3) Still, during the visit to Saint Lucia, attention was drawn to some operational and organisational aspects that should/could be adjusted and/or improved. They are:

- There are serious deficiencies in the communication and coordination between the central FD level and the ranges. This situation needs to be improved as it is badly impacting on efficiency and on capitalisation of information and knowledge, this being the basis for proper management practices, including silvicultural interventions. Also, the sense of a common goal or objective seems to be lost, some of the ranges having almost their own agenda.
This situation can be quickly rectified through the organisation of regular coordination meetings; the organisation of a proper briefing for newcomers on their Terms of Reference and on the concrete expectations; and on adopting a more strict discipline of producing the required reports and filling out formats for the range level and of reading, analysing, and providing feedback to these reports for the central level. It would help if formats and report templates were digitalised and if the written communications were computer-based (faster, allows easy copying to all colleagues, easy archiving).
- Another priority issue is related to the present involvement of considerable FD staff in potentially commercial activities. (see also chapters 5 and 6) Gradually, but getting started as soon as possible, the FD should devolve these activities to interested but competent community groups or individuals changing its executive role to an advisory one. In this respect, it is advisable to establish at central level a unit that develops and coordinates this advisory role.
- If the FD accepts the challenge of adding “management for forest production” to their agenda - as is suggested throughout the report – this should go hand in hand with substantial efforts to revitalise the timber processing and marketing sector. A good preparatory study is available, indicating the main issues, actors and problems but so far no programme has been set up to materialise this revitalisation. So, if the FD is serious about future timber production, it will be a priority to complement the technical units at central level with a unit specifically for timber processing and marketing.
- Finally, if the FD's budget allows, it would be good to get the issue of double mandates (central activity leaders combined with a range officer position) solved. The operational quality at both levels would benefit from such a solution.

Forest-based Carbon Credits

With the rapidly developing carbon markets, the ongoing negotiations on REDD and REDD+ and some nearby countries such as Guyana deeply involved in the business, Saint Lucia's Forestry Department rightly wonders whether and *how also Saint Lucia could benefit from the various mechanisms established in view of promoting/facilitating carbon sequestration and/or carbon emission reduction through forest-related undertakings*. The present chapter aims to provide a brief picture of the situation in the sector today and to give some orientation as to existing opportunities for Saint Lucia in generating revenue or other benefits from a local production of forest-based carbon credits.

A visit to the *Designated National Authority (DNA)* of Saint Lucia for the Clean Development Mechanism (CDM) of the Climate Change Convention (UNFCCC), vested in the Unit for Sustainable Development and Environment of the Ministry of Economic Affairs, Economic Planning Investment and National Development, revealed that Saint Lucia is having very little experience with CDM projects: so far, no CDM projects (all eligible sectors considered) have been implemented nor are there any such projects under preparation. However, the DNA-Unit is having the necessary theoretical background, participates in sector-related international conferences and meetings and declares to be interested in supporting eventual CDM initiatives in Saint Lucia.

In the carbon credits business, a first distinction must be made between the *regulatory markets* which follow the rules and conditions imposed by the CDM/Kyoto Protocol/UNFCCC and the *voluntary markets*. The voluntary markets buy and sell carbon credits that have been generated by projects ruled by criteria and standards other than the official Kyoto ones and that, consequently, cannot be used by the buyers to comply with their Kyoto Protocol targets. The voluntary market is mainly driven by the motive of “corporate responsible behaviour” and as such widely used for the purpose of “corporate image building”.

11 CDM Afforestation & Reforestation (A/R) Projects

Under the terms of the Kyoto Protocol, industrialised countries (“Annex 1 countries”) can partly offset their greenhouse gas (GHG) emissions by investing in emission-reducing projects in developing countries through a market mechanism, called the **Clean Development Mechanism (CDM)**. In turn for the investments made, the investor receives a certain amount of Certified Emission Reductions² (CERs) which can be used for compliance with the Kyoto Protocol targets. *By definition, Saint Lucia could benefit from such investments under the CDM.*

Looking then specifically at the forestry sector, the CDM – under its current form and for the present commitment period 2008-2012 – only issues CERs generated through **afforestation and reforestation (A/R) projects**; hence forest conservation or sustainable forest management projects are not eligible.

In order to get approval from the CDM Executive Board, A/R projects must meet a number of *participation criteria and technical standards*.

² A Certified Emission Reduction (CER) is the unit of GHG reduction that has been generated under the provisions of the Clean Development Mechanism (Article 12 of the Kyoto Protocol). One CER represents 1 tonne of carbon dioxide equivalent (1t CO₂e).

The participation criteria include:

- The host country in which the project is located must have ratified the Kyoto Protocol
- The host country must have established a Designated National Authority (DNA)
- The DNA must approve the project in writing
- The land within the project's boundaries must have been without forest between 31 December 1989 and the start of the project activity.

and the technical standards are:

- Project execution must result in sequestration of carbon that would not have occurred in the absence of the project. It must be *additional*.
- Project execution must not be a compulsory requirement of local, regional or national laws or regulations.
- Project execution must not result in significant negative impacts to the site or the surrounding landscape with respect to soil, vegetation, natural water reservoirs, wildlife and biodiversity.
- Project execution must lead, to the extent possible, to significant improvements of the socio-economic situation of the local population in or around the project site.

Experience has indicated that the *development and implementation of A/R CDM projects* is a rather lengthy, cumbersome and costly process, involving many stakeholders and associated with the development of new tools and methodologies. Figure 1 illustrates the different steps of this process along with the main stakeholders respectively involved.

Today, only 8 out of a total of 1884 CDM approved and registered projects are A/R projects. In contrast to the voluntary markets where forest projects represent the major share of the generated credits, forest-based carbon credits are playing only a marginal role in the main regulatory markets. In the EU-Emissions Trading System (ETS), for instance, forest-based carbon credits are even completely excluded. This virtual exclusion of forest carbon from the regulatory market has been due to a number of concerns, including the additionality, leakage and impermanence issues; the concern that forest carbon offsets reduce pressures to cut emissions at source; the fear that the carbon price would plummet with a large increase in forest carbon offsets; and last but not least the very high transaction costs related to the CDM procedures.

In order to overcome some of the above-mentioned constraints, the UNFCCC Parties decided to include the concept of “*small-scale A/R (SSC A/R) projects*”, subject to simplified modalities and procedures for approval and registration, and as such also resulting in less prohibitive transaction costs. Following the UNFCCC decision 19/CP.9 and the Bali decision D9/CMP3, “small-scale A/R project activities under the CDM are those that are expected to result in net anthropogenic GHG removals by sinks of less than 16 kilotonnes of CO₂ per year and are developed or implemented by low-income communities and individuals as determined by the host Party. If a small-scale A/R project activity under the CDM results in net anthropogenic GHG removals by sinks greater than 16 kilotonnes of CO₂ per year, the excess removal will not be eligible for the issuance of CERs”. Table 14 provides an indication of transaction costs for SSC A/R projects.

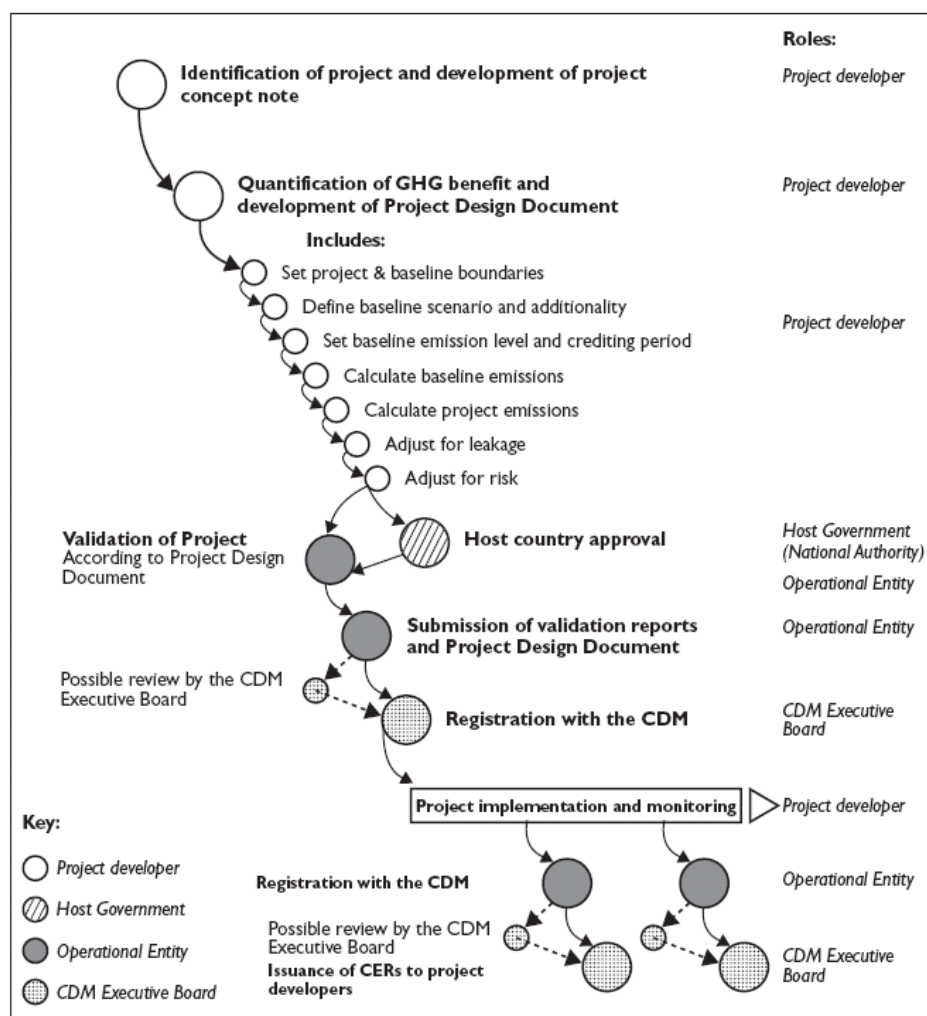


Figure 1: The main steps in the development and implementation of CDM A/R projects.
(Source: ENCOFOR project)

Activity	Estimated Cost (in US\$)
PDD preparation, including feasibility study, baseline development costs, legal fees, etc	45,000
Validation	15,000
Registration	5,000
Monitoring (every 5 years)	20,000
Verification (every 5 years)	20,000
Total fixed transaction costs	105,000
Additional costs	
<ul style="list-style-type: none"> CER issuance fee 	Free of charge if < 15,000 tCO ₂ e; US\$1,500 for the first 15,000 tCO ₂ e and US\$ 0.02/ tCO ₂ e for the excess above 15,000 tCO ₂ e

Table 14: Conservative estimates of CDM transaction costs for SSC A/R projects. (Source: Groenhart, 2007)

Before engaging in CDM-A/R projects, one must also realise that the generated CERs will be classified as *temporary* (tCERs). This is based on the risk that the carbon stored in trees may be lost to the atmosphere through fire, disease or harvesting. *It is imperative to understand that income derived from the tCERs is seldom sufficient to make a forestry project profitable.* To be profitable, the tCER-based income must generally be complemented with the sale of timber, non-timber products or other environmental services.

As stated in a recent Carbon News and Info edition (September, 2009), the World Bank estimates for tCERs are in the range of US\$3 - \$4 with little to suggest prices would get any higher - lower if anything. This is only a fraction of the prices enjoyed for permanent CERs, currently from US\$12 to \$20 in forward purchase agreements. Furthermore, there is no price premium for CDM forestry over the voluntary market to give developers an incentive: the voluntary VERs from A/R projects are now averaging US\$5 (New Carbon Finance, 2009) and \$8 or more when accredited to high standards. (see chapter 13 for further details)

Major buyers of tCERs are the BioCarbon Fund managed by the World Bank, CERUPT (a Dutch carbon fund), the Spanish Carbon Fund and the Japanese GHG Reduction Fund; as mentioned previously tCERs are currently excluded from the EU-Emission Trading System (EU-ETS).

Tables 15 and 16 provide an indication of the revenue (in US\$) that can be derived through the sale of tCERs worth US\$3, US\$4 and US\$6 per CER on two different site qualities:

<i>Year</i>	<i>Price per tCO₂e</i>		
	<i>US\$ 3</i>	<i>US\$ 4</i>	<i>US\$ 6</i>
5	165.00	220.00	330.00
10	330.00	440.00	660.00

Table 15: Gross benefits per hectare in an area with *high* production potential (Source: ENCOFOR Project)

<i>Year</i>	<i>Price per tCO₂e</i>		
	<i>US\$ 3</i>	<i>US\$ 4</i>	<i>US\$ 6</i>
5	79.50	106.00	159.00
10	168.00	224.00	336.00
15	171.00	228.00	342.00
20	94.50	126.00	189.00

Table 16: Gross benefits per hectare in an area with *low* production potential (Source: ENCOFOR Project)

12 REDD and REDD+

The concept of **Reducing Emissions from Deforestation and Forest Degradation (REDD)** has emerged as a hot topic in the international climate change negotiations since 2005 (COP11 in Montreal). A group of countries proposed that deforestation should form part of the UNFCCC as this would address an important source of emissions. It could also become a source of significant funding for developing countries, if they were rewarded for reducing deforestation. The proposal received wide support from the Parties and a process to explore REDD options and modalities was started up. Two years later, at the COP13 in Bali (2007), it was decided and laid down in the Bali Action Plan that: “A comprehensive approach to mitigate climate change should include policy approaches and positive incentives for issues relating to reducing emissions from deforestation and forest degradation in developing countries; and to the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries”. It was further agreed that, if REDD were to be included in a post-2012 framework, a decision about what the REDD mechanism will look like and what it will include needs to be made *by December 2009 at the COP15 in Copenhagen*. Reaching a consensus on this issue was considered to be of paramount importance for a global deal on climate change.

