

INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE:	IMPROVING THE DETECTION AND PREVENTION OF ILLEGAL LOGGING AND ILLEGALITY IN SHIPMENT AND TRADE OF WOOD PRODUCTS IN GUYANA
SERIAL NUMBER:	PD 440/07 Rev.1 (M,I)
COMMITTEE:	ECONOMIC INFORMATION AND MARKET INTELLIGENCE
SUBMITTED BY:	GOVERNMENT OF GUYANA
ORIGINAL LANGUAGE:	ENGLISH

SUMMARY:

While the extent of illegal logging in Guyana may not be as high as reported in some other countries, it does have a significant impact on Guyana's relatively small and developing economy as well as having environmental and socio-cultural consequences.

Two of the main reasons for the sub-optimal detection of illegal logging and other activities are a) the extensive and largely inaccessible forest estate which is difficult to effectively monitor and b) a manual log-tracking system that has tendencies for errors and does not facilitate rapid transfer of information and data.

The project proposed here will address these two issues by a) developing an integrated and dynamic GIS that will incorporate satellite image analysis, illegality indicators and a legality database and b) by establishing a bar-code log-tracking system that will feed into a central database linked to a national wide-area network. This will allow for near real-time transfer of data and the availability of tracking information for the regulatory agency and operators in the private sector.

The outcome of the project will be an environment where detection of illegal logging and other non-compliant activities will be dramatically improved in the forest, in transit and at point of sale. This scenario will see improved detection of illegal activities acting as an effective deterrent resulting in a marked reduction in the incidence of illegal activities. The beneficial knock-on effects of this will be registered in the national economy, local communities and the forest environment.

EXECUTING AGENCY: THE GUYANA FORESTRY COMMISSION

DURATION: 18 MONTHS

BUDGET AND POSSIBLE SOURCE OF FINANCE:	Source	Contribution in US \$	Equivalent in national currency
	ITTO	<u>574,101</u>	
	Govt. of Guyana	<u>184,019</u>	<u>36,803,800</u>
	TOTAL	<u>758,120</u>	

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PART I: CONTEXT

1. Origin

Guyana, the only English speaking country in South America, is located on the Atlantic seaboard of north-eastern South America. It extends 800 km south from latitude 8° N on the Atlantic coast to latitude 1° N, and some 480 km east to west between longitudes 57° and 61° W. It has an area of about 215,000 km² and a population of approximately 750,000. Tropical high forests cover some 16.4 million ha or about 76% of the total land area.

State forests administered by the Guyana Forestry Commission (GFC) account for about 13.6 million ha (63% of the land area). By 2004, 52% of state forest had been allocated for timber harvesting. In addition to state forests, a portion of the national forests are under titled Amerindian lands. Land titles were issued to Amerindians in 1976 onwards and currently approximately 13% of the total land area of the country is under titled Amerindian land (an estimated 1.4m million ha of which is covered by forest).

Access for commercial timber removal on State Forests is controlled by the GFC through the allocation of temporary concessions and permits as follows:

- Timber Sales Agreement (TSA) covers concessions of more than 24,000 hectares and is allocated for a period of more than 20 years.
- Wood Cutting License (WCL) is issued for 3 to 10 years, and covers forests of between 8,000 and 24,000 hectares.
- State Forest Permissions (SFP) are given for two years and cover areas of less than 8,000 hectares. SFPs are generally issued to individual small-scale operators and community-based associations.
- State Forest Exploratory Permits (SFEPs), which are issued for survey and feasibility purposes only and do not include cutting rights.

Since 1991 the number of TSAs has almost doubled from 16 in 1999 to 31 in 2005. During the same period the number of SFPs has declined from 571 to 263.

Guyana's commercial forests are characterised by high species diversity but the main commercial species have a low standing volume per unit area which results in low volume extraction per unit area. It has been estimated that in 2000, the total annual wood production of 400,000m³ came from a forest area of some 6 million hectares, equating to less than 0.1m³/ha overall (though since a significant portion of the allocated area is not active in any given year, actual average increment is probably higher). The reasons for the low productivity can be found in the relatively poor forest soils typical in the country; the highly selective nature of logging (targeting less than 5% of the tree species occurring) and the relatively high occurrence of defective trees (estimated at more than 20% overall).

Log production has shown considerable fluctuations over the past decade, peaking in 1997 at 521,529 m³ and falling to 288,534 m³ by 2000. The latest figures (2005) indicate a slight resurgence to 312,688 m³. Data for the production of sawn lumber from static (and now including mobile) sawmills are not officially available post-1997. At that time, production was 56,604m³/yr. Statistics have been collected for chainsawn lumber since 1994 when annual production was recorded at 29,832 m³. Since then production has remained relatively steady and after a slight decline in 1998-1999 is was up to 36,085 m³ in 2004 and 36,176 m³ in 2005.

Approximately one half of total timber volume production is currently exported from Guyana, the most common destinations are Asia (in particular for logs), Europe (especially sawnwood to UK), Caribbean and North America. The average annual volume of logs exported between 1995 and 2000 was 42,935m³ and average sawnwood exports between the same period was 19,716 m³. In 2004 export volumes for logs and sawnwood, respectively, were 61,255m³ and 39,046 m³.

Guyana is a heavily indebted country that is heavily dependent on external aid and in 2004 had a Gross National Income per capita of US\$990 (globally ranked 146th) according to World Bank data. Between 1988 and 1993 forestry contributed just over 2% to Guyana's Gross Domestic Product (GDP) but between 1997 and 2004 it averaged 3.73% with an all-time high of 4.93% in 1997. In 2004 (the latest available) the contribution was 3.29% (these figures are for production and primary processing only and do not include secondary processing, plywood or furniture manufacture). The most recent published data indicate a

contribution of around US\$ ¾ million to the consolidated fund directly from royalties (not including the area-based acreage fees).

The total value of exports of all logs, sawnwood, roundwood, splitwood and plywood between 1997 and 2004 was US\$251m with an annual average of US\$31.5m, peaking in 2004 at US\$41.6m. In 2005 total export earnings from the sector was US\$46.3 million. The latest official figures, from 1997, indicate that 13,979 persons are directly employed in the timber and forest products production sector.

In recent years there has been a marked increase in the use of chainsaws for the production of lumber on State Forests in Guyana. Chainsawn lumber production is also common on private lands especially Amerindian reservations.

In recent years the issue of illegal logging and other illegal activities in the forestry sector has received a great deal of attention at international intergovernmental fora, public procurement policies, certifiers and the private sector. For example, a statement from the G8 countries following their Environment and Development Ministerial meeting in March 2005 recognised that illegal logging causes environmental degradation, biodiversity loss, and deforestation and thereby affects climate systems. The practice also damages livelihoods, often in the poorest countries, causes loss of revenues to developing nations' governments, distorts markets and trade and can sustain conflicts. Further, the G8 leaders agreed and endorsed a package of measures that include:

- Supporting regional initiatives such as the FLEG Regional Ministerial process, the Asia Forest Partnership, the Congo Basin Forest Partnership and the EU Forest Law Enforcement Governance and Trade Action Plan.
- Sharing technical knowledge and developing tools to apprehend and prosecute offenders, including the use of GIS and other systems to monitor forest activities and conditions.
- Taking steps to halt the import and marketing of illegally logged timber by giving powers to border control authorities through voluntary bilateral trade agreements that are consistent with World Trade Organisation rules.
- Working with governments, timber processors, exporters, importers and NGO's to develop and promote legally sourced timber products.
- Working with society to inform consumers of the problems caused by illegal logging.

Guyana has been placing over the past five years, increasing emphasis on ensuring that forests are managed in a manner that ensures sustainability and legality. This focus is reflected in the work plan of the GFC, specifically in the work plan in planning, forest resources management as well as forest monitoring. The Planning Division, in addition to local initiatives, has been working with ITTO and other international bodies to strengthen forest activities in keeping with international and regional FLEG initiatives. This Division of the GFC is currently coordinating a project on FLEGT, which is in the completion phase. The project aims at conducting an Audit of the log tracking system which Guyana has in place.

Additional work is also being done to strengthen GFC's capability to manage the State Forest estate in keeping with the Forest Laws of Guyana. The Forest Resources Management division of the GFC has been intensively involved in planning concession boundaries, assessing forest management plan and annual plans of operations, assessing the proposed formation of forest roads and other related areas. Current assessment and reviews are however, limited to manual verification and scanned images from previous years. These are not as accurate and effective as the GFC would have preferred them to be to conduct its forest management work. Planning in these areas will be greatly aided with updated information to enhance the forest monitoring capability.

An important part of the work plan of the Forest Monitoring Division focuses on environmental and general monitoring of forest activities in and around forest concessions, throughout the chain of custody of forest produce. This includes managing the log tracking system and associated documentation systems involved in forest activities. Log tag numbers are currently being used to identify each piece of timber produce produced by a concession. The proposed bar code system and the remote sensing technology will greatly assist in enhancing the activities which are performed by the GFC and in particular the identified Divisions mentioned. This project will not only assist in improved environment management but will assist greatly in reducing possible illegal logging activity in the forest of Guyana. Further, GFC's draft new Forest Act, which will be tabled shortly in Guyana's Parliament, sets out stringent requirements on the GFC to ensure that illegal logging is kept to a minimum.

2. Sectoral Policies

The Guyana Forestry Commission (GFC) was created in 1979 out of the pre-existing Forest Department that had its origins in 1925. The GFC is responsible for advising the responsible Minister and making submissions on issues relating to forest policy, forestry laws and regulations. The Commission is also responsible for administration and management of all State forestland. The work of the Commission is guided by a national forest plan that has been developed to address the forest policy. The Commission also develops and monitors standards for forest sector operations, develops and implements forest protection and conservation strategies, oversees forest research, and provides support and guidance to forestry education and training.

The GFC is responsible for the management of an area of 13.6 million ha classified as State Forest. The remainder of the forest is either: State Land; Amerindian Land; or other private property. Forest Concessions are allocated in three categories based on area and contractual length (see above), All operations are strongly encouraged to follow best practice as set out in the Code of Practice for responsible forest operations (though this will not become mandatory until the passage of the new draft Forests Act).

The President of Guyana is the ultimate authority for Forestry (and the Environment and Natural Resources) though the Minister for Agriculture/Fisheries, Crops and Livestock currently has the responsible mandate. There are two statutory bodies responsible for co-ordinating developments in the natural resources sectors:

- Cabinet Sub-Committee on Natural Resources and Environment. This Committee discusses all matters requiring policy decisions before being presented to the full Cabinet.
- Natural Resources and Environment Advisory Committee (NREAC) which includes the Commissioners of Forestry, Geology and Mines, and Lands and Surveys, the Head of the Guyana Natural Resources Agency, the Heads of the Energy Agencies, the Land Use Planning Unit, the Institute of Applied Sciences and Technology, the Hydromet Department and the Director of the Environmental Protection Agency. This committee meets every week and is chaired by the Presidential Adviser on Science, Technology and the Environment

Revised forestry legislation has been drafted to address, inter alia, conservation and protection, sustainable utilisation of the forest estate and Amerindian land rights. The draft is currently with Cabinet for approval.

The Environmental Protection Agency (EPA) was established in 1996 to provide for the management, conservation, protection and improvement of the environment, the prevention or control of pollution, the assessment of the impact of economic development on the environment and the sustainable use of natural resources. The EPA has entered into a Memorandum of Understanding with the GFC that provides for co-operation in the assessment and monitoring of Environmental Impact Assessment. Before any operation can commence in a forest concession, the company must submit an Environmental Impact Assessment for approval by the EPA and the GFC. The GFC has also established an Environmental Monitoring Unit to monitor all environmental matters pertaining to forestry.

The Forest Producers Association is an NGO formed in 1944 by the forest industry to promote and develop the interests of the forest sector and to collaborate on activities such as training, information, public awareness and institutional development. Membership is open to all individuals or companies engaged in any aspect of the business of forest products and it currently has over 60 members. The Association does not receive a subvention from any source and relies on membership fees to conduct its business. This being so the only paid members of staff it employs are an executive director and a personal secretary. The Association is currently receiving some support from multi-lateral international bodies to conduct sectoral training and to develop a strategic plan. The association is a member of the Public Sector Commission.

The Guyana National Forest Policy Statement of 1997 recognises that sustainable forest management can be attained only if there is the availability of sufficient basic information on which planners and forestry practitioners might draw for the formulation and implementation of policies and strategies. In addition, the Policy highlights the importance of a level of control over all harvesting activities, sufficient to provide adequate protection of biodiversity and to ensure sustainable production; and the creation and maintenance of an efficient database, containing up-to-date information which is freely available to all, without compromising confidentiality, on national forest resources, their productivity, management potential, and their ecology and dynamics; and the development of an environmental management system for the forestry sector which would address the environmental and social impacts of any activity within the forest and build strategies to minimize them. The Policy further outlines the importance of sustainable forest management and management of forest concessions issues to ensure the legality and sustainability of forest activities.

The Guyana Draft National Forest Plan of 2001 refers to the Policy Statement and identifies the importance of forest enforcement and governance in the Forest Resources Management and Forest Industry sub-sections. The main areas dealt with under the Plan are compliance with the forest law enforcement, and management of the State Forest to ensure sustainable forest management. It is envisioned that through this programme, the support will be provided to ensure the success of the proposed initiative.

The Guyana Draft National Development Strategy (1996) has amongst its objectives to monitor the forest resources under its control (State Forest) to ensure that the policies and procedures of the GFC in relation to sustainable forest management and law compliance are adhered to. The Strategy makes a strong case for information to be provided in an efficient and effective way to facilitate this recommendation.

