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STATUS OF TROPICAL FOREST MANAGEMENT 2011

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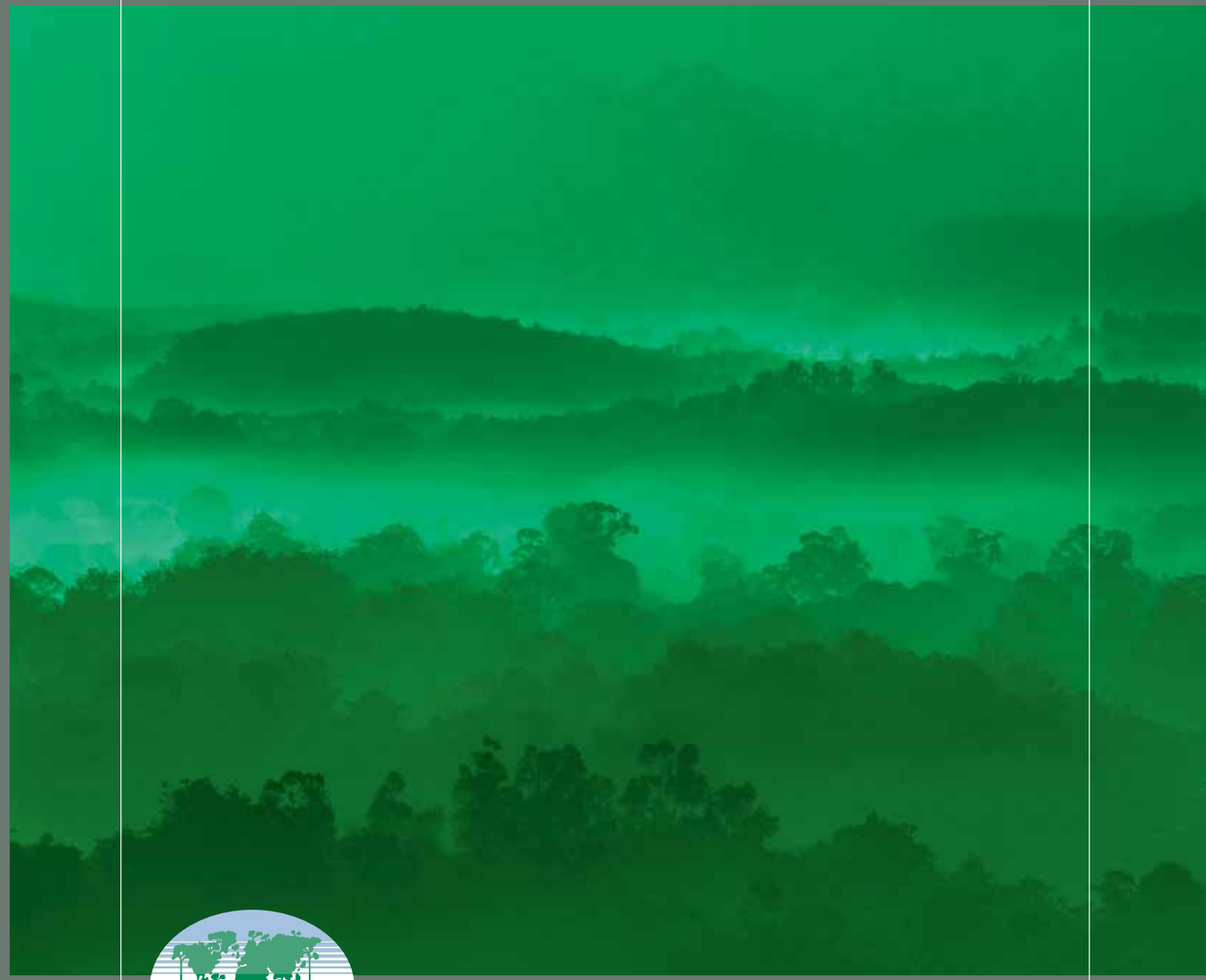

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SURINAME

Forest resources

In 2010 the estimated population of Suriname was 524 000 people (United Nations Population Division 2010), and the country is ranked 97th out of 182 countries in UNDP's Human Development Index (UNDP 2009). A lowland region and the southern highlands account for 80% of the country and form part of the pre-Cambrian Guyana Shield that straddles Suriname, Guyana and French Guiana. Along the northern edge of the shield lies a savanna belt, beyond which is a narrow swampy coastal plain where 90% of the population is concentrated. The estimated forest area is 14.8 million hectares (FAO 2010, Government of Suriname 2009a), which is 91% of the total land area (16.3 million hectares).