In recent debates, increasing attention has been drawn towards the activities after the semicolon of the statement in the Bali Action Plan, related to the conservation and enhancement of carbon stocks, as such turning REDD into REDD+.

To make a REDD/REDD+ mechanism operational, *methods and tools* to estimate and monitor changes in forest cover and associated carbon stocks and GHG emissions, incremental changes due to sustainable management of forest, and reduction of emissions from deforestation and forest degradation are essential. Over the last years, a good number of institutions have focused on the development of such REDD/REDD+ adequate methods and tools. Many of them combine remote-sensing with ground-based assessments. Some useful examples are described in the following publications:

- Global Observation of Forest and Land Cover Dynamics (GOFC-GOLD), 2009: REDD in developing countries: a sourcebook of methods and procedures for monitoring, measuring and reporting.
- Oko-Institut, Germany, 2008: Emissions and removals from land use, land use change and forestry activities in a post-Kyoto regime – a quantitative analysis of a framework for reducing deforestation.
- BioCarbon Fund, World Bank, 2008: Methodology for Estimating Reductions of GHG Emissions from Mosaic Deforestation.
- Gibbs et al., 2007: Monitoring and estimating tropical forest carbon stocks; making REDD a reality.

Furthermore, while waiting for concrete decisions on the role of forestry and the related implementation modalities in the post-2012 climate change framework, to be taken shortly now (assumingly at the COP15 in Copenhagen, December 2009), *a number of programmes have been established aiming at providing technical and financial assistance to developing countries to prepare for full participation in the upcoming REDD/REDD+ mechanism*. They are referred to as the “*REDD Readiness programmes*”. Their objectives and operational features are explained in the following paragraphs.

12.1 The Forest Carbon Partnership Facility (FCPF)

The Forest Carbon Partnership Facility (FCPF) assists developing countries in their efforts to reduce emissions from deforestation and forest degradation by providing value to standing forests. The

establishment of the Facility was announced in 2007 at the COP13 in Bali, it became operational in June 2008, and the World Bank has been entrusted with the managerial aspects.

The FCPF has the dual objectives of (1) building capacity for REDD in developing countries in tropical and subtropical regions, and (2) testing a programme of performance-based incentive payments in some pilot countries, on a relatively small scale, in order to set the stage for a much larger system of positive incentives and financing flows in the future. Two separate mechanisms have been set up to support these objectives:

1. **The Readiness Mechanism:** The FCPF's initial activities relate to technical assistance and capacity building for REDD in IBRD and IDA member countries in the tropics across Africa, East Asia and Pacific, Latin America and the Caribbean and South Asia. Specifically, the FCPF is assisting countries to arrive at a credible estimate of their national forest carbon stocks and sources of forest emissions, work out their national reference scenarios for emissions from deforestation and forest degradation based on past emission rates for future emissions estimates, calculate opportunity costs of possible REDD interventions, adopt and complement national strategies for stemming deforestation and forest degradation, and design national monitoring, reporting and verification systems for REDD. These activities are referred to as 'REDD Readiness' and supported by the Readiness Fund of the FCPF.
2. **The Carbon Finance Mechanism:** Approximately five countries that made significant progress towards REDD readiness will be able to participate in the Carbon Finance Mechanism. They will receive financing from the Carbon Fund, through which the Facility will implement and evaluate pilot incentive programmes for REDD, based on a system of compensated reductions. The selected countries, having: (a) demonstrated ownership on REDD and adequate monitoring capacity; and (b) established a credible reference scenario and options for reducing emissions; will benefit from performance-based payments for having generated verifiably reduced emissions from deforestation and/or forest degradation through their Emission Reductions Programmes. The structure of these payments will build on the options for REDD that are currently being discussed within the UNFCCC process, with payments made to help address the causes of deforestation and degradation. Within the Carbon Finance Mechanism, payments will only be made to countries that achieve measurable and verifiable emission reductions.

Together, these two mechanisms seek to learn lessons from first-of-a-kind operations and develop a realistic and cost-effective large new instrument for tackling deforestation, to help safeguard the Earth's climate, reduce poverty, manage freshwater resources, and protect biodiversity. However, it is important to note that the Facility itself is not a panacea to "save the world's forests". Rather, the experiences generated from the FCPF's methodological, pilot implementation and carbon finance experience will provide insights and knowledge for all entities interested in REDD. The FCPF thus seeks to create an enabling environment and garner a body of knowledge and experiences that can facilitate development of a much larger global programme of incentives for REDD over the medium term.

As of March 2009, 37 countries have been selected into the Readiness Mechanism based on the Readiness Plan Idea Notes (R-PIN) they submitted and which have been reviewed by the Participants Committee and an independent Technical Advisory Panel. The selected countries became REDD Country Participants and received grant support to develop a Readiness Plan, which contains a detailed assessment of the drivers of deforestation and degradation, terms of reference for defining their emissions reference level based on past emission rates and future emissions estimates, establishing a monitoring, reporting and verification system

for REDD, and adopting or complementing their national REDD strategy. A consultation plan is also part of the Readiness Plan.

More information can be found on the FCPF's website: www.forestcarbonpartnership.org. Also the 2008 FCPF Information Memorandum provides a lot of interesting details; the Memorandum can be downloaded from:

http://www.forestcarbonpartnership.org/fcp/sites/forestcarbonpartnership.org/files/Documents/PDF/FCPF_Info_Memo_06-13-08.pdf

Opportunity for Saint Lucia: The FCPF Readiness Mechanism is currently closed to new country participants as all available funds have been allocated. However, it may re-open for new participants in the future, depending on whether additional funds become available. Hence, if the FD of Saint Lucia is interested in receiving financial support for the development of a REDD Readiness Plan, regular contact should be established with the FCPF (website or contact persons indicated on the website) to get direct information on future opportunities – be it re-opening of the Readiness Mechanism or any other relevant opportunity.

As an example and for further guidance on the eventual preparation of an R-PIN by Saint Lucia, Annex 6 presents a completed and approved official template. The R-PIN was submitted by Colombia in 2008.

12.2 The UN-REDD Programme

At the *global level*, the UN-REDD Programme supports country efforts to build consensus and knowledge, and ensures consistency in approaches and economies of scale in the delivery of REDD. The Programme actively explores and documents examples of “best practices”. These activities seek to promote confidence-building in REDD and raise awareness about the options for including a REDD mechanism in a post-2012 regime.

The four specific outcomes of the UN-REDD Programme activities at the global level are:

- Improved guidance on Measurement, Reporting and Verification (MRV) approaches, including consensus on principles and guidelines for MRV and training programmes.
- Increased engagement of stakeholders in the REDD agenda, including raising awareness of REDD amongst stakeholders, ensuring Indigenous Peoples representative groups and non-Annex 1 decision makers are informed and engaged.
- Improved analytical and technical framework of social and environmental benefits maximising the contribution of REDD to sustainable development, including the establishment of indicators to assess governance and socio-economic factors in national REDD frameworks, and developing tools to capture the benefits arising from forest ecosystem services.
- Increased confidence in REDD amongst decision makers on the feasibility of methodologies and the implementation of REDD, through coordination within agencies and with partners, as well as through knowledge management and sharing and support to partner countries.

At the *country level*, the UN-REDD Programme empowers countries to manage their REDD processes by assisting them to identify ways to address their specific drivers of deforestation; develop methods and tools for measuring and monitoring greenhouse gas emissions; facilitate the participation of national stakeholders; and access financial and technical assistance.

- The UN-REDD Programme is currently assisting nine developing countries to prepare and implement national REDD strategies and mechanisms. The first set of UN-REDD Programme pilot countries are

in Africa: Democratic Republic of Congo, Tanzania and Zambia; in Asia and the Pacific: Indonesia, Papua New Guinea and Viet Nam; in Latin America and the Caribbean: Bolivia, Panama and Paraguay.

- Designed collaboratively by national stakeholders and country-led, national UN-REDD Programmes are informed by the technical expertise of FAO, UNDP and UNEP. Priority is given to developing sustainable national multi-sectoral approaches with broad stakeholder engagement that promote equitable outcomes and to ensuring that countries use reliable methodologies to assess emission reductions. In some countries, key elements of delivering emission reductions – such as REDD payment structuring and distribution options - will also be tested.

Further details can be obtained from the website: www.un-redd.org

Opportunity for Saint Lucia: The situation here is pretty much the same as for the FCPF. Also in the case of the UN-REDD programme, the available funds for the Quick Start Activities (Readiness Phase 1) have been fully committed. Yet, a request to participate can be submitted anytime though acceptance is pending on additional future funding. The concerned application form is shown in Annex 7 and can also be downloaded from: <http://www.un-redd.org/UNREDDProgramme/CountryActions/tabid/584/language/en-US/Default.aspx>

12.3 The Forest Investment Programme (FIP)

The Forest Investment Programme (FIP) is a new programme within the World Bank's Strategic Climate Fund which is a multi-donor Trust Fund within the World Bank's Climate Investment Funds. The FIP's overall objective is to mobilize significantly increased funds to reduce deforestation and forest degradation and to promote sustainable forest management, leading to emission reductions and the protection of carbon reservoirs. The FIP is operational since September 2008.

Objectives:

The *main purpose* of the FIP is to support developing countries' REDD efforts, providing up-front bridge financing for readiness reforms and investments identified through national REDD readiness strategy building efforts, while taking into account opportunities to help them adapt to the impacts of climate change on forests and to contribute to multiple benefits such as biodiversity conservation and rural livelihoods enhancements. The FIP will finance efforts to address the underlying causes of deforestation and forest degradation and to overcome barriers that have hindered past efforts to do so.

The FIP is designed to achieve *four specific objectives*:

1. To initiate and facilitate steps towards transformational change in developing countries' forest related policies and practices, through:
 1. serving as a vehicle to finance investments and related capacity building necessary for the implementation of policies and measures that emerge from inclusive multi-stakeholder REDD planning processes at the national level;
 2. strengthening cross-sectoral ownership to scale up implementation of REDD strategies at the national and local levels;
 3. addressing key direct and underlying drivers of deforestation and forest degradation;
 4. supporting change of a nature and scope necessary to help significantly shift national forest and land use development paths;

5. linking the sustainable management of forests and low carbon development;
 6. facilitating scaled-up private investment in alternative livelihoods for forest dependent communities that over time generate their own value;
 7. reinforcing ongoing efforts towards conservation and sustainable use of forests; and
 8. improving forest law enforcement and governance, including forest laws and policy, land tenure administration, monitoring and verification capability, and transparency and accountability.
2. To facilitate the leveraging of additional and sustained financial resources for REDD, through a possible UNFCCC forest mechanism, leading to an effective and sustained reduction of deforestation and forest degradation, thereby enhancing the sustainable management of forests.
 3. To pilot replicable models to generate understanding and learning of the links between the implementation of forest-related investments, policies and measures and long-term emission reductions and conservation, sustainable management of forests and the enhancement of forest carbon stocks in developing countries. By committing to apply a priori and ex post impact assessment of programs and projects, the FIP will ensure that the outcomes and effectiveness of FIP-supported interventions in reducing deforestation and forest degradation can be measured; and
 4. To provide valuable experience and feedback in the context of the UNFCCC deliberations on REDD.

At the moment, discussions regarding the type of activities that will be supported are still ongoing. Yet, the “Third FIP Design Document” presented in May 2009, stipulated the following:

1. Institutional capacity, forest governance and information such as: implementation of systems for forest monitoring, information management and inventory; support for legal, financial and institutional development including forest law enforcement, cadastral mapping and land tenure reform; removal of perverse incentives favouring deforestation and degradation; cross-sectoral and landscape based planning exercises; transfer of environmentally sound technology; and building capacities of indigenous peoples and local communities.
2. Investments in forest mitigation measures, including forest ecosystem services such as: forest conservation; promotion of payments for environmental services and other equitable benefit-sharing arrangements; restoration and sustainable management of degraded forests and landscapes; afforestation and reforestation on previously deforested land; restructuring of forest industries and promotion of company-community partnerships; forest protection measures; improved land management practices; and promotion of forest and chain of custody certification.
3. Investments outside the forest sector necessary to reduce the pressure on forests such as: rural development and social and economic infrastructure programs; alternative energy programs; alternative livelihood and poverty reduction opportunities; agricultural investments in the context of rationalized land-use planning; and agricultural intensification including agro-forestry.

More details on the criteria for FIP investment strategies, programmes and projects can be found in the Revised Draft Design Document (CIF/DMFIP.3/2) (2009), to be downloaded from the link:

<http://siteresources.worldbank.org/INTCC/Resources/3rdDesignMeetingRevisedDraftDesignDocument.pdf>

The FIP does not yet have its own website, but references can be found on: www.climateinvestmentfunds.org

Opportunity for Saint Lucia: To make the FIP operational, the following procedure has been established: (1) a FIP Sub-Committee will agree upon the number of pilot programmes that will be supported and will establish criteria for country selection; (2) all countries complying with the selection criteria will then be invited to submit an “Expression of Interest”; (3) based on these “Expressions of Interest”, an Expert Group will recommend a short-list of pilot countries; and (4) the final selection of beneficiary countries will be done by the FIP Sub-Committee.

