

**MANUALS OF PROCEDURE  
FOR  
FOREST RESOURCE MANAGEMENT PLANNING  
IN THE  
HIGH FOREST ZONE OF GHANA**

**INTRODUCTION**

This set of manuals has been prepared to assist staff of the Forest Service in the duties as custodians of the forest reserves of the country and in their management roles for the forest resources off-reserve.

The following sets of manuals have been prepared:-

**Forest Resource Management Planning in the HFZ**

Section A	Strategic Planning
Section B	Operational Planning
Section C	Sustainable Timber Production On Reserve
Section D	Stock Survey and Yield Allocation
Section E	The Preparation of Timber Harvesting Schedules for Forest Reserves
Section F	Controlled Timber Production Off Reserve

Note: Sections D and E have also been produced and issued as separate manuals

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**In addition the following manuals are available for consultation**

**Manuals of Procedure for Plantations**

Section A	Planning
Section B	Nursery
Section C	Field Operations
Section D	Plantation Thinning Operations

**Guidelines**

Forest Protection in Ghana (The Protection Strategy)  
Fire Control Guidelines,  
Guidelines for Plantation Development  
Collaborative Forest Management Guidelines

**For Timber Contractors**

Logging Manual for Ghana.  
Key Standards for Logging in the High Forest Zone of Ghana

The procedures in the manual will provide staff of the Forest Service with the essential information for the preparation of management plans and to ensure that timber production areas within the High Forest are managed in accordance with the regulations relating to the timber utilisation contracts defined in the Timber Resources Management Act. These procedures have been introduced at a time when the forestry sector is going through a great deal of change in terms of administration and legal controls. The new procedures reflect the need for the Forest Service to be more conscious of their obligations to the land owners and to ensure that the benefits from the forest resources are fairly distributed and managed in accordance with the highest principles of sustainable forestry production.

These sets of procedures have been produced in the form of Instruction Sheets. Revision of any particular sheet may be necessary at some future date, in which case a replacement will be sent to each holder of this manual together with the necessary authority to issue the amendment.

Staff are required to keep the manual up to date and should regularly check that they have received all revisions as indicated on an amendment list to be issued from time to time as required.

Signed

Managing Director  
Ghana Forest Service

## **LIST OF ACRONYMS (all sections)**

AAC	Annual Allowable Cut
APW	Annual Programme of Works
CFM	Community Forestry Management
DA	District Assembly
DFO	District Forest Officer
DS	Dry semi-deciduous forest
FIPB	Forest Products Inspection Bureau
FMSC	Forest Management Support Unit ( Planning Branch)
FMU	Forest Management Unit
FMP	Forest Management Plan
FPA	Fauna Protection Area
FROGGIE	Forest Reserve of Ghana Geographical Information Exhibitor
FS	Forest Service
GHI	Genetic Heat Index
GIS	Geographic Information System
GPS	Global Positioning System
HFZ	High Forest Zone
IFA	Intact Forest Area
LIF	Log Information Form
LMC	Log Measurement Certificate
MLF	Ministry of Lands and Forestry
MoP	Manual of Procedure
ME	Moist Evergreen Forest
MS	Moist semi-deciduous
MSNW	Moist semi-deciduous - north-west subtype
MSSE	Moist semi-deciduous -south-east subtype
NTFP	Non-timber Forest Product
PSP	Permanent Sample Plot
RFO	Regional Forest Officer
SBPA	Special Biological Protection Area
SRA	Social Responsibility Agreements
SWOT	Strength, Weaknesses, Opportunities and Threats (analysis)
TEDB	Timber Export Development Board
TIDB	Timber Industry Development Board
TIF	Tree Information Form
TO	Technical Officer
TOS	Timber Operational Specifications
TSP	Temporary Sample Plot
TUC	Timber Utilisation Contract

**MANUAL OF PROCEDURES**

**FOREST RESOURCE MANAGEMENT PLANNING IN THE HFZ**

**SECTION A - STRATEGIC PLANNING**

**GHANA FOREST SERVICE**

**March 1998**

**MANUAL OF PROCEDURES  
FOREST RESOURCE MANAGEMENT PLANNING IN THE HFZ  
SECTION A - STRATEGIC PLANNING**

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# **Manual of Procedures - Forest Resource Management Planning in the HFZ**

## Preface

The Manual of Procedures for Forest Resource Management Planning prescribes the important tasks to be carried out in order to adequately plan for forest resource management in the high forest zone in the interest of the nation and for the benefit of the resource owners.

The planning process can be divided into strategic and operational planning. Strategic planning sets objectives to guide forest resource management in the long term. Operational planning ensures that programmes of operations to achieve strategic objectives are adequately planned and sufficiently resourced. The new planning process will also provide for local consultation in resource management planning. The Manual is produced in two sections:

Section A - Strategic Planning: Prescribes the requirements for strategic planning at national, forest reserve and district levels. Instruction sheets describe the procedures to be undertaken by the Forest Service in ALL high forest zone districts in conjunction with the resource owners and District Assemblies and other interest groups.

Section B - Operational Planning: Prescribes the requirements for planning of forest operations for forest reserves and TUC operations off reserve by the Forest Service in ALL high forest zone districts in order to successfully implement strategic plans.

The Manual is to be used in conjunction with other related MoPs. A complete list of MoPs is given below.

The Manual has been written to guide forest officers responsible for preparing and implementing forest resource plans but will also be of value to other interest groups outside of the Forest Service particularly the resource owners and District Assemblies.

Forest resource management planning is a core activity at the very heart of our new Forest Service; we expect that the services we provide in this regard will be of the highest standards as set down in this Manual. It is beholding on all officers to be very cognisant with the procedures laid down in this Manual: "ignorance of the law is no excuse for committing an offence."

Procedures documented in this Manual represent the best practice at the time of writing. It is important that individual Instruction Sheets are kept up to date and new Instruction Sheets added as our knowledge improves and techniques are refined.

This Manual replaces all previous guidelines on management plan preparation.

# Forest Resource Management Planning in the HFZ

## MoP Section A - Strategic Planning

### A1. Introduction to Strategic Planning

#### Instruction Sheet A1.1      Overview of Strategic Planning

## 1. Purpose of strategic planning

1.1 The forest management planning process can be divided into strategic and operational planning. Strategic planning sets the long term goals for the management of a resource and describes the sort of changes to be enacted in order to achieve the goals.

1.2 As often said ‘any road will do if you do not know where you are going’. In order to properly plan day to day tasks and to ensure that work programmes have a sense of logic there needs to be an overall plan to direct such activities. Strategic planning sets out to answer the key questions of:

- where are we now ?
- where do we want to get to ? Or what do we want to achieve ?
- how will we get there ?
- who will benefit from resource management ?
- who will be affected or involved in the proposed activities ?

1.3 Operational planning defines work programmes to be undertaken in order to achieve the strategic objectives, especially ensuring that the resource requirements in terms of labour, transport, materials and funds are available at the right time.

1.4 Strategic and operational planning merge at some point and sometimes setting the dividing line is not clear, the important thing to remember is that strategic planning sets the longer term vision of where we wish to reach, while operational planning provides details of how this is achieved.

1.5 Strategic planning is also a mechanism for ensuring that local forest resource management is carried out in accordance with the requirements of National Forest Policy in Ghana. It will ensure that all forest resource management aims at conservation and sustainable development of the nation’s forest and wildlife resources for maintenance of environmental quality and perpetual flow of optimum benefits to all segments of society and to provide for people’s participation in forest resource management.

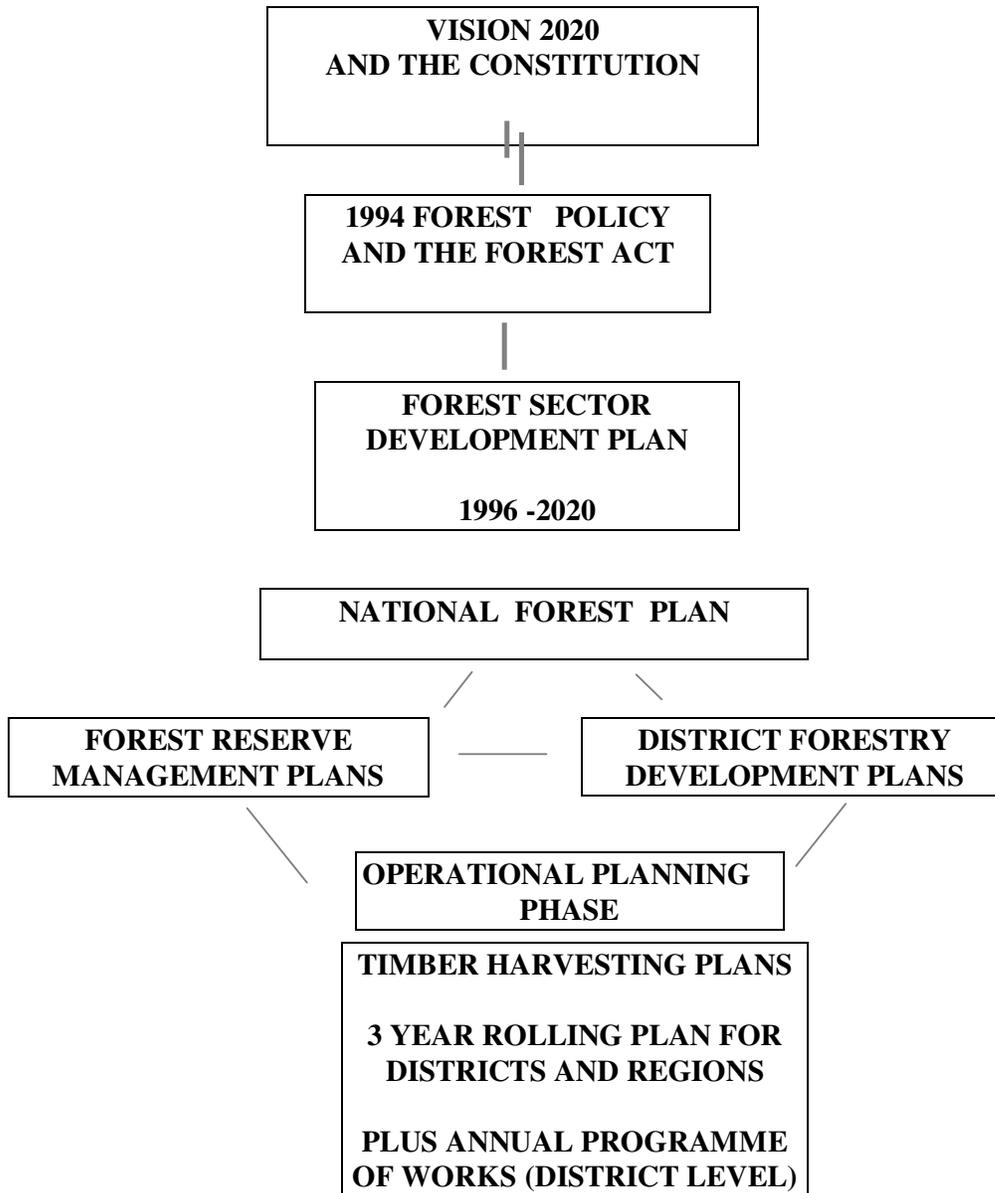
1.6 On reserve, the strategic planning process will establish objectives and standards for environmental and biological protection, for production of timber and NTFPs and for the provision of benefits to local people. The new plans will also constitute an agreement on reserve management between the resource owners, the national interest and the managers.

