

1.0 INTRODUCTION

Forest Management may be defined as the practical application of business methods and technical forestry principles to the operation of a forest resource.

The Forest Management Plan is based upon a detailed social, economical and environmental appraisal, setting out the order and extent of all activities to be carried out in a concession. The Operational Plan addresses activities during specific periods of three to five years in greater detail. Annual plans are designed to set out activities for one year.

Sound Forest Management involves the integration of the biological, social and economical aspects of the forest resource. This results in a sound planning process allowing a balance that makes the integration of the biological, environmental, social and economical factors viable.

The Forest Management Planning requirements of the Guyana Forestry Commission (GFC) are designed not only to help the concessionaire address all the factors involved in timber production, and to accomplish objectives; but also to demonstrate to the GFC (and to commercial banks), that he/she is aware of all the variables and is prepared to make the necessary resource inputs to make the timber production process sustainable. This will be achieved through a set of planned actions, which will ensure that the health of the forest ecosystem and its productive capacity are maintained.

The Forest Management Plan is designed therefore to achieved the following objectives:

1. To establish the administrative capacity to manage the plan area
2. To describe and evaluate the commercial potential of the forest resources in the plan area
3. To protect fragile land on steep slopes, protecting water supplies and protecting the forest's wildlife and biological diversity in general

4. To obtain local community support for forest management
5. To optimise revenues compatible with both the sustained production of timber and the socio-economic well being of local communities
6. To sustain the supply of other forest products and services
7. To lend support to research investigations which will in turn support the objectives of management.

The Forest Management Plan should ultimately describe how each of these objectives will be met, and the following standard format is recommended for the presentation of the necessary data and information:

- Information required
- Sources of information
- Application for management purposes
- Manner of presentation of the information

2.0 EXECUTIVE SUMMARY

The company is required to present an executive summary in the Forest Management Plan.

The contents should include: the plan period; the area to be harvested during the period and projected volumes of produce to be extracted; major works to be carried out including length of main road(s), bridges, buildings, port facilities; major equipment to be purchased; training programmes; social infrastructure and programmes; and important forest protection and conservation activities.

3.0 COMPANY PROFILE

- **INFORMATION REQUIRED**

- Name of company
- Corporate structure of the company
- Commercial interests/general objectives of the company
- Organisational structure of the company
- Job description and responsibilities of each post holder and to whom do they report to

- **SOURCES OF INFORMATION**

- Company records
- Extracts from Articles of Association (of the Company)
- Memorandum of Association (of the company)

- **APPLICATION FOR MANAGEMENT PURPOSES**

- The corporate structure of the company and its performance record influence its capacity to obtain funding
- Current environmental considerations in the use of natural resources requires a suitable mix of technical and administrative skills to cope with such responsibilities
- Other appropriate legal document
- Organisational structure of the company

4.0 COMPANY POLICY TOWARDS NATIONAL DEVELOPMENT

4.1 INSTITUTIONAL FRAMEWORK

4.1.1 GOALS AND STRATEGY

- **NOTES**

Every corporate entity or any business has objectives. It is important that these be well thought out in the context of forest resources. Notwithstanding company or business policy, the objectives of the company in the context of forest resources can only come from extensive reconnaissance surveys over the forest area of interest, supported by research on the topographic and geological characteristics of the area observed.

- **INFORMATION REQUIRED**

- A statement of the Company general policies supported by approved legal documents.
- A statement of the Company's policies towards development of the forest resources in question and associated technical, economic social considerations

- **SOURCES OF INFORMATION**

- Company documents
- Reconnaissance Surveys and other concessionaires

- **APPLICATION FOR MANAGEMENT PURPOSES**

- The information provides the policy frame-work within which all activities by the concessionaire will be planned.

- **MANNER OF PRESENTATION OF THE DATA**

- Statements of the Company's policies

- Extracts illustrating or specifying company policy.

5.0 SECTION A: BACKGROUND TO THE PLAN

5.1 LOCATION AND LEGAL STATUS

5.1.1 TYPE OF CONCESSION

- **INFORMATION REQUIRED**

- Classification of the concession (TSA/WCL)
- Reference number for the TSA/WCL
- The date of issue and date of expiry
- Area of TSA/WCL (hectares)

- **SOURCES OF INFORMATION**

- Company records
- The Forest Resources Management Division (FRMD) of the Guyana Forestry Commission

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Fundamental data for management purposes
- The information allows for projections on number, type of equipment and labour force required, etc.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- Statement highlighting key contractual clauses of the WCL or TSA

5.1.2 GEOGRAPHIC LOCATION

- **INFORMATION REQUIRED**

- General idea of the location of the concession based on natural surrounding features such as rivers, large creeks, heritage/historical sites, monuments etc.

- The administrative region(s) in which the concession is situated.
- Accessibility in terms of major access roads, rivers to area.
- **SOURCES OF INFORMATION**
 - A general map of Guyana scale 1:500,000 showing the TSA/WCL. A general map can be purchased from Lands and Surveys and the index map could be created by the lessee or from the FRMD at a cost. Request for information should be directed to the Head of Division (FRMD).
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - Allows for determination of water transport requirements
- **MANNER OF PRESENTATION OF DATA**
 - The information should be presented in descriptive and diagrammatic form (maps).

5.1.3 DESCRIPTION OF BOUNDARIES

- **INFORMATION REQUIRED**
 - Description of all external boundaries of the area
 - A copy of a map scale 1:50,000 attached in the appendix showing the boundaries clearly outlined. This map should give accurate distances and computation of bearings so as to prevent errors on the ground
 - Co-ordinates or mining concessions within the concession
- **SOURCES OF INFORMATION REQUIRED**
 - Guyana Forestry Commission
 - Geology and Mines Commission
- **APPLICATION FOR MANAGEMENT PURPOSES**

- Fundamental data for management purposes
- **MANNER OF PRESENTATION OF DATA**
 - Appropriate extracts from the WCL/TSA contract document.
 - A map of the concession in scale 1:50,000.
- 5.1.4 VILLAGES AND COMMUNITIES WITHIN/NEIGHBOURING CONCESSION**
- **INFORMATION REQUIRED**
 - Information should be given on the presence of any villages and communities within and neighbouring the concessions.
 - If there are any villages/communities present, the estimates of residents should be given.
 - **SOURCES OF INFORMATION**
 - A general map of Guyana scale 1:100,000/1:50,000 showing communities/villages in relation to the concession is needed. This can be purchased from the Lands and Surveys Department or from GFC (FRMD). The concessionaire will seek to get information from the Amerindian Research Unit on the villages/communities present in relation to the number of residents, education etc.
 - **APPLICATION FOR MANAGEMENT PURPOSES**
 - Labour - availability of labour in the area greatly reduce operational costs.
 - Education and health facilities - the concessionaires may need to focus on such areas as education, recreation and health.
 - The information will be used to prepare appropriate mitigating

measures.

- The information allows for the determination of some possible socio-economic impacts on established communities.