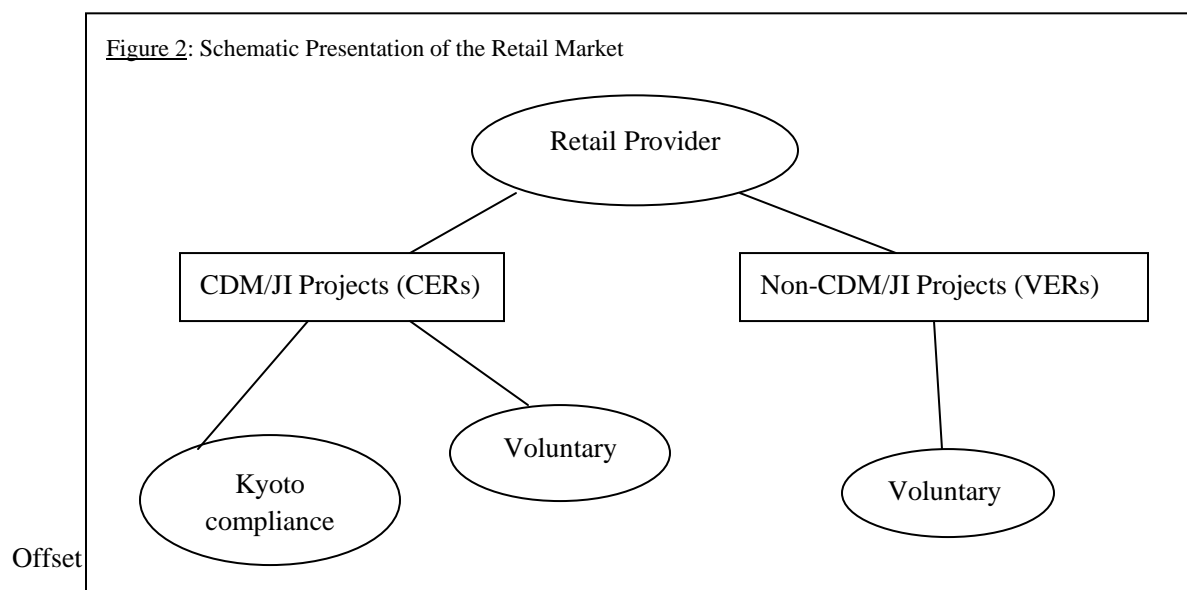
Hence, in this case there is no need for submitting documents, unless an invitation to do so has been received. It is recommendable though to ensure a regular follow-up on the programme development via the above-indicated CIF website, even to inquire via the given info e-mail address in a proactive manner on the selection of countries.

13 Voluntary regimes and markets

As explained in chapter 11, complexities and time-lags evident in the CDM project development and registration process, and its coverage of only A/R projects in the forestry sector, are at the basis of considerable attention diverted to the voluntary carbon market.

The demand side of the voluntary market consists of companies, governments, organisations, organisers of international events and individuals, taking responsibility for their carbon emissions by voluntarily purchasing carbon offsets. These voluntary offsets are often bought from retailers or organisations that invest in a portfolio of offset projects and sell slices of the resulting emission reductions to customers in relatively small quantities. As they sell to the voluntary market, the projects in which they invest do not necessarily have to follow the CDM process. Free of stringent guidelines, lengthy paper work, and high transaction costs, project developers have also more freedom to invest in small-scale community based projects. *The co-benefits of these projects, in terms of, for instance, local economic development or biodiversity are often a key selling point.*

Some examples of voluntary regimes or markets are: the UK Emissions Trading Scheme, the Chicago Climate Exchange Scheme and the Retail Market. The *voluntary market* refers to entities (companies, governments, NGOs, individuals,...) that purchase carbon credits for purposes other than meeting regulatory targets. The *retail market* refers to companies and organisations that invest in offset projects and then sell off portions of the emission reductions in relatively small quantities with a mark-up.



1. CDM/JI projects that are/will be registered either with the CDM Executive Board or with the relevant authority for JI projects and that will be able to generate CERs (CDM projects) or ERUs³ (JI projects)
2. Non CDM/JI projects that are not seeking CDM/JI registration and whose generated credits therefore cannot be used for meeting Kyoto or EU targets. The credits generated by these projects are called Verified Emission Reductions (VERs)

³ ERU = Emission Reduction Unit, the tradable unit generated from Joint Implementation (JI) projects (= between Annex 1 countries).

Note that a buyer can *voluntarily* purchase credits from a CDM or a non-CDM project. The action is defined as voluntary as long as the credits will not be used to meet a regulatory target. Retailers can sell VERs, CERs or ERUs for voluntary or regulatory purposes. However, the vast majority of retailers sell VERs to the voluntary market. The retail market is a rapidly growing market.

Some examples of organisations that act as providers on the retail market and that are active in the forestry sector in developing countries are:

Climate Care (UK): www.jpmorganclimatecare.com

Conservation International (US) : www.conservation.org

Face the Future (The Netherlands) : www.face-thefuture.com

Future Forests (UK) : www.futureforests.net

Plan Vivo : www.planvivo.org

PrimaKlima (Germany) : www.prima-klima-weltweit.de

Controversy over the integrity or otherwise of carbon offsets being generated in the unregulated voluntary market – from A/R projects in particular – has given rise to a range of independent third-party administered standards for the validation of offset projects and the verification of their carbon and wider benefits. Paramount among these benefits is ensuring real and permanent carbon sequestration, promoting wider environmental sustainability and delivering positive outcomes for local communities. On the carbon aspect, the major difference compared to the CDM is how “permanence” is treated, that is, how the standard ensures that no credits are issued that do not represent permanent reductions in emissions. Rather than the CDM approach of issuing tCERs, the voluntary standards issue permanent credits but require a percentage be held in a buffer reserve to cover future unplanned losses of trees from fire, disease or logging.

Overall, project developers aiming to generate credible and widely-accepted forest-based carbon-credits need to seek third party verification of their carbon, environmental and social impacts via one or more of these standards. In terms of overall environmental and social benchmarks, the Gold Standard, the Climate, Community and Biodiversity (CCB) Standard and California’s Climate Action Reserve (CAR) are premium standards for use by project developers in the voluntary carbon market. The Voluntary Carbon Standard (VCS) and VER+ are also considered high-quality standards. For forestry, the VCS and CCB Standard are the most widely accepted on an international scale. The standard used by a project developer is a major determinant of the price of the generated VERs and price differentiation is becoming clearer as the market matures.

14 Conclusions and Recommendations for Saint Lucia

- The most attractive and feasible option for the Forestry Department to participate in the current carbon credit business seems to be the development and implementation of offset projects (afforestation, reforestation, avoided deforestation, sustainable forest management) in the voluntary market. Establishing contacts with forest project developers/investors will be the main first step in the process, a step that is to be taken on the FD's own initiative.
- Engaging in the development of a CDM A/R project at this point does not seem to be an appropriate option. Besides all the constraints highlighted in chapter 11, it would be very unlikely that an acceptable amount of tCERs could be generated before the end of the current Kyoto commitment period (2008-2012) given the delays of time that will be needed for project design, approval and implementation (which would be tree planting and tending). However, participation in the CDM for the next commitment period should be considered and explored as soon as the new agreements, rules and modalities have been made public. In this respect, it is recommended that the FD takes charge of ensuring follow-up on the negotiations, preferably in collaboration with Saint Lucia's DNA.
- Participation in one of the established REDD-Readiness Programmes could result in the implementation of an externally financed REDD programme & strategy, and therefore in the generation of REDD-carbon credits. Two important issues, however, reduce the attractiveness of this option: (1) the present lack of funds in the existing programmes and (2) the uncertainty regarding the status of REDD-carbon credits in the post-Kyoto framework. Regarding the latter issue, the upcoming COP in Copenhagen might yield some decisions. To get access to the REDD-Readiness Programmes, the Forestry Department is recommended to ensure a close follow-up through establishing direct contacts with the concerned persons and/or through regular consultation of the respective websites.

Some Land Use-REDD modeling exercises are currently being undertaken by VITO, a Belgian research institute. The aim is to assess the use of spatially explicit modeling and the opportunity costs of REDD based on policy decisions in the land use sector. The present modeling exercise makes use of the data of the timber inventory recently carried out by Dr. R. B. Tennent (Technical Report No. 5 to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd) and of the SimLucia Land Use Change model developed in the '90s in the frame of a UNEP-financed project. The preliminary findings will be presented at the COP15 side events in Copenhagen. These findings together with further research might prove to be very useful for the Forestry Department when developing REDD Readiness activities or funding proposals. In this respect, it is recommended for the FD to strengthen the contacts with VITO in view of further information exchanges and eventually the establishment of certain collaboration arrangements.

VITO has a broad experience in remote sensing, spatial modeling and GHG-emission monitoring and modeling. (<http://www.vito.be/VITO/EN/HomepageAdmin/Home/WetenschappelijkOnderzoek/>).

- The Climate Change Adaptation Funds currently under discussion and construction (also awaiting more clarity in relation to the post-2012 Climate Change Framework), tend to prioritise the specific needs of small island development states such as Saint Lucia. Therefore, it would be good for the FD to check

whether REDD and/or A/F could be linked to adaptation measures as soon as these funds become operational. If links can be established and made acceptable within the regulatory framework of the concerned Adaptation Funds, these could provide another very interesting opportunity.

- Besides the references already given in the previous chapters, additional websites and publications recommended for further reading include:

The CDM regulatory framework: <http://cdm.unfccc.int>
Up-to-date market information: <http://www.pointcarbon.com/>
The BioCF of the World Bank: <http://www.biocarbonfund.org>
The WB Carbon-finance Unit: <http://carbonfinance.org>
Carbon News and Info: <http://www.carbonpositive.net>
The ENCOFOR project: <http://www.joanneum.at/encofor/>
The FORMA project: <http://www.proyectoforma.org>
The Climate, Community and
Biodiversity Alliance: <http://www.climate-standards.org>
The Voluntary Carbon Standard: <http://www.v-c-s.org>
The Green Carbon Guidebook: http://assets.panda.org/downloads/green_carbon_guidebook.pdf

Exploring the market for voluntary carbon offsets, N. Taiyab, IIED. (2006).

Guidebook to markets and commercialisation of Forestry CDM projects. T. Neeff and S. Henders, FORMAPROJECT, CATIE. (2007).

Acknowledgements

This report on Forest Management Guidelines for Saint Lucia could not have been completed without the information and contributions provided by a large number of people, most of them being mentioned in the list of consulted persons presented in Annex 3.

Sincere expressions of gratitude and sympathy are in the first place addressed to the staff members of the Forestry Department who accompanied and guided me during the field visits, shared their knowledge as well as concerns on forest management, provided me all sorts of documents, papers and maps, established contacts and appointments with resource persons outside the Forestry Department, and who participated in the workshop and the several other meetings that were conducted. I wish you all lots of professional satisfaction in the further fulfilment of your forest management mandate and I hope you will experience the correct recognition for your efforts by the Government of Saint Lucia and all its citizens.

Many thanks as well to all the colleagues on the project for facilitating the work to be done, for exchanging tips and preliminary findings, and for sharing the goods and bads of Saint Lucia during the one-month field phase. It would be a great pleasure working with you again in future assignments.

ANNEXES

Annex 1: Terms of Reference

Purpose of the consultancy

To recommend relevant silvicultural and utilization prescriptions that are necessary for sustainable planning and management of forest resources

Results

The key results of the Expert in Silviculture shall include:

A comprehensive report on the current silvicultural methods used in Saint Lucia and recommendations for silvicultural methods to be used for sustainable forest management practices. The report should include, at least the following key considerations:

1. An agreed work plan at the start of the assignment.
2. Background information; including
 - the state of Saint Lucia forests, and
 - the threats to Saint Lucian forests.
3. Analysis of the current silvicultural methods, including alternative silvicultural prescriptions
 - on forest regeneration
 - on intermediate stand treatments
 - on protection of forests against damage
4. Conclusions and recommendations for sustainable silvicultural management practices for Saint Lucia to be presented in the final report of the consultancy
5. Designated national personnel gain skills and experience silvicultural methods.

Tasks

In consultation with the Project leader and FD personnel, develop a work plan and implement following activities:

- Conduct a literature review on current silvicultural systems used in Saint Lucia.
- Conduct assessment of Saint Lucian forests types
- Identify forest types of special conservation interest
- Advise on the significance and management needs of Saint Lucia's forests
- Analyse forest role in climate change mitigation and adaption in Saint Lucia
- During the course of this assignment, train and mentor designated national personnel in silvicultural methods.

Qualifications

- Minimum of MSc in Forestry, preferably silviculture as the main subject
- Minimum ten years of working experience in forestry sector
- Fluency in English language

Timetable

The time allocation for the consultancy is two working months. Minimum one working month is to be executed in Saint Lucia and the remaining working time can be executed as desk work outside Saint Lucia...