3. Programmes and Operational Activities

International assistance in forestry and related fields is being, or has recently been, received through the following:

- Guianas Sustainable Forest Resources Management Project: 2002- . Funded by The World Wildlife Fund, the project aims at maintaining the integrity of the different forest ecosystems of the Guianas so that they may sustain their ecological functions and processes while supporting the region's socio-economic development. The four project components are: sustainable forest management; gold mining pollution abatement; protected areas effective management; regional integration, collaboration and networking.
- Strengthening Participatory Approaches in Forest Management in Guyana: 2002- . Funded by the Food & Agriculture Organisation of the United Nations, the purpose is to promote the adoption by Government and other natural resource managers of "best practices" for integrating participation in natural resource management for poverty reduction.
- Training in Reduced Impact Logging in Guyana: 2002- . Funded by ITTO [PD 68/01 Rev. 2 (I)], the specific objective of this project is to strengthen the national capacity to deliver training in practical forest operational and managerial skills and knowledge to personnel at all levels of the forest sector by means of establishing an on-site RIL training programme. The project includes the following major activities: the design of the training programme in consultation with stakeholders, the development of demonstration models of good RIL practices, the establishment of the training facility, the training of trainers and other personnel in RIL, and the establishment of a long-term plan to ensure the sustainability of the project.
- A Sustainable Management Model in the Iwokrama Rain Forest: 1999- . Funded by ITTO [PD 10/97 Rev. 1 (F)], the objective of the project is to design, plan and initiate the commercial management of half of the Iwokrama Forest for multiple products and services, and integrate research, training and demonstrations into these operations, in order to improve the practices in Guyana and elsewhere. The project helps Iwokrama produce a state-of-the-art forest management plan for multiple products and services, and feasibility studies for management and harvest based on this plan. It assists in finding an appropriate business partner and negotiating contracts that will assure the adherence of principles of sustainable forest management. Demonstration, research and training in improved practices will be integrated into these model commercial operations.
- The Guyana Forestry Commission Support Project: 1995-2002. Funded by the UK Department for International Development, the purpose of the project was to enable the GFC to effectively fulfil functions in support of sustainable, ecologically sound and socially integrated forest management systems. The goal was to optimise the economic and environmental goods and services from Guyana's forests for the benefit of all communities. Project outputs included a revised national forest policy and law; strengthened GFC structure and functioning; strengthened GFC procedures and capabilities; strengthened forest sector training capacity and improved forest information systems.
- The Natural Resources Management Project: 1998-2005. Funded by the German Government, it is designed to ensure that decision making for natural resources management is based on improved information. The project will develop a database on natural resources, establish land use planning procedures, prepare policy guidelines and legislation for natural resources management and strengthen institutional capacity.
- The Canadian International Development Agency has also provided funding towards the execution of a national forest inventory.
- Development and delivery of a vocational training programme in reduced impact logging and sustainable forest management practices in Guyana: Funded by ITTO [PD 333/05 Rev.2 (I)], the

specific objective is to provide training in reduced impact logging and related matters in order to reduce the level of negative environmental impacts (and promote more environmentally responsible approaches to timber harvesting). The main outputs under this project include: RIL training programme for medium and small scale operators organized and delivered and RIL demonstration forests established; RIL system for small-scale / community forestry operations designed; capacity to provide RIL training programme for small-scale / community forest operations established; RIL training programme for small-scale / community forestry operations organised and delivered; capacity to provide training programme on other aspects of sustainable forest management established; training courses in other aspects of SFM organised and delivered; long term sustainability of vocational SFM/RIL training in Guyana secured.

- Implementation of the sustainable forest management programme of the Iwokrama international centre. Funded by ITTO [PD 297/04 Rev.3 (F)]. The specific objectives are to:
 - manage the area in order to maximize net revenue from sustainable production of forest goods and services, while developing local employment and training opportunities and providing capacity building and technology transfer programmes for the Amerindian communities.
 - to demonstrate, through effective monitoring, how the approach adopted is delivering lasting ecological, economic and social benefits to local, national and international communities.

The main outputs are: Training and technology transfer in the development and implementation of silvicultural programmes provided; fire management plan prepared and training in implementation practices provided; training and technology transfer in operational practices related to forest management provided; forest management and silviculture counterparts trained; Monitoring programmes developed and implemented to evaluate the social and economic impact of the forest management activities on the local Amerindian communities; Additional monitoring programmes developed to evaluate the biological impacts of forest use on wildlife populations.

The proposed National Protected Areas System Project will assist the Government of Guyana with the establishment of a representative system of protected areas, which will also conserve globally important biological diversity. The project will establish an independent Protected Areas Commission and initiate the process of establishing a protected areas system by identifying and supporting the management and development of two pilot areas. The system will contribute to the conservation of ecosystems and biological diversity, watershed protection, and the maintenance of the country's cultural heritage. Project components include the design and identification of a Protected Areas System and selection of protected areas; supporting the management and development of two pilot areas; institutional strengthening and training; legislation and policy development and the identification of long-term sources of financing.

The Tropenbos-Guyana Programme (TGP) is a forest research programme that started in 1989, with core-funding of the Dutch government. The objective of this research programme was to achieve an understanding of the lowland tropical rainforest ecosystems in the area to such a degree that timber harvesting (and possible other non-wood forest products) under a sustainable forest management system can be achieved. At the same time, a satisfactory level of biological diversity should be maintained and an appropriate area of rainforest conserved. The programme included forest management-oriented research and training programmes. Notable contributions included a range of technical publications. The TGP ended in December 2001 though continued accessibility to its assets, knowledge and expertise and continuation of its will be facilitated by the Planning and Research Development Division of the GFC.

The Iwokrama International Centre for Rainforest Conservation and Development is responsible for the management, conservation and sustainable development of 360,000 ha tropical rainforest, which the Government of Guyana dedicated to the international community to demonstrate that tropical forests can provide economic benefits without destroying biological diversity.

The forestry sector has participated in the development of the Amazon Co-operation Treaty (ACT) 'Criteria and Indicators for the Sustainability of the Amazon Forest'. The ACT criteria and indicators, together with those produced by CIFOR and ITTO have been reviewed by the GFC during the preparation of the National Forest Plan. Actions required by the sector have been identified for all appropriate indicators and these have been incorporated into the Plan.

Guyana is also a signatory to the CITES (1973), UN Framework Convention on Climate Change (1992), UN Convention on Biological Diversity (1992), "Forest Principles" (1992), relevant chapters of Agenda 21 (UNCED, 1992) and the ITTA (1994).

The GFC has secured funding from the UNDP to assist the development of national standards for certification. The objective is to develop standards that comply with all criteria and indicators. The process will also seek to involve and develop the interest of potential local certification agencies so that certification services become available at acceptable cost to producers. UNDP funding has also been made available for a comprehensive study of existing harvesting operations to determine the main obstacles to improved forest management and certification. The results of this study will be used to design further interventions that may be required to assist the introduction of sustainable forest management systems.

The GFC is involved in a number of activities to promote more involvement and participation in the forestry sector. These are:

- Educational outreach programmes to Amerindian and hinterland communities;
- Sponsorship of five Amerindian students annually to pursue a certificate in forestry;
- Outreach programmes to secondary schools, educating students about all aspects of forestry and the environment;
- Support for the University of Guyana to run a Diploma, Degree and Master programme in Forestry.

PART II: THE PROJECT

1. Project Objectives

1.1 Development Objective

The Development Objective of the project is to increase the contribution of the forest sector to the national economy by means of higher remittances to the consolidated fund and increased foreign exchange earnings as a result of increased detection and prevention of illegal activities

1.2 Specific Objective

The Specific Objective of the project is to improve the detection and prevention of illegal logging and illegality in shipment and trade of wood products in Guyana.

2. Justification

2.1 Problems to be addressed

There are no official statistics on the level of illegal logging or other illegal activities on the forestry sector in Guyana. Anecdotal evidence suggest that while illegality does exist the proportion of total production of wood products from illegal sources is not as high as has been reported for some other countries where rates of over 50% have been given. Nevertheless, illegal activities are occurring and if detection and prevention are not improved negative impacts may become increasingly significant.

The nature of illegal activities that occur in the forestry sector can be surmised from detection of such activities and from the verbal reports of those involved in the sector (in production, processing, trade and regulation). From such evidence typical illegal activities occurring in Guyana in contravention of laws, regulations and procedures are:

- Clandestine poaching of logs from other concessions, non-allocated state forest, private property or reserves upon which the persons do not have logging rights
- Encroachment and logging on neighbouring concessions
- Laundering or "legalising" produce with falsely obtained tags and/or removal permits
- Misuse of tags (e.g. purchasing tags from another concession holder; wrongly locating stump tags)
- Under-declaring volume of loads and falsely declaring species
- Logging restricted species without authorization
- Operating or processing without appropriate licences (e.g. chainsaw licence, sawmill licence)
- Logging in contravention of the Code of Practice or at variance with approved management plans

The negative effects of illegal logging can be felt in many areas. First the national economy loses out on royalties due when wood is clandestinely produced and undeclared. In addition, acreage fees are also foregone where logging occurs on areas where concessions have not been allocated. It is difficult to quantify the monetary loss in the absence of hard data though for a country ranked 146th globally for GDP the consequences could be significant.

Compounding this is the loss of potential foreign exchange earnings where certain international markets are closed to Guyana's wood exports in the cases where legality cannot currently be assured.

Indigenous communities in Guyana are often the victims of illegal logging where it occurs without their knowledge or informed consent on their titled or traditional lands.

Clandestine illegal logging by definition goes unregulated with the consequence that the GFC's Code of Practice for Harvesting is ignored. The direct environmental impacts of such logging can be quite severe particularly on soils, forest ecosystems and watersheds. Also, where certain high value species (such as purpleheart – *Peltogyne* spp.) are targeted, local extinction of those species may be a risk.

The root causes of illegal logging have not been properly investigated in Guyana, though there are studies elsewhere that can be informative. Poverty or commercial gain are common drivers for illegality which are facilitated when the regulatory framework and law enforcement are weak.

It has been recognised that Guyana has a relatively advanced governance, policy, and legal framework in the forest sector. It also has a log-tracking system that is overseen by the monitoring division of the GFC. However, the forest resource is relatively large and remote and the resources do not exist for effective on-the-ground monitoring of the whole forest estate. At the same time, the log-tracking system is a manually-based method which means that errors can be introduced and data management is slow and cumbersome.

There is currently no effective central server that can act as a focal point for a legality database that tracks wood products through the system or records illegal activities that are detected. As one consequence, data is not readily available through the system and feedbacks from central headquarters to field stations or those in the private sector are virtually non-existent. This in part facilitates certain illegal activities such as the misuse of the timber tags.

GFC currently houses a GIS unit that provides a good mapping service to the public and private sectors. However, this Unit does not currently have the physical or human capacity to acquire or analyse satellite imagery or to integrate satellite imagery into a dedicated GIS for monitoring forest concessions. Also, the unit does not have a direct role in detection and prevention of illegal activities.

A general definition of legality is used in Guyana which defines such acts as those that contravene the relevant laws, regulations or codes. However, a more detailed definition of illegal activities is not used and as such there are no practical indicators for use in detecting and preventing illegal activities using remote sensing with associated ground checks.

Though two of the largest private concessionaires are developing their own chain of custody systems there are no national protocols or guidelines to support the tracking of wood products throughout the supply chain to final point of sale or export.

2.2 Intended situation after Project completion

The 5 outputs of the project will operate synergistically to create an outcome environment where detection of illegal logging and other non-compliant activities will be dramatically improved in the forest, in transit and at point of sale. This scenario will see improved detection of illegal activities acting as an effective deterrent resulting in a marked reduction in the incidence of illegal activities. The beneficial direct effects of this will be registered in the national economy, local communities and the forest environment.

Other regulatory agencies and interested observers around the world will also benefit from the project which will provide a model for similar initiatives elsewhere.

2.3 Project strategy

The essential project strategy, guided by the analysis of objectives (Annex D), is two-fold:

- First, to establish the necessary technological framework to undertake the tasks to tackle the identified causes of the problem and achieve stated objectives.
- Second, to provide the necessary training, development and extension to ensure that new systems are properly implemented by the regulatory agency and, as appropriate, by the private sector.

Satellite images will be acquired and analysed at medium resolution for the whole country and high resolution for certain “hot-spots”. Indicators for identifying and monitoring illegal logging will be developed and resulting images and database integrated into a customised GIS of forest concessions. A barcode tracking system will be developed that will integrate into and provide data for a central legality and tracking database. Chain of custody protocols and guidelines will be developed to ensure that tracking is possible along the entire supply chain to final point of sale.

The central database will be linked to a wide-area network that will provide real-time data to forest field stations as well as processing and manufacturing plants that require assurance on legality of their raw materials and auditors working with forest certification and legal assurance schemes.

A legality monitoring and extension unit will be established within GFC that will have overall responsibility for directing legality-related work of the GFC, maintaining databases and providing extension services in areas of law compliance to the sector as appropriate.

Training will be provided in all technical areas related to the project. An important element of the project will be the fostering of human resources with skills and expertise in such areas as operating monitoring tools (updating information and checking indicators) and information handling (GIS and image analysis, data collection, database management) who will work as leaders in central locations and in the actual regions.