1.7 Off reserve the strategic planning process will ensure the controlled exploitation of the remaining timber resource and will encourage the improved management of forest resources within the context of local development aspirations.

## 2. The Strategic Planning Framework

2.1 Strategic planning is undertaken at a number of levels which inter-link to form one strategic planning framework. The strategic planning framework is shown in Figure 1.

**Figure 1 - The Strategic Planning Framework**



## Vision 2020

2.2 The national long term development aspirations are articulated in the Ghana - Vision 2020 document (refer Box).

### **Vision 2020 - Key national development aspirations are to see:**

- Ghana become a (high end) middle-income country by 2020
- an open and liberal market economy & accelerated economic growth
- the gap between the standards of living of rural and urban people narrowed
- a just and fair African society that provides equal opportunities for all and ensures equitable distribution of the returns from economic activity
- a decentralised, participatory and constitutional democracy
- a cultural ethos of Ghanaian values, beliefs and norms

2.3 From the perspective of forestry, Vision 2020, there are some key guidelines that need to be respected:

### **Vision 2020 - Stipulations on forestry.**

The actions that need to be undertaken in the short and medium term periods include:

- (i) the co-ordination or close integration of operations between the government ministries/ departments/ agencies for agriculture and forestry, particularly in extension work;
- (ii) the significant improvement and effective implementation of control measures;
- (iii) resource management within forest reserves, and
- (iv) the introduction of off-reserve harvesting controls.

To be effective, conservation measures must involve actively District Assemblies and communities. Operational manuals, to be prepared jointly by Ministry of Food and Agric. [MoFA] and Ministry of Lands and Forestry [MLF], are required for the advice of Districts and Communities in the management of forestry, agroforestry and rehabilitation and conservation of renewable natural resources in order to secure the nation's resource base.

### The 1994 Forest and Wildlife Policy

2.4 This policy states the overall aim of forest resource management in Ghana to be :

*'Conservation and sustainable development of the nation's forest and wildlife resources for maintenance of environmental quality and perpetual flow of benefits to all segments of society.'*

2.5 In order to achieve its aim the Forest Policy places particular emphasis on key concepts and strategies :-

#### **1994 Forest and Wildlife Policy - Key Concepts and Strategies**

- \* sustainable production of forest produce
- \* integrated forest management systems
- \* participatory management of forest resources
- \* private sector investment in resource creation
- \* competitive procedures for allocation of forest utilisation contracts.
- \* pricing of forest products to ensure efficient resource utilisation
- \* sharing of the financial benefits of forestry to maintain resource production capacity and to benefit local communities
- \* a low volume, high value timber industry

### The Forest Sector Development Plan

2.7 This plan has been prepared by the Ministry of Lands and Forestry as a master plan for achieving sustainable utilisation and development of forest and wildlife resources, modernisation of the timber industry and the conservation of the environment and thereby ensure the realisation of the objectives of the Forest and Wildlife Policy. The elements of the Master Plan reflect the main national development principles of the Government.

2.8 The Plan sets out the present status of the forest resource, the pattern of utilisation, the present constraints facing the sector and the existing development programme being followed. It then lays out the changes that are needed in order that the Forestry and Wildlife Policy can be fulfilled.

## **Forest Sector Development Plan 1996-2020. Key Points**

In the medium term, the Master Plan has four main development programmes, the first is sustainable forest and savannah management which aims to:

- \* improve the management of existing forest resources and ensure sustainable levels of felling and extraction of timber
- \* increase public awareness and encourage involvement of individuals and communities in protection and management of forest resources

### Wildlife Sector Development Plan

2.9 The wildlife sector are also developing their own Sector Development Plan or Master Plan. The plan will seek to:-

- demonstrate the important contribution that wildlife can make to the national social and economic development goals, and its role in the achievement of Vision 2020.
- provide an analysis of the key issues in the wildlife sector
- identify necessary reforms in the wildlife sector, and define an action strategy to implement these reforms
- identify specific investment needs, and prepare the necessary documentation to facilitate investment decisions by the international donor community.

2.10 The Ghana Wildlife Department has an estate of 15 protected areas covering 12,685 km<sup>2</sup> or 5.2% of the nation and roughly half that of the forestry reserves. However those forest reserves with a significant proportion of their area under some level of permanent protection will also serve the needs of the wildlife sector in terms of fauna conservation through maintenance of habitats. In devising the protection strategies for the forest reserves, account will need to be taken of any special requirements for wildlife.

### The National Forestry Plan

2.11 The National Forest Plan is a legal requirement on the part of the Forest Service as stipulated within the new Forest Act. The Plan is prepared under the direction of the Managing Director and has to be submitted to the Minister through the Forestry Commission. The Plan is based on a distillation of the forest inventory data and other information regarding the extent, production and utilisation of the forest resource. It sets out the level of timber harvest allowed and the categories of forest recognised and presents the foundations for forest management. The Plan should be reviewed and revised when required, rather than after a specific interval.

### Forest Reserve Management Plans

2.12 The Forest Reserve Management Plans are the key strategic planning tools required by regional and district forestry staff, they provide the overall management direction for an individual forest reserve or a group of reserves combined for ease of management into the Forest Management Units (FMU). It is the preparation of these plans which is the main focus of this MoP. They set out the medium to long term planning objectives for the reserve(s).

2.13 The main purpose of the plan is to present the present state of knowledge on the extent and quality of the forest resources, its utilisation, the zoning of the forest into recognised management categories based on defined principles and a synthesis of the ownership and legal status of the reserve.

2.14 The strategic plans will provide the reader with the overall management objectives to be followed and the state of the forest desired within a time framework of 20 years or so. The plan is prepared by the Forest Service in full collaboration with the land owners and must be endorsed by their representatives. Such plans therefore represent a statement of intent by the Forest Service in managing the resource and provide a means of judging their performance in this duty

#### District Forestry Development Plans

2.15 Following the greater responsibility of the District Assemblies for managing their own resources, it is now a Government requirement that every District Assembly should form an Environmental Committee charged with the responsibility of co-ordinating environmental developments within the district including all aspects within the forestry sector. Five year development plans are required to set out the overall direction given the present resources and the present and projected demands being made.

2.16 The DFO will be full member of the District Environmental (or Development) Committee and will have the responsibility of ensuring that all Forest Service programmes are represented in the District Forest Development Plan along with any commercial and extension activities that are relevant to the sector.

### **OPERATIONAL PLANS**

*Operational planning is the subject of MoP Section B, however for completeness, the sort of plans involved are briefly referred to below:-*

#### Forest Reserve Operational Planning Annex

2.17 This is an annex to the main forest reserve strategic plan. It is prepared soon after completion of the strategic plans and would be reviewed every five years. It is brief and focuses on the more pressing tasks to be undertaken over the following five years for each of the management zones. Whereas the management plan may have been prepared for an FMU, the operational planning annex should be written on a reserve by reserve basis.

#### Timber Utilisation Operational Plans

2.18 Operational plans for the Timber Utilisation Contract (TUC) Areas for both on and off reserve are prepared by the contracting companies and approved by the Forest Service. They set out details of the level of logging and its location over a five year period and are supported by more detailed compartment plans (on-reserve) and annual plans (off-reserve).

#### Commercial Plantation Plans

2.19 For those reserves where commercial plantation development is underway or expected to be so within the next three years, planting plans are required as the basis for the agreement issued to the investing company.

#### Three Year Rolling Plan and Annual Programme of Work

2.20 The strategic forest reserve management plans and the district level forestry development plans need to be converted into costed programmes covering the more immediate future. The work programme is defined on a three year basis, rolled forward every year. The programme for year 1 is defined very exactly, listing all activities and a full breakdown of costs, this being the Annual Programme of Works. All responsibilities of the Forest Service emanating from the TUC Operational Plans and the plantation programmes which will require resources of staff time or operating funds must also be included within the three year rolling plans and annual programme of works. Staff are referred to MoP Section B for details.

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**  
**Instruction Sheet A2.1 Introduction to the Plans and their Preparation**

**1. Introduction**

1.1 This Instruction sheet provides an overview of the legal requirements of the forest reserve management plans and their structure. Later Instruction sheets in Part 2 will detail the procedures required to undertake data collection and to write the plans so that they meet the interests of the clients, the resource owners and the nation.

**2. Legal Requirements**

2.1 Preparation of forest reserve management plans is a core function of the Forest Service. All forest officers must be familiar with the legal obligations of the FS in this respect (refer Box).

**Legal Requirements for Forest Reserve Management Plans**  
**Timber Resources Management Regulations**

**Management of Lands suitable for Timber Rights**

.....the Chief Conservator of Forests (CCF) will prepare and implement a Forest Management Plan (FMP) for each forest block under his control, specifying the subdivision of forest management units (FMU) into production and protection areas, the relevant proportion of the AAC and the nature of sustainable forest management operations to be carried out therein.