Annex 2: Documents consulted

AGRICO Ltd. (2008)

Final Report to the Riverbank Assessment Consultancy for Saint Lucia (SFA 2003/SLU/0709/PE/LC).

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Final Riverbank Assessment Report (Annex 1) to the Riverbank Assessment Consultancy for Saint Lucia (SFA 2003/SLU/0709/PE/LC).

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Silviculture for sustainable management of tropical moist forest. Unasylva Nr. 181, FAO, Forestry Department.

Butler, (1983)

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The Status and Management of Saint Lucia's Forest Reptiles and Amphibians. Technical Report No. 2 to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.

Dupuy, B. et al (1999)

Tropical Forest Management Techniques: a Review of the Sustainability of Forest Management Practices in Tropical Countries. FAO Working Paper (FAO/FPIRS/04) prepared for the World Bank Forest Policy Implementation Review and Strategy.

Ecosystem Marketplace and New Carbon Finance. (2009)

Fortifying the Foundation: State of the Voluntary Carbon market 2009.

European Commission (2005)

Country Environmental Report for Saint Lucia. Annex XI to the EC Delegation's Annual Report 2004.

FAO, Forestry Department. (2005)

Global Forest Resources Assessment. Country Report: Saint Lucia. FRA2005/081.

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Environmental Education Plan 2003/04.

Forestry Department – MALFF/GSL. (2006)

Strategic Plan for Forest Management.

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Strategic Plan for Nature Conservation (Eco-tourism + Environmental Education)

Forestry Department – MALFF/GSL. (2006)

Strategic Plan for Forest Resource Development (2006-2007)

Forestry Department – MALFF/GSL. (2007)

Strategic Plan for Watershed Management.

Forestry Department – MALFF/GSL. (2007)

Forest Research Strategy

Forestry Department – MALFF/GSL. (2007)

Institutional Review.

Forestry Department – MALFF/GSL. (2008).

Revised Forest Policy and Legislation (in process of approval): Final drafts of Saint Lucia Forest Policy; of Saint Lucia Forest (Timber and Non-Timber Products) Regulation; of Saint Lucia Forest Act; and of Saint Lucia Wildlife Protection (Amendment) Act.

Forestry Department – MALFF/GSL.

Strategic Plan for Wildlife Management.

Forestry Department – MALFF/GSL.

Forestry Trails Emergency Plan.

Global Canopy Programme (2009)

The little REDD+ Book: an updated guide to governmental and non-governmental proposals for REDD.

Government of Saint Lucia. (2001)

Forest, Soil and Water Conservation Act (revised edition).

Graveson, R. (2009)

The Classification of the Vegetation of Saint Lucia. Technical Report No. 3 to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.

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Important Plants of Saint Lucia: Botanical Descriptions and Species Checklist. Technical Report No. 4 to the National Forest Demarcation and Bio-Physical Resource Inventory Project, FCG International Ltd, Helsinki, Finland.

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Tennent, R.B. (2009)

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Draft Plan for Eco-tourism Improvement.

Power point presentations:

Preliminary findings from the biodiversity surveys – Jenny Daltry

Reptiles and amphibians – Jenny Daltry

A new vegetation classification – Roger Graveson

Annex 3: Persons/Organisations consulted

- **Forestry Department**

Hermine ALEXANDER, Tour Guide, FD Dennery Range Office
Michael ANDREW, Chief Forest Officer
Alwin DORNELLY, Range Officer Quillesses, Activity leader Wildlife Management/Research
Vincent ERNEST, Forest Officer, Dennery Range
Donatien GUSTAVE, Range Officer, Millet range, Activity leader Forest research
Pius HAYNES, Range Officer Soufriere Range
Lyndon JOHN, Assistant Chief Forest Officer (Operations)
David LEWIS, Range Officer Northern Range
David MATHURIN, Accounting Unit
Nerius MITCHEL, Forest Officer Soufriere Range
Karl MONTY AUGUSTINE, Range Officer, Dennery Range
Theodora NICHOLAS, Forest Officer Soufriere Range
Canice PETERSON, Forest Officer Millet Range
Eugène PHILIP, Nursery Union
Alfred PROSPERE, Activity leader Watershed management and future Forest Management
Sylvie RAYMOND, Education and Eco-tourism Unit
Rebecca ROCK, Mapping Unit
Adams TOUSSAINT, Assistant Chief Forest Officer (Conservation)

- **Project staff/consultants**

Jenny DALTRY, Biodiversity Assessment and Management
Vijay DATADIN, Data Management and GIS
Roger GRAVESON, Botany and Vegetation Classification
Matthew MORTON, Critical habitats and bird survey
Robert TENNENT, Project Manager and Timber Inventory

- **Others**

Erwin ALBERT, Forest harvester/ chainsaw license holder
Bertram CLARKE, Executive Officer, Banana Industry Trust
Judith EPHRAIM, CDM-DNA for Saint Lucia, Sustainable Development and Environment Unit, Ministry of Economic Affairs Economic Planning Investment and National Development
Sarah GEORGE, Deputy Chief Fisheries Officer
Niranda MAURICE, CDM-DNA for Saint Lucia, Sustainable Development and Environment Unit, Ministry of Economic Affairs Economic Planning Investment and National Development
Ananias VERNEUIL, IWCAM project and ex- Range Officer in Dennery Range.
??, Chainsaw license holder harvesting in the FR

Annex 4: Timber Inventory – Strata Composition

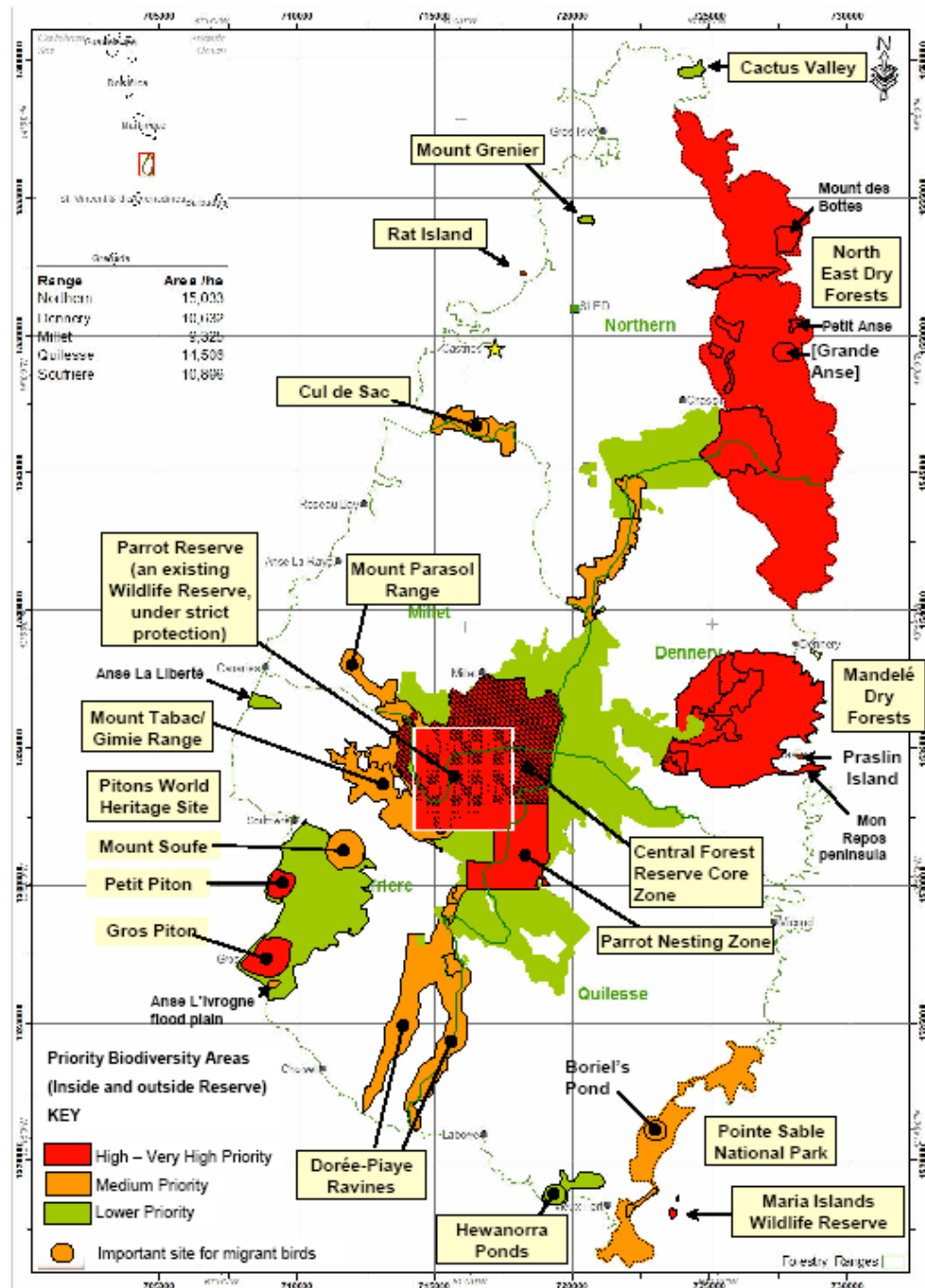
Strata Composition (sampled strata only)

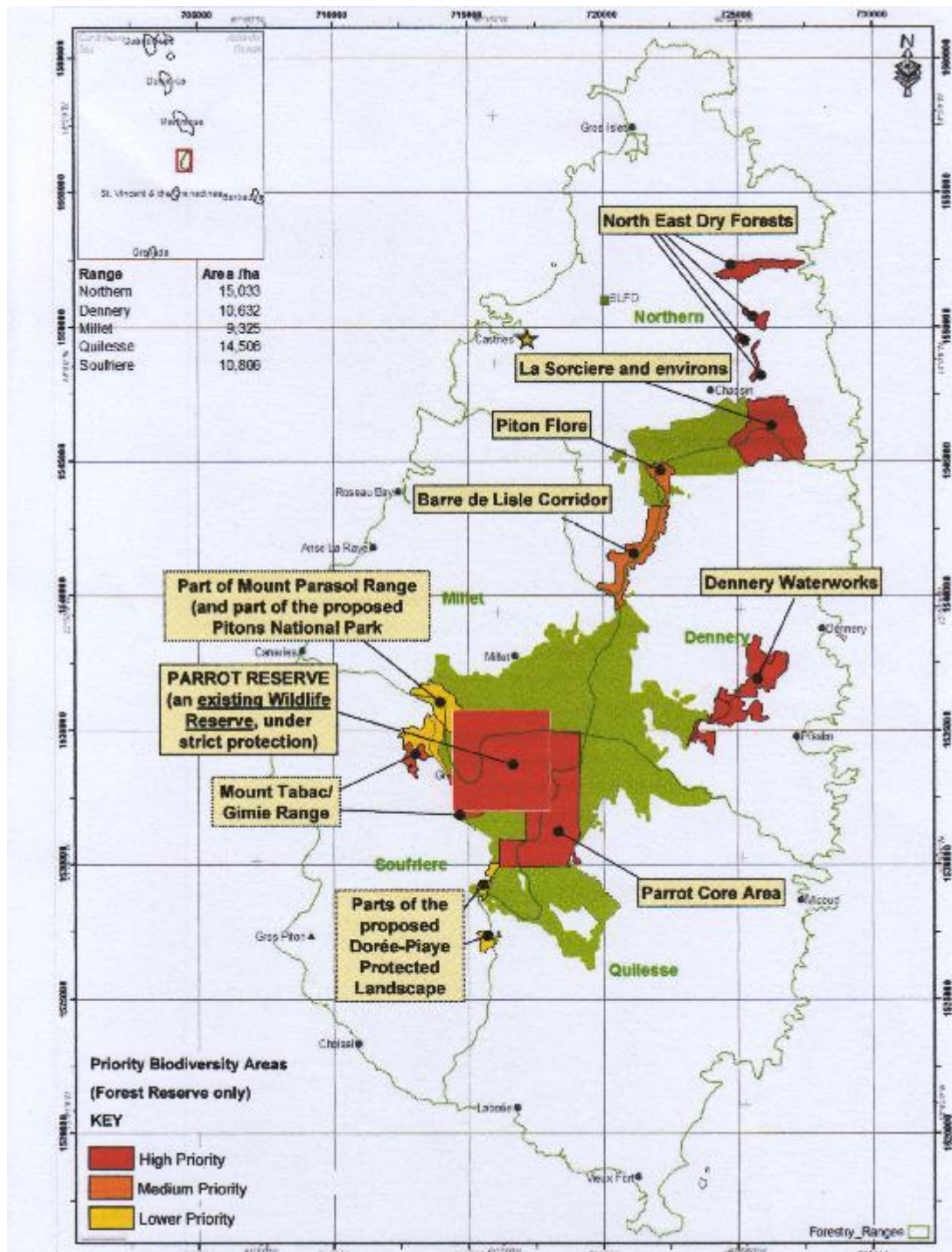
<i>Inventory year</i>		2009	
<i>Stratum</i>	<i>Forest Unit</i>	<i>Area (hectares)</i>	<i>Number of plots</i>
<i>Barre de l'Isle</i>			
	Addition Barre de L'isle South	147.3	11
	Barre de L'isle North	225.6	26
	Barre de L'isle South (lost)	99.0	6
	Barre de L'isle South	741.0	15
	<i>Stratum totals</i>	1212.8	58
<i>Castries Waterworks</i>			
	Castries Waterworks	1396.8	111
	<i>Stratum totals</i>	1396.8	111
<i>Central Forest A</i>			
	Addition to Central Forest A	248.1	15
	Central Forest A	1667.4	22
	Roseau Dam	121.8	13
	<i>Stratum totals</i>	2037.3	50
<i>Central Forest B</i>			
	Addition Central Forest B	149.0	5
	Central Forest B	1459.7	56
	Fond Estate acquisition	350.4	12
	<i>Stratum totals</i>	1959.1	73
<i>Denmery</i>			
	Addition Denmery Ridge large	96.0	3
	Denmery Ridge	72.0	5
	Denmery Waterworks	145.0	10
	St. Joseph's Estate	79.4	2
	<i>Stratum totals</i>	392.5	20
<i>Marquis</i>			
	Marquis 1	132.7	4
	Marquis 2	35.4	2
	Marquis 3	14.7	1
	<i>Stratum totals</i>	182.8	7
<i>Quillesse</i>			
	Addition to Quillesse	196.6	19
	Quillesse	1366.8	63
	Saltibus Grand Magazin	113.3	15
	<i>Stratum totals</i>	1676.7	97
	<i>Forest totals</i>	8858.0	416