Forest types. Three broad forest zones can be distinguished, corresponding to the three major biogeographical zones: the hydrophytic forests in the north, which comprise swamp forests, mangroves and ridge and marsh forests; xerophytic savanna forests in the savanna belt; and the predominant mesophytic humid forest types of the Guyana Shield. These, in turn, comprise the following forest types[a]:

- high dryland forest (rainforest) – 13.3 million hectares
- high savanna forest or dry evergreen forest – 132 000 hectares
- low savanna forest – 18 000 hectares
- high swamp forest – 483 000 hectares
- low swamp forest – 239 000 hectares
- mangrove forest – 100 000 hectares
- marsh forest – 468 000 hectares
- ridge forest – 35 000 hectares.

The Government of Suriname (2009a) estimated the total area of mangroves at 115 000 hectares, but FAO (2010) put the area at 100 000 hectares and Spalding et al. (2010) at about 50 900 hectares.

Permanent forest estate. There is no formally established PFE in Suriname. Nevertheless, all formally established nature reserves and other protected and conservation areas have been established by explicit legal documents that provide strict guidelines for protection and use, thus providing a reasonable guarantee that those protected areas will be maintained as such. Since the establishment of the first protected areas in the 1950s, no protected area has been revoked. Recently, a procedure has been introduced to use a compatible GIS–GPS system to determine the exact location of boundaries and whether any given point on the ground is inside or outside the nature reserve or other protected area.

Concession areas are also allocated on the basis of explicit legal documents that provide information on boundaries as well as guidelines for their management and use. In practice, however, there are few guarantees that these areas will remain in the category of production forest. In the past, some concessions have been converted to protection areas or assigned to other economic uses (such as mining or large-scale agriculture). This was the case, for example, for the community forest in the Brokopondo district, which was allocated to Cambior (now Iamgold) for gold-mining, and some concessions in the district of Marowijne, which have been allocated to China Zhong Heng Tai Investment (Suriname) NV for large-scale oil-palm plantations. The vast majority of forests in Suriname is legally classified "as forests to be provisionally maintained"; forests thus classified will be maintained as forest until such time that they are legally designated to a specific use.

In Table 1, PFE has been taken to include all formally established protected forest areas and all forest concessions and formally designated community forests, but forests "to be maintained provisionally" have been excluded. Also excluded are forested lands of the state that are leased to private individuals for conversion (mainly to agriculture), as well as privately owned forested land that is currently used for timber production but could be converted to non-forest at any time at the discretion of the owners.

Thus, 5.32 million hectares of forest may be considered to be designated as production forest in the PFE, while 2.19 million hectares have been designated for protection and conservation.

Since the PFE has restricted formal status, its demarcation on the ground is minimal. Concessionaires are supposed to demarcate their concession boundaries but, in practice, this is generally confined to the cutting and maintenance of outer boundaries of the cutting compartment under harvest.

Forest ecosystem health

Deforestation and forest degradation. Suriname does not face the population and migration pressures that have led to deforestation in many other countries. According to FAO (2010), Suriname lost 18 000 hectares of forest between 1990 and 2010 (0.1%). The estimated forest loss since 1650 is 400 000 hectares[a], or less than 3% of the extant forest estate. Until about 1980, mining on forested land was mainly for bauxite, which was exported. In the 1980s, however, gold-mining emerged as an activity of growing importance, both economically and environmentally. The total area of forest destroyed due to gold-mining is about 90 000 hectares[a], including 30 000 hectares in the last decade (Fox 2010). An estimated 14 000 small-scale miners and service providers work in Suriname's interior (ibid.). There is no significant occurrence of forest fire from natural causes.

At least 13 million hectares of Suriname's forest estate is primary forest[a]; Table 2 presents an estimate of 13.8 million hectares, which is slightly less than the estimate shown in FAO (2010). Of the 4.5 million hectares of forest designated for timber production, an estimated 744 000 hectares have been logged selectively over time and more intensively, though still selectively, in the last five decades. This forest is considered 'selectively logged primary forest'. The low intensity of harvesting over relatively long felling cycles has helped to maintain these forests in relatively good shape. About 250 000 hectares of forest are used for shifting agriculture and could be considered degraded; the extent of this area is not increasing.[a] There is also

Table 1 Permanent forest estate

Reporting year	Estimated total forest area, range (million ha)	Total closed natural forest ('000 ha)	PFE ('000 hectares)			
			Production		Protection	Total
			Natural	Planted		
2005*	13.6–14.8	14 100	6890	7	4430	11 327
2010	**14.8**	**14 100****	**5319‡**	**13†**	**2194**	**7513**

* *As reported in ITTO (2006).*

** *Calculated using the ratio of forest with greater than 60% forest cover estimated by UNEP-WCMC (2010) (95.5%) and the estimated total natural forest area.*

‡ *Includes inactive concessions (either not issued or revoked or lapsed), active concessions, and community forests.*

† *Government of Suriname (2009a). The status of this planted forest in the PFE is unclear and is not included in the total.*

Table 2 Forest condition

	PFE	Non-PFE	Total
	'000 ha		
Area of primary forest	6769	7037	13 806
Area of selectively logged primary forest	744	0	744
Area of degraded primary forest	0	250	250
Area of secondary forest	0	0	0
Area of degraded forest land	0	90	90

Source: ITTO estimate based on Government of Suriname (2009a) and FAO (2010).

degraded forest in the vicinity of mining operations, although the extent of this is unquantified.