- **PRESENTATION OF DATA**

- General statistical data, e.g. estimated number of men, women and children, occupation etc.
- A map on scale 1:50,000 indicating the location of the communities (if any).

5.2 NATURAL ENVIRONMENT

5.2.1 TOPOGRAPHY AND HYDROLOGY

It is suggested here that only **Land Form** be treated under this item, and that **Geology and Soils** be treated under item 5.2.2

- **INFORMATION REQUIRED**

- A description of the main drainage system (main rivers and creeks).
- A description of the terrain in terms of the relative altitudes in different parts of the concession (including the highest point).
- Evidence of rock outcrops
- Presence and extent of swamps or poorly drained terrain.

- **SOURCES OF THE INFORMATION**

- Topographical maps (Lands and Surveys Department)
- Geological maps (Geology and Mines Commission)
- Reconnaissance surveys

- **APPLICATION FOR MANAGEMENT PURPOSES**

- The nature of topographical conditions influence the harvesting systems employed, primarily in terms of economic considerations, road specifications and choice of machinery.
- The nature of topographical conditions determines the accessibility of the timber resources.
- There is need to understand the correlation between terrain and forest type.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- All FMPs must include a topographical map at a scale of 1:50,000 identifying areas which may not be logged due to mountainous terrain, extensive swamps, or significant rock out-crops; suggested buffer (riparian) zones along rivers and large creeks must be clearly identified.
- A statement must be provided in about one hundred words describing the constraints represented by difficult terrain, especially in terms of engineering considerations (gradient for roads, choice of tractors and logging trucks and number and type of bridges).

5.2.2 GEOLOGY AND SOILS

- **INFORMATION REQUIRED**

- Main soil types in the area.
- Potential sources (quarries) for road building material, such as laterite.
- General information on prevailing agricultural or mining activity in the area.

- **SOURCES OF INFORMATION**

- Guyana Forestry Commission (FAO/UNDP maps)
- Geology and Mines Commission
- National Agriculture Research Institute (NARI)
- Lands and Surveys Department
- Reconnaissance surveys by the concessionaire

- **APPLICATION FOR MANAGEMENT PURPOSES**

- The prevailing geological patterns and soil types influence forest species composition.
- Fertile soils or geologically rich areas (in terms of gold and diamond, bauxite and petroleum) may cause land use conflicts.
- Soil types influence road width specifications, the risk of fires and post harvest degradation.
- Soil types influence the nature and intensity of silvicultural activity.
- Soil types influence the choice of machinery (trucks and tractors).

- **MANNER OF PRESENTATION OF THE INFORMATION**

- A map of the concession area showing soil types.
- A table showing soil types and their relative percentages of the total area.
- An account of about two hundred words showing the implications of the different soil types for environmental and silvicultural considerations.

5.2.3 CLIMATE

- **INFORMATION REQUIRED**

- List of neighbouring meteorological stations
- The basic weather pattern in the area
 - * very dry months
 - * very wet months
- Mean monthly figures on precipitation
- Evidence of flooding or localised storms including evidence of storm damage to standing timber.

- **SOURCES OF INFORMATION**

- Meteorological Department - Ministry of Works
- Ministry of Agriculture
- Guyana Forestry Commission
- Reconnaissance Surveys by the concessionaire

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Weather patterns influence road construction and maintenance and therefore log hauling by trucks.
- Increased stream flow levels in the rainy season can be an advantage or disadvantage depending on the harvesting system employed.
- Localised flooding in the rainy season influence specifications for bridges, culverts and drains.
- Rainfall intensity combines with soil type to influence road width and road margin (border) clearance.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- A list of meteorological stations.
- A simple graphical illustration of rainfall within area.
- An account of about fifty words identifying the implications of weather patterns for logging operations.

5.2.4 VEGETATION AND FOREST TYPES

- **INFORMATION REQUIRED**

- An account of all the various forest types in relation to their topographical position, for example - mixed forest on hilly terrain.

- The relative percentage and actual area of each forest type in the concession area.
 - The estimated number of stems per hectare per forest type (stand tables) and by species / species groups.
 - The estimated standing volume per hectare per forest type and by species / species groups.
 - A list of the more frequent species in the concession.
 - Source(s) of inventory data, intensity of inventory, number and distribution of samples methodology employed, manner of calculation of estimated standing volume.
- **SOURCES OF INFORMATION**
 - Aerial photographs from Guyana Forestry Commission
 - Forest Inventories by/for the concessionaires
 - Tropenbos
 - Other concessionaires
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - Forest management and forest harvesting activities may be extremely expensive unless well planned, and good planning may be achieved when the most information is available.
 - Concessionaires must comply with the Code of Practice for Forest Operations and it is essential that they are familiar with the forest resources on the concession.
 - The composition of forest types vary with their topographical position and this must be planned for.
 - A knowledge of the availability of standing timber by species is essential to predict production levels and planning of marketing strategies.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- A vegetation map (scale 1:50,000 or 1:100,000).
- A table showing all forest types and their relative percentage of the total productive forest area.
- A table showing the productive forest area versus the non-productive forest area and their relative percentage of the total forest area.
- A table showing estimated commercial volume per hectare per forest type.
- A table showing estimated number of commercial stems per hectare per forest type.
- Distribution of diameter classes by species and assessment of regeneration.

5.3 AREA MANAGEMENT HISTORY

- **INFORMATION REQUIRED**

- Name of previous concession holder
- Period during which the area was exploited
- Nature of concession SFP/WCL
- Main product harvested (Balata, Wallaba, Manicole etc.)
- Extent and location of areas harvested
- Estimated volume by product harvested
- Special peculiarities of past logging history
 - * e.g. felling by axe, chainsaw/sawpit operation
 - * hauling by graystick/skid winch etc.

Other Peculiarities

- * evidence of fire
- * evidence of occasional flooding
- * evidence of extensive cultivated areas
- * past non-forestry activities

- **SOURCES OF INFORMATION**

- Reconnaissance surveys including discussions with residents in or near the area.
- Personal records of the concessionaire, if the concessionaire preparing the FMP has been logging the area before.
- GFC Head Office/field stations: these can advise on the persons to whom a particular area was allocated before; there may be a limit as to how much information field officers of the GFC can provide.
- Local churches

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Areas exploited, intensely burnt or degraded cannot be included in the productive forest area: moreover intensity of silvicultural or rehabilitation efforts can be determined for such areas.
- Attempts to determine growth rates in secondary forests may be made.
- Areas partially exploited would have different residual stockings and the level of harvesting permitted would be different.
- It is important to know the history of an area to assess the condition of the vegetation there. However there is a chance to observe and predict.
- What post harvest changes may occur in those areas to be harvested.
- The prevalence of accelerated erosion in areas logged can inform considerations on road construction and choice of machinery.

- **APPLICATION FOR MANNER PURPOSES**

- An account of not more than half a page expressing clearly the major historical events.
- Estimated volume by product should be put in a table in the following format:

TABLE: 3.A-Production recorded during period:.....