Human resources leaders to-be, who will be selected through a rigorous screening process, will undergo training in various fields and be expected to be able to instruct the content of the training to other related parties as well. The progress and achievements of the projects will be compiled into a report focused on in the context of forest laws and presented to all member countries via ITTO. **GFC will work with ITTO during and after the project to undertake appropriate extension activities, directed towards regulatory agencies and other interested observers, to ensure that the project serves as a model for other countries in the region and internationally.**

2.4 Target beneficiaries

Target beneficiaries are identified at the local and national level, both public and private:

- Local communities are often the victims of illegal logging and other illegal activities in the forestry sector. Two key issues are the misuse of tags and documents issued to communities to conduct logging on their lands. The establishment of the barcode tracking system will eliminate the possibility of tags being re-used or being used to launder wood by identifying as coming from a spurious source. The key second issue is one of undetected poaching by unscrupulous loggers from community land. A satellite image-based monitoring system will be able to detect illegal activities in areas that are remote and only occasionally visited on the ground. Also, the negative effects of illegal and unregulated logging on the environment, particularly in water resources, will be strongly mitigated by such activities being deterred.
- A reduction in the amount of illegal wood in the local market will benefit the majority of legitimate operators who will receive a fair price for their products instead of being in unfair competition with cheaper illegal produce.
- Exporters will benefit directly by the opening up of markets requiring legal assurance that may currently be closed to them.
- National benefits to Guyana will come directly from an increase in the royalties and acreage fees currently avoided by much of illegal logging activity. Part of this income could be used to increase the human resource capability of the regulatory agency's monitoring function thereby providing a continuous beneficial effect. Indirectly, the reputation of Guyana as a country responsible and sustainably managing its forests for maximum benefit will continue to be enhanced.

2.5 Technical and scientific aspects

2.5.1 Satellite image analysis and GIS

The value of satellite systems in monitoring logging activities, especially in the tropics, is widely appreciated. For example, Global Forest Watch cited the following advantages to using satellite imagery in monitoring illegal logging:

- Imagery provides a national landscape-level view
- Allows detection of logging roads where access is limited
- Provides documentation of infractions
- Input to prioritize field-based activities
- Mechanism for long-term monitoring

There are many different sources of satellite imagery and several techniques for analysing images. What is presented here is one such approach that is considered appropriate to the situation pertaining in Guyana.

Satellite images spanning 2005 to 2006 will be used to detect deforestation activities. Many of the canopy disturbances, including some secondary roads, are difficult to detect after only a few months so up-to-date

coverage is critical (studies have indicated that the detection of logging roads could be as low as 50% two to five years after logging occurred – though modification of the false color composite image can give better detection of various types of roads).

Analysis of the satellite data will be conducted in two stages. The first stage combines medium resolution data (<30m) from CBERS 2, SPOT and Landsat TM to detect logging and roading operations at the national level. A search of image archives shows that a recent (2005 -2006) coverage over 90% of Guyana already exists. It is estimated that 17 Landsat coverages will be required with up to 10 CBERS images (free of charge to South American countries) to supplement these. In areas where there is no coverage, SPOT data can be acquired by placing an order to task the satellite.

The satellite data from stage 1 will be geo-referenced to existing GIS datasets (UTM zones 20-21) and processed to enhance the detection of deforestation activities. Data at this resolution is suitable for identifying both large and small (>5 ha) deforestation activities. Figure 1. shows the extent of a large area of deforestation as imaged by CBERS 2 (top image) and Landsat TM close to the Guyana / Brasil border.

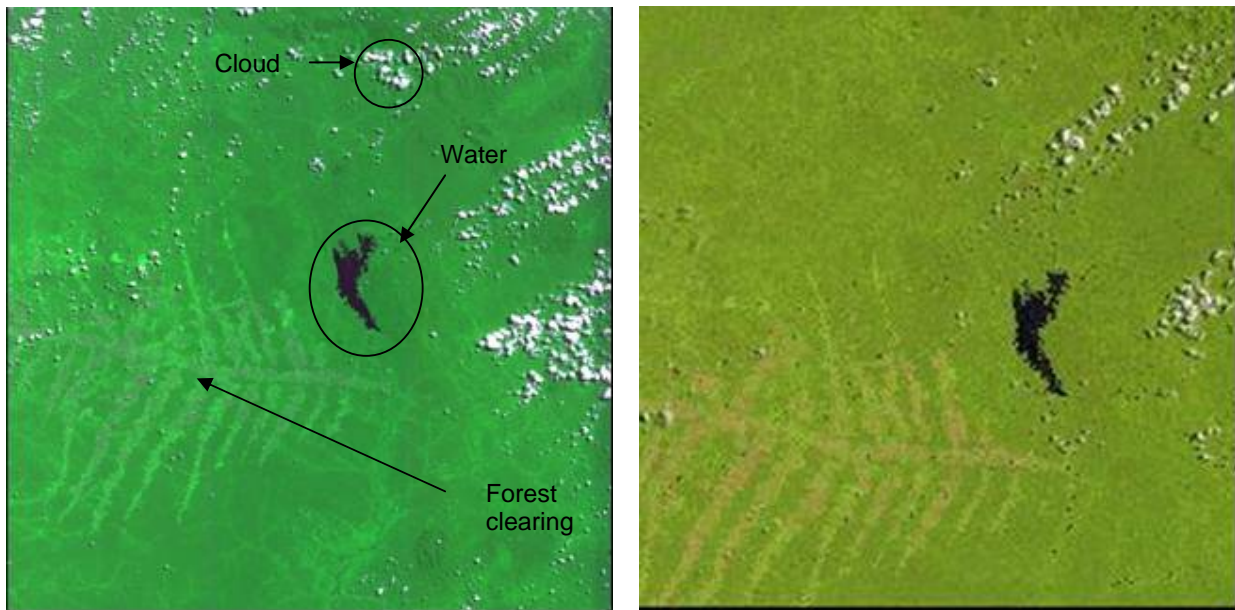


Figure 1. Detection of forest clearing using CBERS2 (20m) and Landsat 5 (30m) satellite data

Detection of small fragmented areas (~ 5 ha) is also possible at this resolution. Figure 2. shows an area identified using SPOT 4 (20m) data over Suriname. Detection of disturbed areas and roads is enhanced by displaying near infrared spectral bands which are sensitive to bare soil or decaying woody vegetation.

Areas identified during analysis of the image data will be exported to a GIS and overlaid and compared against existing coverages, such as, legal boundaries of existing forest concessions or road networks, if available. It is recommend that before proceeding to stage 2 that detected areas be verified by either ground or airborne inspection. Once potential hotspot areas have been positively identified then higher resolution data, required for stage 2, will be ordered.

The second stage uses areas detected from stage one, and uses high resolution data (2 to 10m) to target these “hotspots”. Data from two satellites, IKONOS and SPOT 5, are able to provide detailed maps (<= 1: 25 000 scale) of these areas. Since no nationwide coverage exists, these images will need to be ordered (tasked). It is estimated that around 26 images will be acquired for this stage of the process.

It is estimated that satellite image processing and interpretation (including detection) for both phases could take up to 3 months. The result of the satellite interpretation will be a national base layer comprising harvested areas and road network. These layers will be held in a GIS to enable mapping and documentation of deforested areas.

High resolution data will ordered over areas identified from Stage 1. Cloud-free data can be difficult to acquire at certain times of the year, and so data providers often specify a minimum three month acquisition

window. An assessment of images in the archive suggests that images captured between July and November have a higher probability of being cloud-free.

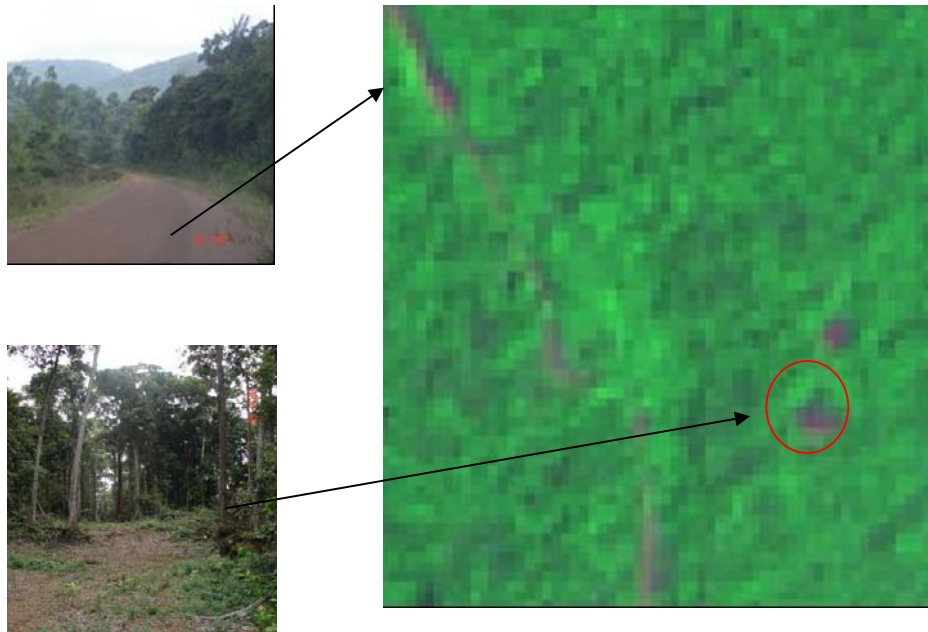


Figure 2. Detection of roads and small fragmented areas of deforestation

The work is very similar to stage 1 and involves geo-referencing and enhancement of the image data in order to extract deforested areas and road networks. With Image data at this scale, it will be possible to extract areas of less than 1 hectare in size and detect and map small logging tracks. Figure 3 compares for the same area the detail provided by IKONOS image (left image) against a Landsat TM image.



Figure 3. Detection of forest clearing using IKONOS (4 m) and Landsat 5 (30 m) satellite data

2.5.2 Timber-tracking system based on barcode labels

Conceptually speaking, chain of custody systems incorporate labeling devices, documentation processes, data protocols, communications systems, and computer software and hardware for data storage, retrieval, and analysis. Information systems require standardization of procedures and data. The use of computer technology, such as bar-code readers, interconnected databases, and internet communications, can greatly enhance the robustness of log-tracking systems, and thereby eliminate some of the opportunities for fraud which exist under simpler systems.

A major advantage of electronically based tracking systems is the ease with which cross-checks between records taken at different points can be made so that anomalies, such as counterfeit labels, can be quickly detected. Since data can be electronically time-stamped, altering of records also is easy to detect. These capabilities provide a significant deterrent to individuals who might otherwise try to cheat the system. With manual systems, by contrast, checking of records is a tedious, error-prone task that can only be done on a sampling basis. Where collusion in corruption is widespread, even the most thorough audits are unlikely to reveal anomalies in manual systems.

Apart from improved security against tampering, electronic systems also offer significant advantages for efficiency. A large number of logs moves through the supply chain in a given period of time for a typical processing facility, and electronic scanning of tracking documents significantly reduces the likelihood that errors will be introduced through faulty recording. Electronic storage and transmission of data also facilitate timeliness in reporting. Because of these advantages, log labels that can be electronically scanned, such as those that include bar codes, offer a substantial advantage over other types of labels.

This project is aimed at helping prevent illegal logging and trade in illegally harvested timber by utilizing a timber tracking system based on barcode utilization in the harvesting of tropical forests, shipment and exporting stages. This project involves introducing and operating a barcode timber tracking system and thereby enhancing the accuracy in confirming and guaranteeing the legality of exported timber.

The timber tracking system is based on a barcode system utilizing wide area computer networks. By connecting to a central database stored with information required for recording and tracking the flow of timber from the origins of the timber through to the point where it is processed and exported, this system enables distribution systems to be managed from the origins of the timber that was harvested in a forest where sustainable forest management is in place, through to the point where it is distributed, processed and exported.

Under this system, raw materials and stumps are identified using a plastic barcode tag that is attached immediately after logging or when being split into pieces at timber collection points. Barcode labels are a widespread and ubiquitous labeling technology. They use the thickness of vertically drawn bars and the degree of separation between them to code information. Linear barcodes are used in many applications when the use of a numeric or alphanumeric code can provide the key to a database of products. The main limitation is that only a small amount of data can be stored in the linear barcode itself. The advantages of barcodes are that they can be rapidly scanned and the data contained within them immediately converted to a digital format.

In forestry, bar-coding is widely used for the labeling of processed wood products particularly in retailing but also for wholesale storage and distribution of processed wood products. Barcoding has also been used in log tracking; however, its use is not widespread as there are several challenges in using barcode labels, such as, maintaining bar code in a useable state given the hostile environment often encountered in the movement and storage of logs. The most successful barcodes for log tracking are those attached to nail based rigid labels. Barcoded conventional labels have been successfully used in log yards, but less so for tracking logs throughout the supply chain. Barcoded conventional labels are more susceptible to damage and falling off than nail based rigid labels during transportation and handling operations.

The logs that have been split are transported to manufacturing plants where the number and description are recorded on timber certificates and removal licenses. A record is made when the logs are received at manufacturing plants and when they arrive at timber yards as well. With this system, the data from timber certificates and removal licenses are inputted at a dedicated department via barcode label data and can be used in central database management. As a result, the forest management headquarters can obtain accurate and prompt information on logs that are shipped to manufacturing plants. Furthermore, each manufacturing plant will also provide data on the external dimensions, volume and product class of the manufactured product following chain-of-custody protocols and guidelines to be developed. In this manner, the forest management headquarters is able to track timber all the way back to its stump. In other words, this system enables: management of all processes from production, distribution and processing starting from the place when timber is harvested to the place where it is processed and exported.

All exported timber products to be exported must obtain an export license from the forest management headquarters. This license information is also stored in the central database, enabling the forest management headquarters to track each exported good all the way back to its stump.

This wide area network is also used to transfer information from the forest management headquarters to regional departments and manufacturing plants. The central server retains information related to

sustainable forest management verification and the management of processes of production, distribution and processing. Information can be converted into PDF files and distributed as small e-mail attachment files. Manufacturing plants and departments can also request information of interest via e-mail. The central database is perpetually updated using the data of regional and field offices. By making reference to this database, detailed data can be obtained on both a national level and individual forest level. Information is displayed using GIS for prompt grasping of the volume and product class of logs, lumber, veneer and plywood that are from different distribution and processing points.

2.6 Economic aspects

Direct economic benefits to the national economy through increased royalty and, to a lesser extent, acreage fees, will accrue immediately once detection and prevention of illegal activities improve as a result of the project. Indirectly, the improved image of Guyana as a country with even lower rates of illegal logging and the ability to verify legality with an enhanced wood tracking system will open up further export markets for forest products.