Vulnerability of forests to climate change. The mean annual temperature in Suriname is projected to increase by 0.9–3.3 °C by 2060 (McSweeney et al. undated). Increased rainfall variability and changes in the geomorphology of the coast and in water resources are also projected (Government of Suriname 2002). Suriname's low-lying coastal zone is vulnerable to seal-level rise. This is Suriname's most fertile land, where most economic activities are practised and where the population is mostly concentrated (ibid.). Inland forests are vulnerable to increased drought and forest fire in extreme el Niño years.

SFM policy framework

Forest tenure. According to the 1987 Constitution, all forests, except those on privately owned land, belong to the state. Accordingly, Table 3 shows that almost all of Suriname's forest estate is publicly owned, although more than 1 million hectares have been allocated as private concessions (see below).

The Constitution does not provide for collective rights or the collective use of land, but Amerindian and Maroon people (the latter being descendants of slaves of African origin) claim these rights.

Criteria and indicators. The Forest Management Act (1992) provides criteria for the sustainable use of forest resources. The Government of Suriname used the ITTO C&I in its submission to ITTO for this report.[a]

Forest policy and legislation. The Forest Management Act (1992) covers the sustainable and rational use of forest resources, taking into account the interests of forest-dwellers and the conservation of nature and biological diversity. It provides rules governing timber production (and, to some extent, timber processing) and export. It covers the various licences for forest harvesting, including different types of timber concession and the use of community forests.

A national forest policy was adopted in 2003 after an extensive process of consultation with stakeholders. This policy provides broad guidelines for the use of forests for production, protection and conservation. According to the policy, the main goal of forest management is "enhancing the contribution of the forests to the national economy and the welfare of the current and future generations, taking into account the preservation of the biodiversity". It contains economic, sociocultural and environmental goals of equal weight. The Interim Strategic Action Plan for the Forest Sector was published in 2008.

An environmental law was drafted in 2001 and a revised version is under review by the Ministry of Labour, Technological Development and Environment. If enacted, this law will have important procedural consequences for the issuance of timber licences and the installation of timber-processing units. In the absence of agreed national C&I, the environmental impact assessments described in the draft law will be essential for monitoring progress towards SFM.

Table 3 Forest area, by tenure

Ownership category	Total area	Of which PFE	Notes
	'000 ha		
State ownership (national, state or provincial government)	14 752	7513	PFE includes nature reserves and other protected areas, MUMAs, community forests, inactive concessions, and active concessions held by firms, associations, individuals or families. Non-PFE includes 'forests to be provisionally maintained', and forest for which leases have been issued for clearing and development.
Other public entities, including municipalities, villages, etc.*	0	0	With its centralized government structure, Suriname's regional governments at the district and local levels do not own (forest) land.
Total public	**14 752**	**7513**	
Owned by local communities and/or Indigenous groups	0	0	
Private owned by individuals, firms, other corporate	24	0	

Source: Government of Suriname (2009a).

Institutions involved in forests. The government institutions responsible for the management and protection of Suriname's forest resources are the Ministry of Physical Planning, Land and Forestry Management, the semi-autonomous Foundation for Forest Management and Forest Control (*Stichting voor Bosbeheer en Bostoezicht* – SBB), and NB (the Nature Conservation Division of the old Suriname Forest Service – *Lachtwet en BosBeheer*, LBB). SBB is responsible for the enforcement of the Forest Management Act (1992) and, consequently, for the management of production forests. NB is responsible for the enforcement of the Nature Conservation Act (1954) and the Game Act (1954) and, consequently, for the management of nature reserves and other protected areas. There has been an ongoing process to establish a single authority for the management of production and protection forests, the Forest and Nature Management Authority (Bosnas), but this is still pending.

Suriname has one university (Anton de Kom University of Suriname) with a modest school for forestry, one for biology and another for the environment. Most currently active forestry professionals in Suriname, however, received their education abroad. The Institute for Natural Resources and Engineering Studies is a well-established training institute for forestry technicians, one level below the Bachelor of Science. The Interim Strategic Action Plan for the Forest Sector includes an ambitious training component in line with the recommendations made on the training needs of the forest sector in the context of ITTO pre-project proposal PPD 97/04(I). The Jan Starke Vocational Training and Recreation Center provides forest-related vocational courses, although it is in decline.