Tuesday, 22 September 2009

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Annex 5: Priority areas for biodiversity conservation





Annex 6: Example of an FCPF Readiness Plan Idea Note (R-PIN)

FCPF R-PIN Template

The Forest Carbon Partnership Facility (FCPF) Readiness Plan Idea Note (R-PIN) Template

Guidelines:

1. The purpose of this document is to: a) request an overview of your country's interest in the FCPF program, and b) provide an overview of land use patterns, causes of deforestation, stakeholder consultation process, and potential institutional arrangements in addressing REDD (Reducing Emissions from Deforestation and Forest degradation). This R-PIN will be used as a basis for the selection of countries into the FCPF by the Participants Committee. Information about the FCPF is available at: www.carbonfinance.org/fcpf
2. Please keep the length of your response under 20 pages. You may consider using the optional Annex 1 Questionnaire (at the end of this template) to help organize some answers or provide other information.
3. You may also attach at most 15 additional pages of technical material (e.g., maps, data tables, etc.), but this is optional. If additional information is required, the FCPF will request it.
4. The text can be prepared in Word or other software and then pasted into this format.
5. For the purpose of this template, "Deforestation" is defined as the change in land cover status from forest to non-forest (i.e., when harvest or the gradual degrading of forest land reduces tree cover per hectare below your country's definition of "forest." "Forest degradation" is the reduction of tree cover and forest biomass per hectare, via selective harvest, fuel wood cutting or other practices, but where the land still meets your country's definition of "forest" land.
6. When complete, please forward the R-PIN to: 1) the Director of World Bank programs in your country; and 2) Werner Kornexl (wkornexl@worldbank.org) and Kenneth Andrasko (kandrasko@worldbank.org) of the FCPF team.

Country submitting the R-PIN:

Date submitted:

1. General description:

a) Name of submitting person or institution: Andrea García Guerrero

Title: Minister's Advisor

Contact information: Address: Calle 37 No. 8-40

Telephone: (571) 332-3400 ext 1216

Fax (571) 332-3400 ext 1173

Email: AGarcia@minambiente.gov.co Website, if any:

Affiliation and contact information of Government focal point for the FCPF (if known):

b) List authors of and contributors to the R-PIN, and their organizations:

Ministry of Environment, Housing, and Territorial Development: Andrea García Guerrero – Advisor to the Minister, Nasby Neira, International Affairs Office Advisor – Maria del Pilar Pardo, Ecosystems Direction Director – Pablo Manuel Hurtado Rincón, Ecosystems Direction Technical advisor, – María Adelaida Fernandez, Economic Analysis Group Advisor – Marcela García, Economic Analysis Group Advisor.

Hydrology, Meteorology and Environmental Studies Institute (IDEAM): Ricardo Lozano, Director – Sandra Pérez, Sub Director of Environmental Studies – Claudia Olarte, Environmental Studies Sub Direction Specialist – Helmuth Nieves, Environmental Studies Sub Direction Technical Advisor, – **Sub Director of Ecosystems and Environmental Information** - María Cecilia Cardona Ruiz, Forests Group Coordinator, **Sub Director of Ecosystems and Environmental Information** - Forest Group, Patricia León Poveda, **Sub Director of Ecosystems and Environmental Information** - Forest Group, Adriana Paola Barbosa Herrera, **Sub Director of Ecosystems and Environmental Information** - Forest Group.

National Natural Park Special Administrative Unit: Julia Miranda, Director, – Carlos Sarmiento, Technical Sub direction – Virginia Salazar, Environmental Services and Sustainable Area Advisor – Sergio Camilo Ortega P., Environmental Services and Sustainable Area Advisor

Van Humboldt Institute: Fernando Gast, Director

FCPF R-PIN Template

c) Who was consulted in the process of R-PIN preparation, and their affiliation?

The above mentioned people, governmental entities and several NGO experts (TNC, Conservation International)

2. Which institutions are responsible in your country for:

a) forest monitoring and forest inventories

Hydrology, Meteorology and Environmental Studies Institute (IDEAM) and SINA (National Environmental Information System) Research Institutes: national inventories and monitoring.

Regional Autonomous Corporations (CARs – regional environmental authorities): natural resources management and regional monitoring.

b) forest law enforcement:

The Ministry of Environment, Housing, and Territorial Development (MEHTD) is the central leading entity that defines natural resource policy, including forests protection and use. At a regional level, forest law implementation is the responsibility of the CARs, urban entities (for large cities), and territorial entities (Regional Governments and Townships). The Special Administrative Unit for the National Natural Park System (SAUNNPS), as part of the administrative structure of the Ministry, controls the country's protected areas. On the other hand, the Ministry of Agriculture and Rural Development is responsible for the formulation and implementation of policy related to forestry plantations for commercial use.

c) forestry and forest conservation:

In the Colombian institutional framework, management and conservation of natural forests and protective plantations, is the responsibility of the National Environmental System (SINA), which is composed by the MEHTD, CARs, IDEAM and the SAUNNPS, as well as other research institutes with territorial emphasis).

d) coordination across forest and agriculture sectors, and rural development:

Through the National Department of Planning and inter-ministerial agendas.

3. Current country situation (consider the use of Annex 1 to help answer these questions):

Where do forest deforestation and forest degradation occur in your country, and how extensive are they? (i.e., location, type of forest ecosystem and number of hectares deforested per year, differences across land tenure (e.g., national forest land, private land, community forest, etc.)):

The different land tenure dynamics (public, communal or private) have lead to the fragmentation and/or loss of natural ecosystems in Colombia in the past century, principally forest ecosystems. Recently, the IDEAM has established an official deforestation rate of 101, 303 ha/yr, for the period from 1994 and 2001, based on a visual classification of LANDSAT images. This is the equivalent to the yearly reduction of 0.18% of the national forest cover¹. However, this data does not reflect annual regional variations.

Within this framework, it is worth mentioning that for the period studied, the most affected ecosystems in the country are:

Amazon Region: Pre-humid forests near the Amazon basin and forests of the basins of the Caquetá, Putumayo and Guaviare rivers.

Pacific Region: Humid forests of the Pacific plains

Andes Region: Sub-humid high altitude andean forests, sub-humid andean forests, tropical dry andean forests.

¹ INSTITUTO DE HIDROLOGÍA, METEOROLOGÍA Y ESTUDIOS AMBIENTALES, IDEAM. 2004. Informe anual sobre el estado del medio ambiente y los recursos naturales renovables en Colombia. Bogotá. 256 p. (Annual report on the condition of the environment and natural renewable resources in Colombia.

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sub-andean dry forests, pre-montane sub-humid forests, wet sub-andean forests, sub-andean very dry forests and shrublands, andean pre-montane wet forests, dry pre-montane Andean forests

Caribbean Region: Sub-humid and dry forests of the caribbean plains, riparian forests of the basins of the caribbean, riparian forests of the basins of inter-andean valleys, sub-humid forests and dry forests of the Caribbean mountains

The harvesting of natural forests is the most important Wood source for the furniture industry and construction in Colombia. It is estimated that between these two productive sectors approximately 3 million square meters of wood are consumed annually (IDEAM, 2006, National Forestry Information System). In general, 480 species are extracted, especially 15, of which 6 are of high commercial value. This extraction is mainly concentrated in the Pacific and Amazon Regions, and remnant forests of the Andean Region, including the Magdalena River Valley and the Caribbean Region. This activity is the principal source of economic resources and income for many communities living in these regions, forest dwellers, composed mainly by afro-colombian communities and indigenous communities, and colonists from other regions of the country. The harvesting is conducted by selective logging in many cases, in low-income environments, with complex processes of commercialization that do not favor the sustainable management of forests. Quite the contrary, they incentivize forest degradation and deforestation. Much of the income generated by these activities is not left to the local communities or forest dwellers, but in stead to intermediaries and buyers that re-sell the wood or harvested wood products in towns and cities.

The demand on precious-woods has forced the CARs and Sustainable Development Corporations to report them as highly threatened²:

Common name	Cientific Name	Family
Cedro	<i>Cedrela odorata</i>	Meliaceae
Abarco	<i>Cariniana pyriformis</i>	Lecythidaceae
Roble	<i>Quercus humboldtii</i>	Fagaceae
Caoba	<i>Swietenia macrophylla</i>	Meliaceae
Comino	<i>Aniba perutilis</i>	Lauraceae
Chaquiro	<i>Retrophyllum rospigliosii</i>	Podocarpaceae
Nogal	<i>Juglans neotropica</i>	Juglandaceae
Caracolí	<i>Anacardium excelsum</i>	Anacardiaceae
Carreto	<i>Aspidosperma polyneuron</i>	Apocynaceae
Pino colombiano	<i>Podocarpus oleifolios</i>	Podocarpaceae

For the case of deforestation due to illicit crops³, studies have determined that to produce 1 hectare of coca, producers have to deforest 4 hectares of tropical rain forests, and to produce 1 hectare of poppy, 2.5 of Andean forest. This means that according to estimates of the period between 1990 and 1998, a total cumulative area of 78,516 ha of Andean forests were deforested due to poppy plantations, and from the period between 1987 and 1998, 425,600 ha of tropical rain forest were lost due to coca plantations.

Finally, by analyzing protected areas⁴, and the change in forest cover in these areas until 2005 at a semi-detailed level, it was estimated that the deforestation rate is 2,300 ha/year. This study calculated that the impact of illicit crops on the deforestation of National Natural Parks, and found that generally less than 1% of forest cover is lost due to this driver, however, it has been found that this is not the case for some of the Parks such as Catatumbo-Bari and Paramillo which present serious deforestation due to illicit crops, 14% and 11% of their deforestation respectively.

² Colombia, Ministerio de Ambiente, Vivienda y Desarrollo Territorial, e Instituto Amazonico de Investigaciones Cientificas. 2007. Libro Rojo de Planta de Colombia. Volumen 4. Especies maderables amenazadas: Primera Parte. Serie libros rojos de especies amenazadas de Colombia. Bogotá. 232 p.

³ Dirección Nacional de Estupeficientes. 2011. Impacto ambiental ocasionado por sustancias químicas, los cultivos ilícitos y las actividades conexas. Bogotá D.C. 42p.

⁴ ONU-UNDCP. 2005.

⁵ Fuente: IDEAM, 2001. Inventario de Gases efecto Invernadero. Módulo de Cambio en el Uso de la Tierra y Silvicultura. Bogotá. Pv.