For each respective FMP, depending on the condition of the resource base in the production area, each FMU will be available for the exercise of timber rights, providing that no more than 4 timber utilisation contracts will operate therein at any one time.

**3. Key Policy Considerations**

3.1 All Forest Officers should be aware of the requirements of the Forest Policy concerning management of forest reserves. All forest reserve management plans should be in line with the objectives and strategies agreed in the Forest Policy.

3.2 The Forest Policy clarifies the specific purpose of forest management inside the forest reserves. The overriding objective of forest reserve management in the HFZ is:

*Preservation of vital soil and water resources, conservation of biological diversity & the environment & sustainable production of domestic and commercial produce.*

3.3 Under the terms of the Forest Policy the policy framework for the management of the forest reserves in the HFZ is clear and is summarised in the box.

### **Key Policy Guidance on Forest Reserve Management in the High Forest Zone**

#### Forestry for what:

To ensure that the biological and environmental values of the permanent forest estate are preserved and secondly to sustainably produce forest products that can contribute to domestic and commercial economies, provide funds for forest management and generate revenue for the resource owners.

#### Forestry for who:

For the benefit of the resource owners and in the interest of the nation. The benefits to be provided for the resource owners include forest produce for domestic use and revenue from resource utilisation as defined in the Constitution.

#### Forestry by whom:

The Forest Service manages the forest reserves, according to agreed objectives and standards, on behalf of its two clients; the resource owners and the national interest. The manager can engage contractors to undertake certain operations including timber harvesting.

#### Forestry - how:

**Integrated forest reserve management systems** that can reconcile the Protection, Production and People elements of forest reserve management in perpetuity.

3.4 Two key elements have to be taken into account during all strategic planning for forest reserves. Firstly the forest reserves in Ghana are unique in that the land in the reserves and the forests are for the most part the property of the traditional landowners. The Forest Service is mandated only to manage them for the benefit of the owners and in the interest of the nation. The forest reserve management plan represents a binding agreement between the Forest Service and the nation and the resource owners on how the reserve is to be managed.

3.5 Secondly, the forest reserves serve a multitude of interests; they maintain the environmental conditions necessary for agriculture, they sustain rural communities through provision of medicines, foods, fuelwood, soil fertility, livelihoods, building materials. In addition they supply materials for the timber and furniture industries and generate revenue for local and national development, they can also act as a carbon sink and shelter agricultural crops from drying winds. These interests can be summarised as the PROTECTION, PRODUCTION and PEOPLE interests, they need to be prioritised, reconciled and provided for in the forest reserve management plan. The Forest Policy guides us in prioritisation and reconciliation of different interests.

3.6 Our policy is to give the protective functions of the reserves priority over the productive. The productive area is the residual left over after the protective functions have been provided for.

3.7 The tangible benefits due to the resource owning communities are revenue as defined in the Constitution and free access to forest products for domestic use within the limits of sustainability.

3.8 In the past, forest reserve management often focused on timber production. In accordance with the new policy the reserves will be actively managed for protection, production and in the interest of local people on a sustainable basis. These different elements of forest management will be integrated into one forest reserve management system.

3.9 The new plans replace the old working plans which were originally devised to guide exploitation, especially timber harvesting. Also in recent years the management plans have included too many details on operations and defined programmes of work. The new plans do not include such details of operations. However there will be an operational planning annexe which does provide a priority list of those tasks to be completed over the next five years.

3.10 The life of the management plan is not defined, it will only be amended, when and if it is needed to be. But for guidance, it should be seen to be a plan designed to cover at least 20 years. The operational planning annexe would be revised every five years.

#### **4. The Planning Process**

##### Purpose of preparing a reserve management plan

4.1 All forest reserve management plans aim to provide strategic guidance to the resource owners and managers on :

- where we are now - the current resource situation;
- what the reserve will be managed for;
- in whose interest will it be managed;
- by who will it be managed;
- how the goals of management will be achieved.

4.2 The Forest Act requires that all forest reserve management plans shall:

- (a) describe the area, specifying boundaries, ownership of the land, and the status of forest and wildlife resources;
- (b) with a view to achieving the sustainable development of the forest resources of the area, state management objectives, identifying where appropriate management zones, including zones to be devoted to provenance or other protection;
- (c) indicate the measures to be applied for the achievement of such objectives;
- (d) specify domestic use rights established through consultations with claimants of such rights.

4.3 The Forest Act requires that every draft plan be submitted to the Forestry Commission for approval and that with the assistance of the District Assemblies every draft plan be publicised to obtain the support of the owners or users of the concerned lands and any other concerned persons.

## Overview of the Planning Process

4.4 The RFOs are required to review the status of the forest reserve plans under their supervision and sets an agreed priority with his district staff on the order of preparation or revision. The proposed programme is sent to the FMSC and the Director of Operations HQ for comment.

4.5 The RFOs should agree with the DFOs the level of support they will need from the Regional Planning Team and from FMSC and set a timetable. Responsibilities for data collection and initial drafting will be agreed at the same time.

4.6 The main activities in the planning process are summarised below and explained in later Instruction Sheets.

### **1. Formulation**

- formation of planning team
- review of current situation based on existing information
- provisional zonation
- field investigations
- provisional management planning for each zone
- compilation of a first draft management plan

### **2. Consultation**

- formal review of working draft by resource owners
- revision of the working draft
- local endorsement of the draft plan
- forward the draft plan for national review and approval

### **3. Distribution**

- publish and circulate copies of the final plan
- prepare summary pamphlet of the plan

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**

**Instruction Sheet A2.2 Formation of planning teams and collation of existing information.**

**1. Introduction**

1.1 This instruction sheet describes the first three steps in the planning process:

- formation of a planning team
- collation of existing information
- field reconnaissance

**2. Formation of a planning team**

2.1 No one person can prepare a management plan, it is a team effort.

2.2 Once the RFO has initiated the process by selecting the priority reserves to be targeted over the next 12 months, the planning team needs to be formed. The team is usually led by the Deputy RFO in charge of Technical Operations who would be expected to take on the role of Regional Forestry Planning Officer, unless this task is undertaken personally by the RFO.

2.3 Team composition is flexible but will usually comprise at least:

- Deputy RFO
- the respective DFO
- Regional CFM support team
- Support staff from the FMSC
- A representative each from the landowners and the DA.
- Other representatives of local interest groups or specialists as required

Support required from the FMSC will depend to some extent on local circumstances, for instance in the transitional zone the assistance of the fire ecologists may be especially critical.

2.4 The team leader should ensure everyone in the team is clear about the objectives of the task and should agree with the team a schedule for preparation of the plan. The team leader should formally notify the District Assembly and the landowners and the Forestry Commission that plan preparation has commenced. The team leader should organise a one day training/briefing session for the team and ensure that all members have a copy of this MoP.

**3. Collation of existing information**

3.1 The strategic forest reserve plan is written in two main parts. Part 1 sets the current situation within the reserve in terms of its ownership, composition and recent management practices. Part 2 sets out the management proposals and prescriptions for the future. There is a third (brief) part dealing with implementation aspects. In order to prepare Parts 1 and 2, it is essential for the team to review all the

basic information that they will need to synthesis the salient points. The table (2.2.1) below indicates some of the more important sources of information that might be utilised.

**Table 2.2.1 Information Required for Plan Preparation**

<b>Item</b>	<b>Required for</b>	<b>Available from</b>
<b>Plans</b>		
Previous management plan if ever produced	general background, change in forest cover previous management history, ownership.	RFO, DFO, FMSC, HQ
Plantation Management Plans	background on state of plantations	RFO, DFO, FMSC, HQ
Annual Programmes of Work	previous work programmes	DFO
TUC Plans	back ground on timber production area and level of harvesting	DFO, RFO
<b>Reports</b>		
TSP Inventory Reports	to provide summary of forest composition and level of production	FMSC
NTPP survey data	background on NTPP presence and possible levels of production	
Annual reports	revenue summaries, previous management, volume exploited, fire and illegal felling	DFO, RFO
Plantation Inventory Reports	composition of plantations	FMSC, DFO
LMC Reports	volume and species extracted	FMSC
<b>Registers</b>		
Compartment Register	details of previous management and summaries of harvesting	DFO
Felling register	harvesting information and previous management.	DFO
District Timber Revenue Returns	harvesting history	DFO, RFO
<b>Maps</b>		
Forest reserve boundary map Exiting Compartment Maps Progress Maps Plantation Maps Administrative boundaries Protected Areas	creation of new mapping series	DFO, RFO, FMSC, HQ, District Assembly HQ
<b>Others</b>		
Gazettment notice	description of reserve boundary	HQ

3.2 In addition, FMSC on receiving the RFOs forward programme for forest reserve planning will assist in providing the following information:-

Maps:

- a) Forest Reserve Location Map
- b) Hill Sanctuaries (derived from the Survey of Ghana maps)
- c) Protection Areas already identified (SBPAs, Swamps, Provenance Protection Areas etc.)
- d) Provisional Forest and Vegetation Types (based on canopy closure from the satellite imagery and air photography if available)
- e) Fire sensitivity maps
- f) Location of PSPs, research plots

### Summaries of Data Bases

- a) Forest condition, known occurrence of protected species (extracted from FROGGIE )
- b) Genetic Heat Index
- c) TSP data - summary tables of species diameter distribution, volume, NTFPs
- d) Fire history and fire sensitivity ratings for compartments
- e) Approval Data base- listing of approved yields by compartments
- f) PSP data base - summaries of growth data from relevant PSPs.

### Other

- a) Summary of relevant meteorological data
- b) Summary of soil and site investigations
- c) Relevant Wildlife Department reports on status of fauna and protection plans
- d) Relevant plans or surveys by private or governmental mining organisations.

## **PLANTATION INVENTORY REPORTS**

Inventories and mapping was conducted of the 12 main blocks of plantations in the country during 1992-95.