Status of forest management

Forest for production

There are several systems for timber harvesting, including concessions, community forests and incidental cutting licences (ICLs). The procedures for granting concessions and licences were not transparent in the past.

Although for a decade or longer prior to the establishment of SBB, ICLs had become a popular way to evade the relative rigid requirements for concessions, in the last decade this practice has been redressed almost completely. ICLs are now restricted to salvage logging areas and conversion forests.

In early 2010, a total area of 1.22 million hectares[1] were under 68 active concessions, comprising 34 licences for areas smaller than 5000 hectares in size (116 000 hectares in total), ten licences for areas 5000–10 000 hectares in size (69 000 hectares in total), three licences for areas 10 000–15 000 hectares in size (32 300 hectares in total), five licences for areas 15 000–25 000 hectares in size (83 700 hectares in total), twelve licences for areas 25 000–50 000 hectares in size (411 000 hectares in total), and four licences for areas 100 000–150 000 hectares in size (507 000 hectares in total). In addition, community cutting licences have been issued for 437 000 hectares, and 114 000 hectares have been designated as community forests for Indigenous or Maroon communities. Six ICLs have been issued for a total of 54 800 hectares, and one ICL for Submerged Wood has been issued for 116 000 hectares. In total, cutting licences of all forms have been issued for about 2 million hectares of forest.[b]

Effective forest management and forest production control were virtually non-existent when SBB was established in 1998 with a mandate to establish a leaner and more cost-effective forest management organization than the Forest Service it replaced. SBB subsequently developed a comprehensive computerized log-tracking system, LogPro, to monitor harvesting operations, the payment of forest fees and forest planning at the FMU level. Although this system is still under development it has already proved useful in promoting SFM. GIS technology was introduced in the forest sector with the support of the WWF Guianas program for the mapping and planning of forest operations on the ground. Initially this was done for SBB's own operations, but the system has been extended gradually to logging companies and other private operators in the forest to facilitate the mutual exchange of planning and other information related to ground-level activities. Training courses in the use of GIS were conducted for representatives of the private sector, including consultants, who are being hired increasingly by logging companies to prepare

1 In October 2010 this had reportedly increased to 1.3 million hectares in 62 concessions, comprising 18 intensively managed concessions covering 605 000 hectares, 16 extensively managed concessions covering 55 000 hectares, and 28 "idle concession or preparatory harvesting activities" covering 640 000 hectares.[b]

the planning of their operations to the (higher) standards that now prevail.

The management and control style adopted by SBB can be categorized as either *intensive forest management* (for large concessions) or *extensive forest management* (for small concessions).

Operators with a relatively large production capacity, including operators that produce mainly for export, were deemed capable of causing extensive damage to a large area of forest in a relatively short time. A high priority was therefore placed on ensuring their adherence to stringent regulations. Application for concessions larger than 5000 hectares must include a business plan (including a financial feasibility plan for wood-processing and logging activities, and a forest management plan) that sets out the intended approach of the applicant to the development of the concession, if granted. After the granting of the concession and before any actual harvesting, a more detailed overall management plan must be submitted to SBB indicating the division of annual cutting areas and the infrastructure to be built. In addition, specific planning is required for each annual cutting area for that year, including 100% inventories and the detailed layout of skidding roads, taking into account the maximum allowable cut as suggested by the Celos Management System (normally 20–25 m^3/hectare) and the selection and marking of the trees to be felled (in the field as well as on tree maps to be included in the planning documents for submission to SBB for approval). Since the requirements for 100% inventories in cutting blocks were introduced, about 17 500 hectares (175 blocks of 100 hectares each) have been surveyed in this way.

Restricting harvesting to inventoried 100-hectare cutting blocks allows the close monitoring of the actual cut in relation to inventoried stock. According to observations of 87 cutting blocks exploited between 2006 and 2009, the average harvest in intensively managed concessions was 12.3 m^3 per hectare.[a] The average annual harvest area for concessions and community forests in the PFE is about 13 500 hectares.

The approved harvest plan forms the basis of production control by SBB. The trees actually cut are labelled with a polyethylene label with a unique number that is issued by SBB from LogPro, its computerized log-tracking system. These label numbers, together with the tree number as assigned in the 100% tally and indicated on the tree map included in the approved harvest plan, must be entered in a felling register, as prescribed by law. The label numbers are thus linked to the tree numbers of the inventory. When the logs are prepared for transport from the production site their label numbers are entered in a way bill. If the original log is cross-cut prior to transport from the production site, the resulting smaller logs are numbered with new labels linked to the number of the original log (and therefore automatically to the tree number assigned in the 100% tally). A copy of the felling register must be presented to the forest guard covering the particular production area, who forwards it to SBB headquarters, where it is entered into LogPro. Systematic inspections of sawmills and other processing facilities are also conducted to ensure that any timber not seen during earlier inspections is detected, registered, and entered into LogPro.