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b) Are there any estimates of greenhouse or carbon dioxide emissions from deforestation and forest degradation in your country? If so, please summarize:

The results of the consolidated CO₂ emissions and absorptions and emissions of non CO₂ gases from activities in the LULUCF sector can be found in the following tables⁶:

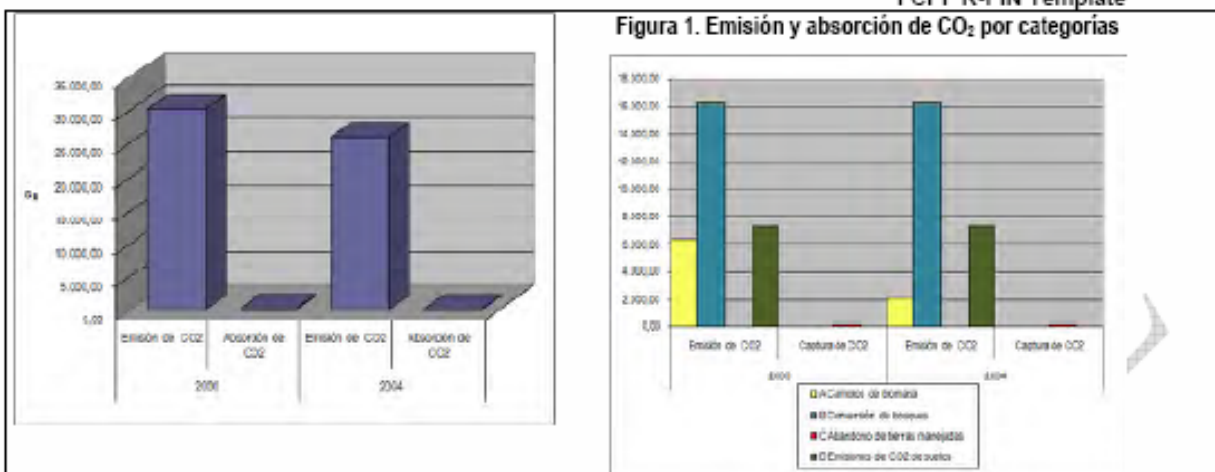
SECTORIAL REPORT FOR THE NATIONAL GHG INVENTORY – YEAR 2000 (Gg)					
Categories – sources and sinks	CO ₂ Emissions	CO ₂ Removals	CH ₄	N ₂ O – NO _x	CO
	29,944.93		12.67	0.009 – 3.15	110.88
Total net LULUCF					
Total LULUCF	30,095.40	-150.47			
Changes in biomass in forests and other types of woody vegetation	6,412.76				
Conversion of forests and grasslands	16,345.70		12.67	0.09 – 3.15	110.88
Abandonment of agricultural land		-150.47			
CO ₂ Emissions from soils	7,36.94				

SECTORIAL REPORT FOR THE NATIONAL GHG INVENTORY – YEAR 2004 (Gg)						
Categories of GHG sources and sinks	CO ₂ Emission	CO ₂ Removal	CH ₄	N ₂ O	NO _x	CO
Total net LULUCF	25,720.5		12.67	0.09	3.15	110.88
Total LULUCF	25,820.94	-100.39				
Changes in forest biomass and other types of woody vegetation	2,130.90					
Conversion of forests and grasslands	16,345.70		12.67	0.09	3.15	110.88
Abandonment of agricultural lands		-100.39				
CO ₂ emissions from soils	7,344.35					

The following is a graphical comparison between CO₂ emissions and adsorptions for years 2000 and 2004:

Fig 1. Total CO₂ emission and adsorption

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SIMSI (United Nations's Office for Drugs and Crime satellite imagery analysis system) has estimated that the burning of natural forests due to illicit crops destroys 280 tones of biomass per hectare, which means 152 million tones of biomass that have turned into ashes, CO₂ and sediments. This process contributes to high GHG emissions and to diminish the navigability of rivers and canals and affect the country's dams.

c) Please describe what data are available for estimating deforestation and/or forest degradation. Are data published? Describe the major types of data, including by deforestation and forest degradation causes and regions if possible (e.g., area covered, resolution of maps or remote sensing data, date, etc.).

The principal source of data on degradation and deforestation is the annual report on the status of the environment and renewable natural resources in Colombia published by IDEAM in 2004. In this report, reforestation data from the last 30 years is presented. As a result of the analysis, IDEAM estimated, as mentioned previously, a deforestation rate of 101,303 hectares a year. This number should be recalculated with a set periodicity to maintain precision (FIDE IDEAM 2004:144).

For national park areas, data that has been published has been obtained by different research projects. Currently, they are using MODIS Rapid Response (NASA/Maryland University), to detect disturbances that could be related to the illegal occupation of land. This data is available in the Technical sub-direction of the National Parks Unit (Monitoring and Planning of Management Unit), as well as in publications and reports from governmental research institutes such as SINCHI and the Von Humboldt Institute. For the specific case of illicit crops, the data source is SIMSI. Annex I contains a more detailed account of documents that further this information.

d) What are the main causes of deforestation and/or forest degradation?

As the main drivers associated to forest degradation and deforestation we have detected:

- Expansion of agricultural frontier
- Colonization
- Construction of infrastructure projects
- Forest fires
- Extraction of wood for energy purposes
- Sub-utilization of forest resources (unsustainable management)
- Selective logging or high-grading for valuable forest species

In addition to these drivers, we find low governability in some areas of the country due to the armed conflict that affects the environmental authorities' capacity to manage the forest resource.

The direct drivers mentioned have their origin or are exacerbated by a complex interaction of underlining elements. These factors are found at the local, regional and national levels, and vary from place to place depending on the local

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circumstances; the underlying causes are more complex and controversial than the direct drivers. Some of them are linked to national policy, planning and legislation in different economic sectors such as the agricultural and mining sectors. In that sense, we see a trend in the past decades to undervalue the forest resource of the Country.

Annex 2 contains the current National Park's vegetation cover and their influence areas

e) What are the key issues in the area of forest law enforcement and forest sector governance (e.g., concession policies and enforcement, land tenure, forest policies, capacity to enforce laws, etc.)?

There are a series of key aspects that determine the application and implementation of forestry policy. These vary according to regional specificities. These are, among other, the following:

- Presence of illegal armed groups that generate instability and difficult governability conditions.
- Lack of capacity and financial resources in the CARs, which affects their ability to manage the resource efficiently
- Coordination difficulties between different governmental entities related to the forest sector
- Difficulties in implementing follow-up on command and control instruments on management and harvesting
- The acceptance of illegal forest products by the industry
- Lack of integration, development and equity of productive chains in forestry, inefficiency, and difficulty in the regulation of these activities
- Lack of capacity in ethnic communities for sustainable forest management
- Under-value of the wood products from natural forests
- Lack of interactions of policies, plans and legislation of different sectors

4) What data are available on forest dwellers in lands potentially targeted for REDD activities (including indigenous peoples and other forest dwellers)? (e.g., number, land tenure or land classification, role in forest management, etc.):

From the total Colombian forest cover, more than 23 million hectares are located in collective territories that legally belong to indigenous or Afro-colombian communities. This defines the country's definition and implementation of special strategies for conservation, management and sustainable use of forests within these territories.

For example, for regions with the most forestry capacity, namely the Amazon and Pacific regions, we have:

- In the Amazon region, there are 88 "resguardos" (indigenous legally owned communal land), that span through three departments: Putumayo (30 resguardos), Caquetá (38 resguardos) and Amazonas (28 resguardos).
- In the Pacific region, there are 238 "resguardos", located in the departments of Antioquia (37 resguardos), Caldas (3 resguardos), Cauca (36 resguardos), Chocó (104 resguardos), Nariño (34 resguardos), Quindío (5 resguardos), Risaralda (4 resguardos) and Valle del Cauca (17 resguardos). They constitute an area of 8'311,884 hectares and are home to 29,073 people of 5,619 families.

In 2001, of the total area of the Colombian Amazon (476,505 km²), 41.8% are indigenous "resguardos"; 26.2% are forest reserves, 10.6% are in National Natural Parks or Reserves, and 3.8% are in special management districts. Today we have some areas under two legal figures, indigenous "resguardos" and protected areas, these cover 3.6% of the whole region (Murcia et al., 2003).

5. Summarize key elements of the current strategy or programs that your government or other groups have put in place to address deforestation and forest degradation, if any:

a) What government, stakeholder or other process was used to arrive at the current strategy or programs?

The National Forestry Development Plan –NFDP–, was elaborated in compliance of law 37 of 1989 and of the recommendations by the United Nations Forum on Forests (UNFF).

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For its formulation, the National Government through the Ministries of Environment, Agriculture, Commerce, Economic Development and the National Planning Department, through a participative institutional, and sectoral process, constructed a long-term plan, in which a national policy was defined with the purpose of incorporating the forestry sector to the national economy, to improve the livelihood of communities, by offering productive alternatives that contribute to sustainable development and peace.

Additionally, the participative strategy for the ecologic restoration run by the National Park Unit is developed through 4 principal process: i) the establishment of inter-institutional cooperation agreements for the implementation of the restoration processes ii) the conformation of restoration groups composed by peasant families that live within restoration areas, iii) the conformation of an inter-institutional technical committees for the ecological restoration of the affected area and iv) the establishment of an inter-institutional management and commentary system in the area.

Recently, the current formulation of the National Strategy for Payment for Environmental Services has been the result of several activities, in which international NGOs such as TNC, WWF, and CI participated along with the private sector, regional environmental authorities, and research institutes.

In terms of REDD readiness, the country would organize a broad consultation process, which would include among others; work shops with different actors of the sectors involved (peasant and indigenous communities, industry, NGOs, universities, etc.), in order to achieve an integral vision for their development. Work would be focused mainly, but not exclusively, on strategic forest ecosystems so as to generate a cost-effective impact on the local and institutional capacity to tend to deforestation and degradation issues.

b) What major programs or policies are in place at the national, and the state or other subnational level?

In order to reduce deforestation and degradation of forests, the implementation of the National Forest Development Plan – NFDP- must continue and be enhanced, as well as the revision and coordination of the different related policy instruments. The following planned projects have a direct effect on the abovementioned topics, although many lack the financing necessary for their implementation:

1. Updating the national and regional forest inventories
2. "Zonification" and ordainment of forest ecosystems at the municipal, regional and national scales
3. Formulation of contingency plans against forest fires at the regional and local scales
4. Conformation of a National Organization of Prevention Centers for forest fire detection and control
5. Monitoring of forest ordainment and sustainable management in productive forests, through indicators and criteria
6. Basic and applied research for natural forest management
7. Low-impact management in natural forests meant for production
8. Monitoring and control over forestry extractive operations and the mobilization of forest products
9. Current status report on forestry industries that produce wood products for industry from natural and planted forests
10. Establishment of a support system for the expansion and technical modernization of existing forestry industries
11. Strengthening and implementation of the Forest Information Systems
12. Design of a forest monitoring and follow-up system
13. Design and implementation of a quality control system to the management and use of forest resources
14. Evaluation of the National Forestry System's pertinence, structure, and management schemes
15. Promoting of forest goods and services at the international level

For the national inventory issue, forest "zonification" and ordainment, the development of a monitoring, follow-up and modeling plans are fundamental, as they will facilitate the following:

- Delimitation, accounting and zoning of forest ecosystems and forest areas in the country
- Characterization of the goods and services generated by the forest ecosystems and forest areas with the participation of environmental entities
- Evaluation and assessment of the production capacity of goods and services of forest ecosystems
- Detection of changes and trends in forest ecosystems
- Interpretation of the impacts of changes on surrounding areas, so mitigation options can be defined
- Generation of protocols, guides and standards for the efficient management of forestry information
- Generation of the forest indicators with the aid of the SINA system and private sector, to learn about forest

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- dynamics in different areas of the country
- Definition of the forestry sector's input to the national Gross Integral Product

In the framework of the national forest development plan, we can point out some important activities such as:

- Development of pilot projects with communities for natural forest management and regeneration that would allow for social integration and transfer of knowledge and resources
- Development of policy instruments for forest protection, conservation and management, and sustainable agricultural development
- Monitoring of forest use plans
- Implementation of the National Strategies for Payment for Environmental Services
- Integration of the Strategic Sectorial Environmental Evaluations that allow compensation for unavoidable environmental damages in the process of mega-project development
- Development of activities related to the use and of sustainable extraction of timber and non timber forest products from natural forests, to be implemented by research institutes
- Development of the sustainable biocommerce initiative, which aims to generate sustainable production alternatives based on native biodiversity

The points mentioned above are framed in a decentralized and specialized institutional scheme, being that the regional environmental authorities (CARs) are the managers of renewable natural resources.

At the same time, a participative ecological restoration strategy is being implemented in the National Natural Parks, based on natural assisted regeneration of ecosystems. This means that the natural processes and their natural sequence are recognized as the axis of restoration and are imitated and promoted so as to aid the ecosystem in the recovery of its structure, composition, and functions.

6. What is the current thinking on what would be needed to reduce deforestation and forest degradation in your country? (e.g., potential programs, policies, capacity building, etc., at national or subnational level):

For the purposes of readiness for REDD, the country would seek capacity for diagnosing, project design and monitoring of carbon in forests at a national and regional level. At a national level this would be done through IDEAM, and regionally through the CARs. In parallel, work would be forwarded on the socialization of the opportunities and incentives related to REDD in all regions of the country, emphasizing work on areas with high deforestation rates.

This work would be done with the objective of generating incentives from different communities that are participating in processes that lead to the degradation or deforestation of forests. Each community should establish the causes of deforestation in their area of influence, and develop sustainable forest management plans or alternative productive projects. After this proposal comes forward from the community, entity or person(s) that own the land, the central and/or local government may come in to support the community in the technical aspects that it may not be able to do on its own. This assistance could include, capacity building for the area's forest inventory, remote imagery analysis, reference scenario setting, development of a monitoring scheme, support for the detailed design and implementation of the alternative productive plan. The governmental organizations in charge of these tasks will aim to create the capacity to supply the support needed through readiness assistance such as the one possible through the FCPF.

It is important to mention that this scheme would ensure that each community related to a REDD project or initiative (or with their territories involved in one) not only would consent to the activity, but determine the alternatives that would satisfy their needs and that they are made in line with their culture and traditions.

Additionally, we have detected some concrete actions that will be forwarded or are being developed at the national level to aid in the coordination of activities of this nature:

- Policy instruments designed for communities that live in areas of transition from forest to non forest
- Establishment of the national strategy for payment for environmental services

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- The elaboration of a interministerial policy document (CONPES) on climate change that will seek to coordinate and harmonize policies that will detect and eliminate perverse incentives in the different sectors
- Improvement of the CARs' management capacity in areas such as planning, ordainment, conservation, management and use, follow-up and monitoring of forest ecosystems.
- Evaluation and adjustment of policies that could negatively impact climate change

a) How would those programs address the main causes of deforestation?