The following reports are available:

- 1. Afram Headwaters FR**
- 2. Opro River FR**
- 3. Afrensu Brohuma FR**
- 4. Jimira FR**
- 5. Yaya FR**
- 6. Tain II FR**
- 7. Bosomoa FR**
- 8. Awura FR**
- 9. Aboma FR**
- 10. Pru Shelterbelt**
- 11. Boumfum FR**
- 12. South Fomangsu FR**

Reports provide 1:10,000 compartment maps plus details of stocking, basal area, volume of all main species

## **4. Field Reconnaissance**

4.1 As early as possible, the DFO and his TOs should visit the reserve to meet with the landowners and the District Assemblies and inform them of the programme. At this stage it will be useful to travel around the reserve boundary as much as possible and get an idea of the number of communities dependent on the reserve. This information will be essential in planning the completion of the socio-economic surveys.

4.2 The DFO should also make note of any major disturbances to the reserve in terms of fire, encroachment, illegal felling, that might make the existing TSP data unreliable.

4.3 The whole planning team should also make an early visit to the reserve to meet representatives of the land owners and form an initial impression of the planning arrangements necessary.



**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**  
**Instruction Sheet 2.3 Provisional Zonation Maps**

**1. Introduction**

1.1 All reserves serve important environmental functions: protection of watersheds, protection of crops from drying harmattan winds and protection of steep slopes from erosion. Most forest reserves were originally established for these and other critical functions. In recent years, biodiversity conservation has come to be seen as an important function of the forest reserves. In order to ensure that the protective functions of the reserves are adequately provided for, the Forest Department has prepared a Protection Strategy.

1.1 It will be the responsibility of FMSC to produce a provisional zonation map indicating the extent of the timber production area, all the protected areas and any areas currently out of production (convalescence).

1,2 This will be produced from an examination of satellite imagery (to indicate canopy closure) supported by topographic maps to identify those areas unsuited for logging due to excessive slope. The data bases held at FMSC will provide the basis for locating the large-grained protection zones.

1.3 Maps will be produced as a series of overlays making use of the GIS facilities. This allows for easy modification and later amendment.

**2. Zonation - Overview**

2.1 The initial zonation of the reserve is a critical stage in the planning process. Management of timber production areas clearly will need a different management regime to those areas being managed primarily for soil and water conservation. In the past this led to the identification of working circles;

- the production working circle (or selection working circle) for timber and occasionally pole production
- the protection working circle
- the conversion working circle

2.2 The approach today is to identify a more specific range of forest management categories. During zonation each area of the reserve is assigned to a management category. Most of the new management zones fall into either protection or production, conversion is to be regarded as a category of production. The two broad categories of management are therefore:

- Protection zones
- production zones

Community rights are recognised for each of these categories and defined for each of the individual zones.

2.3 The critical point to be made is that the protection categories are regarded as the more important; essentially the production zones being defined after all the (large-grained) protection areas and culturally sensitive areas have been demarcated - see box

## **LARGE- GRAINED AND FINE-GRAINED PROTECTION**

Large-grained protection is the term used for those blocks of forest that are delineated on the forest reserve map prior to operations as requiring a specific management prescription.

The protection categories can be grouped into:-

### **Areas protected for Environmental Stability**

Hill and Swamp Sanctuaries

Shelterbelts

Fire Protection Blocks

### **Areas required for preservation of biodiversity**

Special Biological Protection areas

Provenance Protection Areas

### **Culturally sensitive areas**

Cultural sites - local significance

- national significance

Fine Grained Protection is protection at the level of the compartment or individual trees or small clumps, defined at the time of the stock surveys and prior to timber harvesting.

Restriction on harvesting applies where :

Land is locally steep >20%

Close to watercourse (25-50 m) depending on stream

size

Permanently wet areas (not identified as Swamp Sanctuaries under large-grained protection mapping

Protected species

Very open patches of forest

(canopy condition classes 5&6)

## **CONDITION CLASSES**

### **AS USED TO DESCRIBE THE STATE OF RESERVES**

<b>1 . EXCELLENT:</b>	<b>Few signs of disturbance</b>
<b>2. GOOD :</b>	<b>Disturbance less than 10%.</b>
<b>3. SLIGHTLY DEGRADED:</b>	<b>Obviously disturbed but patchy</b>
<b>4. MOSTLY DEGRADED:</b>	<b>Patchy, but degraded forest predominant.</b>
<b>5. VERY POOR :</b>	<b>Canopy mostly broken (75% +)</b>
<b>6. NO SIGNIFICANT FOREST LEFT:</b>	<b>Scattered trees remaining only.</b>

### 3. Zonation for Protection

#### Introduction

3.1 The protection categories are defined by the Forest Protection Strategy<sup>1</sup> which lists the categories described in Table 2.3.2. The area of Hill Sanctuary and the larger swamps will be taken from the contoured (1:50,000 scale) Survey of Ghana maps. The hill areas should be accurately defined and there should be no need to amend the indicated boundaries. The areas of swamp may however be subject to some amendment following ground inspection and will be subject to fine-grained protection (refer Box ).

3.2 The other biodiversity protection categories will be defined by the Botany Unit of FMSC and are based on ground surveys already undertaken. Some modification to the boundaries might be necessary following reconnaissance at the time of preparation of the plan. The boundaries for culturally sensitive areas will be greatly affected by local representation and knowledge and only national archaeological sites are likely to be known prior to discussions with the communities. Any specific areas required as Fauna Protection Areas will be defined by the Wildlife Department and mapped by FMSC. Protection of fauna will benefit from the maintenance of the Hill Sanctuaries and the SBPAs and it is not expected that the area required to be allocated especially for fauna protection will be extensive. It might however be necessary in a few localities to maintain migratory corridors.

3.3 The semi-protected zones that will be required to limit potential damage from fire (the fire buffer zones and shelterbelts) will also be mapped by FMSC as part of Part 1 preparation.

#### Details of the Protection Zones

3.4 *Hill Sanctuaries:* All land over 30% slope will automatically be defined as Hill Sanctuaries. All such land can not be logged without causing an unnecessarily amount of site deterioration. The identification of such areas will be carried out by FMSC making use of the Survey of Ghana 1:50,000 sheets. Areas where the number of 50 feet (16 m) contours exceed 5 per 5 mm indicate that the slope is in excess of 30%. The use of digital mapping facilities should however enable the hills to be accurately defined as an output from the GIS.

3.5 After the formation of compartments, there will inevitably be some lying partially within the hill zone and partially within another protection or productive zone. In such circumstances, compartments should be subdivided into subcompartments and numbered with letters i.e. 32 a, 32 b etc. If more than 65% of the compartment area is taken up with Hill Sanctuary, then the whole compartment should be so categorised.

3.6 *Swamp Sanctuaries:* Areas dominated by perennial swamps are not suitable for logging and should be excluded from timber production. Larger areas will have been identified during initial mapping of the reserve by FMSC, the smaller areas will be later defined as a part of fine grain protection at the time the compartment plan is prepared.

3.7 *Provenance Protection Areas:* In order to ensure that an adequate genetic base is retained for the over-logged scarlet species, the conservation policy allows for the retention of 5% of the flat land area of the Moist Semi-deciduous, Dry Semi-deciduous and the Moist Evergreen forest within those reserves with forest still in good condition and providing a good breeding population. The location of these areas will be defined by the Botany Unit of FMSC either on a map or by providing the relevant compartment numbers.

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<sup>1</sup> Forest Protection in Ghana. W.Hawthorne, A.Juam Musah, FMSC 1993

3.8 *(Ghana) Special Biological Protected Areas: (SBPAs or GSPBAs).* These are areas which should be provided with full protection. They are areas where the forest has been identified to have a high Genetic Heat Index (GHI) and are intended to provide nature sanctuaries for forest with a large number of rare species or representing an unusual forest community. These areas attract wide scientific interest and will be registered with the international community.

3.9 Details of the location of these sites will be provided by FMSC and the field staff will be required to ensure that all such areas are properly demarcated and protected.

3.10 *Research Areas:* Specific sites will have been identified and put under investigation by Ghanaian and international research organisation. The responsibility for mapping and demarcating the sites lies with the concerned research organisation who should directly inform the RFO/DFO of the need to protect the sites. The permitted treatment of the sites will be defined by the concerned organisations. It is obviously essential that this information is properly recorded as an annex to the management plan.

3.12 FMSC will provide maps of all Permanent Sample Plots (PSPs) and inform the DFOs of what restrictions apply to a particular set of PSPs. In all cases, it will be necessary to measure the plots before and after harvesting, and therefore district staff must inform the Mensuration Unit of FMSC in good time before harvesting is due to take place in a compartment known to have a PSP.

3.12 In addition to the zones identified to ensure maintenance of the floral diversity of the forest, other protected areas are required as part of the programme to minimise the fire hazard.

3.13 *Fire Protection Blocks:* Fire is a major factor in the destruction of the forest. In the Moist semi-deciduous zone it has been the direct cause of 30% loss of the forest in the 1980s. Logging in the drier areas has a direct link to increasing the incidence of fire. Opening the canopy in such areas encourages the infestation of grasses which provide a ready fuel in the dry season. In such areas logging should be very restricted. As a means of decreasing the spread of fire, areas of closed canopy forest which lie to the windward side of the fire susceptible areas should be retained as a barrier. Such blocks will be identified by the Ecology Unit of FMSC and the DFOs will be provided with details of their location under the Part 1 process. The Ecology Unit has evolved a system of calculating the fire risk to compartments within the Dry and Moist semi-deciduous zones (refer Box) and will provide the DFO's maps indicating the high risk area.

3.14 *Shelterbelts:* During the original reservation process, attention was paid to the preservation of shelterbelts - long, narrow belts of forest - as a means of reducing the drying effects of the drying winds on cocoa production. Such areas are still important for the maintenance of a forest environment, however due to their long perimeter in relation to their total area, such shelterbelts are particularly sensitive to the effects of fire. Accordingly such areas should be protected from logging.

3.15 The location of such shelterbelts will be obvious to all DFOs. All narrow belts of forest - only one compartment wide situated within fire-risk areas should be retained as unlogged areas. The advice of the Ecology Unit of FMSC can be sought if the district staff are not sure of the location of such areas.