Despite the establishment of these elaborate planning and administrative procedures, for a variety of reasons only a relatively small area and only a few operators are presently under such 'intensive' management.

Extensive forest management is confined to smaller operators, including those active in community forests. Such operators must maintain the boundaries of their concessions and of the annual cutting areas in which they are active (just as in intensive management). Systematic 100% inventories are not required, but the felled timber must be registered in a felling register, as required for intensive management operations. Extensive forest management is applied in concessions where the impact of harvesting on the economy and the environment is relatively low. The ultimate goal is that all concessions are managed according to the procedures of intensive management. All granted licences, whether for intensively managed or extensively managed concessions, are monitored by SBB.[b] An estimated 10–20% of (commercial) production is not registered (FAO 2010).

Although there is growing interest among private forest-owners to produce timber on a sustainable basis, for which they seek assistance from the growing number of consultants available for this kind of supporting service, the practice is not well established and cannot be enforced by SBB given

Forest river scene near Botopasie, Suriname. © *istockphoto/B. Coenders*

its current capacity.[a] It should be noted that timber production in conversion forests is, by definition, unsustainable.

Under SBB, significant progress has been made towards SFM in Suriname's forests, but for a variety of reasons the impact is currently sub-optimal.[a] A major constraint is the relatively low educational level of the forestry workforce, although, to some extent, this problem has been reduced by the development of a group of reasonably competent forestry professionals acting as consultants to assist in the planning of operations by both smaller and larger operators. Another major constraint for the industry is a lack of capital, which hampers the acquisition of equipment that would, for example, enable the effective application of reduced impact logging techniques. An even bigger constraint is of an institutional nature: the formal establishment of the Bosnas has been delayed for more than four years, with a consequent impact on the availability of the resources needed for adequate coverage of the entire production forest area.[a]

Silviculture and species selection. The forests are characterized by a wide variety of species – more than 600 tree species have been described. Some 50 species are known as class A commercial species and about 100 as class B. There has been a significant shift in the last three decades in the species harvested for industrial roundwood. An important reason for this shift pertains to the restricted access to the production forests in more remote parts of the interior during the country's civil war (1986–1993), which led to the use of species previously considered useless or of low value. Many such species proved highly suitable for some very demanding applications in construction and furniture manufacturing.

About 375 000 hectares of the PFE have been inventoried for their standing timber stocks. Table 4 lists some of the most commonly harvested species.

Planted forest and trees outside the forest. In ITTO (2006) the area of forest plantations, and the area of plantations under management plans, were both reported at 7000 hectares. In this report, the estimated planted-forest area has been adjusted to 13 000 hectares on the basis of Suriname's submission[a], but the area under management plans is probably zero (Table 5). The predominant

Table 4 Commonly harvested species for industrial roundwood

Species	Annual harvest quantity (m^3)		Notes
	PFE	Non-PFE	
Qualea spp*	27 175	6507	Harvested predominantly from high dryland forest.
*Dicorynia guianensis**	22 114	8136	
*Goupia glabra**	11 019	3851	
Vochysia tomentosa	4621	5502	
Vatairea guianensis	6644	1674	

* *Also listed in ITTO (2006). In the case of Qualea, Q. rosea was specified in ITTO (2006).*
Note: *Data are averages for 2004–2008.*
Source: *Government of Suriname (2009a).*

Table 5 Management of the production PFE ('000 hectares)

Reporting year	Natural					Planted		
	Total	Available for harvesting	With management plans	Certified	Sustainably managed	Total	With management plans	Certified
2005*	6890	1740	73	0	0	7	7	0
2010	**5319**	**2000**	**899**	**89**	**247**	**13**	**-**	**0**

* *As reported in ITTO (2006).*

planted species for industrial purposes is *Pinus caribaea*, comprising about 58% of the plantation estate. The principal indigenous species are *Cedrela* spp, *Cordia alliodora* and *Simaruba amara*; the main broadleaved exotic species are eucalypts. There is little information about standing volume, growth rates or current condition. No expansion of the plantation estate, or replanting of harvested sites, is planned.