In taking into account the needs of communities that are deforesting (mainly out of necessity or lack of alternatives), or finding the way to compensate for their opportunity costs and the costs for other deforestation agents such as companies that base their production on wood extraction or agricultural expansion, sustainable projects can be created. These projects should endure in time, be compatible with communities' interests, and would not generate conflicts due to imposing land use changes and life style changes, because the initiatives would be coming from within.

The national forest monitoring program will allow, through the national forestry information system to generate information regarding to forests, maintain up-to-date indicators related to forest change, deforestation rates, and other information necessary to mitigate deforestation, this with the view of maintaining decision makers well informed, mainly the Ministry of Environment, who is in charge of generating the national forest policy.

These programs will allow for the improvement of management of the forest resource in the whole country, with current and continuous information about the condition of the resource, with a better integration of the entities in charge of the forest sector, from the national to local scales, with personnel capable of planning, ordaining, drafting conservation management, use and monitoring plans for forest ecosystems, under sustainability criteria.

b) Would any cross-sectoral programs or policies also play a role in your REDD strategy (e.g., rural development policies, transportation or land use planning programs, etc.)?

Colombia is working on a national policy on climate change at the highest level of Ministerial consultations. In this document, one of the sectors to be treated is the forestry sector. As with all other sectors, a vulnerability to climate change study will be mandated, as will be a study on mitigation potential (including REDD). The result will be an adaptation and a mitigation plan for the sector.

c) Have you considered the potential relationship between your potential REDD strategies and your country's broader development agenda in the forest and other relevant sectors? (e.g., agriculture, water, energy, transportation). If you have not considered this yet, you may want to identify it as an objective for your REDD planning process.

The need for the implementation of trans-sectoral policies that aim to harmonize the development agenda with the ecosystem characteristics is apparent when we realize the conflicts generated by different land uses such as agriculture, and extensive cattle ranching and forest land for ecosystem and water conservation purposes. Additionally, the sub-utilization of land produces problems of food shortage and social inconformity, which have a direct impact on the over-utilization of fragile ecosystems (IDEAM 2004:124).

According to the land use conflict map done by the National Geographic Institute Agustín Codazzi (IGAC), lands properly managed are 37.7% (approx. 21'996,294 ha) and the improperly managed constitute 62.3% (approx. 36'343,312 ha) of the total land.

32.7% of the land partially or intensely transformed, is being over-utilized in some degree, which is an area of 19'079,013 ha. The moderately and intensely over-utilized land spans over 68% of the territory, which is an area of 12'973,728 ha or 11.3 % of the country. These are areas with high risk of degradation and of losing their capacity to provide their ecosystemic functions. Finally, it was established that 29.6% of the area partially transformed is being sub-utilized, which is an area of 17'270,299ha (IDEAM 2004:121)

d) Has any technical assistance already been received, or is planned on REDD? (e.g., technical consulting, analysis of deforestation or forest degradation in country, etc., and by whom):

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The country has received no assistance for REDD as of yet. There is a small scale pilot project financed (ERPA signed in 2007) by the World Bank in Antioquia (San Nicolas), which is allowing the Ministry to test this option and is implementing a new methodology for this purpose.

7. What are your thoughts on the type of stakeholder consultation process you would use to: a) create a dialogue with stakeholders about their viewpoints, and b) evaluate the role various stakeholders can play in developing and implementing strategies or programs under FCPF support?

As expressed in previous questions, several events and strategies will be put in place in order to "socialize" the RED topic and proposed mechanism, including readiness for RED. The objective will be to learn about any concerns from the communities and the sector, and to inform them so they can decide if they want to participate. All of this will be framed in the consultation procedures established by Colombian legislation for indigenous and afro-colombian communities (Law 21 of 1990 and Law 70 of 1993).

a) How are stakeholders normally consulted and involved in the forest sector about new programs or policies?

They would be consulted through informative papers with questions for feedback, workshops, conferences and working groups.

b) Have any stakeholder consultations on REDD or reducing deforestation been held in the past several years? If so, what groups were involved, when and where, and what were the major findings?

Not specifically for RED, between the MEHTD and IDEAM, there are several cooperation scenarios in various forest related issues, such as the formulation and development of the National Monitoring Program for Forests.

c) What stakeholder consultation and implementation role discussion process might be used for discussions across federal government agencies, institutes, etc.?

Through the implementation of the national forest development plan, different scenarios have been generated, such as the national round table on forests, an inter-institutional committee, a forest policy advising committee, the national environmental council, and the national economic and social policy council (CONPES), which are possible forums for the presentation and discussion of RED.

Specifically regarding the Climate Change CONPES, due to the nature of the council, the representation is at the highest ministerial level, and the following ministries are involved:

Agriculture Ministry
Energy Ministry
National Planning
National Farmers association
Water and sewerage facilities institutions
Research institutes, regional authorities, protected areas authority, civil society reserves, etc.

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d) Across state or other subnational governments or institutions?

Additionally, we plan to hold work shops with the CARs in order to socialize the government's proposal with regards to REDD, give the community the opportunity to express any concerns they might have, and in a second phase, create capacity in local CARs and communities that wish to initiate REDD activities.

e) For other stakeholders on forest and agriculture lands and sectors, (e.g., NGOs, private sector, etc.)?

All NGOs, and other interested sectors will be invited to the regional work shops on REDD.

f) For forest-dwelling indigenous peoples and other forest dwellers?

As indicated before, forest land in collective territories are about 23 million hectares in Colombia, and the National Law dictates specific consultation mechanisms according to Law 21 of 1991 and Law 70 of 1993. In this sense, because of the work shop plus official consultation process, we would be going beyond the law and allow for participative forums and processes.

8. Implementing REDD strategies:

a) What are the potential challenges to introducing effective REDD strategies or programs, and how might they be overcome? (e.g., lack of financing, lack of technical capacity, governance issues like weak law enforcement, lack of consistency between REDD plans and other development plans or programs, etc.):

LIMITING FACTOR	ACTION
Lack of updated information on forests and forest change	Updating data through the national forest inventory and the operation of the national forest information system, plus the design of a monitoring system to track forest change.
Lack of updated information on forest carbon.	Obtaining local carbon content data and coupling with the systems mentioned above.
Issues relating to technical and technological limitations.	Improving technology used for forest monitoring, such as ALOS imagery that also surpasses barriers of imagery interpretation due to clouds (significant issue in the Pacific and Amazon regions).
Lack of financial resources	Cooperation among the National and local governments and international resources.
Difficulties in inter-institutional coordination.	Coordination of management and operation plans at regional and national levels.
Lack of operational capacities of some local environmental authorities (CARs).	Capacity building through strategic partnerships with other institutions and the national government.
Lack of industry capacity.	Industry formalization. Capacity building and conformation of cooperative working groups.
Governability issues.	The central government is working on this. We have to be prepared for natural resource management in places we start recovering.
Difficulties to implement a follow-up system for forest management and monitoring.	Developing and implementation of the forest monitoring program.
Lack of implementation of sustainable forest management alternatives.	Development of general forest ordainment plans in regions, localized areas or pilot areas.
Very low technical capacity in local communities in sustainable forest management and appropriate technologies and best practice guidelines.	Capacity building, transference of technology and pilot projects.

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Lack of incentives for conservation and sustainable forest management.	Revision and adjustment of national and regional policy, and international incentives such as REDD.
Lack of productive alternatives in some regions.	Development of production systems that integrate additional value because of conservation, biodiversity and impact on climate. Finding sustainably produced products that can be sold in "green markets".
Illegality	Enforcement of command and control instruments, transparency agreements, strategic alliances, development or implementation of certification and gold standard.
An extractive forest culture	Education for communities to value the forest through productive processes (of timber and non-timber forest products), with aggregate values and specific green market options. Recognition and payment for environmental services.

b) Would performance-based payments through REDD be a major incentive for implementing a more coherent strategy to tackle deforestation? Please, explain why. (i.e., performance-based payments would occur after REDD activities reduce deforestation, and monitoring has occurred):

It is fundamental to have a national forest inventory that is more accurate and updated, and available for the CARs to use in their planning, managing, use, and monitoring of forest ecosystems. The financing from REDD will be essential to contribute to achieve this national goal.

Payment for environmental services (PES) is an alternative to recognize these services and the opportunity costs incurred by forest land owners. Given the nature of these payments, their implementation should be coordinated with other policy instruments. It is important to clarify that REDD projects will be in line with any policy related to PES, and will be a complementary option to this program.

In addition, the continuation of the National Forestry Development Plan implementation with its different programs and sub-programs, allows us to address many obstacles mentioned in the prior question, directly and indirectly. The policy is there, but it is crucial to have enough economic resources for its correct development.

Resources from REDD will also allow favorable conditions for local producers, while at the same time they can provide the "income or investment return time" from certain forestry activities, making them more favorable and feasible for the communities that implement them, which are frequently low-income families. In this way, payment for GHG emission avoidance will favor local communities and increase their conception of the value of forests.

9. REDD strategy monitoring and implementation:**a) How is forest cover and land use change monitored today, and by whom? (e.g., forest inventory, mapping, remote sensing analysis, etc.):**

The following table presents the results of the multi-temporal study on forest cover change for Colombia between years 1986, 1994, and 2001.

Cobertura	1986	1994	Cambio 1986-1994	1986 - 1994 (miles de ha/año)	2001	Cambio 1994-2001	1994-2001 (miles de ha/año)
Ec. urbanos artificiales	92	125	33	4	144	19	3
Agroecosistemas	33.382	34.367	985	122	34.749	381	58
Bosques	56.902	56.280	-622	-77	55.613	-667	-101
Plantaciones forestales	107	165	58	7	269	104	16
Páramos	1.725	1.614	-111	-14	1.627	13	2
Sabanas	15.525	15.531	6	1	15.556	25	4
Nieves	54	40	-14	-2	29	-11	-2
Humedales	2.991	2.848	-143	-18	3.006	158	24
Coberturas poca vegetación	3.124	2.958	-166	-20	2.949	-9	-1
Sin cobertura natural	57	54	-3	0	56	2	0
No definidos*	39	17	-22				

*Los "No definidos" son producto del manejo de la información en el Sistema de Información Geográfico, SIG, y de las sombras de interpretación de los sensores remotos.

Fuente: Ideam, 2004. Nota: Factor de cálculo entre los períodos 1986-1994 = 8,091 y 1994-2001 = 6,582.

The study conducted by IDEAM and published in the Annual Natural Renewable Resources and Environment Assessment in Colombia for 2004, indicates that of the national land area, 49% or 55'882,000 hectares are forests (natural and plantations), and that of this areas we lost 77,000 hectares/year between 1986 and 1994 and of 101,000 hectares/year for the period between 1994 and 2001. The study started with the identification and classification of vegetation cover in different units with the use of remote sensors (Landsat TM imagery, for the 80s, and 90s decades, and years 2000 to 2003) and the translation of these in vegetation cover maps and current use maps, for years 1986, 1994 and 2001, over which trend analysis are done. It is important to specify that due to the lack of consecutive satellite imagery (due to cloud cover or missing images for specific periods), it was necessary to implement an interpolation of the analyzed areas to be able to determine the mosaic base year.

The country has its Environmental Research Institutes (SINCHI, IAP, INVEMAR, IAVH) which are coordinated by IDEAM, and these entities retrieve and analyze the country's vegetation cover. For this reason, the researchers in these institutes should be given financial and technical support, for them to be able to develop the mentioned studies in an improved manner and more frequently. It is estimated that the percentage of the research done in the country in forest related issues is only 30% of its potential.

b) What are the constraints of the current monitoring system? What constraints for its application to reducing deforestation and forest degradation? (e.g., system cannot detect forest degradation of forest stands, too costly, data only available for 2 years, etc.):

Studies developed have found problems in their development due to lack of technical support and that financial resources

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are not enough to guarantee the sustainability of the studies in time. In consequence, it is necessary to strengthen institutional capacities in environmental monitoring, project design and implementation. The use of high end technologies, access to satellite imagery, protocols and standards, information management policies, data management and information processing systems. Another issue is that the subject is not treated as a priority study topic, studies are done only on a need-to-know basis.

Another limiting factor is the lack of updated remote sensing imagery, availability of capable technicians with enough allocated time to the subject matter in addition to the lack of field operations for corroboration of the interpreted classified units.

It is necessary to strengthen the capacities of institutions in terms of information management, data registry, technical support for data processing, coupled with the strengthening of coordination within and among institutions for the elaboration of reports and the development of field verification protocols with capable personnel for data management and registry.

It is also necessary to reach institutions and make them understand the strategic importance of monitoring and follow-up to deforestation and forest degradation.

Another difficulty is the high costs in maintaining the information platform and information contained in high-resolution satellite imagery updated.

c) How would you envision REDD activities and program performance would be monitored? (e.g., changes in forest cover or deforestation or forest degradation rates resulting from programs, using what approaches, etc.)

It is necessary to have specific spatial, biological and socioeconomic information provided for each project in order for the country to be able to develop an analysis on the local and regional context. Some of the information could be provided by local or central governmental institutions (IDEAM, IGAC and CARs), and some by the project developers. Such information includes:

- Satellite images, aerial photographs, and field data – IDEAM, IGAC, CARs
- Vegetation characterization/biomass - IDEAM, IGAC, CARs or project developers
- Identification of potential leakage causes and monitoring of leakage (through satellite images and/or field methods) – project developers
- Development of bioclimatic models - IDEAM
- Soil types/properties – IGAC, CARs
- Population information - project developers
- Socioeconomic indicators pre-project and during the project – project developers

10. Additional benefits of potential REDD strategy:

a) Are there other non-carbon benefits that you expect to realize through implementation of the REDD strategy (e.g., social, environmental, economic, biodiversity)? What are they, where, how much?