## FIRE RISK ASSESSMENT

The danger of fire in the Dry and Moist semi-deciduous zones is linked to the following factors:-

- Vegetation** - Density of canopy  
- ground flora
- Treatment** - recent fire history  
- intensity and timing of last logging
- Position** -aspect  
-distance to rocky outcrops  
- distance to plantations and open areas
- Human Activity** - accessibility of area  
- distance to settlement
- Infrastructure** - fire fighting crews and equipment  
- access
- Current Weather** -humidity, weather , rainfall

A scoring system has been developed to weight each group of compartments according to its potential fire risk.

3.16 As part of the fire control planning process, values can be assigned to all the management zones that have been defined within the reserve. Such values (scored on a scale of 1-5) are an indication of the value at risk in terms of resource value. Areas where there are life and property at risk, for example locations close to villages, cultural sites and tourism development should be afforded the highest protection with a score of 5. Areas destined for conversion with no forest resources would be given the lowest score of 1. The FMSC will be issuing separate guidelines on these aspects.

**Table 2.3.1 Indicative Value Scores for Fire Protection**

Score	Fire Protection Area
1	Areas demarcated for conversion
2	Young plantations and convalescence areas
3	Timber Production Areas, mature plantations
4	Important conservation areas -SPBAs, FPAs
5	Locations close to settlement

3.17 *Convalescence Areas*: Under semi-protection are those areas which would otherwise be regarded as timber production areas, except that with their low basal area (taken as 15 m<sup>2</sup>/ha or less) and the poor stocking of exploitable trees, they can not be included within the current 40 year rotation and are therefore being left to regenerate.

3.18 These areas will be roughly defined by FMSC from satellite imagery (and air photography when available) and in part supported by the results of the national inventory. Such areas will need to be

examined at the time of Part 1 preparation and the maps provided by FMSC should only be taken as indicative.

#### **4. Zonation for Production**

##### Introduction

4.1 The main production areas will consist of the timber production area, the existing plantations and selected areas especially identified for NTFP harvesting. The boundaries of the latter will be completely dependent on local knowledge and will not be defined by FMSC. The existing areas of plantation should be accurately known from the results of existing surveys.

4.2 The extent of the timber production area is the remaining forest after all the other zones have been identified.

4.3 *NTFP Production Areas:* Non-timber forest products can be collected in most zones of the forest to varying degrees. However, there are special areas known to the local community that are important for traditional products. The harvesting of these products might be disrupted by standard logging and where this is the case, then NTFP Production areas should be defined and mapped as part of the consultation process.

4.4 *Plantation Areas:* All major areas of plantations have been mapped and inventoried as part of the national assessment of plantations carried out in 1992-3. Maps defining the boundaries of the existing compartments were prepared for the 12 key reserves (refer Instruction Sheet 2.2) which have the predominant area of plantations. The inventory excluded small pockets of plantations and those that had failed, but it does provide 1:10,000 scale maps of each compartment surveyed showing the location of degraded or failed plantations.

4.5 District staff should therefore be able to define the extent of the plantations reasonably accurately. Additional maps will also be provided by FMSC incorporating the existing inventory maps but modified with satellite imagery where possible.

4.6 *Timber Production Areas:* The remaining areas will represent the timber production areas to be managed sustainably under a 40 year cutting cycle with defined diameter limits for each commercial species (details in MoP Section D).

**Table 2.3. 2 Forest Management Categories to be used for Forest Reserve Zonation**

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>	<b>Mean of Identification</b>
<b>PROTECTION</b>			
<b>Hill Sanctuaries</b>	All land within the reserve where the slope is $\geq 30\%$ .	To provide environmental protection of steep slopes that would be subject to erosion if logged. To ensure maintenance of the watersheds. To also provide widescale protection for undefined flora and fauna resources.	Identified by FMSC using the Survey of Ghana 1:50,000 scale contoured maps. All areas above the slope criterion are included. Compartments with at least 65% steep land are designated as protected.
<b>Swamp Sanctuaries</b>	Perennial wet areas	Maintenance of water sources, flora and fauna preservation	Coarse grained areas identified by FMSC from base maps. Smaller areas identified as part of the fine-grain protection activities undertaken during stock survey
<b>Provenance Protection Area</b>	Area with high populations of key economic species.	Act as gene banks for exploited species	Areas initially identified by the Botanical Unit of FMSC. Additional areas may be identified in the course of Part 1 preparation.
<b>Special Biological Protection Area</b>	Areas of high plant GHI or presence of rare fauna species.	Full protection of areas of high bio-diversity and therefore of both national and international value.	Botanical surveys undertaken by FMSC.
<b>Cultural sites</b>	Culturally important areas identified during the settlement procedure or in special cases areas identified since and archaeological sites.	Preservation of the sites of traditional or historic value for the benefit of the local community and the nation.. Promotion of tourism where acceptable.	As demarcated on existing base maps and reinforced by local knowledge during community discussions.
<b>Research Area</b>	Research Working Circles	Provide scientific and technical knowledge of use both by the Forest Service and the wider scientific community	Demarcated and mapped by the research organisation. Information to be combined by FMSC
<b>Fauna Protection Areas</b>	Areas identified by the Wildlife Department as being critical to the preservation of the habitat required for rare or important species.	Maintenance of natural habitat for critical species.	

**Table 2.3. 2 (continued) Forest Management Categories to be used for Forest Reserve Zonation**

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>	<b>Mean of Identification</b>
<b>SEMI-PROTECTION</b>			
<b>Fire Buffer Zones</b>	Intact areas surrounding 'valuable' forest in fire prone areas	Provide a buffer from fire from outside the reserve reaching valuable forest considered to be fire-susceptible.	Areas to be recommended by Ecology Unit , FMSC and modified as appropriate following field inspections
<b>Shelterbelts</b>	Areas with a large boundary to area ratio which are therefore particularly vulnerable.	Maintenance of forest cover and hence restrict spread of fire and provide continuing shelter for agricultural crops	Original areas demarcated as shelterbelts for protection from desiccating winds. Located from existing forest reserve maps.
<b>Convalescence forest</b>	Forest which due to either the effects of past logging or fire is now at stage where it can not be logged in the present management cycle. A guide of 15m <sup>2</sup> basal area or less is indicative in this case	Area left to regenerate until commercially sized timber available for felling	Satellite imagery or air photography, supported by ground reconnaissance
<b>PRODUCTION</b>			
<b>NTFP Production Areas</b>	Areas identified by rights holders as important NTFP collecting grounds which do not fall into the protection designations.	Production of NTFPs for local and commercial use	NTFP survey (FMSC) but extended and modified by local knowledge
<b>Timber Production Areas</b>	Healthy productive forest. >15m <sup>2</sup> /ha. basal area which does not fall into protection, research or NTFP area designation.	Sustainable timber production	Residual areas on the zonation maps after the other zones have been identified
<b>Plantation area</b>	Existing stands of artificially regenerated areas	Timber . pole and fuelwood production	Satellite imagery supported by ground surveys
<b>OTHERS</b>			
<b>Conversion</b>	Areas where forest cover and regeneration is minimal and might be suitable for conversion to plantations. A guide of 5m <sup>2</sup> basal area or less would suggest this condition.	To act as a land bank for possible conversion to forest plantations if site conditions are suitable.	Satellite imagery, forest inventory data and ground reconnaissance.
<b>Enclosed Farms</b>	Farmland which has been legally recognised.	Legitimate agricultural practices which do not lead to further forest damage	Existing forest boundary maps.

## THE STAR SYSTEM AND GENETIC HEAT INDEX

Tree species have been categorised on the basis of their scarcity and the degree of exploitation. The different categories are referred to as various star colours, i.e.

<b>BLACK</b>	Rare internationally and uncommon in Ghana, highly protected
<b>GOLD</b>	Fairly rare both internationally and/or in Ghana, high protection
<b>BLUE</b>	Widespread internationally but rare in Ghana or vice versa. Protection required
<b>SCARLET</b>	Common, but under high pressure from over-exploitation. Strict controls on annual allowable cut if they are to remain commercially viable. Level of cut > 200% of AAC
<b>RED</b>	Common, but tend to be over-exploited, restriction needed Level of cut 100-200% of AAC
<b>PINK</b>	Utilisable but not as popular to the trade, present cut below AAC
<b>GREEN</b>	No particular conservation concern

**GENETIC HEAT INDEX (GHI):** Used to provide a measure of the genetic value of forest in terms of the composition of tree species only. It is a weighted index derived from :-

$$\text{GHI} = \frac{(\text{BK} \times 27) + (\text{GD} \times 9) + (\text{BU} \times 3) + (\text{RD} \times 1) \times 100}{\text{BK} + \text{GD} + \text{BU} + \text{RD} + \text{GN}}$$

where BK= no. of black species, GD= gold species, BU = blue, RD = red and GN = green.

Values range from 0 - 533

**ECONOMIC INDEX (EI):** Similar to the GHI but gives an indication of the number of economic species, weights are the same as for the GHI.

Values range from 0 - 120

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**

**Instruction Sheet A2.4 Provisional Setting of objectives for beneficiary rights**

**Introduction**

1.1 The resource owning communities have a statutory right to benefit for the management of the forest reserves. These rights are guaranteed under the 1994 Forest and Wildlife Policy, the 1998 forest Act and the 1992 Constitution.

1.2 All forest reserve management plans must clearly identify the local beneficiaries of reserve management and the benefits they will receive from forest reserve management. This Instruction Sheet prescribes procedures for identifying the beneficiaries and defining provisional beneficiary objectives. Both the beneficiaries and the objectives will be finalised after the field investigations and formal consultations.

1.3 The Forest Department is incorporating a collaborative forest management approach into all aspects of forest reserve management in order to ensure local people can benefit for reserve management and can contribute to improved forest reserve management. Equitable sharing of benefits from reserve management is a key element of collaboration. Refer to the Guidelines on Collaboration in Forest Reserve Management for details.