2.7 Environmental aspects

Illegal logging by definition goes unregulated with often detrimental consequences to the forest environment and watersheds. Improving the ability of the regulatory agency to detect and deter illegal logging and to increase its ability to monitor logging activities and forest products along the supply chain will increase its ability to enforce environmental regulations and guidelines that currently exist.

2.8 Social aspects

It has been stated that rural communities, especially those that are indigenous and have their own titled lands may suffer from the direct (e.g. environmental degradation; resource depletion) and indirect effects of logging (such as increased or inequitable competition). The reputations of Community logging associations that are succeeding in regularising their activities can be unfairly tarnished by the existence of illegal logging by other chainsaw operators. A reduction in illegal activities in the forestry sector would therefore be expected to have positive social impacts.

2.9 Risks

Developmental Objective

Assumption 1: International demand for tropical forest products continues

Over the past few years the demand for tropical forest products has increased with a corresponding strengthening of the world market price. With their unique and valued characteristics, tropical forest products are set to remain in high demand – especially so for wood sourced from legally verified sources

Assumption 2: National forest policy and strategy continue to support legality in the forestry sector

The Government of Guyana and its forest regulatory agency are both committed to continuous improvement in the sector and particularly to the encouragement of legal practices across the board.

Specific Objective

Assumption 1: Relevant government ministries, agencies, NGOs and the forest sector industry continue to work together to improve detection and prevention of legality

Improving legality in the sector is in the best interests of all stakeholders and it is envisaged that all players will continue to work in a coordinated manner to improve detection and the prevention of illegal practices.

Output 1: Dedicated GIS (including satellite image analysis and legality database)

Assumption 1: Sufficient suitably qualified and/or experienced persons available for training

The current GIS unit within the GFC is staffed by 5 experienced officers who have been trained in at least the rudiments of GIS and remote sensing. In addition to the head of that Unit, there are within other Government Agencies and the private sector in Guyana, a number of persons with a variety of backgrounds in GIS and RS. In addition, the University of Guyana runs a number of courses for students in GIS and RS.

Output 2: Barcode Timber-Tracking system.

Assumption 1: Sufficient suitably qualified and/or experienced persons available for training

There are numerous persons within the GFC and the private sector who would have the necessary technical foundation to be able to operate the bar-code system, following training.

Assumption 2: Forest industry supports introduction of system

Since the forest industry currently has to comply with a manual log-tracking system, it is not envisaged that there will be a problem with the introduction of an automated system – indeed in many ways the barcode system will be easier to understand and operate.

Output 3: Central Monitoring and Detections Database

Assumption 1: Sufficient suitably qualified and/or experienced persons available for training and subsequent management of the database

There are considered to be sufficient persons within Guyana who have graduated from UG who would have the necessary technical foundation to be able to benefit from training and subsequently be able to manage the database.

Output 4: Wide-area computer network (WAN) and report dissemination procedure.

Assumption 1: Technological infrastructure in Guyana supports system

Guyana has a continuously advancing communications infrastructure which currently includes cell phone networks, wireless broadband internet and satellite phone connectivity.

Assumption 2: Private sector recognize the value of tracking information

Since verification of the source of wood products will be to the advantage of the processor and exporter there should be no obstacle to the sector recognising the importance and value of the tracking data.

Output 5: Legality and Monitoring Extension Unit

Assumption 1: Forest industry responds to provision of training and awareness

In the past Guyana has had a good track record in the sector for the uptake of new innovations and training and awareness seminars are generally well attended.

Assumption 2: Sufficient suitably qualified and/or experienced persons available for training and operating the Unit

It is envisaged that the majority of the staff will be currently employed by the GFC. Some new staff will be necessary, however, and there will be sufficient skills and experience within the local labour pool to allow for effective recruitment.

3. Outputs

3.1 Specific Objective: To improve the detection and prevention of illegal logging, and illegality in shipment and trade of wood products, in Guyana.

- Output 1: Dedicated GIS (including satellite image analysis and legality database).
- Output 2: Barcode Timber-Tracking system.
- Output 3: Central monitoring and detections database.
- Output 4: Wide-area computer network (WAN) and report dissemination procedure.
- Output 5: Legality and Monitoring Extension Unit

4. Activities¹

4.1 Output 1 Dedicated GIS (including satellite image analysis and legality database).

- Activity 1.1 Acquire satellite imagery
- Activity 1.2 Analyse satellite images to determine presence of logging roads and logging activity
- Activity 1.3 Determine indicators of illegal logging
- Activity 1.4 Undertake ground-truthing checks and field surveys
- Activity 1.5 Develop legality database
- Activity 1.6 Acquire appropriate hardware and software
- Activity 1.7 Integrate satellite image analysis and legality database into a dedicated GIS for forest concessions

4.2 Output 2 Barcode Timber-Tracking system.

- Activity 2.1 Review current manual tracking system (including Proforest report)
- Activity 2.2 Develop barcode timber-tracking system procedures (including chain-of-custody protocols)
- Activity 2.3 Acquire equipment
- Activity 2.4 Conduct training of key personnel
- Activity 2.5 Undertake trial run of tracking system
- Activity 2.6 Conduct regional training and promotion workshops
- Activity 2.7 Undertake full implementation of system
- Activity 2.8 Monitor performance of system and report

4.3 Output 3: Central monitoring and detections database

- Activity 3.1 Review current data storage and record keeping
- Activity 3.2 Acquire hardware and software for central server
- Activity 3.3 Develop integrated central database to record tracking data and detection information
- Activity 3.4 Link central database to wide-area network
- Activity 3.5 Monitor performance of system and report

4.4 Output 4: Wide-Area computer network (WAN) and information dissemination protocols.

- Activity 4.1 Inception report identifying network management, potential users of network, hardware, software and other resource requirements
- Activity 4.2 Acquisition of resources and identification of key personnel
- Activity 4.3 Develop procedures for use of WAN and protocols for information sharing and dissemination
- Activity 4.4 Establish network (linking to central database)
- Activity 4.5 Monitor performance of integrated system and report

4.5 Output 5: Legality Monitoring and Extension Unit

- Activity 5.1 Develop Terms of Reference for Unit
- Activity 5.2 Identify key personnel including “leaders”
- Activity 5.3 Train key personnel and leaders in database management, wide-area networks, GIS, satellite image analysis and illegal logging monitoring
- Activity 5.4 Conduct regional and national training and awareness workshops

¹ See also Annex F – work breakdown structure

5. Logical Framework

Project Elements	Indicators	Means of Verification	Assumptions
<p>DEVELOPMENT OBJECTIVE</p> <p>To increase the contribution of the forest sector to the national economy by means of higher remittances to consolidated fund and increased foreign exchange earnings as a result of increased detection and prevention of illegal activities²</p>	<ul style="list-style-type: none"> Contribution of forest sector to consolidated fund shows 10% increase by 2008 Value of wood-based forest products exports to US\$ 55m/yr by 2008 5+ international markets requiring legal assurance purchasing Guyana wood products by 2008 	<ul style="list-style-type: none"> Ministry of Finance records Forest Products Marketing Council (FPMC) reports 	<ul style="list-style-type: none"> International demand for tropical forest products continues National forest policy and strategy continue to support legality in the forestry sector
<p>SPECIFIC OBJECTIVE</p> <p>To improve the detection and prevention of illegal logging and illegality in shipment and trade of wood products in Guyana.</p>	<ul style="list-style-type: none"> Detection of illegal activities increased by 30% by 2007 Reports of illegal activities down by 50% by 2009 Incidence of undetected illegal logging down to below 5% by 2008 5+ concessions with legal assurance certificates by 2008 	<ul style="list-style-type: none"> GFC detection database records Expert and informed opinion in the sector GFC and FPMC records 	<ul style="list-style-type: none"> Relevant government ministries, agencies, NGOs and the forest sector industry continue to work together to improve detection and prevention of legality <u>Other measures (such as national legal verification system, improved law enforcement and enhanced livelihood alternatives) are also adopted to reduce illegality</u>
<p>OUTPUTS</p> <p>1. Dedicated GIS (including satellite image analysis and legality database)</p>	<ul style="list-style-type: none"> Satellite image analysis complete by 2007 Indicators and illegality database established by 2007 Appropriate hardware and software in place by 2007 Trained personnel in place by 2008 GIS established and operational by 2008 	<ul style="list-style-type: none"> GFC reports Consultancy reports 	<ul style="list-style-type: none"> Sufficient suitably qualified and/or experienced persons available for training
<p>2. Barcode Timber-Tracking system.</p>	<ul style="list-style-type: none"> System established and operational by 2008 	<ul style="list-style-type: none"> GFC reports Consultancy reports 	<ul style="list-style-type: none"> Sufficient suitably qualified and/or experienced persons available for training

² **The information and results from this project will not be sufficient to solve the problem of illegal logging alone. To effectively meet the development objective, other measures (such as national legal verification system, improved law enforcement and enhanced livelihood alternatives) will also be needed to complement this project.**

Project Elements	Indicators	Means of Verification	Assumptions
			<ul style="list-style-type: none"> Forest industry supports introduction of system
3. Central monitoring and detections database.	<ul style="list-style-type: none"> Database established and operational by 2008 	<ul style="list-style-type: none"> GFC reports Consultancy reports 	<ul style="list-style-type: none"> Sufficient suitably qualified and/or experienced persons available for training and subsequent management of the database
4. Wide-area computer network (WAN) and report dissemination procedure.	<ul style="list-style-type: none"> Database established and operational by 2008 Relevant reports available to GFC regional offices and appropriate private sector players by 2008 Trained personnel in place by 2008 	<ul style="list-style-type: none"> GFC reports Consultancy reports Private sector organizations' reports 	<ul style="list-style-type: none"> Technological infrastructure in Guyana supports system Private sector recognize the value of tracking information
5. Legality and Monitoring Extension Unit	<ul style="list-style-type: none"> TORs for Unit agreed by 2007 Unit established and mandated by 2008 Trained personnel in place by 2008 	<ul style="list-style-type: none"> GFC reports Consultancy reports 	<ul style="list-style-type: none"> Forest industry responds to provision of training and awareness Sufficient suitably qualified and/or experienced persons available for training and operating the Unit

ACTIVITIES	INPUTS
1.1 Acquire satellite imagery	8 MD IRS ³ consultant 10 MD LRSGIS ⁴ consultant 5 MD secretariat Purchase satellite images (ortho-rectified) 1 return international flight
1.2 Analyze satellite images to determine presence of logging roads and logging activity	75 MD IRS consultant 20 MD LRSGIS consultant 5 MD IFIC ⁵ consultant 1 return international flight

³ International Remote Sensing consultant

⁴ Local RS and GIS consultant

⁵ International Forestry, Legality, CoC consultant

ACTIVITIES	INPUTS
1.3 Determine indicators of illegal logging	25 MD IFIC consultant
1.4 Undertake ground-truthing checks and field surveys	25 MD IFIC consultant 20 days local travel
1.5 Develop legality database	20 MD IFIC consultant 20 MD IDN ⁶ consultant
1.6 Acquire appropriate hardware and software	5 MD secretariat 8 MD IGIS ⁷ consultant 5 MD LRSGIS consultant Purchase computer equipment, peripherals and software 1 return international flight
1.7 Integrate satellite image analysis and legality database into a dedicated GIS for forest concessions	40 MD IGIS consultant 20 MD LRSGIS consultant 10 MD IFIC consultant 1 return international flight
2.1 Review current manual tracking system (including Proforest report)	3 MD IBT ⁸ consultant 1 return international flight
2.2 Develop barcode timber-tracking system procedures (including chain-of-custody protocols)	35 MD IBT consultant 12 MD IFIC consultant
2.3 Acquire necessary equipment	3 MD IBT consultant 5 MD secretariat
2.4 Conduct training of key personnel	10 MD IBT consultant 5 MD secretariat
2.5 Undertake trial run of tracking system	10 MD IBT consultant 10 MD IFIC consultant
2.6 Conduct regional training and promotion workshops	10 MD IBT consultant 10 MD secretariat
2.7 Undertake full implementation of system	10 MD IBT consultant 10 MD IFIC consultant

⁶ International Database and Network consultant

⁷ International GIS consultant

⁸ International Barcode and Tracking consultant

ACTIVITIES	INPUTS
2.8 Monitor performance of system and report	10 MD IBT consultant 10 MD IFIC consultant
3.1 Review current data storage and record keeping	5 MD IDN consultant
3.2 Acquire hardware and software for central server	2 MD IDN consultant 2 MD secretariat
3.3 Develop integrated central database to record tracking data and detention information	25 MD IDN consultant
3.4 Link central database to wide-area network	20 MD IDN consultant
3.5 Monitor performance of system and report	10 MD IDN consultant
4.1 Produce inception report identifying network management, potential users of network, hardware, software and other resource requirements	10 MD IDN consultant 5 MD secretariat
4.2 Acquisition of resources and identification of key personnel	10 MD IDN consultant
4.3 Develop procedures for use of WAN and protocols for information sharing and dissemination	20 MD IDN consultant
4.4 Establish network (linking to central database)	15 MD IDN consultant
4.5 Monitor integrated system and report	10 MD IDN consultant
5.1 Develop Terms of Reference for Unit	3 MD IFIC consultant 5 MD IDN consultant
5.2 Identify key personnel including "leaders"	3 MD IFIC consultant 5 MD IDN consultant

ACTIVITIES	INPUTS
5.3 Train key personnel and leaders in database management, wide-area networks, GIS, satellite image analysis and illegal logging monitoring	10 MD IFIC consultant 10 MD IDN consultant 15 MD IGIS consultant 15 MD IRS consultant 10 days room and equipment rental 40 training materials 200 lunches
5.4 Conduct regional and national training and awareness workshops	10 MD IFIC consultant 10 MD IDN consultant 8 days room and equipment rental 120 lunches Local travel 8 days 120 Workshop materials