Timber production and trade. The annual production of industrial roundwood in 2009 was estimated at 190 000 m^3, up from about 94 000 m^3 in 1999 and 159 000 m^3 in 2004. Sawnwood production increased from 28 000 m^3 per year in 1999 to 65 000 m^3 per year in 2009, plywood production decreased from 4000 m^3 in 1999 to 1000 m^3 in 2009, and veneer production increased from zero in 1999 to 3000 m^3 in 2009 (ITTO 2011). Installed national sawmilling capacity is estimated at 280 000 m^3 per year. In total, more than 160 species are harvested.[a] In 2009, Suriname exported logs valued at US$2.70 million and sawnwood valued at US$2.80 million (ITTO 2011).

Non-timber forest products. NTFPs are used to varying degrees by different groups, predominantly people living in the country's interior. Apart from incidental small-scale efforts, no significant inventory of NTFPs has been conducted to date. There is a significant export trade of Surinamese wildlife: FAO (2010) reported that wildlife exports (mainly birds) were worth about US$404 000 in 2007 (a reduction of more than US$500 000 compared to 2004, due largely to a ban on bird

Table 6 Forest carbon potential

Biomass forest carbon (MtC)	% forest with canopy cover >60%	Deforestation/ degradation potential to 2030	Enhancement of carbon sink capacity to 2030	Forest area change monitoring capacity	Forest/ GHG inventory capacity	Importance of forest fire/ biomass burning	Engagement in international REDD+ processes
663–2753	96	+	+	++	++	+	++

+++ high; ++ medium; + low; estimate of national forest carbon based on Gibbs et al. (2007); estimate of % total forest with canopy cover >60% based on UNEP-WCMC (2010).

imports in the European Union during an outbreak of Avian flu). In 2006 an estimated 55 000 kg of medicinal plants valued at US$453 000 were exported to the Netherlands.

Forest carbon. Suriname has a large and mostly intact forest resource. The REDD+ mechanism is designed to assist countries like Suriname by providing positive incentives for conserving forests and improving forest management. Taking into account Suriname's developmental needs, REDD+ could assist in mitigating some of the drivers of deforestation and forest degradation.

Gibbs et al. (2007) estimated Suriname's forest biomass carbon stock at 663–2753 MtC, and FAO (2010) estimated it at 3165 MtC. Box 1 shows the quantity of carbon contained in Suriname's forests estimated by Tjon (1998) on the basis of observations in 30 plots distributed over a range of forest types.

Box 1 Forest carbon stock, Suriname

	Carbon store (MtC)	
	PFE	Non-PFE
Above-ground biomass	1340	1210
Soil	365	330

Source: Based on estimates by Tjon (1998) of carbon stocks in various forest.types.

Nearly one-third (31%) of Suriname's GHG emissions are produced by the land-use change and forest sector (Government of Suriname 2002). Since 2009 the Government of Suriname has been developing a REDD+ readiness preparation proposal in the framework of the Forest Carbon Partnership Facility and is a member of the REDD+ Partnership. The preparation of a national REDD+ strategy is coordinated by the National REDD+ Working Group, which comprises representatives of governmental institutions, forest-dependent communities (Indigenous and Maroon peoples), the timber industry, academia, civil society and other observers (Government of Suriname 2009b). Table 6 summarizes Suriname's forest carbon potential.

Forest for protection

Soil and water. No part of Suriname's forest is managed exclusively for the protection of soil and water, but the relative lack of human pressure means that, in effect, vulnerable slopes in the hinterlands, the productive capacity of the soils, and the water storage and production capacity of the vast majority of forested lands are generally well conserved. Nevertheless, threats do exist. For example, some waterways are contaminated with mercury as a result of uncontrolled gold-mining, and river siltation and soil erosion are prevalent (ITTO 2003b, Fox 2010).

Biological diversity. Suriname has large intact forest ecosystems of global significance and forests have extremely high conservation and ecological values, particularly in the swamps and on the Guyana Shield. The inventoried biota comprises 5800 species of plant, including 200 endemic species, 185 species of mammals, 668 species of birds, 152 species of reptiles, 95 species of amphibians and 790 species of fish (Malone 2007); it is certain that much remains to be discovered. Five mammals, one amphibian, one arthropod and one plant are listed as critically endangered, endangered or vulnerable on the IUCN red list of threatened species (IUCN 2011). Two plant species are listed in CITES Appendix I, 30 in Appendix II and one in Appendix III (UNEP-WCMC 2011).