GENERAL AREA	PRODUCT	SPECIES	VOLUME	UNIT
Cmpt. Banya	Logs	Greenheart	10 072	m ³
		Other species	20 018	m ³
	Wallaba Poles	Wallaba	9 003	m ³
	Charcoal	Wallaba	2 003	tonnes

- There is need to include a map showing clearly exploited areas, degraded areas and areas available for exploitation.
- The relative percentage of the various categories (productive area, degraded area, protected areas) must be presented either in a graph or in a table (as per table on page 15).

Category	Area (ha)	Percentage
Productive	45,000	71
Non productive		
Degraded		
Swamp		
Burnt		
Inaccessible		
Total		

5.4 ECONOMIC ENVIRONMENT

5.4.1 EXISTING PHYSICAL INFRASTRUCTURE

- **INFORMATION REQUIRED**

- Size of main compound (in hectares).
- Legal status of area (private property, agricultural lease, etc.).
- A complete description of all facilities (residential quarters, bonds, storehouses, garages, factories, wharves, workshops: the location of each should be identified).

- **SOURCES OF INFORMATION**
 - Records of the company
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - Actual assets of the company indicate the seriousness of their approach to forest operations.
 - Actual assets help determine additional funding requirements (borrowing capability).
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - A plan of the main village/town
 - A map (scale 1:50,000) or plan showing the location of the main facility as well as the field facilities on the concession area.

5.4.2 ROADS AND BRIDGES

- **INFORMATION REQUIRED**
 - If the area has been previously occupied, details of the primary road network should be illustrated by a map.
 - Proposed roads to be constructed in the concession area with detail roading specification.
 - State of public roads near the concession area.
 - Type, disposition and status of bridges.
- **SOURCES OF INFORMATION**
 - Company records
 - Topographic maps
 - Reconnaissance surveys
 - Guyana Defence Force, Camp Ayangana (Capt. Elvis)

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Existing roads will form part of the general system of the concession area and will indicate responsibility for road maintenance.
- The prevailing road system determines accessibility for reconnaissance and forest inventory objectives.
- Consideration for fire prevention measures.
- Health consideration for persons passing through the concession.
- Whether there is need to build new roads, trails etc.
- What equipment would be necessary and the best suited equipment for the construction and the transportation for forest produce.
- Whether the area is predisposed to erosion and sedimentation.
- The information provided will give an idea of the degree of previous logging activities.
- The information allows for the introduction of security measures.

- **MANNER OF PRESENTATION OF THE DATA**

- A topographic map showing the location of all existing roads and bridges.
- Details should be provided both in descriptive and diagrammatic forms.

5.4.3 COMMUNICATION EQUIPMENT

- **INFORMATION REQUIRED**

- A list of all relevant communication equipment , their respective dates of purchases, and their actual use status.

- Company records
- **MANAGEMENT NEEDS FOR THE INFORMATION**
 - Communication is the essence of healthy business.
- **MANNER OF PRESENTATION OF DATA**
 - Telephone number(s)
 - For non-telephone systems a copy of the official approval for the system.
 - For non-telephone systems a table as follows below:

LIST OF EQUIPMENT AND COMMUNICATION SYSTEMS OWNED BY ‘COMPANY’

NO.	ITEM/MODEL	SERIAL NO.	DATE OF PURCHASE	REMARKS

6.0 SECTION B: FOREST MANAGEMENT PLANNING

6.1 OBJECTIVES OF MANAGEMENT (Outline Company Policy including timber production, tourism, non-timber forest products mining etc.,)

7.0 SILVICULTURE (Outline Company Policy)

7.1 SILVICULTURE SYSTEM

• **NOTES**

A Silviculture System is comprised of a sequence of operations designed to enhance forest stand development of a particular group of species. The use of any Silviculture prescription or practice under natural forest conditions depends on the particular silvicultural system that may be adopted, and the actual practices may vary considerably from one site to another.

The objective of the silvicultural system should be to ensure that an adequate number of good quality trees of commercial species are retained for subsequent felling cycles, while disruption to the forest ecological processes is minimised.

The selection system currently practised in Guyana normally requires climber cutting prior to felling to minimise damage to surrounding trees, a limit to the number of trees removed per hectare to ensure that the size of canopy gaps created by felling and extraction is minimised, and restriction on the minimum diameter of trees felled to ensure that commercial trees are retained for subsequent felling cycles.

The silvicultural system adopted will be specific to each forest type and will be informed by the forest composition determined by inventory (Section 9), and market and utilization (Section 15).

- **INFORMATION REQUIRED**

- Definition and description of silvicultural system that will be implemented by the concessionaire. For example, enrichment planting, refinement, post-harvest treatments, thinning, tending.
- For each forest type, a description of harvesting procedures that have silvicultural components to be carried out should be stated. For example, tree selection, directional felling, winching.
- For each species (or species group) to be harvested an indication of the limits to be imposed on numbers and diameter of trees to be harvested, and number/percentage of seed trees to be retained.

- **SOURCES OF INFORMATION**

- Forest types (Section 5.2.4)

- Forest inventory (Section 9)
 - Markets and utilisation (Section 15)
 - The Code of Practice for Forest Operations sets general guidelines for the maximum removals per hectare for all species
 - The Forests Act identifies minimum girth limits for species
 - NGOs. (Conservation International, Smithsonian Institute, Tropenbos, Iwokrama, Edinburgh Centre of Tropical Forestry (Barama)
 - International NGOs (IICA, CIFOR etc.)
 - The internet and other concessionaires
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - The silvicultural system adopted for each forest type will determine potential yields from the concession, the sequence of harvesting operations and consideration when selecting harvesting equipment.
 - Silviculture practices are critical for sound forest management and certification.
 - Silvicultural systems help to determine rotation or harvesting cycles.
 - Silvicultural components (tree marking selection, directional felling) all have consequences for the future stand, and thus silvicultural considerations should be taken into account during harvesting operations.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - Arguments for the choice of Silviculture-system.
 - The resources allocated within the organisational structure for silvicultural work.

8.0 FOREST USE ORGANIZATION

- **NOTES**

Forest organisation is the act of classifying portions of forests in accordance with its complex biological nature and topographic variation.

There are essentially two types of classification which for our purposes we may describe as follows:

i) legal classification (non - productive)

Identification of non-productive areas of the concession. These will include areas of non-forest or non-commercial forest (swamps, savannahs), areas that are inaccessible for harvesting, areas set aside for biodiversity reserves, research and protected areas, buffer strips and areas of special cultural, religious or historical significance.

ii) administrative classification (productive)

Identification of productive area and division into compartments. Compartments are the unit of management. It is advisable that boundaries follow topographic features. The maximum compartment size will be based topographic features, productivity estimates and on the assumption that the cutting cycle is 60 years which can be harvested in five years.

Compartments must be permanent and numbered. Estimates should be made of gross and net areas (excluding, for example riparian reserves) and (if possible) area of each forest type within the compartment.

The order in which compartments are to be harvested (and the planned harvest year) should be indicated.