We expect that a obvious result of REDD activities will be the conservation of forests, and therefore expect also that ecosystem services that are not generally valued in the markets, such as protection and enhancement of biodiversity and different cultural positive effects will take place.

In parallel, we expect that resources obtained through REDD activities will contribute to improving the livelihoods of forest dwellers due to increased financial flow and protection of environmental services they need.

For communities with high opportunity costs, we expect that REDD income will be the necessary incentive (in most cases) to achieve a change in their traditional land use tendencies towards more sustainable options.

Finally, it is of interest to the Colombian government, to try to enhance the participation of marginalized and vulnerable communities that are in threatened forest ecosystems that contain important carbon reserves.

b) Is biodiversity conservation being monitored at present? If so, what kind, where, and how?

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The country produces national biodiversity reports that reflect the status of such resource in the national territory, however, given the bio-geographic complexity and size of our country, the reports fail to reflect the huge biodiversity found in our territory.

Currently, the IDEAM, Department for National Statistics and MEHTD have agreed to generate and validate through a pilot test of a methodology for the implementation and updating of the national forest inventory, together with the SINA members and the academic sector. The goal of such inventory is to account for and monitor forest biodiversity and some ecosystem services proxies such as carbon stock and biomass content.

c) Under your early ideas on introducing REDD, would biodiversity conservation also be monitored? How?

Yes, as an additional benefit, but it mainly depends on if the buyer(s) are willing to pay for this aggregate value so projects can manage the costs. Initially, broad monitoring could be continued through the SINA institutes.

d) Are rural livelihood benefits currently monitored? If so, what benefits, where, and how?

No, but as part of a future process of national approval of REDD projects in the MAVDT, this would be a basic requisite.

e) Under your early ideas on introducing REDD, would rural livelihood benefits also be monitored? How?

Yes, by defining indicators that can measure the socioeconomic benefits (or negative impacts if any) generated by REDD.

11. What type of assistance are you likely to request from the FCPF Readiness Mechanism?

- Identify your early ideas on the technical or financial support you would request from FCPF to build capacity for addressing REDD, if you are ready to do so. (Preliminary; this also could be discussed later.)
- Include an initial estimate of the amount of support for each category, if you know.
- Please refer to the Information Memorandum and other on-line information about the FCPF for more details on each category:

a) Setting up a transparent stakeholder consultation on REDD (e.g., outreach, workshops, publications, etc.):

We would need assistance for the workshops mentioned above.

b) Developing a reference base of deforestation trends: Assessment of historical emissions from deforestation and/or forest degradation, or projections into the future.

Starting from the identification of institutional actors and their roles in the development of REDD projects, needs for the development of strategies that will allow for the setting of baselines of emissions from deforestation will be assessed. Particular attention will be placed on institutional capacity building, human resources, technical and financial.

1. Capacity building on the application of international rules for the development of standards, methodologies and protocols for monitoring deforestation.
2. Strengthening and capacity building on information management (documentation, preserving information and outreach)
3. Strengthening of institutional capacity for the development and operation of the national forest inventory as a basis for the characterization of carbon stocks at the national and regional levels
4. Developing thematic cartography on the country's forest ecosystems
5. Financing for characterization and zonification of the country's forests
6. Purchase remote imagery (including ALOS images) and update available remote imagery sets, and establish permanent evaluation periods
7. Train people to interpret the remote images each year and evaluate them using the developed and
8. Update and strengthen technical capacities for the design of sampling schemes and field inventories

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9. Update and strengthen capacities in data base design, operation and management
10. Capacity building on issues related to the evaluation of environmental services
11. Updating of the information platform of relevant institutions
12. Adquisición y actualización de equipos de campo para la colecta de datos e información y muestras botánicas
13. Purchase and updating of field equipment for field data and sample collection
14. Capacity building for relevant institutions on the use, Electronic programming and calibration of field equipment
15. Capacitación en manejo de programas estadísticos para la interpretación de datos
16. Capacity building on the use of statistical software for data interpretation

c) Developing a national REDD strategy: Identification of programs to reduce deforestation and design of a system for providing targeted financial incentives for REDD to land users and organizations (e.g., delivery of payments, governance issues, etc.):

Colombia's goal is to achieve a sub-national REDD approach where the Government will support the communities or organizations that want to implement REDD activities in their territories. Transactions would be between the buyer and the project proponents directly, under conditions established by both parties, and they would pay no fee or levy on their credits to the Government given this design. If project participants ask for advising on these issues, this could be arranged on a case by case basis.

d) Design of a system to monitor emissions and emission reductions from deforestation and/or forest degradation:

IDEAM through the Second National Communication has developed the GHG national inventory based on the 1990, 1994, 2000 and 2004 IPCC guidelines, and with that, a first step in the annual systemization of data collection for the different sector inventories, including LULUCF.

At the same time, in order to feed into this information, and achieve more precise data and reduce the uncertainty, it is necessary to strengthen the national forestry information system in its data compilation process, analysis and validation. At this time, the country does not have sufficient and reliable enough data on forests and their status and dynamics, including carbon data. In this sense, it is critical to have a national forestry inventory, which at the moment is being designed by IDEAM.

Strengthening of capacity is needed in order to increase institutional capacities at the national and regional level to strengthen forest management and follow-up capacities, and create a registration and report of information system, within the related sectors.

It is equally important to have frequent access to high quality satellite imagery, in aims to analyze forest cover change with a higher precision.

Among the main challenges for a RED program, there are priorities that can be categorized in two groups: technical and capacity building needs. These building blocks are essential to guarantee the survival of the program in the long-term, in order to deliver deforestation and forest degradation reduction, prevention and mitigation in Colombia. For this purpose, we need to be prepared functionally, technically, and scientifically so as to obtain the clear criteria necessary for a RED strategy; we need to emphasize the following aspects: strengthen and promote clear ecosystem monitoring programs that are agreed upon by the national environment institutions in coordination with the MEHTD. Having this in mind, the involved institutions will need:

1. Conformation of the organizational structure for deforestation monitoring
2. Creation of the national reference framework for deforestation
3. Development of the "Actions to address, prevent and mitigate deforestation effects in Colombia" Project, which should involve a long-term plan that includes the development of a model for avoiding deforestation, purchasing, processing, interpretation and analysis of remote imagery, updating the cartography that serves as a basis for the evaluated period, construction of change matrices, interpretation of results: which includes determining the drivers of deforestation, evaluation of the level of degradation, determination and establishment of mitigation strategies and policies for the management and restoration of degraded areas. Updating of the information platform, and the strengthening of the technical capacities of relevant institutions.
4. Conformation and consolidation of a technical team to research, monitor and model carbon cycles in soils and forest vegetation, modeling of critical variables to determine the storage capacity of different forest types and the

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<p>emissions of GHG due to different anthropogenic and natural disturbances in forests</p> <ol style="list-style-type: none"> 5. Strengthening of institutional capacities to formulate, develop and implement in cooperation with relevant institutions, a national RED strategy that allows for the creation of a measurement, monitoring and verifying system of emissions from deforestation and forest degradation Capacity building on the knowledge and lessons learned at the national and international levels, on the development of methods for restoration of forests (<u>including native and indigenous knowledge</u>) 6. Capacity building on the construction of models to establish change tendencies, and produce actual and potential scenarios of forest dynamics 7. Capacity building and updating on the development of mitigation strategies for deforestation impacts 8. Updating of flight routes for aerial photography in areas of difficult access and/or with security issues 9. Updating and broadening of the IDEAM's environmental monitoring network for strategic ecosystems 10. Capacity building and permanent updating of national and regional technical teams in sampling techniques, <u>modeling, GIS, remote imagery interpretation, data management and analysis, quality control and data validation</u>
<p>e) Other?:</p>
<p>12. Please state donors and other international partners that are already cooperating with you on the preparation of relevant analytical work on REDD. Do you anticipate these or other donors will cooperate with you on REDD strategies and FCPF, and if so, then how?:</p> <p>No donors or partners yet.</p>
<p>13. Potential Next Steps and Schedule:</p> <p>Have you identified your priority first steps to move toward Readiness for REDD activities? Do you have an estimated timeframe for them yet, or not?</p>
<p>14. List any Attachments included (Optional: 15 pages maximum.)</p>

Anexo I:

BIBLIOGRAFÍA RELACIONADA CON DEGRADACIÓN Y DEFORESTACIÓN DE BOSQUES EN COLOMBIA.

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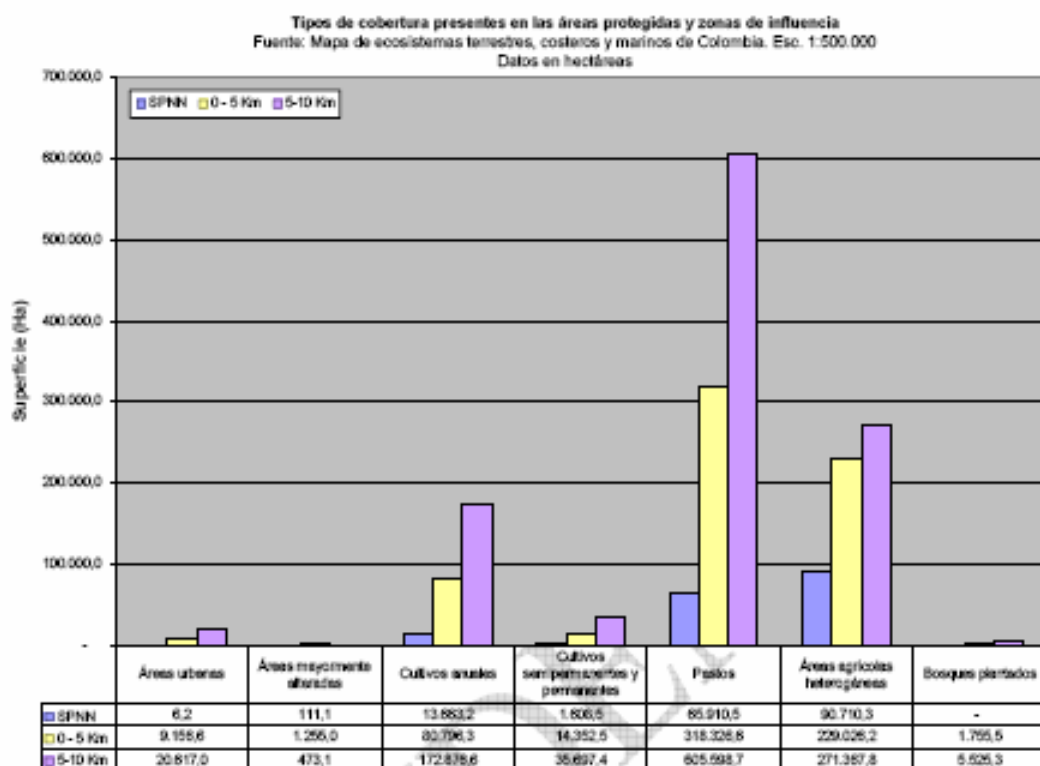
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Annex 7: Request Form to participate in the UN-REDD Programme



The United Nations Collaborative Programme
on Reducing Emissions from Deforestation and
Forest Degradation in Developing Countries

REQUEST TO PARTICIPATE IN THE UN-REDD PROGRAMME

I, _____, serving in my capacity as REDD National Focal Point or equivalent function, hereby formally express the interest of the Government of _____ to participate in the UN-REDD Programme. I understand that funds for the current Quick Start Activities (Readiness Phase 1) have been fully committed. **Pending further funding opportunities, my country wishes to participate in the following:**

☐ **The UN-REDD Programme Online Collaborative Workspace's Community of Practice.** The Workspace provides its members access to UN-REDD Programme documents, reports, technical notes and codified lessons learned, dedicated country pages to contribute updates on the progress of national REDD readiness, a large repository of REDD publications and papers, a daily news feed with the latest REDD news, progress on the activities of our partners, and the ability to network with a large community of REDD stakeholders.

☐ I hereby designate (name and email address) _____ to serve as a focal point for knowledge-sharing through the Workspace.

☐ We have the following pilot activities to share as case studies: _____

☐ **Regional Trainings and Workshops**, understanding that participation will be funded by the UN-REDD Programme when possible.

☐ We have the following training opportunities to offer to UN-REDD Programme partner countries: _____

☐ As an **observer to the UN-REDD Programme Policy Board**. I would be grateful if the UN-REDD programme Secretariat would present this request to the UN-REDD Programme Policy Board for consideration. I understand that participation in the Policy Board meetings will be self-funded.

In addition, I wish to confirm that my country participates in the following REDD readiness initiatives:

☐ World Bank's Forest Carbon Partnership Facility. If so:

☐ Our R-PP has been approved **OR** ☐ Our R-PP is in preparation or awaiting approval

☐ Other Readiness initiatives: _____

SIGNATURE AND TITLE

STAMP

DATE

Please submit to Mr. Yemi Katerere, Head of the UN-REDD Programme Secretariat, email: yemi.katerere@un-redd.org