7. Budget

7.1 Overall budget by activity (breakdown)

Outputs & Activities	Inputs			Y/Q	Budget	Total
	Units and Quality	No. or days	Unit costs		Component	Amount
Output 1. Dedicated GIS (including satellite image analysis and legality database)						
Activity 1.1 Acquire satellite imagery	IRS consultant	8	\$375.0	1/1	16	\$3,000
	LRSGIS consultant	10	\$225.0	1/1	12	\$2,250
	Landsat satellite images	17	\$500.0	1/1	51	\$8,500
	Ikonos satellite images	26	\$2,000.0	1/1	51	\$52,000
	Daily subsistence (accommodation) allowance	8	\$90.0	1/1	31	\$720
	International flights	1	\$3,000.0	1/1	32	\$3,000
Activity 1.2 Analyze satellite images to determine presence of logging roads and logging activity	IRS consultant	75	\$375.0	1/1-2	16	\$28,125
	LRSGIS consultant	20	\$225.0	1/1-2	12	\$4,500
	IFIC consultant	5	\$375.0	1/1-2	16	\$1,875
	International flights	1	\$3,000.0	1/1-2	32	\$3,000
	Daily subsistence (accommodation) allowance	80	\$90.0	1/1-2	31	\$7,200
Activity 1.3 Determine indicators of illegal logging	IFIC consultant	25	\$375.0	1/2-3	16	\$9,375
	Daily subsistence (accommodation) allowance	25	\$90.0	1/2-3	31	\$2,250
Activity 1.4 Undertake ground-truthing checks and field surveys	IFIC consultant	25	\$375.0	1/3	16	\$9,375
	Daily subsistence (accommodation) allowance	25	\$90.0	1/3	31	\$2,250
	Local travel	30	\$30.0	1/3	33	\$900
	Local field staff	120	\$40.0	1/3	12	\$4,800
Activity 1.5 Develop legality database	IFIC consultant	20	\$375.0	1/4	16	\$7,500
	IDN consultant	20	\$375.0	1/4	16	\$7,500
	Daily subsistence (accommodation) allowance	40	\$90.0	1/4	31	\$3,600
Activity 1.6 Acquire appropriate hardware and software	IGIS consultant	8	\$375.0	1/4	16	\$3,000
	LRSGIS consultant	5	\$225.0	1/4	12	\$1,125
	Computer equipment etc	3	\$3,000.0	1/4	44	\$9,000
	Daily subsistence (accommodation) allowance	8	\$90.0	1/4	31	\$720
	International flights	1	\$3,000.0	1/4	32	\$3,000

Outputs & Activities	Inputs			Y/Q	Budget	Total
	Units and Quality	No. or days	Unit costs		Component	Amount
Activity 1.7 Integrate satellite image analysis and legality database into a dedicated GIS for forest concessions	IGIS consultant	40	\$375.0	2/1	16	\$15,000
	LRS GIS consultant	20	\$225.0	2/1	12	\$4,500
	IFIC consultant	10	\$375.0	2/1	16	\$3,750
	Daily subsistence (accommodation) allowance	50	\$90.0	2/1	31	\$4,500
	Map database creator	20	\$175.0	2/1	12	\$3,500
	Indicator database creator	20	\$175.0	2/1	12	\$3,500
Output 2. Barcode Timber-Tracking system.						
Activity 2.1 Review current manual tracking system (including Proforest report)	IBT consultant	3	\$375.0	1/1	16	\$1,125
	Daily subsistence (accommodation) allowance	3	\$90.0	1/1	31	\$270
	International flights	1	\$3,000.0	1/1	32	\$3,000
Activity 2.2 Develop barcode timber-tracking system procedures (including chain-of-custody protocols)	IBT consultant	35	\$375.0	1/1	16	\$13,125
	IFIC consultant	12	\$375.0	1/1	16	\$4,500
	Daily subsistence (accommodation) allowance	47	\$90.0	1/1	31	\$4,230
Activity 2.3 Acquire necessary equipment	IBT consultant	3	\$375.0	1/2	16	\$1,125
	Daily subsistence (accommodation) allowance	5	\$90.0	1/2	31	\$450
	Barcode labels	200000	\$0.2	1/2	51	\$40,000
	Barcode readers, information terminals	20	\$1,000.0	1/2	44	\$20,000
Activity 2.4 Conduct training of key personnel	IBT consultant	10	\$375.0	1/2	16	\$3,750
	Daily subsistence (accommodation) allowance	10	\$90.0	1/2	31	\$900
	Room rental	3	\$150.0	1/2	56	\$450
	Lunches	60	\$15.0	1/2	56	\$900
	Training materials	20	\$10.0	1/2	55	\$200
Activity 2.5 Undertake trial run of tracking system	IBT consultant	10	\$375.0	1/2	16	\$3,750
	IFIC consultant	10	\$375.0	1/2	16	\$3,750
	Local travel	7	\$30.0	1/2	33	\$210
	Daily subsistence (accommodation) allowance	20	\$90.0	1/2	31	\$1,800

Outputs & Activities	Inputs			Y/Q	Budget	Total
	Units and Quality	No. or days	Unit costs		Component	Amount
Activity 2.6 Conduct regional training and promotion workshops	IBT consultant	10	\$375.0	1/3	16	\$3,750
	Daily subsistence (accommodation) allowance	10	\$90.0	1/3	31	\$900
	Local travel	7	\$30.0	1/3	33	\$210
	Workshop materials	120	\$100.0	1/3	55	\$12,000
	Room rental	3	\$150.0	1/3	56	\$450
	Lunches	120	\$15.0	1/3	56	\$1,800
Activity 2.7 Undertake full implementation of system	IBT consultant	10	\$375.0	1/3	16	\$3,750
	IFIC consultant	10	\$375.0	1/3	16	\$3,750
	Daily subsistence (accommodation) allowance	20	\$90.0	1/3	31	\$1,800
Activity 2.8 Monitor performance of system and report	IBT consultant	10	\$375.0	1/4	16	\$3,750
	IFIC consultant	10	\$375.0	1/4	16	\$3,750
	Daily subsistence (accommodation) allowance	20	\$90.0	1/4	31	\$1,800
	Copying & Binding	10	\$5.0	1/4	55	\$50
Output 3. Central monitoring and detentions database.						
Activity 3.1 Review current data storage and record keeping	IDN consultant	5	\$375.0	1/1	16	\$1,875
	Daily subsistence (accommodation) allowance	5	\$90.0	1/1	31	\$450
	International flights	1	\$3,000.0	1/1	32	\$3,000
Activity 3.2 Acquisition of central server and associated equipment	IDN consultant	2	\$375.0	1/2	16	\$750
	Daily subsistence (accommodation) allowance	2	\$90.0	1/2	31	\$180
	Computer equipment etc	1	\$20,000.0	1/2	44	\$20,000
Activity 3.3 Develop integrated central database to record tracking data and detention information	IDN consultant	25	\$375.0	1/2-3	16	\$9,375
	Daily subsistence (accommodation) allowance	25	\$90.0	1/2-3	31	\$2,250
Activity 3.4 Link central database to wide-area network	IDN consultant	20	\$375.0	1/3	16	\$7,500
	Daily subsistence (accommodation) allowance	20	\$90.0	1/3	31	\$1,800
Activity 3.5 Monitor performance of system and report	IDN consultant	10	\$375.0	1/3	16	\$3,750
	Daily subsistence (accommodation) allowance	10	\$90.0	1/3	31	\$900

Outputs & Activities	Inputs		Unit costs	Y/Q	Budget	Total
	Units and Quality	No. or days			Component	Amount
Output 4. Wide-area computer network (WAN) and report dissemination procedure.						
Activity 4.1 Produce inception report identifying network management, potential users of network, hardware, software and other resource requirements	IDN consultant	10	\$375.0	1/1	16	\$3,750
	Daily subsistence (accommodation) allowance	10	\$90.0	1/1	31	\$900
	Copying & Binding	10	\$5.0	1/1	55	\$50
Activity 4.2 Acquisition of communication infrastructure resources and identification of key personnel	IDN consultant	8	\$375.0	1/1-2	16	\$3,000
	Daily subsistence (accommodation) allowance	8	\$90.0	1/1-2	31	\$720
	Communications infrastructure equipment	1	\$35,000.0	1/1-2	44	\$35,000
Activity 4.3 Develop procedures for use of WAN and protocols for information sharing and dissemination	IDN consultant	20	\$375.0	1/2	16	\$7,500
	Daily subsistence (accommodation) allowance	20	\$90.0	1/2	31	\$1,800
Activity 4.4 Establish network (linking to central database)	IDN consultant	15	\$375.0	1/2	16	\$5,625
	Daily subsistence (accommodation) allowance	15	\$90.0	1/2	31	\$1,350
Activity 4.5 Monitor integrated system and report	IDN consultant	10	\$375.0	1/3	16	\$3,750
	Daily subsistence (accommodation) allowance	10	\$90.0	1/3	31	\$900
Output 5. Legality and Monitoring Extension Unit						
Activity 5.1 Develop Terms of Reference for Unit	IFIC consultant	3	\$375.0	1/4	16	\$1,125
	IDN consultant	5	\$375.0	1/4	16	\$1,875
	Daily subsistence (accommodation) allowance	10	\$90.0	1/4	31	\$900
Activity 5.2 Identify key personnel including "leaders"	IDN consultant	3	\$375.0	1/4-2/1	16	\$1,125
	IFIC consultant	5	\$375.0	1/4-2/1	16	\$1,875
	Daily subsistence (accommodation) allowance	10	\$90.0	1/4-2/1	31	\$900

Outputs & Activities	Inputs			Y/Q	Budget	Total	
	Units and Quality	No. or days	Unit costs		Component	Amount	
Activity 5.3 Train key personnel and leaders in database management, wide-area networks, GIS, satellite image analysis and illegal logging monitoring	IDN consultant	10	\$375.0	2/1-2/2	16	\$3,750	
	IFIC consultant	10	\$375.0	2/1-2/2	16	\$3,750	
	IGIS consultant	15	\$375.0	2/1-2/2	16	\$5,625	
	IRS consultant	15	\$375.0	2/1-2/2	16	\$5,625	
	Daily subsistence (accommodation) allowance	50	\$90.0	2/1-2/2	31	\$4,500	
	Room rental	10	\$150.0	2/1-2/2	56	\$1,500	
	Lunches	200	\$15.0	2/1-2/2	56	\$3,000	
	Training materials	40	\$200.0	2/1-2/2	55	\$8,000	
	Activity 5.4 Conduct regional and national training and awareness workshops	IDN consultant	10	\$375.0	2/2	16	\$3,750
		IFIC consultant	10	\$375.0	2/2	16	\$3,750
Daily subsistence (accommodation) allowance		20	\$90.0	2/2	31	\$1,800	
Local travel		8	\$30.0	2/2	33	\$240	
Workshop materials		120	\$40.0	2/2	55	\$4,800	
Room rental		8	\$150.0	2/2	56	\$1,200	
Lunches		120	\$15.0	2/2	56	\$1,800	
TOTAL						\$531,675	

7.1 (cont'd) Overall budget by activity (summary)

OUTPUTS / ACTIVITIES + Non-Activity Based Expenses		10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital items	50. Consumable items	60. Misc.	GRAND TOTAL
Output 1:	Dedicated GIS (including satellite image analysis and legality database)							
1.1	Acquire satellite imagery	5,250	(I) -	3,720	(I) -	60,500	(I) -	69,470
	Analyze satellite images to determine presence of logging roads and logging activity							
1.2	Determine indicators of illegal logging	34,500	(I) -	10,200	(I) -	-	-	44,700
1.3	Undertake ground-truthing checks and field surveys	9,375	(I)	2,250	(I) -	-	-	11,625
1.4	Develop legality database	14,175	(I) -	3,150	(I) -	-	-	17,325
1.5	Acquire appropriate hardware and software	15,000	(I)	3,600	(I) -	-	-	18,600
1.6	Integrate satellite image analysis and legality database into a dedicated GIS for forest concessions	4,125	(I) -	3,720	(I)	9,000	(I) -	16,845
1.7		30,250	(I) -	4,500	(I) -	-	-	34,750
	Subtotal 1	112,675	-	31,140	9,000	60,500	-	Q1-4 YR 1; Q1 YR2 213,315
Output 2:	Output 2. Barcode Timber-Tracking system.							
2.1	Review current manual tracking system (including Proforest report)	1,125	(I) -	3,270	(I) -	-	-	4,395
2.2	Develop barcode timber-tracking system procedures (including chain-of-custody protocols)	17,625	(I) -	4,230	(I) -	-	-	21,855
2.3	Acquire necessary equipment	1,125	(I)	450	(I)	20,000	(I) <u>25,000</u> (I)	61,575
2.4	Conduct training of key personnel	3,750	(I)	900	(I) -	1,550	(I) <u>15,000</u> (E)	6,200
2.5	Undertake trial run of tracking system	7,500	(I)	2,010	(I) -	-	-	9,510
2.6	Conduct regional training and promotion workshops	3,750	(I)	1,110	(I) -	14,250	(I) -	19,110
2.7	Undertake full implementation of system	7,500	(I)	1,800	(I) -	-	-	9,300
2.8	Monitor performance of system and report	7,500	(I)	1,800	(I) -	50	(E) -	9,350
	Subtotal 2	49,875	-	15,570	20,000	55,850	-	Q1-4 YR1 141,295