**2. Provisional Identification the Beneficiaries of Forest Reserve Management**

2.1 From previous records the ownership of the reserve should be determined and later verified in consultation with traditional and local government authorities.

2.2 There are generally three types of owners of forest reserves:-

- Stool(s) or skin(s)
- The Government
- Alienation Holders

2.3 A provisional list of the communities that fall under the jurisdiction of the various types listed above should be compiled during the reconnaissance visits (Instruction Sheet 2.5).

2.4 According to the 1992 Constitution, the revenue from stool land will be shared between the Traditional Authority, the Stool and the District Assembly. The names of the concerned District Assemblies and the Traditional Authorities should also be recorded.

### **INFORMATION BOX: BENEFITS TO LOCAL PEOPLE**

The forest reserves have remained the property of their traditional owners, in addition to the indirect benefits associated with environmental protection, **the direct benefits** the owners should receive from forest reserve management are:

- Revenue from natural forest management and plantation development on their land in accordance with the Constitution
- Secure access to forest products for domestic use free of charge and within the limits of sustainability

These benefits of forest reserve management are rights deriving from ownership and are not contingent on a further economic contribution to day to day forest management. The resource owning communities also have a right to be consulted during strategic planning.

#### **Who are the local people ?**

Primarily the communities that own the land; all the communities that make up the land-owning stool will be identified in the management plan. In addition it is expected that settler communities accepted onto the land by the landowners and living close to the reserve will also be considered beneficiary communities.

It is also envisaged that forest reserve management will become more efficient once collaboration is built into strategic planning and forest operations. Some communities have a comparative advantage in NTFP management, rehabilitation of degraded areas and fire prevention. Where it is agreed that a particular community is best placed to undertake certain operations a formal working partnership can be entered into.

### **3. Beneficiary Objectives: the right to revenue**

3.1 The resource owners have a statutory right to receive all the revenue from forest reserve management, less any revenue retained by the Forest Service as management fees for operations it is agreed that the Forest Service will carry out.

3.2 The right of the beneficiaries to receive revenue from the forest reserve management should be clearly stated as an objective of management.

3.3 During management planning the potential sources of revenue will be identified.

<b>Beneficiary Objective</b>	<b>Characteristics</b>	<b>Objective of Management</b>	<b>Means of Identification</b>
Revenue from forest reserve management	Applies to all production and protection zones	To ensure a fair share of the revenue is disbursed to the landowners in accordance with the provisions of the Constitution and forest laws in a timely fashion	Identify the resource owners from the previous management plan and the gazette.

#### **4. Beneficiary Objectives: The Rights to Forest Produce for Domestic Use**

4.1 Local people have a statutory right to collect forest produce from the forest reserve to help meet their requirements for forest produce for domestic use.

4.2 The management plan should clearly state that as an objective, the reserve will be managed to provide forest produce to meet domestic needs.

4.3 During management planning the type of forest produce to be provided for domestic use should be agreed.

<b>Beneficiary Right</b>	<b>Characteristics</b>	<b>Objective of Management</b>	<b>Means of Identification</b>
Access to forest produce for domestic use	Applies to all production and protection zones except SBPAs and Fauna Protection Areas. Restrictions on the method of collection will apply to some of the management zones	To ensure local people have access to forest produce from the forest reserve for domestic use within the limits of sustainability	Field investigations to identify all communities that should use the rights; plus review of customary rights.

4.4 The communities also have the right to be consulted during reserve planning and in the formulation of timber harvesting agreements, and may wish to establish specific operating restrictions to be agreed by all parties.

4.5 The communities may wish to apply their own traditional controls on the method of collection of NTFPs - restriction on the number of pestles per family/year, hunting restricted to set months etc. As much as possible these traditions should be supported and incorporated within the agreed management prescriptions for the zones. Reference should be made to the Guidelines on NTFP management to be issued by the Community Forestry Management Unit of FMSC.

4.6 Specific Timber Operating Specifications may apply to timber contracts issued within the reserves to take account of any local requirements and restrictions that need to be adhered to in order to protect the environment or to protect community rights and traditions from infringement by would-be contractors. (This is discussed in MoP C)

#### **5. Additional Beneficiary Rights**

5.1 Any additional beneficiary rights the local people may have been granted at the time of reservation which are to be maintained or any new rights should be recorded in the objectives of management.

5.2 Examples of the additional beneficiary rights may include right to employment on plantation development programmes and rights of access to fetish sites and intellectual property rights.

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A 2. Forest Reserve Management Plans**  
**Instruction Sheet A2.5 Supportive Field Investigations**

**1. Introduction**

1.1 This instruction sheet provides guidance on the type of field investigations that will be required in order to complete Part 1 of the management plan and by inference Part 2. The amount of field work required will vary widely, depending on the number of communities dependent on the reserve and the complexity of the area with respect to different potential management zones. In addition, the amount of disturbance there has been since the last inventory will dictate the amount of re-assessment there will need to be.

1.2 The types of survey that will be required:-

- socio-economic surveys of forest-user groups
- reconnaissance of forest types and comparison to the draft Forest Classification Map
- confirmation of the extent of convalescence areas and suitability for regeneration
- state of external and internal boundaries
- check on the condition of plantations compared to compartment records and maps

1.3 For those reserves where the earlier inventories were insufficient to provide an adequate assessment of the forest, or there has clearly been major changes, then more intensive sampling might be necessary than can be provided by reconnaissance surveys.

**2. Socio-economic Investigations**

Purpose of the Surveys

2.1 The socio-economic investigations aim to:-

- Identify those communities that will enjoy domestic use rights
- Understand the socio-economic context of reserve management
- Ensure all communities around the reserve are aware of the planning process and are able to participate fully.
- Explore the potential for local collaboration in management.

Team Composition

2.2 Teams of three are recommended able to operate independently. It is expected that local contracts will be given for this work as it will require intensive field work and would be outside the normal operational functions of the Forest Service. It is expected that following training from the FMSC, contracts can be given to a local field teams for this work. Redeployed extension agents living in the area or local unemployed graduates can be effectively trained to carry out these tasks in their own communities.

2.3 The team will be under the direction of the Regional Forest Planning Office and more directly the DFO who would ensure that they are familiar with the reserve and the communities.

## Methodology

2.4 As far as possible, participatory approaches will be used to help the planning team gain an understanding of the local socio-economic situation and to ensure local communities are involved in the planning process. General guidance on survey technology can be found in the Guidelines of Collaboration in forest Reserve Management prepared by the FMSC. Based on the findings of the reconnaissance survey, the FMSC will assist in the design of surveys for a particular reserve and provide training for local field teams.

2.5 The local field teams will use participatory tools to ensure that all the communities that live around the reserve are contacted and all the key interest groups concerned with the management, protection and use of the resource are identified and their particular needs, perceptions and ideas understood.

2.6 The surveys will be designed to provide information on the following aspects:-

- social and economic structure of the communities
- perceived land and forest rights and relationship with other communities
- potential for collaboration in forest management operations
- dependence on the forest for products and services.
- the variety and scale of importance of timber and NTFPs
- indigenous knowledge of local ecology that may help to develop prescriptions for forest reserve management
- any particular locations of importance for harvesting such materials
- experience of improving the propagation or directly improving the production of NTFPs
- calendar for harvesting and marketing
- the marketing chain and possibilities for local value added processing
- relationship with the former Forest Department and contractors
- issues likely to be important in defining Social Responsibility Agreements with contractors
- experiences of forest fire, location and reasons for regular burns
- interest in tree planting and providing contract labour

## Reporting and Analysis

2.7 The reporting format will be defined by FMSC. As much of the basic data analysis will be done by the teams themselves as part of the contract but inevitably some of this responsibility will fall on the Regional Planning Office with support from FMSC.

2.8 The reports will be prepared on a reserve by reserve basis and will need to be supported by a large scale map (1:25,000 approx.) to indicate the location of all communities interviewed, their perceived area of interest, location of important NTFP harvesting sites and culturally significant areas which should be removed from the timber production areas

## **COLLABORATION IN FOREST RESERVE MANAGEMENT**

**Collaboration is a working partnership between the local people and the Forest Service to ensure that a management of all forest resources is equitable and more efficient.**

**In order to ensure forest reserve management is equitable, the management plan will clearly state the benefits the local people have a right to receive from the management of their resource.**

**Many communities living close to the reserve will also have a comparative advantage in carrying out some of the prescriptions for management of production and protection zones. Communities may be able to collaborate in:**

- **establishment of plantations in conversion zones**
- **rehabilitation through enrichment planting in convalescence zones**
- **establishment of fire breaks**
- **cultivation of NTFPS**
- **boundary maintenance**
- **research programmes**

**During the socio-economic surveys the potential for collaboration should be explored. At a later stage agreements can be drawn up to guide the implementation of collaborative management programmes. The agreements will clearly specify the objectives of the programme, activities, resources and respective roles and responsibilities.**

**The practice of requesting some communities to freely contribute their labour in order to obtain access to the reserve to exercise their statutory right to collect NTFPs will cease.**

### **3. Reconnaissance of the state of the high forest**

#### Forest Classification

3.1 On receipt of the Provisional Forest Classification Map from FMSC, the DFO should organise a field check to ascertain if the categories would appear to be correct making use of existing access tracks. In some reserves, access might be such that one or several survey lines have to be cut. They should be aligned to cross a range of the identified forest types. For this exercise the DFO might need to obtain an enlargement of the forest classification map from FMSC. The map provided should be overlain on the Survey of Ghana contoured map to assist location in the forest. The teams will need to

select easily identifiable points for the start of the transect and carefully scaling off the distance to walk before meeting an assumed change in forest classification.

3.2 It is hoped that more use can be made of a Global Positioning System (GPS) receiver for this type of investigation since it allows the teams to accurately locate their position on a map without the need for surveying.

3.3 The reconnaissance should be confirming that the condition classes indicated in FROGGIE are correct, that the TSP summaries of basal area are acceptable for the areas visited and that the break in slope for the start of the Hill Sanctuaries appears to have been properly located. In addition the location of the convalescence zone should be checked and confirmation made that the level of regeneration is adequate for the area to be retained for re-establishment under natural regeneration. The guide of  $5\text{m}^2$  per ha for the basal area for defining possible conversion areas - is just that, a guide. The amount of regeneration needs to be examined and an estimate made of the likely effects of complete protection, if there are adequate signs that the site might recover, then it should be left under convalescence. The status of a particular piece of land can always be reviewed and down-graded for potential conversion to plantations at a future date.