Both classification types should be addressed in the FMP on the basis of extensive reconnaissance surveys and consultations with the GFC and the EPA.

- **INFORMATION REQUIRED**

- Identification of productive and non-productive forests.
- A table illustrating the relative percentages of production and non-productive forests (as section 5.3).
- A list of compartments, a description of their respective boundaries, the acreage of each compartment, the criteria used for selecting and demarcating compartments, and the coding system used to identify compartments.
- Forward reading plan for primary roads showing road numbers (road alignment on map) and the year in which road sections are to be opened.
- The points proposed or location of other infrastructure including major logging depots, processing facilities and key forward camps, and when these are to be constructed.

- **SOURCES OF INFORMATION**

- Reconnaissance surveys by the concessionaire
- Topographic maps
- GFC's Code of Practice for Forest Operations

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Forest organisation is essential to maintain control of all operational events, to optimise the use of resource inputs and to manage the

extraction of timber.

- Compartments within the forest permit descriptions of the forest, facilitate the maintenance of (historical) records, facilitate forest protection strategies and administrative features as siting of camp grounds, log depots, forest inventory, and road construction.

- **MANNER OF PRESENTATION OF THE DATA**

- A stock map of the entire concession (giving an idea of the distribution and extent of forest types, productive and non-productive zones, location of compartments, the location of the primary road system, and the location of sites for major events as villages and log depots.
- A table showing all the compartments and their respective identification codes by area and estimated (sequential) period of development and or exploitation.
- A table showing linear road distance per compartment and expected date of development of the road system in each compartment.
- A table showing the expected start/completion date of the development of each major site identified for villages, forward camps, major log depots, and processing sites (if any) within the concession.

9.0 FOREST INVENTORY DESIGN

9.1 MANAGEMENT LEVEL INVENTORY

- **INFORMATION REQUIRED**

- A statement of the objectives of the inventory
- Inventory methodology (random, systematic), including sampling

intensity and target precision

- The type of plots or sample points, and a map showing their distribution
- The fixed area - area, form, shape or Basal Area Factor(s) if point sampling used
- The distance between plots
- The number of plots (a function of CV, Probability Level, desired error and sampling fraction)
- A tree making scheme
- The type of data recorded, including a sample of field forms(s) used
- The minimum dbh recorded, and maximum if applicable
- A list of inventorised and utilized species
- The methods of assessing tree condition and or quality
- The methods of estimating volume (u.b.)
- The procedures for analysis and presentation of data
- A timetable of work and a list of inputs
- A clear explanation (and justification) indicating whether or not, and why potential commercial species are included in the inventory.
- Personnel directly responsible for implementing and monitoring inventory operation.

As a minimum the inventory must describe, for each forest type, the stocking of the major commercial species by diameter classes including an estimate of standing volume. For each forest type a sampling error should be given for the total number of commercial trees per

hectare. A pilot survey will normally be required, or existing inventory information referred to, to determine the sampling intensity to achieve the required precision.

- **SOURCES OF INFORMATION**

- Guyana Forestry Commission (Library, FRMD).
- Iwokrama
- Tropenbos
- Other concessionaires

Larger concessionaires are expected to employ professional foresters with inventory experience.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- The inventory will determine the standing volume of commercial trees within each forest type in the concession.
- By applying criteria of the silvicultural system (Section 7) an annual allowable cut by species can be calculated for the concession.
- Reference to the compartment layout and the sequence of logging will determine how volumes and species mixtures will change as harvesting proceeds.
- The inventory information will help to determine the optimum road system to access the resources, and the distribution of productive areas within compartments and the concession.

It is important that there be a clear explanation to the methods of estimating the parameters of the forest. This is necessary due to the cost involved, and the considerable amount of planning which will be directly related to the information obtained.

- **MANNER OF PRESENTATION OF THE DATA**

- A statement of objectives of the inventory and description of the methodology.
- A table showing the planned distribution of sample plots by forest type and compartment.
- A description of data analysis, procedures and summary of results examples of field forms and result tables.
- A programme showing timetable for completion of inventory work and budget inputs.

9.2 PRE-HARVEST INVENTORY

- **INFORMATION REQUIRED**

- A clear explanation of the methodology used to implement the enumeration. The species selected for harvesting will be used for planning purposes. This should include a clear definition of the criteria used for selecting trees for enumeration (species, diameter range, quality, category, etc).
- The concessionaire should give reasons why potential crop trees are or are not included in the pre-harvest inventory. This inventory should be made to check whether planned skid trail patterns were achieved .

(Please note that the GFC has proposed a methodology to be used to implement the pre-harvest inventory in the Code of Practice for Forest Operations (Appendix 4). Although this guide allows for standardisation of the procedure at a national level, concessionaires should feel free to adopt any other methodology which can be shown to be equally effective).

- Personnel directly responsible for implementing and monitoring inventory operations.

- **SOURCES OF INFORMATION**

- Guyana Forestry Commission (Library, FRMD)
- Code Of Practice For Forest Operations
- Other Concessionaires
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - The pre-harvest inventory data is necessary for planning of harvesting. Harvesting (including road construction) is the most expensive forestry activity. Planning is therefore necessary for the proper use of human resources and the cost effective use of a variety of (expensive) machinery. A pre-harvest inventory also assists with coping with market demands, and is important for determining directional felling of trees and design of extraction routes or skid trail layouts.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - A statement of objectives of the inventory and description of the methodology.
 - A description of data analysis, procedures and summary of results, examples of field forms and result tables.
 - A tree location map per block (100 ha) for the first compartment only preferably on graph paper showing all trees enumerated (identifying the key species such as Baromalli or Greenheart), the trees to be harvested and the location of the skid trails.
 - A programme showing timetable for completion of inventory work.

9.3 POST-HARVEST INVENTORY

- **INFORMATION REQUIRED**

- A statement of objectives of post-harvest inventory.
- A clear explanation of the methodology that will be used to implement post-harvest enumeration.
- Information on the amount and quality of trees remaining in the block after harvesting.
- Trees felled but not extracted should be clearly identified.
- **SOURCES OF INFORMATION**
 - Guyana Forestry Commission
 - Manual of Audit Procedures
 - Other Concessionaires
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - The process assists the concessionaire with internal auditing
 - Trees planned for removal but not removed
 - Commercial stems intentionally retained within the stand
 - Assessment of gap size, and damage to residual stand
 - The process also assists in determining what rehabilitation is necessary through the adoption of an appropriate silvicultural technique.
 - The inventory data would determine whether planned skid trail pattern was achieved or not.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - Statements highlighting peculiarities of the harvesting process.
 - Statements should be made of existing PSPs for measuring post-harvest recovery.

- Statements highlighting the procedures that will be involved for the post-harvest inventory.
- A copy of the original tree stock (tree location) map highlighting clearly trees removed, and trees planned for removal but not removed, and trees removed which were not planned for removal.
- Assessment of gap size, skid/road percentage cover
- Assessment of trees damage
- Number of stumps of felled trees

9.4 GROWTH, YIELD AND DEFECT DATA

- **INFORMATION REQUIRED**

- Information on the rate of growth of any species of interest.
- Information on the correlation between dbh and the prevalence and nature of defects and soil types.