OUTPUTS / ACTIVITIES + Non-Activity Based Expenses		10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital items	50. Consumable items	60. Misc.	GRAND TOTAL
Output 3: Output 3. Central monitoring and detentions database.								
3.1	Review current data storage and record keeping	1,875	(I) -	3,450	(I) -	-	-	5,325
3.2	Acquisition of central server and associated equipment	750	(I) -	180	(I) 20,000	(I) -	-	20,930
3.3	Develop integrated central database to record tracking data and detection information	9,375	(I)	2,250	(I) -	-	-	11,625
3.4	Link central database to wide-area network	7,500	(I)	1,800	(I) -	-	-	9,300
3.5	Monitor performance of system and report	3,750	(I)	900	(I) -	-	-	4,650
	Subtotal 3	23,250		8,580	20,000	0		Q1-3 YR1 51,830
Output 4: Output 4. Wide-area computer network (WAN) and report dissemination procedure.								
4.1	Produce inception report identifying network management, potential users of network, hardware, software and other resource requirements	3,750	(I)	900	(I) -	50 (E)	-	4,700
4.2	Acquisition of communication infrastructure resources and identification of key personnel	3,000	(I)	720	(I) 35,000	(I) -	-	38,720
4.3	Develop procedures for use of WAN and protocols for information sharing and dissemination	7,500	(I)	1,800	(I) -	-	-	9,300
4.4	Establish network (linking to central database)	5,625	(I)	1,350	(I) -	-	-	6,975
4.5	Monitor integrated system and report	3,750	(I)	900	(I) -	-	-	4,650
	Subtotal 4	23,625		5,670	35,000	50		Q1-3 YR1 64,345

OUTPUTS / ACTIVITIES + Non-Activity Based Expenses		10. Project Personnel	20. Sub-contracts	30. Duty travel	40. Capital items	50. Consumable items	60. Misc.	GRAND TOTAL
Output 5: Output 5. Legality and Monitoring Extension Unit								
5.1	Develop Terms of Reference for Unit	3,000	(l) -	900	(l) -	-	-	3,900
5.2	Identify key personnel including "leaders"	3,000	(l) -	900	(l) -	-	-	3,900
5.3	Train key personnel and leaders in database management, wide-area networks, GIS, satellite image analysis and illegal logging monitoring	18,750	(l) -	4,500	(l) -	12,500	(l) -	35,750
5.4	Conduct regional and national training and awareness workshops	7,500	(l) -	2,040	(l) -	7,800	(l) -	17,340
	Subtotal 5	32,250	-	8,340	0	20,300	-	60,890
	Subtotal 6	241,675	-	69,300	84,000	136,700	-	531,675
6.0	Non-activity based expenses							
	Contingencies (10%)						53,168 (E)	
	Executing Agency management expenses (15%)							79,751
	Subtotal ITTO	241,675		69,300	84,000	<u>121,600</u>	0	0
	Subtotal Executing Agency funding	0		0	0	<u>15,100</u>	53,168	79,751
	Total	241,675		69,300	84,000	136,700	53,168	79,751
								664,594

7.2 Project Budget by Source and Year

1. **ITTO**

Budget Components	Total	Yr 1	Yr 2
10 Project Personnel	241,675	185,175	56,500
20 Sub-contracts	-		
30 Duty Travel	69,300	57,420	11,880
40 Capital Items	84,000	84,000	
50 Consumable Items	<u>121,600</u>	<u>101,300</u>	20,300
60 Miscellaneous	-		
Subtotal 1	<u>516,575</u>	<u>427,895</u>	88,680
80 ITTO Administration, Monitoring & Evaluation			
81. Monitoring & Evaluation	15,000		
Subtotal 2	<u>531,575</u>		
82. Programme Support Costs (8% of subtotal 2)	<u>42,526</u>		
ITTO TOTAL	<u>574,101</u>		

2. **Executing Agency**

Budget Components	Total (all Yr 1)
10 Project Personnel	36,000
20 Sub-contracts	-
30 Duty Travel	-
40 Capital Items	-
50 Consumable Items	<u>15,100</u>
60 Miscellaneous	53,168
70 Executing Agency Management Cost (15% of Overall Budget by Activity)	79,751
EXECUTING AGENCY / HOST GOVT. TOTAL	<u>184,019</u>

7.2 (cont'd) *Consolidated budget by source*

	Budget Components	Total cost	ITTO	GFC
10	Project Personnel			
	<i>12. National consultant</i>			
	Remote Sensing & GIS	12,375	12,375	-
	Local Field and General Staff	11,800	11,800	-
	GFC staff	<u>36,000</u>		<u>36,000</u>
	<i>16. International consultants</i>			
	Remote Sensing	36,750	36,750	
	GIS	23,625	23,625	
	Forest Management, Illegal logging and CoC	58,125	58,125	
	Barcode and Tracking	34,125	34,125	
	Database and Networks	64,875	64,875	-
	19. Component Total	<u>277,675</u>	<u>241,675</u>	<u>36,000</u>
30	Duty Travel			
	<i>31. Daily Subsistence Allowance</i>	52,740	52,740	
	<i>32. International Travel</i>	15,000	15,000	-
	<i>33. Local Travel</i>	1,560	1,560	-
	39. Component Total	<u>69,300</u>	<u>69,300</u>	<u>0</u>
40	Capital Items			
	<i>44. Capital Equipment</i>	84,000	84,000	-
	49. Component Total	<u>84,000</u>	<u>84,000</u>	<u>0</u>
50	Consumable Items			
	<i>51. Raw Materials</i>	<u>100,500</u>	<u>85,500</u>	<u>15,000</u>
	<i>55. Office Supplies</i>	<u>25,100</u>	<u>25,000</u>	100
	<i>56. Other consumables</i>	11,100	11,100	
	59. Component Total	<u>136,700</u>	<u>121,600</u>	<u>15,100</u>
60	Miscellaneous			
	<i>61. Sundries</i>	-	-	-
	<i>63. Contingencies</i>	53,168	-	53,168
	69. Component Total	<u>53,168</u>	<u>0</u>	<u>53,168</u>
	SUBTOTAL 1	<u>620,843</u>	<u>516,575</u>	<u>104,268</u>
70	Executing Agency Management Cost (15% Overall Activity Budget)	79,751		79,751
	79. Component Total	<u>79,751</u>	<u>0</u>	<u>79,751</u>
	SUBTOTAL 2	<u>700,594</u>	<u>516,575</u>	<u>184,019</u>
80	ITTO Administration, Monitoring & Evaluation			
	<i>81. Monitoring & Evaluation</i>	15,000	15,000	-
	<i>82. Programme Support Costs</i>	<u>42,526</u>	<u>42,526</u>	-
	89. Component Total	<u>57,526</u>	<u>57,526</u>	<u>0</u>
90	Refund of Pre-Project Costs	-	-	-
100	GRAND TOTAL	<u>758,120</u>	<u>574,101</u>	<u>184,019</u>

PART III: OPERATIONAL ARRANGEMENTS

1. Management Structures

The Guyana Forestry Commission will be the sole executing and implementing institution for this project. **A Project Steering Committee will be established to oversee the project that will include at least the following members:**

- **Guyana Forestry Commission**
- **International Tropical Timber Organization**
- **Forest Products Association**
- **Ministry of Finance**
- **Main Donors**

2. Monitoring, Reporting, and Evaluation

Bi-annual (mid-year and end-of-year) progress reports will be prepared and submitted to ITTO at mutually agreed dates. These financial and operational progress reports will be submitted to GFC for analysis and approval; if approved, GFC will forward them to ITTO.

In addition, market reports, workshop reports, and other similar documents will be printed and made available to ITTO and other interested parties as appropriate. This will facilitate the national monitoring process and increase interactions with stakeholders and assist in developing and maintaining support for the project.

The project completion report will be completed and submitted to ITTO and GFC within 3 months of project completion.

The project will be subject to monitoring by ITTO representatives. The project will also be subject to GFC monitoring on behalf of the Government of Guyana. ITTO will monitor project outputs (reports etc) during the project which, once satisfactory, should remove the need for mid-term review. The project will be subject to an *ex-post* evaluation by ITTO. GFC will also evaluate the project in accordance with Guyana technical cooperation guidelines.

3. Future Operation and Maintenance

The project will result in the establishment of a Legality and Monitoring Extension Unit. This is envisaged as an internal unit which will be financed under a new budget head but within existing fiscal framework. However, the consultants' reports will provide details on structure and solutions for any additional financing based on international experience and local conditions.

The current GIS capability within the existing Resource Information Unit will be considerably strengthened and extra technical staff will be required. Meeting additional future maintenance and operational costs could be achieved by greater revenues accruing to the GFC as a result of more effective law enforcement and royalty collection.

The barcode log-tracking system will become part of minimum requirements for concessionaires as part of their responsibility to sustainable forest management. The log-tracking system will be further mainstreamed by being incorporated in to the legal verification system that is currently being developed for Guyana with the financial support of USAID.

The future cost of barcode tags and the operation of the Legality Unit will be met by GFC out of its central budget and offset by the increase in royalties from an expansion of legal operations.

PART IV: TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTA 1994 Objectives

This project is consistent with the following ITTA objectives:

- (c) To contribute to the process of sustainable development;
- (d) To enhance the capacity of members to implement a strategy for achieving exports of tropical timber and timber products from sustainably managed sources by the year 2000;
- (e) To promote the expansion and diversification of international trade in tropical timber from sustainable sources by improving the structural conditions in international markets, by taking into account, on the one hand, a long-term increase in consumption and continuity of supplies, and, on the other, prices which reflect the costs of sustainable forest management and which are remunerative and equitable for members, and the improvement of market access;
- (h) To improve market intelligence with a view to ensuring greater transparency in the international timber market, including the gathering, compilation, and dissemination of trade related data, including data related to species being traded;
- (k) To improve marketing and distribution of tropical timber exports from sustainably managed sources;

2. Compliance with ITTO Action Plan

This project is consistent with the Yokohama Action Plan and is compliant with the following strategies, goals and actions:

1.5 Key Strategies for Implementation

One of the major focuses of ITTO and its members during the term of this Action Plan is accelerating progress towards the fulfillment of ITTO Objective 2000. This requires (*inter alia*):

- 2. Shifting focus from the development of national forest policies and legislation toward implementation on the ground, especially at the forest management unit level. This would include, for example: supporting efforts to strengthen forest law enforcement; more training and capacity building; wider application of reduced impact logging (RIL), and strengthening timber tracking to improve the accuracy and transparency of information on timber products and trade.

Economic Information and Market Intelligence

Goal 1: Improve transparency of international timber market.

Action 3. Where feasible and in cooperation with relevant organizations, fill key data gaps through regular assessments and special studies, including the collection and analysis of information on forest law enforcement, sustainable timber harvesting, illegal trade, secondary products, substitution, plantation timber, and certified products.

Goal 2: Promote tropical timber from sustainably managed sources.

Action 2. Provide a forum for discussion on non-discriminatory trade, subsidies for competing products, shortcomings in enforcement of forest law and regulation, and other factors that may affect the marketability and access of tropical timber products.

Reforestation and Forest Management

Goal 1: Support activities to secure the tropical timber resource base.

Action 1. Support the effective enforcement of forest laws and regulations that ensure sustainable forest management and secure the production base.

Action 7. Identify shortcomings in enforcement of forest laws and regulations, and overcome them.

ANNEXES

ANNEX A - Profile of the Executing Agency

1. The Expertise of the Executing Agency

The Guyana Forestry Commission's mission is "To provide excellence in forestry management services to our stakeholders through the application of professional skills to contribute to our nation's development." It is the Government Agency that is responsible for the management of Guyana's forest resources in accordance with the National Forest Policy, which was approved by Cabinet in 1997.

The GFC is mandated by law to:

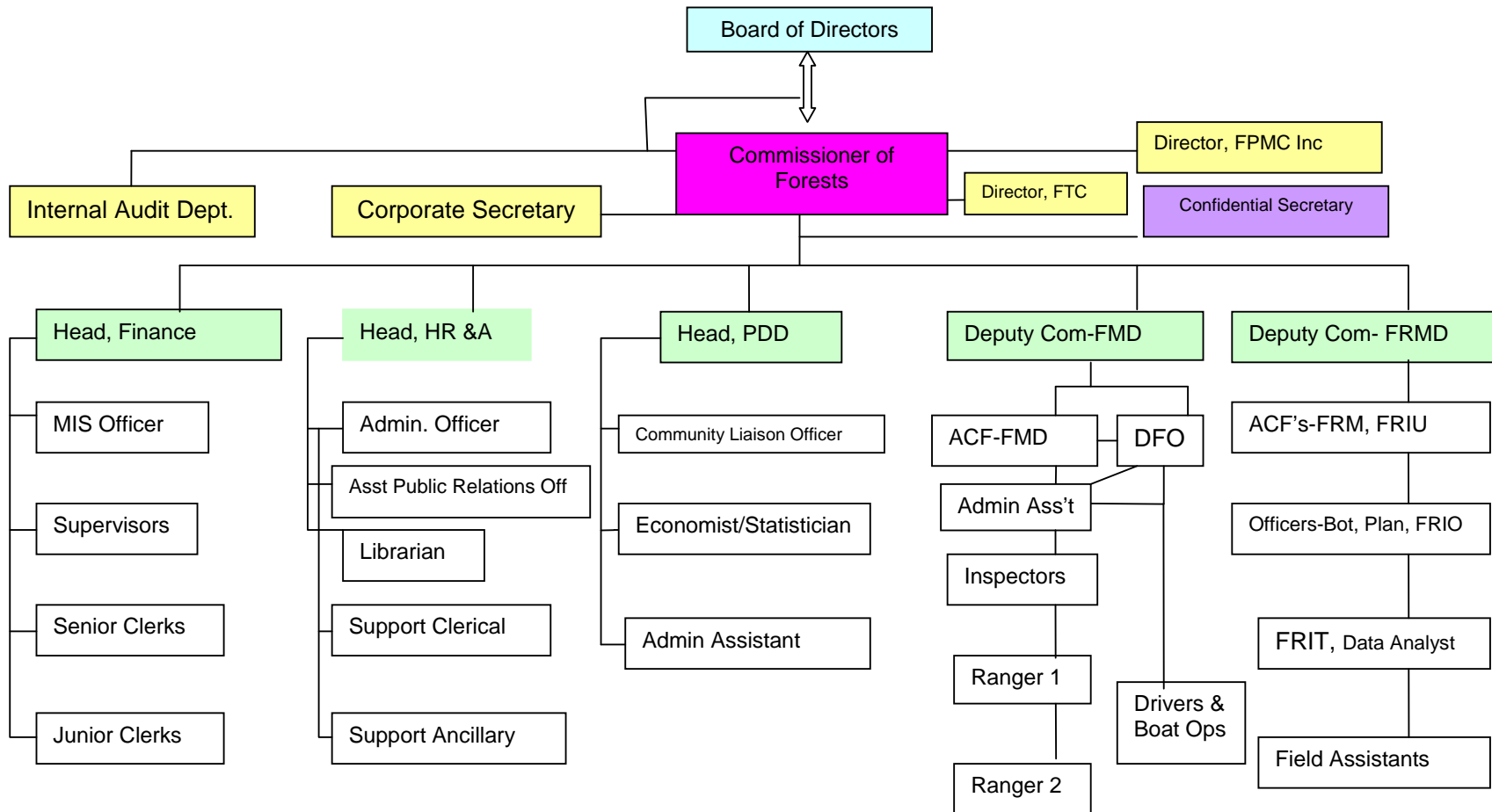
- Advise the Government on, and implement the National Forest Policy;
- Be responsible for the management and control of the utilization of the forests to ensure an optimum yield of forest produce and the maintenance or improvement of the environment.