### **CONVALESCENCE AND CONVERSION AREAS**

Areas where the basal area is consistently below  **$15\text{m}^2/\text{ha}$**  should be considered for convalescence and taken out of the present series of coupes. Such areas may need **active** assistance through intensive fire control and enrichment planting where regeneration is inadequate.

Where elephant grass or *Chromolaena* is common then attention to fire control and enrichment planting will be essential.

For those areas where the basal area is consistently below  **$5\text{m}^2/\text{ha}$**  may be considered as possible conversion areas (i.e. plantation development areas). But first there needs to be an examination of the level of natural regeneration through regeneration counts. If there are good signs of natural regeneration taking place - then the area should be retained for convalescence. The chances of good regeneration will be improved by adequate protection.

3.4 Land that is recognised as belonging to the conversion category, may in fact not be suited to plantation development either because of undesirable site factors - shallow soil, low base exchange; or indeed from a marketing point of view. i.e. poor access, distance from processing units etc. The use of such land would need to be reviewed. Assistance will be provided by the MoP A on Plantation Planning in this respect.

### Boundaries

3.5 During this reconnaissance stage the field staff should be examining the state of the external boundaries of the reserve including the number of remaining pillars. Maintenance of clear boundaries is a first step in forest protection. Encroachment and the spread of fire will be a natural consequence for neglecting this task. At the same time internal boundaries - compartment boundaries, fire lines etc. should be examined along with the state of roads and bridges.

3.6 Details of the work needed to put boundaries and roads into order is part of operational planning, but there may be strategic decisions to be taken; for example, a reserve which is subject to constant encroachment and/or fire on one perimeter may need a specific long term strategy (development of buffer zones, improved community land management ) to address the problem.

### Plantations

3.7 The extent of existing plantations are not always well known, though the recent national inventory has provided detailed compartment maps for those areas sampled. The DFO will be provided with copies of these maps modified where possible by recent satellite imagery. As part of the preparatory phase for the management plan preparation, these base maps should be checked. As part of the exercise, the field staff should check the status of the compartment registers and see if they provide an up to date account of the operations carried out and the state of the present crop. Observations should be made on the crop - whether it has failed or is potentially productive and the approximate mean top height and its stocking. Note should also be made whether there would appear to be any major changes since the time of the inventory, for example logging - or an extensive fire.

3.8 At this stage, a full plantation inventory is not needed, but a good estimate of the condition of the resource is required. For small plantation areas, the DFO might indeed consider putting in temporary sample plots in accordance with the procedures in instruction sheet A2 of the Plantations MoP.

**Manual of Procedures - Forest Resource Management in the HFZ  
MOP Section A - Strategic Planning**

**A 2. Forest Reserve Management Plans**

**Instruction Sheet A2.6 Provisional management planning for protection zones**

Management planning: an overview

For each management zone that has been identified long term management planning can now begin. During management planning we are trying to prepare four things:

- Measurable Objectives: For each zone a measurable objective is prepared to ensure progress and performance can be monitored. The objective should cover quality, quantity and time where applicable.
- Management Regimes: The regime stipulates the general method of treatment for this management zone. The regime is the same across the high forest zone and is non-negotiable. In particular the regime stipulates whether or not logging is permitted.
- Management Prescriptions: The prescriptions recommend in more detail the silvicultural and other operations required in this zone to achieve the objective. The prescriptions are based on an understanding of the local situation and can include suggestions on local collaboration in operations. Reference must be made to specific MoPs.
- Rights and Responsibilities: Specify who has rights in this management zone and who has responsibilities

**1. Introduction**

1.1 This Instruction Sheet deals with the management planning relevant to the protection zones. - both those under full protection and those regarded as being semi-protected. It defines the management regimes that are appropriate to each zone. These have national relevance and therefore the main aspects of the regimes are not open to negotiation. Minor modifications to some of the fringe aspects of the regimes may be possible and these are indicated in the instructions.

1.2 The other components namely the measurable objectives, management prescriptions and rights and responsibilities will be affected by local conditions. Guidance is provided on how to complete these sections.

**Protected Areas**

**2. Hill Sanctuary**

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>
Hill Sanctuaries	All land within the reserve where the slope is $\geq 30\%$ .	To provide environmental protection of steep slopes that would be subject to erosion if logged. To ensure maintenance of the watersheds. Additionally provides an extensive area of protection for undefined species of both flora and fauna

2.1 *Measurable Objective:* The area of the Hill Sanctuaries will be defined and should become practice immediately after the commencement of plan implementation. The objectives should therefore define that the total area of.....ha as identified on the base maps will be retained in this zone, and that the area will not be allowed to diminish during the management of the reserve. Furthermore, the quality of the forest ( in terms of canopy closure or forest condition) will not be allowed to deteriorate, and the construction of any new access tracks will be prevented. Additional isolated areas of Hill Sanctuary will be defined as part of fine grained protection mapping.

2.2 An important objective of the Hill Sanctuaries is the maintenance of water supplies in terms of quality (silt-levels) and quantity. For those reserves where this function is seen as critical, then regular assessments should be implemented with the assistance of the water authorities.

2.3 *Management Regime:*

- No logging allowed throughout this zone.
- NTFPs can be collected following general Forest Service and Wildlife Department Guidelines- providing this does not entail either:-
  - tree felling
  - construction of tracks for extraction

*Local Modifications* - Communities should be encouraged to define the scale and type of NTFPs to be collected in these areas and define any appropriate restrictions in order to prevent overcutting by a few individuals

2.4 *Management Prescriptions:*

- All compartments with more than 65% of their area falling in this zone are to be managed in accordance with the approved regime. Otherwise, the compartment may be subdivided and managed separately.
- No trees to be felled, but the collection of dead, fallen wood for local fuel requirements is permissible.
- All other harvesting restricted to NTFPs
- Any site specific restrictions on hunting to be prescribed by the Wildlife Department and negotiated with the land owners during the preparation phase.
- Fire breaks of minimum 3 m and preferably 5 m to be established and maintained where this zone borders with convalescence areas, conversion areas or farms in all Moist Semi-deciduous and Dry Semi-deciduous reserves, plus other areas rated as having a high fire risk.

2.5 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe on to this zone and for monitoring their activities in the area where Hill Sanctuaries adjoin timber production areas. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that fire is not allowed to enter the sanctuaries.

2.6 The communities have the right to collect fuelwood from dead trees for personal consumption and for the collection of NTFPS in accordance with any self-imposed restrictions and in such a manner that the state of the forest is not damaged. They are allowed free access at all times.

2.7 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

### 3. Swamp Sanctuaries

Area Category	Characteristics	Objectives of Management
Swamp sanctuaries	Perennial wet areas	Maintenance of water sources, flora and fauna preservation

3.1 *Measurable Objective:* The area of Swamp will be defined through large-grained protection mapping coupled with fine-grained protection mapping during stock surveying. The larger areas of permanent swamp will therefore be clearly defined at the time the plan is under initial preparation. The objectives should therefore state that the total area of.....ha as defined from the base maps will be retained in this zone and the area will not be allowed to be disturbed by timber operators. Furthermore, the area within this zone will for most reserves increase as the smaller swamp areas are identified at the time of compartment inspection.

3.2 *Management Regime:* No logging allowed throughout this zone.  
The collection of NTFPs prohibited or severely restricted  
Hunting and the collection of fauna restricted

*Local Modifications* -Large swamps may be a traditional source of reeds, fish etc. Agreements should be made on the level of access to these areas and the controls to be imposed.

3.3 *Management Prescriptions:*

- All compartments with more than 65% of its area falling into this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No timber harvesting to be allowed
- No construction of tracks
- No collection of NTFPs except for those covered under local agreements made between the Forest Service and the land owners at the time of the plan preparation.

3.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe on to this zone and for monitoring of their activities in the area where Swamp Sanctuaries adjoin timber production areas. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not damage the sanctuaries.

3.5 The communities have the right to collect only those products defined at the time of plan preparation.

3.6 The Forest Service has the rights to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

#### 4. Provenance Protection Areas (PPAs)

Area Category	Characteristics	Objectives of Management
Provenance Protection	Area with high	Act as gene banks for

<b>Area</b>	populations of key economic species.	exploited species
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4.1 *Measurable Objective:*

- a) The PPAs will be defined at the time of plan preparation under the direction of the Botany Unit, FMSC. The area as defined and demarcated should not be allowed to diminish during the course of plan implementation - unless specific modifications are received from FMSC.
- b) The quality of the forest in terms of its condition class should not deteriorate and would be expected to improve.

4.2 *Management Regime:* No commercial logging

The collection of NTFPs restricted but acceptable where non-destructive.

4.3 *Management Prescriptions:*

- All compartments with more than 65% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No timber harvesting to be allowed except where specific trees have been marked by FMSC for removal in order to encourage the development of commercial species.
- No construction of tracks
- Collection of NTFPs allowed providing there is no disruption to the canopy

4.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe on to this zone and for monitoring of their activities in the area where PPAs adjoin timber production areas. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not damage the PPAs.

4.5 The communities have the right to collect NTFPs defined at the time of plan preparation.

4.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

## 5. Special Biological Protection Areas (SBPAs)

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>
<b>Special Biological Protection Area</b>	Areas of high plant GHI or presence of rare fauna species.	Full protection of areas of high bio-diversity and therefore of both national and international value.

5.1 *Measurable Objectives:*

- a) Areas as defined by the Botany unit of FMSC at the time of plan preparation to be retained without any deterioration of the site or the quality of the forest.
- b) Floral and fauna diversity of the area to be maintained or improved
- c) Populations of specially identified species to be maintained or increased.

5.2 *Management Regime:* No tree felling  
The collection of all NTFPs not allowed

*Local Modifications* -For very large SBPAs, a buffer zone may be recognised where the selective collection of NTFPs will be allowed. A central core being retained for complete protection.