- **SOURCES OF INFORMATION**

- Guyana Forestry Commission
- Tropenbos

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Growth and yield data is used to predict changes in the volume of growing stock and in setting realistic rotation or harvesting cycles.
- Defect data is used to generate more realistic estimates of standing commercial volume.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- Estimates of annual increment/area
- Volume equations if these already incorporate a defect factor
- Tables or graphs for growth and yield data
- Sources of the information

10.0 PRODUCTION OPERATIONS

10.1 YIELD REGULATION AND PRODUCTION ORGANISATION

10.1.1 CALCULATION OF CUTTING CYCLE AND ANNUAL ALLOWABLE CUT

The Code of Practice for Forest Operations prescribes a maximum harvestable rate of 20m³/hectare per cutting cycle of 60 years pending studies into the economic implications of this volume. The choice of 20m³/hectare is a deliberate attempt to ensure that merchantable trees remain in the stand after harvesting operations, and the rate of harvesting does not exceed the growth rate of commercial species.

- **INFORMATION REQUIRED**

- The Annual Allowable Cut (AAC) is the amount of forest produce that can be harvested from the concession on a sustainable basis each year taken into consideration the assumed 60 years cutting cycle.

The AAC is calculated from the best information available on the area of the resource available for production, the average volume available per productive hectare, and the cutting cycle. The cutting cycle is the number of years between one harvesting operation and the next. The AAC is constrained by the requirements of the Code of Practice for

Forest Operations which limits the quantity that can be removed per hectare in response to productive capacity of the resource (specifically the rate of volume increment of the commercial species). The AAC is also constrained by the number of species that can be marketed.

For example

Mr. Ulu obtains a concession comprising 30,000 ha for a period of 20 years with an option for renewal for 20 years. If the productive forest within the concession is 24,000 ha, then the total allowable cut would be $24,000 \text{ ha} \times 20\text{m}^3 = 480,000 \text{ m}^3$, and the **annual allowable cut** would be $480,000 \text{ m}^3$ divided by 60 years = $8,000 \text{ m}^3/\text{year}$.

that is, Total concession area = 30,000 ha

Productive forest area = 24,000 ha

Assume allowable harvest of $20\text{m}^3/\text{ha}$ per cutting cycle

therefore, total allowable cut = $24,000 \times 20\text{m}^3$
 $= 480,000 \text{ m}^3$

Concession period = 20 years

therefore, annual allowable cut = $24,000 \text{ ha} \times 20\text{m}^3$ divided by 60 yrs
 $= 8,000 \text{ m}^3/\text{yr}$

In the above example, the concession period is less than the assumed cutting cycle of 60 years. Therefore, the concessionaire should only harvest a proportion of the concession. The proportion that should be harvested is equivalent to the concession period divided by the cutting cycle, that is $20/60 = 1/3$. If the concessionaire renews the concession for a further 20 years, another third of the productive area may be harvested within the renewal period.

- **SOURCES OF INFORMATION**

- The net productive area of the concession is determined in section 8: Forest Organisation. The average volume available per hectare is obtained from the results of the management level inventory (Section

9.1). Note that a check should be made to ensure that the inventory has sampled all of the net productive area, in particular that plot locations are not biased by excluding areas of low stocking, or areas that cannot be harvested.

- The best current estimate of the cutting cycle for timber is about 60 years. This is based on growth data obtained by the Forestry Department and Tropenbos. Cutting cycles for other products must be based on the best available growth information
- Limits per hectare harvests are detailed in the Code of Practice for Forest Operation..
- The companies marketing plan, Section 15 should be referred to, to determine the species that can be considered when calculating the AAC.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- The AAC determines the amount of raw material that will be available from the concession for sale and further processing. It is vital information for the planning of forest investment. The cutting cycle determines the rate at which the concession is developed and the requirements for detailed forward planning and infrastructure development.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- The information and assumptions used to calculate the AAC must be detailed, with reference to sections 8 (Forest Organisation) and 9.1 (Management Level Inventory).
- The calculation of AAC must be detailed for each species to be marketed and for all species combined.

10.2 SCHEDULE OF TIMBER PRODUCTION

- **INFORMATION REQUIRED**

- Section 8: Forest Organisation identifies that the concession area should be divided into compartments (Section 6.ii) and the order in which they are to be harvested. If the management level inventory has been stratified by forest type, and the area of each type can be determined at a compartment level, it will be possible to predict the produce mixture that will be available from each compartment each year. The sequence of harvesting operations may be modified to ensure continual production of certain product types.
- **SOURCES OF INFORMATION**
 - Compartment information from section 8 and management level inventory information from section 9.
 - The maximum level of production will be informed by the AAC calculation in section 10.1.1.
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - The schedule of production allows for detailed forward planning of product availability to assist marketing.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - The schedule may be presented in a tabular format with column headings: harvest year, compartment, forest type, area, product volume by species

11.0 HARVESTING OPERATIONS

11.1 MACHINERY

- **INFORMATION REQUIRED**
 - Information on all current machinery and acquisitions during the Management Plan period as illustrated in the table on page 33.
 - Machinery should be detailed by operation (roading, harvesting, log transport), and personnel directly responsible for each operation.
 - Machinery capacity or horsepower should be stated and the reasons

why specifications have been chosen for the particular operation.

- The concessionaire should indicate the expected life of machinery, and thus capital value that may be recovered over the working life (please show calculations and assumptions).

Schedule of Machinery to be used during FM Planning Period 1.1.99-31.12.2004

Item No.	Type	Model	Expected use date	Remarks & Expected life
1.	Dump Trucks (3)	MACK H6	1.3.99	New. 2004-2-.21
2.	Motor-grader	CAT DL-3	-do-	Rented
3.	Bulldozer (D6)	CAT D6m	-do-	Rented
4.	Front-End Loader	CAT TL-8	-do-	New
5.	Skidders	CAT TY-1	1.9.99	-do-
6.	Chainsaws (8)	STILHL 076	-do-	-do-
7.	Pickup(s) (2)	NISSAN PATROL 4 x 4	1.9.99	New
8.	Logging Trucks	MACK N3-6x4	-do-	-do-
9.	Log Loader	CAT TL-17	-do-	-do-

- **SOURCES OF INFORMATION**

- Company procurement programmes
- Manufacturers handbooks and specifications

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Planning of operations is based on machine capabilities

- **MANNER OF PRESENTATION**

- Description of machine types and how they are to be deployed.
- Assumptions made on the productivity of each unit.
- Tabular presentation of current capacity and planned acquisitions.

11.2 LOGGING PROCEDURES AND RULES

• INFORMATION REQUIRED

- Detailed specification of what is a merchantable log for the company (sweep tolerance, minimum length, minimum diameter).
- Statements highlighting the organisation and existence of an internal control system that would ensure effective, efficient, damage-limiting and safe utilization of the forest.
- State clearly the sequence of harvesting operations from pre-harvest inventory, tree marking, felling, log numbering, skidding, hauling, transporting through to post-harvest assessment.
- Details of each operation should be clearly stated, and how they are to be planned, executed and monitored.
- Personnel directly responsible for implementing and monitoring logging operations.