Protective measures in production forests. Harvesting guidelines to protect soil, water and conservation values devised by SBB must be incorporated in the harvesting plans of concessionaires and approved prior to actual harvesting. They include the maximum allowable cut per hectare and the alignment and maximum area of skidding roads to be constructed in a felling

compartment. In addition, rules are stipulated in concession agreements regarding the storage and disposal of chemicals, machine oils and other chemical waste. These are closely monitored by SBB and adhered to reasonably well by loggers, although standards related to the spillage of used motor oils and waste may slip through control from time to time, meaning that adherence may be less than optimal.[a]

Extent of protected areas. According to the Government of Suriname (2009a), an estimated 1.89 million hectares of forest are contained within protected areas classified in IUCN protected-area categories I–IV, including 1.15 million hectares of lowland evergreen broadleaved rainforest. The estimate of UNEP-WCMC (2010) is slightly lower, at 1.46 million hectares. Of particular significance is the Central Suriname Nature Reserve, created in 1998 (1.6 million hectares). A further 245 000 hectares are in protected areas classified as IUCN protected area categories V–VI. Just under 1.5 million hectares of protected areas are covered by management plans (Table 7).[a]

Estimate of the area of forest sustainably managed for protection. Most of the protected area – and a large area of 'unprotected' forest in remote parts of the country – is intact due to a lack of development pressure. Therefore, all protected areas subject to management plans are assumed to be under sustainable management.

Socioeconomic aspects

Economic aspects. Forest-based activities contributed about 2% of Suriname's GDP, which was worth about US$1.8 billion in 2007. The formal market value of timber and NTFPs was estimated at about US$19 million and the value of the informal market was estimated at US$2.52 million.[a] In addition, the Water Supply Company of Suriname reported a production of 32 million m^3 of drinking water in 2007, with an estimated market value of US$18 million.[a] The water-bottling industry has developed rapidly in the last decade and currently comprises at least five significant-sized companies. Local consumption as well as exports of bottled water are growing steadily, although no data on the value of these were available for this report.

The Government of Suriname charges a fee per m^3 of timber felled and per hectare of forest concession held. However, there are inconsistencies in the fee structure: for example, there is little difference in the level of fees for timber according to the marketability of species and therefore there is little incentive to use lesser-known species (moreover, local forestry entrepreneurs consider the fees to be too high). The fees per area of concession are very low, which tends to encourage the application for and holding of large concessions for speculation rather than production. For these reasons, a revision of the forest charges system has been prepared, and will soon be enacted, in which the number of timber classes for fee calculation will be increased, there will be greater differentiation between timber classes, and, overall, the average fee per m^3 will be reduced by about 50%. Concurrently, the fee per area of concession will be increased significantly, which will help to compensate government for the decrease in revenue resulting from the reduction in the fee per m^3. The fee per area will be lower for remote areas to encourage their development and to alleviate pressure on timber production areas closer to existing infrastructure.

An estimated US$60 million has been invested in foreign-owned logging operations and processing equipment. The Government of Suriname invests in SFM through its funding of SBB and NB. Combined, those two institutions have an annual budget for forest management, administration, research and human-resource development of about US$2.56 million. Annual grants and loans from international organizations amount to about US$850 000.[a] In total, just under 1100 people work in the forest sector to implement or support forest management, including 133 with professional qualifications (45 in government and 88 in the private sector) and 135 trained (part-time or full-time) forest workers (51 in government and 84

Table 7 Management of the protection PFE ('000 hectares)

Reporting year	Protection PFE	Attributed to IUCN categories I–IV	Allocated for soil and water	With management plans	Sustainably managed
2005*	4430	1390	1160	-	-
2010	**2194**	**1890**	**0**	**1460[a]**	**1460**

* *As reported in ITTO (2006).*

in the private sector). The private sector comprises 29 logging companies and about 30 consultants (17 of whom are university-trained). In addition, the wood-processing sector has about 2400 employees.[a] About 250 people are employed in the management of protected areas (FAO 2010).

Livelihood values. An estimated 65 000 Amerindian and Maroon people rely on forests for 50% or more of their livelihoods, particularly in the districts of Sipaliwini, Brokopondo, Para and Marowijne.[a] Forest resources are important for medicines, building materials and fibres, but particularly for wild animals, fruit, seeds and nuts, which are major food sources. More than a thousand plant and animal species are known to be used in one form or another (van Andel et al. 2003).

People inhabiting the more remote hinterlands have very large areas of forests available for subsistence purposes: while their daily activities would mostly be confined to a couple of kilometres from their settlements, they may also undertake longer trips by boat or by foot away from their settlements (e.g. for prospecting, hunting and fishing). The issue of 'how much land' is required for customary use has emerged in discussions regarding the land rights claims of Amerindian and Maroon peoples, and an attempt has been made to identify the extent of the area around their settlements that could eventually be declared their economic zone. In the settlements closest to Paramaribo and other urban centres, the need to share living space has given rise to a certain balance, whereby traditional lifestyles tend to be confined closer to settlements. However, in large part this issue remains to be resolved.

About 550 000 hectares of forest has been allocated to Amerindian and Maroon peoples as community forests. SBB considers these to be under 'extensive' management[b], although some have been over-exploited due to weak communal business management capacity, which allows the forest to be logged by entrepreneurs from outside the communities on the basis of very poor agreements.[a] SBB, Celos (an agricultural research organization) and WWF are working together to provide training that will enhance the capacity for sustainable management among communities in the Pokigron and Marshall Creek region.