The GFC is governed by a Board of Directors appointed by the President. The Commissioner of Forests is the Chief Executive Officer and an ex-officio member of this Board.

The GFC is structured with the following Divisions to address its policy mandate:

1. Planning and Development: responsible for the co-ordination and preparation of forest sector plans and reports and GFC reports and publications, for conducting special studies, for providing a drafting project proposals to donor agencies and for implementing projects.
2. Forest Resources Management Division: responsible for, inter alia, data collection on national forest resource, conducting surveys and inventories, researching and making recommendations on forest dynamics and silviculture, planning and recommending the allocation of concession areas.
3. Forest Monitoring Division: responsible for the enforcement of Forest Laws and regulations, monitoring and control of environmental and social impacts of operations within the forest estate and collection of revenue.
4. Human Resources Division: responsible for staff management and development, production and implementation of Human resources policies and procedures, education, training, including in-service training and liaison with relevant teaching and training institutions.
5. Finance Division: responsible for financial and board matters.

The GFC is also equipped with a library, which provides library services to staff at the GFC and to the public.



The main projects and studies that were completed/initiated within the last three years include the following:

- Revision of the National Forest Legislation
- Preparation of a Draft National Forest Plan
- Classification of State Forest by predominant use (in consultation with other land use agencies)
- Preparation of Forest Area management plans
- Initiation of a National Forest Inventory
- Development of procedures for allocation of forest concessions
- Introduction of log tagging systems and improved forest monitoring to combat illegal forest operations
- The development of national standards for forest certification
- FOR EXPO 2000 – A national exhibition to showcase products that originate from Guyana's Forests.
- Promotion of and participation in the University of Guyana's and the Guyana School of Agriculture's training programs (MSc; BSc; Diploma; Certificate).
- The use of GIS as a tool to inform Forest Management planning and processes.
- Preparation of several manuals/documents which include
 - Guidelines for the preparation of forest management plans
 - Code of practice for forest operations (operational standards)
 - Forestry in Guyana (fact sheet)
 - Manual of procedures for forest concession allocation
 - Quarterly market reports
 - Timber grading rules for Guyana

Funding to undertake the activities mentioned above was provided principally by the Government of Guyana and the UK Department of International Development. Some activities were partially funded by the Canadian International Development Agency, UNDP Global Program on Forests, and World Wide Fund for Nature.

Previous projects submitted to ITTO by Guyana are (UPDATE):

- FUNDED: A Sustainable Management Model in the Iwokrama Rain Forest [ITTO PD 10/97 Rev. 1 (F)].
- NOT FUNDED: Forest Industry Training Project (1997).
- NOT FUNDED: Design and Implementation of an Information System within the GFC (1997).
- FUNDED: Training in Reduced Impact Logging in Guyana. [PD 68/01 Rev. 2 (I)].
- Funded: Development and delivery of a vocational training programme in reduced impact logging and sustainable forest management practices in Guyana: Funded by ITTO [PD 333/05 Rev.2 (I)].
- Not Funded To strengthen the capacity to effectively market the exports of forest product from Guyana.
- Funded: Implementation of the sustainable forest management programme of the Iwokrama International Centre. [PD 297/04 Rev.3 (F)].
- Approved: Utilization of Lesser Used Wood Species in Guyana.

2. The Infrastructure of the Executing Agency

The GFC has a main headquarters building in Demerara, with Divisional offices in Berbice and Essequibo. In addition to these central Division offices, 15 field stations are distributed throughout the country. All stations are equipped with radio/telephone communication equipment for easy exchange of information across the entire country. The Divisional offices are all computerized, and there is access to key databases via this medium. The head office has accommodation for consultants working on projects. These facilities are strategically located for training, but the infrastructure needs to be renovated. The GFC has a fleet of road and field vehicles.

Budget

Budget (US\$)

2003	2004	2004	2005
565,000	650,000	650,000	702,000
96,500	160,000	160,000	190,000
186,000	175,000	175,000	205,000
425,000	500,000	500,000	560,000
104,000	150,000	150,000	175,000
Total	1,376,500	1,635,000	1,832,000

(1US\$=G\$200)

3. Personnel

- a) Experts with post-graduate degrees: 6
- b) Experts with Bachelors degrees: 11
- c) Middle-level technicians: 26
- d) Administrative personnel: 10
- e) Total number of personnel in forestry-related fields: 150

ANNEX B – Key Project Staff

The executing agency will provide support and project oversight staff only. Key project implementation staff will all be external.

CVs for key Executing Agency project staff:

JAMES SINGH

1. **Name** James Nirmal Singh
2. **Date of birth** September 6, 1962
3. **Country of birth** Guyana
4. **Nationality** Guyanese

EDUCATION

Degree	Name / Specialization	Institution	Year
BSc	Biology (Chemistry Minor)	University of Guyana	1986
MSc	Forest Products Technology	University of Andes, Venezuela	1991
MBA	General Management	University of West Indies	2004

EMPLOYMENT RECORD

- 1999-present** Commissioner of Forest, Guyana Forestry Commission
- 1998-1999** Deputy Commissioner of Forests, Guyana Forestry Commission (GFC)
- 1997-1998** Manager, Center for Biological Diversity, University of Guyana (UG)
- 1996-1997** Forester, Iwokrama International Centre, Guyana
- 1991-1996** Head, Forestry Unit, UG
- 1991-1993** Lecturer I, Forestry Unit, UG
- 1986-1991** Assistant Lecturer, UG

RELEVANT WORK OVER THE PAST THREE YEARS

- Overall management of the Guyana Forestry Commission to promote the achievement of yearly work plans and greater cooperation and collaboration with the forestry sector/industry. Overall coordination of all Forestry donor funded projects.
- Assisting in the formulation of appropriate policies to encourage development and growth in the forestry sector of Guyana. This involves participation in several Governmental Boards and sub-committees.
- Attendance at overseas meetings/seminars/conferences on behalf of the GFC and the Government of Guyana (Forestry and Natural Resource issues).
- Providing support to the Guyana Forestry educational and training facilities (Forestry Training Centre; University of Guyana; Guyana School of Agriculture)

PRADEEPA BHOLANATH

1. **Name** Pradeepa Bholanath (Ms)
2. **Date of birth** August 31, 1982
3. **Country of birth** Guyana
4. **Nationality** Guyanese

EDUCATION

Degree	Name / Specialization	Institution	Year
MSc	Environmental Economics	University of York, U.K.	2003
BSc	Accountancy	University of Guyana	2002

EMPLOYMENT RECORD

- 2005 to present** Head, Planning and Development Division, GFC
- 2004 – 2005** Special Projects Coordinator, (GFC)
- 2002-2003** Economist, (GFC)
- 2002-2003** Management Trainee , (GFC)

RELEVANT WORK OVER THE PAST THREE YEARS

1. Formulate Project Proposals on relevant areas on social, economic and technical aspects of forestry and explore potential opportunities for funding.
2. Compile research papers on relevant areas in forestry and forest economics.
3. Coordinate projects under special/external funding agencies – for example, FAO, WWF, ITTO, etc.
4. Perform Project Review and Analysis of the sector research papers and other relevant documentation.
5. Liaise with Consultants working with the GFC and supply information requirements as these become necessary.
6. Conduct economic analysis on issues affecting the forest sector.

VIJAY DATADIN

1. **Name** Vijay Datadin (Mr.)
2. **Age** 38
3. **Country of birth** Guyana
4. **Nationality** Guyanese

EDUCATION

Degree	Name / Specialization	Institution	Year
MSc	GIS	Edinburgh University	1999
Dipl.	Computer Science	University of Guyana	1995
BSc	Chemistry/ Mathematics	University of Guyana	1992

EMPLOYMENT RECORD

- 2003 – present** Managing Partner, RedSpider
- 2002 - 2003** GIS Manager, Iwokrama International Centre
- 2000 - 2002** GIS Fellow, Iwokrama International Centre
- [1998-1999]** [Chevening Scholar]
- 1995 – 1998** GIS/IT Specialist, Iwokrama International Centre

RELEVANT WORK

- 2000 – present**
 - Expert Panel member and coauthor of Guyana National ICT4D Strategy (2006)
 - Georectified high-resolution IKONOS imagery of the Guyana Coast
 - Planned and managed hi-precision Differential GPS Survey of Guyana Coast
 - Trained Guyana Sea Defences Unit staff in ArcGIS
 - Built GuyanaCoastData.net portal serving information, maps and data and GIS portal CaribbeanGIS.com
 - Delineated understorey rainforest flooding using high-resolution satellite radar imagery and mathematical models (accepted for publication by peer-reviewed journal)
 - Plenary speaker at URISA Caribbean GIS Conference (2005)
 - Built predictive spatial model of Greenheart (*Chlorocardium rodiei*) distribution using forest inventory data and a Digital Elevation Model
 - Lead author of Guyana National GIS Policy (approved by the Cabinet in 2005)
 - Consulted on the establishment of the GFC GIS Unit (recommendations and implementation)
 - Served as internal (Iwokrama) Project Manager for ITTO Project PD 10/97 Rev.1 (F)
 - Organised 1st GIS Conference in Guyana
 - Trained personnel in ArcView and Arc/INFO GIS under the GINRIS project
 - Built the Iwokrama International Centre GIS

RELEVANT TRAINING

- 2000 – present**
 - ITTO 19th Project Formulation Training Course (Paramaribo 2003)
 - ERDAS Training Courses in Fundamentals, Advancing, GIS Integration & Spatial Modeling, Interface Customisation & Spatial Modeling. (Atlanta 2000)

TASREEF KHAN

1. **Name** Tasreef Khan (Mr)
2. **Date of birth** May 28, 1974
3. **Country of birth** Guyana
4. **Nationality** Guyanese

EDUCATION

Degree	Name / Specialization	Institution	Year
Certificate	Professional Development	University of the West Indies, St Augustine	2001
BSc	Forestry	University of Guyana	2000
Diploma	Forestry	University of Guyana	1998

EMPLOYMENT RECORD

- 2004 – present** Deputy Commissioner of Forests, Guyana Forestry Commission (GFC)
- 2003-2004** Deputy Commissioner of Forests (Acting), GFC
- 2002-2004** Assistant Commissioner of Forests , GFC
- 2001-2002** Assistant Commissioner of Forests (Acting) , GFC
- 2001** Forest Resources Planning Officer, GFC
- 2000-2001** Inventory Officer

RELEVANT WORK OVER THE PAST THREE YEARS

- Preparing workplans and budgets for the Forest Resources Management Division and monitoring implementation
- Overseeing the preparation of standards for all forest operations and procedures for monitoring compliance with the standards
- Overseeing the development and maintenance of a forest resource information system
- Developing plans for forest resource classification and allocation
- Supporting and monitoring the preparation of forest management plans and operational plans for permit areas
- Ensuring that social issues are addressed in resource allocation, management planning and preparation of operational standards
- Providing advice and making recommendations on forest research strategies and procedures

Terms of Reference for Key Staff positions

Function: **Consultant**

Title: *International Remote Sensing (Satellite Imagery) Specialist*

Experience: The specialist will have a minimum of 10 years experience in remote sensing with a first degree in an environmental or natural resource-based subject and a higher degree in an appropriate field. S/he will have been closely involved in similar exercises of detecting forestry activities using satellite imagery, preferably in tropical situations. S/he will ideally have experience with ITTO projects and have lived and worked in one or more developing countries.

Duties:

1. Lead the procurement of appropriate satellite imagery.
2. Lead the analysis of satellite images to determine the presence, in particular, of logging roads and logging activity.
3. Train key personnel in satellite image analysis.
4. Prepare appropriate reports and communications materials.

Function: **Consultant**

Title: *International GIS Specialist*

Experience: The specialist will have a minimum of 10 years experience in GIS with a first degree in an environmental or natural resource-based subject and a higher degree in an appropriate field. S/he will have been closely involved in similar exercises of establishing a GIS to detect and monitor illegal activities in forestry, preferably in tropical situations. S/he will ideally have experience with ITTO projects and have lived and worked in one or more developing countries.

Duties:

1. Lead the procurement of appropriate hardware and software.
2. Lead the integration of satellite image analysis and legality database into a dedicated GIS for forest concessions.
3. Train key personnel in GIS development and use.
4. Prepare appropriate reports and communications materials.