• SOURCES OF INFORMATION

- Professional forest management staff employed by the concessionaire
- References can be made on experiences of other companies operating in Guyana, particularly techniques that have been found to be appropriate for the characteristics of the resource.
- Reference should be made to environmental safeguards and health and

safety standards.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- To ensure efficient, safe and environmentally acceptable harvesting operations.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- An overview of the sequence of harvesting operations and detailed information on procedures and practices of each operation.

12.0 ENVIRONMENTAL CONSERVATION MEASURES

12.1 MAIN OBJECTIVES

12.2 PROTECTION

- **NOTES**

Management of a resource includes taking steps to prevent any un-regulated or un-controlled depletion or its destruction (by pyric factors, biological agents or un-due human interference).

12.2.1 ILLEGAL OPERATIONS

- **INFORMATION REQUIRED**

- Protection requirements for the concession must be identified. Arrangements must be made for the concession to be regularly patrolled to identify encroachment or damage to the forest. The company must have adequate plans and must be equipped to respond to such events.
- Procedures must be established for patrolling and inspecting the concession, as well as monitoring the entrances to the concession.

- **SOURCES OF INFORMATON**

- Plans to react to emergency situations should be developed in

consultation with the Guyana Defence force and Guyana Police Force.

- Guyana Forestry Commission

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Protection measures are fundamental to the management of any resource.
- The concession holder is partially responsible for the protection of the forest resource. Failure to control encroachment or forest destruction will result in reduction of allowable harvests and possibly to the imposition of penalties.
- The company will be able to respond more rapidly and efficiently to events that threaten the forest if forward planning has been carried out.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- Identification and discussion of protection requirements with reference to map locations of areas of particular interest.
- A comment on the status of boundaries and plans to maintain such lines free from interference and to maintain sign-boards.
- Programmes for monitoring and patrolling the concession area.
- Reference to plans for responding to situations including details of equipment to be used, arrangements for training of staff, and for liaison with emergency services.

12.2.2 FIRE

- **INFORMATION REQUIRED**

- A clear statement of objectives.
- Assets that will be threatened, degree of fire risk, fire history of the area.

- Fire protection requirements, measures and strategies for the concession must be identified. Arrangements must be made for the concession to be regularly patrolled to identify fire damage to the forest. The company must have adequate plans and must be equipped to respond to such events.
 - Procedures to be established for patrolling and monitoring entrances to the concession.
- **SOURCES OF INFORMATION**
 - Plans to react to emergency situations should be developed in consultation with the Guyana Defence force, Guyana Fire Service and Guyana Police Force.
 - Guyana Forestry Commission
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - Protection measures are fundamental to the management of any resource.
 - The concession holder is partially responsible for the protection of the forest resource. Failure to control encroachment or fire will result in forest destruction and reduction of allowable harvests, and possibly to the imposition of penalties.
 - The company will be able to respond more rapidly and efficiently to events that threaten the forest if forward planning has been carried out.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - Identification of fire prone areas within the concession
 - Discussions of fire protection requirements with reference to map locations of areas of particular interest.
 - Programmes for monitoring and patrolling the concession area.
 - Reference to fire management plans for responding to situations including details of equipment to be used, arrangements for training of staff, and for liaison with emergency services.

12.2.3 PEST AND DISEASE MANAGEMENT

- **INFORMATION REQUIRED**

- Pest and disease protection requirements for the concession must be identified. Arrangements must be made for the concession to be inspected to identify pest and disease infestation or damage to the forest. The company must have adequate plans and must be equipped to respond to such events.
- Procedures must be established for inspecting the concession.

- **SOURCES OF INFORMATION**

- Plans to react to emergency situations should be developed in consultation with National Agricultural Research Institute and Ministry of Agriculture.
- The Code of Practice for Forest Operations section 7
- Guyana Forestry Commission (library)
- Tropenbos

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Pest and disease protective measures are fundamental to the management of any resource.
- The concession holder is partially responsible for the protection of the forest resource. Failure to control or minimise pest and disease infestation will result in reduction of allowable harvests and destruction of the forests.
- The company will be able to respond more rapidly and efficiently to events that threaten the forest if forward planning has been carried

out.

- **MANNER OF PRESENTATION OF THE INFORMATION**
 - Identification and discussion of pest and disease protection requirements with reference to map locations of areas of particular interest.
 - Programmes for monitoring and inspecting the concession area.
 - Reference to pest and disease management plans for responding to situations including details of equipment to be used, arrangements for training of staff, and for liaison with emergency services.

2..3 USE OF CHEMICALS

- **INFORMATION REQUIRED**
 - Objective(s) for the use of chemicals
 - Types of chemicals, concentrations and application levels to be used in or near the forest
 - Detailed disposal methods for chemicals and waste oil
- **SOURCES OF INFORMATION**
 - Manufacturer handbooks, guidelines and precautionary statements
 - Government Analyst Department
 - Chemical agencies
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - The information helps in providing preventative or recommended measures within which objectives are set.

- Concessionaires must comply with the Code of Practice for Forest Operations (Section 7) to minimise potential contamination and disruption to the forest ecosystem and human health.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - List of pesticides or preservatives to be used in or near the forest
 - A description of preventative measures to be taken
 - A description of disposable methods

12.4 BIO-DIVERSITY RESERVES

- **Notes**

Tropical forests are well known for their high biodiversity, and contain a vast array flora and fauna. Biodiversity reserves need to be established covering a representative sample of the commercial forest types in their unlogged state, in order to preserve examples of the full biodiversity of the productive forest types. Therefore, provision must be made for the allocation of reserved areas and buffer zones within logging concessions for reasons given in the Code of Practice for Forest Operations in section 3.

- **INFORMATION REQUIRED**
 - Objectives of biodiversity reserves and buffer zones.
 - Simple guidelines on the selection of biodiversity reserves
 - Areas to be set aside as reserves and buffer zones as part of the non-production forest.