Social relations. Suriname's people comprise a racial mix of Amerindians, Creoles, Hindus, Maroons, Javanese, Chinese and Caucasians. About 10% of the population is Amerindian or Maroon, who claim collective land-use rights, including to forests.

Amerindian and Maroon groups have sought international support for their land-rights claims, including through the Inter American Court of Justice. In 2007 this court delivered a verdict in favour of the Saramaccan tribes, who had filed a complaint that the Government of Suriname had neglected their land rights by granting concessions and other rights to people from outside their community without their permission. The Court ordered the government to redress the disputed acts and to recognize the claimed rights.

Land rights continue to be a difficult issue between the government, tribal communities and other stakeholders. The government has established an official working group to help find a resolution.[a]

Seminars, workshops and other interactive communication modalities involving all relevant stakeholders have, to a certain extent, proven effective in reconciling views over forest policy development and SFM. Well-identified stakeholder groups with strong voices in such processes are:

- The Platform for the Timber Sector in Suriname (PHS), comprising a relatively small but vocal number of private logging entrepreneurs, with a persistent dislike of any initiative undertaken by the SBB.
- Representatives of Indigenous and Maroon people who live in the forests in the hinterlands of the country.
- Several national and international NGOs, including Conservation International, WWF and Tropenbos Suriname.[a]

SBB has also often been able to provide effective mediation in conflicts between concessionaires over boundary demarcation. Where this mediation proves insufficient, the protagonists may take the case to a judicial court. Conflict prevention, or the early resolution of emerging conflicts between the Government of Suriname (particularly the forest management agencies) and private operators, is attempted by providing for a representation of relevant stakeholders in the governing bodies of the forest management agencies. Representatives of stakeholders are also included in ad hoc committees and work-groups dealing with particular issues regarding the sustainable use and management of the country's forest resources.[a]

Not all attempts at conflict resolution have been successful. Some stakeholders have failed to take their seats in the governing bodies of existing and proposed management agencies. It has also proven very hard to obtain agreement between the forest management agencies and some stakeholders, particularly the PHS, on most of the issues subject to discussion.[a]

In all sectors, including the forest sector, the rules and requirements regarding health and safety in the workplace are set out in the Safety Act (1947), which is administered by the Ministry of Labor, Technological Development and Environment. The Directorate for Labor in this ministry conducts frequent inspections in different working locations, including sawmills and timber-harvesting sites. There is close correspondence between the prevailing labour regulations and International Labour Organization (ILO) conventions. Labour unions play a role in assuring that ILO recommendations and regulations are taken into account and adhered to. However, labour unions have only a limited role in companies active in the forest sector.[a]

Among the 29 enterprises interviewed in the context of the present report, two deaths were recorded in forest-based operations in the three years to 2009. In addition, three cases of permanent disabilities and six instances of injuries followed by complete recovery were recorded.[a]

The contribution of members of the Amerindian and Maroon communities to tree-spotting and botanical research regarding plant species in the forest is indispensable, as is their contribution to all forms of surveys in forest areas in the hinterlands.[a]

Summary

Suriname has taken some important steps towards SFM. A GIS–GPS system has been introduced to help locate boundaries of protected areas and to assist in the mapping and planning of forest operations. A computerized log-tracking system is being rolled out. There is almost no deforestation, and most of the forest estate is primary forest. There is an interim strategic action plan for implementing the national forest policy. About 2 million hectares of forest are under licence, although not all concessions are currently under harvest. There has been an ongoing process to establish a single authority for the management of production and protection forests, the Bosnas, but this is still pending. A number of steps have been taken to improve conflict resolution in Suriname's forests, but land rights are an ongoing issue between government, Amerindian and Maroon peoples, and other stakeholders.

Key points

- More than 90% of Suriname is forested, and very little deforestation is taking place. Gold-mining has become a significant cause of forest and environmental degradation.
- Suriname has an estimated PFE of 7.51 million hectares (compared with 11.3 million hectares in 2005), comprising 5.32 million hectares of natural production forest (compared with 6.89 million hectares in 2005) and 2.19 million hectares of protection forest (compared with 4.43 million hectares in 2005).
- As of late 2010, 62 logging concessions had been allocated over a total area of 1.3 million hectares.
- An estimated 247 000 hectares of the production PFE is under SFM, including 89 000 hectares that are certified.
- An estimated 1.46 million hectares of the protection PFE is under SFM.

Endnotes

a Government of Suriname (2009a).

b Personal communications with officials of the Government of Suriname, 2010.

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