Function: **Consultant**

Title: *International Forest Management, Legality, Chain-of-Custody Specialist*

Experience: The specialist will have a minimum of 10 years experience in forest management covering aspects of GIS/RS, legality and chain-of-custody, with a first degree in an environmental or natural resource-based subject and a higher degree in forestry. S/he will have been closely involved in similar exercises of advising on forest management, developing indicators, undertaking field work and establishing CoC protocols, preferably in tropical situations. S/he will ideally have experience with ITTO projects and have had spent extensive periods working in the forest sector in Guyana.

Duties:

1. Assist in analysis of satellite images.
2. Lead the determination of illegal logging indicators.
3. Lead the ground truthing and field survey exercise.
4. Lead the development of a legality database.
5. Assist in integration of satellite image analysis and legality database into a dedicated GIS.
6. Assist in the development of the barcode system/chain of custody.
7. Assist in the trial run of the barcode system and conduct monitoring.
8. Assist in developing TORs for the legality and extension unit.
9. Train key personnel in illegal logging detection and monitoring.
10. Prepare appropriate reports and communications materials.

Function: **Consultant**

Title: *International Barcode Tracking System Specialist*

Experience: The specialist will have a minimum of 7 years experience in barcode tracking systems with a first degree in an environmental or natural resource-based subject and a higher degree in an appropriate field. S/he will have been closely involved in similar exercises, preferably in tropical situations. S/he will ideally have experience with ITTO projects and have lived and worked in one or more developing countries.

Duties:

1. Review current manual tracking system.
2. Lead the development of the barcode timber-tracking system procedures.
3. Lead the acquisition of necessary equipment.
4. Lead a trial run of the tracking system.
5. Conduct training of key personnel and regional training and promotional workshops.
6. Lead the full implementation of the system and monitor performance.
7. Prepare appropriate reports and communications materials.

Function: **Consultant**

Title: *International Database and Network Specialist*

Experience: The specialist will have a minimum of 7 years experience in database and network establishment with a higher degree in an appropriate field. S/he will have been closely involved in similar exercises, preferably in tropical situations. S/he will ideally have experience with ITTO projects and have lived and worked in one or more developing countries.

Duties:

1. Review current data storage and record keeping.
2. Produce inception report identifying network management, potential users etc.
3. Lead acquisition of resources and identification of key personnel.
4. Develop integrated central database to record tracking and detention data.
5. Develop procedures for use of WAN.
6. Link central database to WAN.
7. Monitor performance of system.
8. Prepare appropriate reports and communications materials.

Function: **Consultant**

Title: *National Remote Sensing/GIS Specialist*

Experience: The specialist will have a minimum of 7 years experience in GIS and remote sensing with a first degree in an environmental or natural resource-based subject and a higher degree in an appropriate field. S/he will have been closely involved in similar exercises of detecting forestry activities using satellite imagery, preferably in tropical situations. S/he will ideally have experience with ITTO projects.

Duties:

1. Assist in procuring appropriate satellite imagery.
2. Assist in the analysis of satellite images to determine the presence, in particular, of logging roads and logging activity.
3. Assist in procuring appropriate hardware and software.
4. Assist in the integration of satellite image analysis and legality database into a dedicated GIS for forest concessions.
5. Prepare appropriate reports and communications materials.

Function: **Local freelancer**

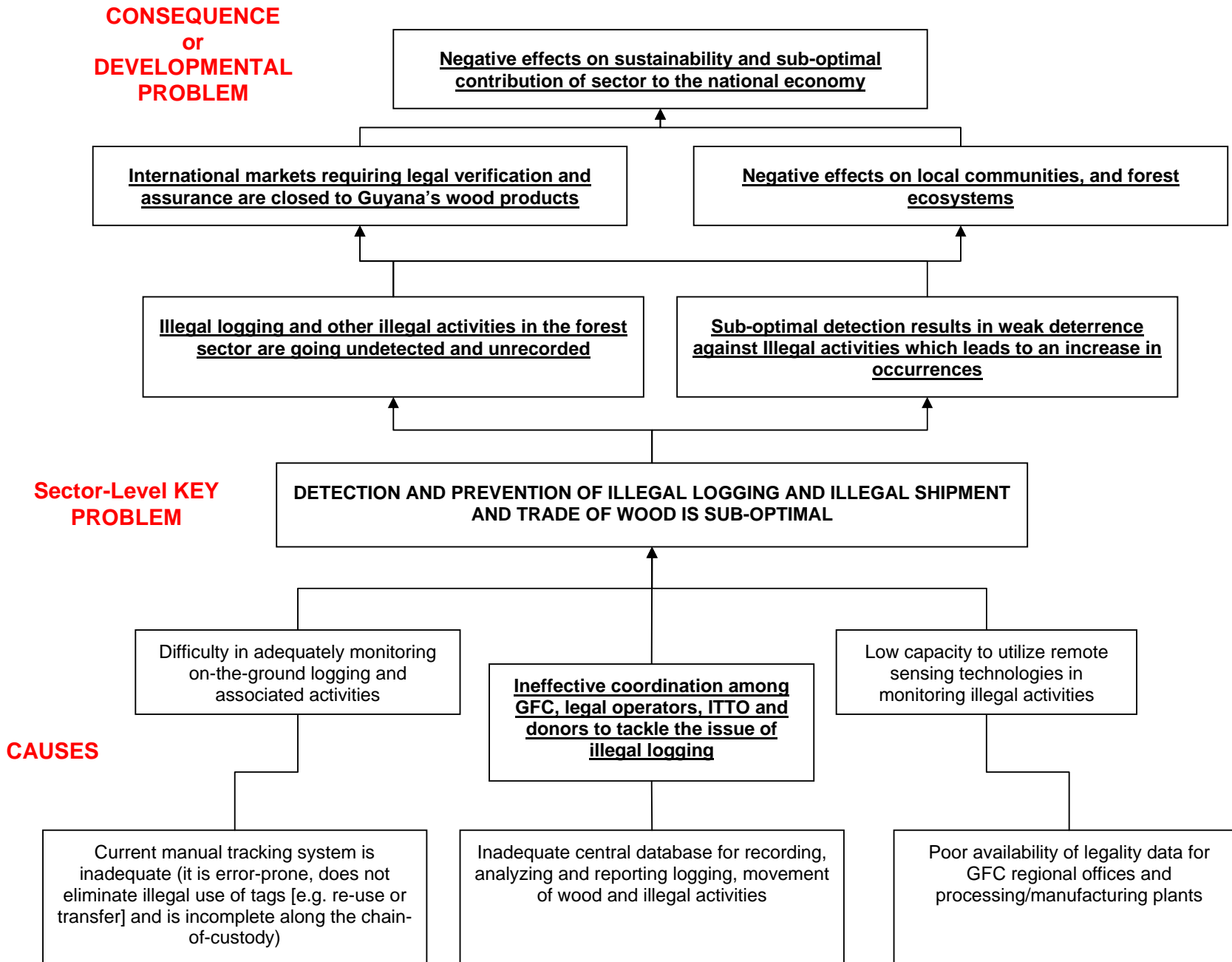
Title: *Map/Indicator database creators (2)*

Experience: The local freelancers will have at least a diploma from a recognised university and 3 years relevant experience.

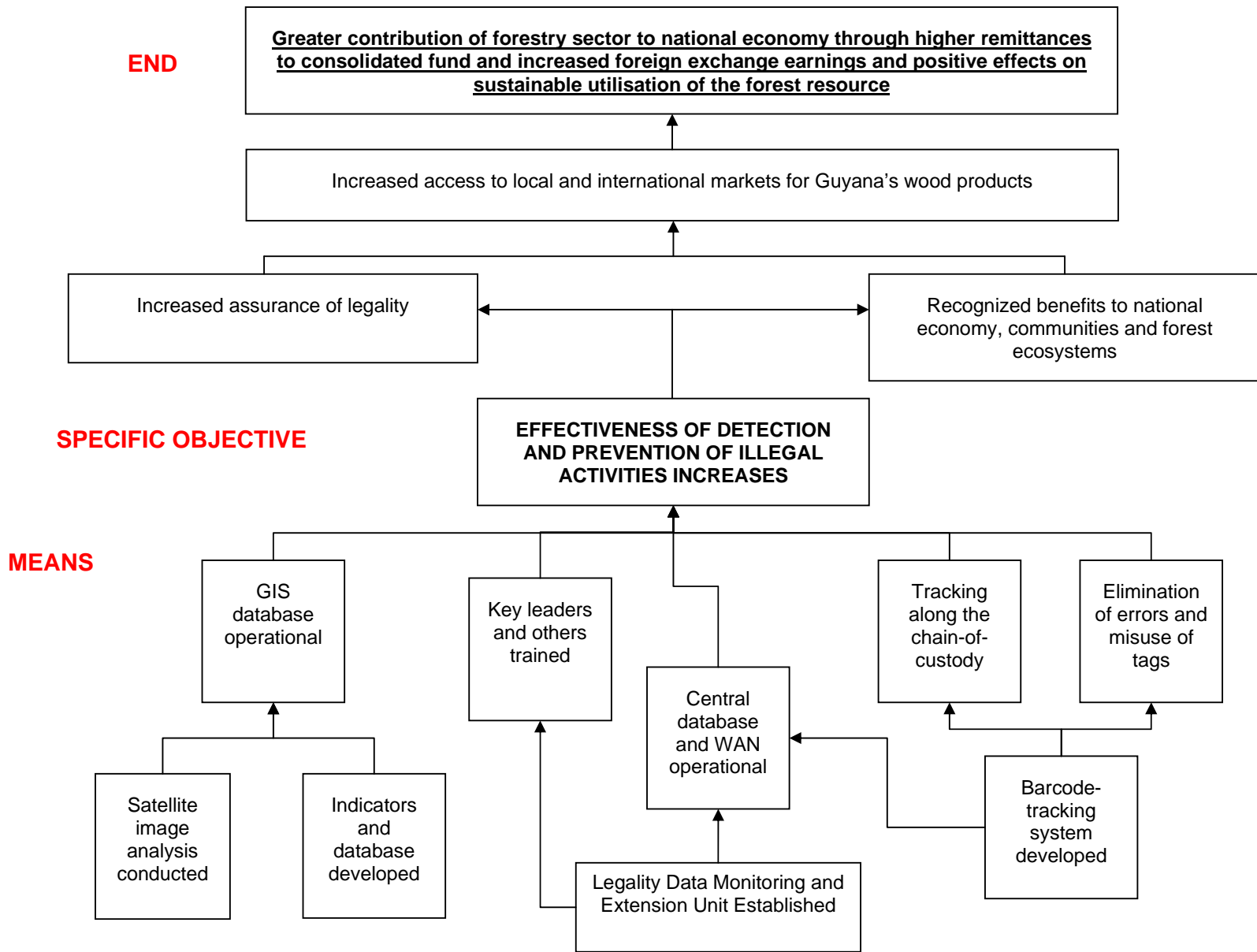
Duties

1. Assist in creating and maintaining relevant databases

ANNEX C – Problem Tree



ANNEX D – Objectives Tree



ANNEX E – Work Breakdown Structure

SPECIFIC OBJECTIVE

TO IMPROVE THE DETECTION AND PREVENTION OF ILLEGAL LOGGING, SHIPMENT AND TRADE OF WOOD PRODUCTS IN GUYANA

OUTPUTS

1. Dedicated GIS (including satellite image analysis and legality database)

2. Barcode Timber Tracking System

3. Central monitoring and detections database

4. Wide-Area computer network

5. Legality Monitoring and Extension Unit within GFC

ACTIVITIES

- 1.1 Acquire appropriate satellite imagery
- 1.2 Analyze satellite images
- 1.3 Determine indicators of illegal logging
- 1.4 Undertake ground-truthing checks and field surveys
- 1.5 Develop legality database
- 1.6 Acquire appropriate hardware and software
- 1.7 Develop a dedicated GIS for forest concessions

- 2.1 Review current manual tracking system
- 2.2 Develop barcode-tracking system procedures (including chain of custody)
- 2.3 Acquire equipment
- 2.4 Training of personnel
- 2.5 Trial implementation of system
- 2.6 Regional workshops
- 2.7 Full implementation of system
- 2.8 Monitor and report

- 3.1 Review current data storage and record keeping
- 3.2 Acquire central server hardware and software
- 3.3 Develop integrated database
- 3.4 Link central database to wide-area
- 3.5 Monitor and report

- 4.1 Inception report
- 4.2 Acquisition of resources and identification of key personnel
- 4.3 Develop procedures for use and protocols for information dissemination
- 4.4 Establish network
- 4.5 Monitor and report

- 5.1 Develop Terms of Reference for Unit
- 5.2 Identify key personnel including "leaders"
- 5.3 Train key personnel and leaders in RS, GIS, database management, networks, legality monitoring
- 5.4 Hold regional and national training and awareness workshops

ANNEX F

**TABLE SHOWING HOW EXPERT PANEL'S COMMENTS AND RECOMMENDATIONS
AT THIRTY THIRD PANEL SESSION, HAVE BEEN ADDRESSED**

COMMENTS/RECOMMENDATION	PAGE NO. IN PROPOSAL
1. Revise the problem tree to situate the project within the broader scope of the illegal logging problem.	Page 46 – ANNEX C
2. Provide more information on the sustainability of project outputs and long-term financing of bar codes.	Page 32
3. Revise the management structure to provide for a PSC to include representative(s) of concessionaires, government, ITTO and donor(s).	Page 32
4. Include Forestry Commission inputs and at least part of the cost of bar codes under Guyanese budget contribution.	Cover page, 27 - 31
5. Address need to act on information provided by the project in Logical Framework.	Page 16
6. Consider appropriate extension activities in liaison with the ITTO Secretariat.	Pages 8 - 9