- A description of Forest Type Classification of the reserve(s) and buffer zone(s).
 - Description of reserve(s) bounded as far as possible by natural boundaries.
 - Monitoring procedures of reserves and buffer zones from logging operations, illicit operations and other forms of disturbances.
 - An indication of the presence of plants and animals species that deserves special attention
- **SOURCES OF INFORMATION**
 - Biodiversity Centre
 - Tropenbos
 - Guyana Forestry Commission
 - ECTF
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - Concessionaires must comply to the Code of Practice for Forest Operations (Section 3)
 - Biodiversity reserves allows for future monitoring of changes in the forest by providing an example of the forest in its undisturbed state, against which changes can be compared.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - A map (1:5000) illustrating biodiversity reserves and buffer zones and access within the concession.
 - A description of reserves and buffer zones with acreage.
 - A table showing forest type classification in relation to biodiversity reserves and buffer zones.
 - Monitoring procedures for reserves and buffer zones

13.0 MONITORING AND RESEARCH

13.1 PREVIOUS AND OR CURRENT RESEARCH ACTIVITIES

- **INFORMATION REQUIRED**

- A brief description of any forest research known to have been done in the area.
- Nature of the research activity(ies)
- Research agency
- Exact location of research plots
- Main findings of the research
- Possible positive impacts that could be created by the concessionaires
- Possible negative impacts that could be created by the concessionaires
- A brief description of any forest research known to have been done in adjacent areas or areas with similar forest types
 - * soil surveys
 - * demographic surveys
 - * wildlife surveys
 - * reconnaissance for agricultural objectives
 - * reconnaissance for mining objectives

- **SOURCES OF INFORMATION**

- Guyana Forestry Commission
- University of Guyana
- Amerindian Research Unit (UG)
- National Agricultural Research Institute
- Ministry of Agriculture
- Tropenbos, ECTF, Iwokrama, Smithsonian Institute, Roth Museum
- Churches

- Geology and Mines Commission
- **APPLICATION FOR MANAGEMENT PURPOSES**
 - The information helps in setting management objectives by establishing criteria within which such objectives are set: some technological considerations may need modification; environmental considerations may take precedence over economic considerations; areas of conflict may be predicted with more certainty; and more thorough planning is facilitated through the possession of more information.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - An account of about half a page summarising the main research activities implemented within or adjacent to the area or in areas with similar topographical conditions (forest research only). The implications of the research results for the concession's management objectives must be stated very clearly. The source documents for the data/information must be quoted in their entirety in the bibliography in the FMP.

13.2 PROPOSALS FOR EXPERIMENTAL OR PERMANENT SAMPLE PLOTS

- **INFORMATION REQUIRED**
 - The GFC is responsible for co-ordinating forest research and are in the process of developing a national forest research plan that will identify research priorities and outline a strategy for implementation.
 - Companies should identify their own forest research priorities and the resources they are able to commit to conducting research. For specific research topics a formal experimental plan should be prepared and submitted to GFC.
- **SOURCES OF INFORMATION**
 - Research priorities will be identified as part of Forest Management Plan preparation. These should be discussed with GFC to determine

whether similar research has been conducted elsewhere in Guyana or the region.

- There are several standard texts available that describe procedures for developing formal experimental plans.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Research is an integral part of forest concession management.
- PSPs are important tools for forest research, and equally important for concessionaires to obtain operational data.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- Description of research needs and priorities
- For specific research topics, a statement of the objectives of the research and a tabular summary of the programme including inputs by year.

13.3 PLANS FOR MONITORING THE EFFECTS OF LOGGING

- **Notes**

Logging activities contribute to alterations in forest environments. It follows that logging is an activity that must be monitored if serious attempts are to be made to safeguard the essential elements of the forest environment.

The concessionaire should state in clear terms the plans/proposals to be implemented to monitor or support the effects of logging.

(It is urged here that there should be consultation with the Guyana Forestry Commission in order to ensure consistency in the methodologies used and to ensure a basis for the comparison of results, if necessary).

The Code of Practice for Forest Operations sets down considerations for Environmental inputs into logging.

- **INFORMATION REQUIRED**

- Company's personnel directly responsible for implementing and monitoring the progress of operations
- Companies must monitor all operations to confirm compliance with requirements of the Code of Practice for Forest Operations and the FMP. Procedures for monitoring of forest operations have been developed by the GFC. These should be adopted and modified as necessary.
- Monitoring procedures to be applied must be detailed including resources to be allocated and an annual work programme.

- **SOURCES OF INFORMATION**

- Manual of Audit Procedures prepared by GFC
- The Code of Practice for Forest Operations
- FMP and other operational standards should be reviewed to ensure that the proposed monitoring programme is comprehensive.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- Monitoring of operations is an essential part of management.

- Monitoring will identify operational problems and inefficiency, and allow for remedial action to be taken.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - Description of monitoring procedures to be implemented. As a minimum these should conform to the GFC Manual of Audit Procedures.
 - A work programme showing monitoring activities and inputs in a tabular format.

13.4 COOPERATION/INTERACTION WITH RESEARCH GROUPS

- **Notes**

The concessionaire should indicate clearly what plans there are to collaborate with research agencies.

Research agencies usually have professionals, as well as appropriate laboratory facilities. It should be relatively easy to collaborate with such agencies in the pursuit of knowledge on several aspects of forest resources management.

Useful agencies in Guyana include:

- National Agricultural Research Institute
- University of Guyana
- Tropenbos
- Edinburgh Centre for Tropical Forestry
- Guyana Forestry Commission
- Iwokrama

13.5 CO-ORDINATION WITH OTHER RESOURCE USERS

- **NOTES**

The rights and privileges of other forest users must be respected. In many cases it is possible to take advantage of the presence of other resource users for security reasons, for temporary suppliers of labour, for conflict resolution and as a market for selected quantities of forest products.

- **INFORMATION REQUIRED**

- The nature of the relationship between the concessionaire and other resource users within the concession area or in the vicinity of the concession or with other concessionaires.

- **SOURCES OF INFORMATION**

- Reconnaissance surveys by the concessionaire.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- There is a need to take advantage of any resource available while seeking to minimise areas of conflicts and ensuring maximum security.

- **MANNER OF REPRESENTATION OF THE INFORMATION**

- A concise description of the relationship with other users. Specimens of any contracts entered into with any stake-holder should be included.

14.0 SOCIAL ISSUES

- **NOTES**

Sustainable Forest Management has three dimensions: environmental, economical and social aspects. The very nature of forestry activity in tropical forests demand a high human resource input.

People (consumers) dictate the characteristics of markets for forest products. People are involved in the productive process in several categories - skilled, semi-skilled and unskilled. However policies aimed at conserving forests are only as effective as people are sufficiently motivated to enforce such policies.

Poor social policies creates several undesirable situations:

- commitments on paper are not taken seriously
- efficient timing of events is not possible
- staff changes are frequent (especially among the highly skilled employees).
- social unrest - characterised by frequent interventions by trade unions - become common.

On the other hand good social policies (including training opportunities) lead to higher rates of productivity, better timber quality, greater adherence to policy and commitment to objectives, more care with (expensive) machines and more sensitivity to environmental issues.

14.1 TRAINING INITIATIVES

14.2 EMPLOYMENT POLICIES

14.3 ISSUES OF EMPLOYEE WELFARE (accommodation, occupational health and safety etc., - see Code of Practice for Forest Operations, Section 8)

14.4 TRADE UNIONS

- **INFORMATION REQUIRED**

- New concession operations will have to complete an Environmental Impact Assessment (EIA), which will include social impacts. This section should address recommendations made in the EIA.
- Consultations held with communities in and around the concession should be documented.

- A description of results/findings on past consultation with local communities and workers.
- The impact of forestry activities on the livelihood of communities, including a programme of actions to be taken arising from consultations, and a description of arrangements made for ongoing liaison.
- Companies that are maintaining a camp for workers and dependants must state in detail their plans for accommodation and provision of utilities and other services, education and medical facilities and staffing, recreational facilities and camp welfare.
- Arrangements for medical emergencies should be stated.
- Company social policies should be stated including employment and termination, training and other staff development and welfare programmes.
- Measures to ensure compliance with occupational health and safety regulations should be detailed.
- Arrangements for monitoring social impacts of the operations, both on neighbouring communities and on the companies employees and their dependants should be stated.
- Company's personnel directly responsible for implementation of activities.

- **SOURCES OF INFORMATION**

- If a social impact assessment has not been carried out for the concession area this should be considered.
- Information on minimum requirements for medical services and

education should be obtained from relevant Government departments and NGOs (Ministry of (Public) Health, Ministry of Labour/Social Development, Trade Unions)

- Companies human resources personnel will be able to provide information on social policies and procedures.
- Specialist inputs may be required to design appropriate social monitoring procedures.

- **APPLICATION FOR MANAGEMENT PURPOSES**

- High standards of social welfare are required by Government and the GFC. Companies will benefit directly from improved community and worker relationships.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- Descriptions of consultations, policies and programmes (health facilities and recruitment of medical personnel (of any level), emergency procedures for rapid evacuation of sick or injured persons, issues of occupational health and safety, educational facilities and education personnel, training areas and training opportunities, plans for the procurement, stocking and distribution of ration, employment policies and in particular how local communities will be used, assisted and helped in tangible ways, communication systems (electronic), issues of employee accommodation (and issues of potable water supply and sanitation).
- A work programme showing monitoring activities and inputs in a tabular format.

15.0 MARKETS AND UTILIZATION

- **NOTES**

Concessionaires are expected to be guided by some marketing research information both locally and overseas. Normally marketing criteria determine what species are harvested and what products are produced.

- **INFORMATION REQUIRED**

- Description on how forest produce is taken from the concession to the processing plant (including possible delays etc.,)
- Description on product conversion and processing.
- For each species or species group to be harvested, what are the expected markets.
- What current non-marketable species the concessionaire may be targeting for new markets
- What arrangements are being put in place by the company to develop market opportunities to ensure maximum returns for the sale of the product, and to ensure that maximum use is made of the available forest produce.
- What resources are to be allocated to marketing
- What market promotion activities or strategies will the company undertake over a period of at least five years.

- **SOURCES OF INFORMATION**

- Company professional staff with responsibility for marketing.
- Guyana Forestry Commission
- Forest Product Association
- ITTO
- Internet
- Other concessionaires

- **APPLICATION FOR MANAGEMENT PURPOSES**

- A marketing strategy is essential to ensure that the company operates efficiently, and that maximum beneficial use is made of the forest resource.
- **MANNER OF PRESENTATION OF THE INFORMATION**
 - A description of the company's marketing strategy including arrangements for collaborating with other companies and marketing organisations.
 - A description of market research that has been conducted, main conclusions of this research and future research plans.
 - A table showing species to be harvested and expected markets, with an estimate of market demand (volume) where available.

16.0 RECORDS

16.1 KINDS OF RECORDS TO BE MAINTAINED BY CONCESSIONAIRE

- **NOTES**

Maintenance of certain records are obligatory under the Employment and Severance Pay Act and Regulations, the Occupational Health and Safety Act and Regulations, the Income Tax Act and Regulations and the NIS Act and Regulations. Records up to a maximum of five years should be kept by all concessionaires and should be made available to the GFC or other approved stakeholder.

Forest Officers reserve the right to look into issues of occupational health and safety and all records related to or associated with timber production.

- **INFORMATION REQUIRED**

- Production records
- Inventory and survey records
- Administrative records (employment, training, wages and taxes and other statutory deductions, maintenance of equipment)
- Research records including environmental monitoring reports
- Occupational Health and Safety records (reports of accidents, hazards and medical reports)
- Current market prices
- Registration/licences for mills, vehicles, etc.,

- **SOURCES OF INFORMATION**

- Inland Revenue Department
- National Insurance Scheme
- Ministry of Health
- Ministry of Labour
- Company records
- Guyana Forestry Commission

- **MANAGEMENT NEEDS FOR THE INFORMATION**

- To ensure compliance with the various laws as they may affect both present and future management of the plan area.
- It will be important to monitor the progress of the company with its Forest Management Plan, since the records could be sources of valuable data that could generate interesting information e.g. trends and patterns, and predictions.

- **MANNER OF PRESENTATION OF THE INFORMATION**

- Maps and plans
- Reports
- Tables, graphical illustrations, diagrams and spread sheets
- Listings

17.0 MAPS

It is in the interest of the concessionaire to organise operations in the most efficient manner possible. The concessionaire needs to provide a clear indication that he/she knows exactly what he/she is doing.

The concessionaire should therefore use as many maps, charts, plans and diagrams as necessary to provide a clear picture of the scope of the operations.

The concessionaire should attempt to present maps of varying scales because maps of various scales represent an efficient way of planning and organising all events related to resource development.

Maps of scale 1:50,000 or 1:100,000 are recommended whenever it is necessary to show information over the entire concession.

Maps of scale 1:50,000 or 1:25,000 should be used to illustrate issues related to compartments.

Maps of scale 1:25,000 or 1:10,000 should be used to illustrate events at the level of the block.

The GFC will assist in the preparation of vegetation maps.

It is advisable however that maps be ordered directly from the Lands and Surveys Department, Ministry of Agriculture or from the Guyana Geology and Mines Commission. Both agencies sell maps of different scales. Maps of scales 1:50,000 and 1:100,000 are particularly easy to obtain.

Plans and diagrams are preferred for illustrating villages, forward camps and permanent log depots. Normally Plans and diagrams would be associated with maps.

LISTS OF MAPS TO BE SUBMITTED WITH FOREST MANAGEMENT PLAN AS APPENDICES

1. A general map of Guyana at scale 1:50,000 showing TSA/WCL as for section 5.1.2.
2. A general map of Guyana at scale 1:50,000 showing locality of communities/villages (if any), computation of bearings, geographic coordinates or mining concessions within concession as for section 5.1.3
3. A topographic map of the concession at scale 1:50,000 identifying areas which may be classified as non-productive and productive areas, and large rivers and creeks as for sections 5.2.1, 5.3 and 8.0.
4. A soil type map of the concession as for section 5.2.2.
5. A vegetation / forest type map of the concession at scale 1:50,000 or 1:100,000 illustrating non-productive and productive zones, location of compartments, location of all existing road system and proposed main roads to be constructed, bridges, location of sites for major events as villages or log depots in the concession as for sections 5.2.4, 5.4.2 and 8.0.
6. A map of the concession illustrating key ingress and egress points that may attract encroachment, fire prone areas as for sections 12.2.1 and 12.2.2.

7. A map of the concession at scale 1:50,000 illustrating only biodiversity reserves and buffer zones, and access to such sites within the concession as for section 12.4.