5.3 *Management Prescriptions:*

- All compartments with more than 50% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No logging of any type to be allowed within the SPBAs (including buffer zones)
- No construction of tracks
- Collection of NTFPs not allowed, limited collection may be possible within the buffer zones if these have been demarcated as such . Collection within the core area always forbidden.

5.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe on to this zone and for monitoring of their activities in the area where SBPAs adjoin other zones. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not enter the SBPAs. In areas protected in the interest of the globally significant biodiversity, the Forest Service is responsible for trying to secure compensatory grants or funding for alternative livelihood support wherever possible.

5.5 The communities have a restricted right to collect specified NTFPs within the buffer zones but not within the core zone. The range of NTFPs and the location of the buffer zone to be agreed at the time of plan preparation.

5.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

## 6. Cultural Sites

Area Category	Characteristics	Objectives of Management
<b>Cultural sites and Tourist Development Areas</b>	Culturally important areas identified during the gazettment procedure or following local consultation process. May be both national archaeological sites and those relating to local traditions	Preservation of the sites of traditional or historic value for the benefit of the local community and the nation. Encouragement of tourism when appropriate and agreed by the communities

6.1 *Measurement Objectives:* Preservation of the site. No damage to be caused to the area through the collection of timber or NTFPs.

6.2 *Management Regime:* complete protection from forest activities.

6.3 *Management Prescriptions:*

- All compartments with more than 65% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No logging of any type to be allowed within cultural sites
- No construction of tracks
- Collection of NTFPs not allowed, unless communities request specific products (non-destructive collection techniques) acceptable within local traditions.

6.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe on to this zone and for monitoring of their activities in the area where cultural areas adjoin other zones. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that local communities or others do not damage these sites.

6.5 The communities may have a very restricted right to collect specified NTFPs. The range of NTFPs to be agreed at the time of plan preparation.

6.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the site.

## 7. Research Areas

Area Category	Characteristics	Objectives of Management
Research Area	Research Working Circles	Provide scientific and technical knowledge of use both by the Forest Service and the wider scientific community

7.1 *Measurable Objectives:* Site to be managed in accordance with the treatments defined in the research plan.

No undesired external treatment allowed to affect the forest.

7.2 *Management Regime:* Defined by the research organisation..

7.3 *Management Prescriptions:*

- All compartments with more than 75% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No logging of any type to be allowed within research sites, unless specified within the research plan.
- No construction of tracks, unless specified in the research plan
- Collection of NTFPs not allowed, unless specific instructions to the contrary are provided by the research organisation.

7.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe into research sites, unless standard logging is acceptable to the researchers. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The Forest Service will monitor timber extraction where activities are close to research plots. The community and the Forest Service have joint responsibility for ensuring that local communities or others do not damage these plots.

The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the plots.

## 8. Fauna Protection Areas (FPAs)

Area Category	Characteristics	Objectives of Management
<b>Fauna Protection Areas</b>	Areas identified by the Wildlife Department as being critical to the preservation of the habitat required for rare or important species.	Maintenance of natural habitat for critical species.

### 8.1 Measurable Objectives:

- a) Areas as defined by the Wildlife Department at the time of plan preparation to be retained without any deterioration of the site or the quality of the forest.
- b) Floral and fauna diversity of the area to be maintained or improved
- c) Populations of specially identified species to be maintained or increased.

- 8.2 *Management Regime:* No tree felling  
The collection of all NTFPs not allowed  
No road or track development

*Local Modifications* -For very large FPAs, a buffer zone may be recognised where the selective collection of NTFPs will be allowed. A central core being retained for complete protection.

### 8.3 Management Prescriptions:

- All compartments with more than 50% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No logging of any type to be allowed within the FPAs (including buffer zones)
- No construction of tracks
- Collection of NTFPs not allowed, limited collection may be possible within the buffer zones if these have been demarcated as such. Collection within the core area always forbidden.

8.4 *Rights and Responsibilities:* The Wildlife Department and the Forest Service have the responsibility for ensuring that no timber concessions infringe on to this zone and for monitoring of their activities in the area where FPAs adjoin other zones. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not enter the FPAs

8.5 The communities have a restricted right to collect specified NTFPs within the buffer zones but not within the core zone. The range of NTFPs and the location of the buffer zone to be agreed at the time of plan preparation.

8.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

## Semi-Protected Areas

### 9. Fire Buffer Zones

Area Category	Characteristics	Objectives of Management
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<b>Fire Buffer Zones</b>	Intact areas surrounding 'valuable' forest in fire prone areas	Provide a buffer from fire from outside the reserve reaching valuable forest considered to be fire-susceptible.
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9.1 *Measurable Objectives:*

- a) Forest areas that are identified as Fire Buffer Zones by the Ecology Unit of FMSC at the time of plan preparation to be retained and successfully prevented from further logging.
- b) Ground cover maintained in semi-green state due to maintenance of closed forest conditions
- c) Forest fires peter out before crossing the buffer

9.2 *Management Regime:* No tree felling

The collection of all NTFPs allowed providing harvesting is non-destructive to the forest.

9.3 *Management Prescriptions:*

- All compartments with more than 50% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No logging of any type to be allowed within the fire buffer zones
- No construction of tracks
- Collection of NTFPs allowed where the collection does not damage the forest
- Early burning along the outer edge of the buffer
- Additional fire line to be maintained along the inside edge of the buffer

9.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions infringe on to this zone. The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not log within the buffer zones. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones

9.5 The communities have a restricted right to collect specified NTFPs within the fire buffer zones. The range of NTFPs to be agreed at the time of plan preparation.

9.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

## 10. Shelterbelts

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>
<b>Shelterbelts</b>	Areas with a large boundary to area ratio which are therefore particularly vulnerable.	Maintenance of forest cover and hence restrict spread of fire and provide continuing shelter for agricultural crops

10.1 *Measurable Objectives:*

- a) Areas that are identified as Fire Shelterbelts by the Ecology Unit of FMSC or by the DFO at the time of plan preparation to be retained and successfully prevented from further logging.
- b) Ground cover maintained in semi-green state due to maintenance of closed forest conditions
- c) Forest fires peter out before crossing the buffer

10.2 *Management Regime:* No felling of any live trees. no felling of any slightly burnt trees  
The collection of all NTFPs allowed providing harvesting is non-destructive to the forest.

10.3 *Management Prescriptions:*

- Compartments can not be subdivided - all compartments in narrow strips of forest within the DS and MS zones to be included
- No logging of any type to be allowed within the shelterbelts
- No construction of tracks
- Collection of NTFPs allowed where the collection does not damage the forest
- Early burning along the outer edge of the buffer
- Additional fire line to be maintained along the inside edge of the shelterbelt

10.4 *Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions are allocated to these compartments. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not log within the shelterbelts.

10.5 The communities have a restricted right to collect specified NTFPs within the shelterbelts. The range of NTFPs to be agreed at the time of plan preparation.

10.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

## 11. Convalescence Forest

Area Category	Characteristics	Objectives of Management
Convalescence forest	Forest which due to either the effects of past logging or fire is now at stage where it can not be logged in the present management cycle. A guide of 15m <sup>2</sup> /ha basal area or less is indicative in this case	Area left to regenerate until commercially sized timber available for felling

11.1 *Measurable Objective:*

- a) Areas as defined at the time of plan preparation are maintained are not logged for at least 40 years.
- b) Regular improvement in the stocking of the forest over the convalescence period

11.2 *Management Regime:* No logging for at least 40 years  
Intensive fire protection  
Enrichment planting in selected areas  
Collection of NTFPs restricted to herbs

11.3 *Management Prescriptions:*

- All compartments with more than 65% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.

- No logging of any type to be allowed until the area reverts back to timber production
- Enrichment planting with suitable fast growing species planted into cut lines at intervals of around 5-10 m intervals
- Maximum fire protection should be planned. The perimeter to be defined with clear fire lines. For large areas, division by subsidiary fire breaks should be carried out.
- Collection of NTFPs allowed where the collection does not damage the forest

The status of the forest will be reviewed after 40 years to see if the areas can be brought into the forthcoming rotation.

*11.4 Rights and Responsibilities:* The Forest Service has the responsibility for ensuring that no timber concessions are allocated to these compartments. The Forest Service also has the responsibility for monitoring and reporting on the quality of forest management with respect to this and all other zones. The community and the Forest Service have joint responsibility for ensuring that local communities or others from outside do not attempt to log in these areas.

11.5 The communities have a restricted right to collect specified NTFPs. The range of NTFPs to be agreed at the time of plan preparation.

11.6 The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**

**Instruction Sheet A2.7 Provisional management planning for production zones**

**I. Introduction**

1.1 This Instruction Sheet provides assistance on the management planning required for all the production zones. The format is similar to that used for Instruction Sheet 2.6 (Protection Zones). For all the zones, descriptions are provided for the main sub heads of Measurable Objectives, Management Regimes, Management Prescriptions and Rights and Responsibilities as used in Sheet 2.6; however, an additional heading of Indicative Levels of Production is also included.

1.2 There will be uniformity for many of these subheads across the country for any one particular zone.

**2. Timber Production Areas**

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>
<b>Timber Production Areas</b>	Healthy productive forest. >15m <sup>2</sup> /ha. basal area which does not fall into a protection zone or NTFP area designation.	Sustainable timber production

2.1 *Measurable Objectives:* Sustainable production of timber to provide a perpetual flow of wood products, revenue for the resource owners and to fund forest management while maintaining environmental quality and social responsibility.

Timber production should be roughly equal each year and as the forest moves into normality the area of forest logged each year should be close to 1/40 of the total area of the timber production area.

2.2 *Management Regime:*

The timber production areas will be managed using the selection system with fixed diameter limits for each commercial species. The rotation has been set at 40 years for all forests. Yield is strictly controlled using documented guidelines on tree selection and the application of defined yield formula..

2.3 *Management Prescriptions:- summary*

- definition of the timber production areas into compartments of around 100 -150 ha
- definition of harvesting schedules to define the most appropriate time to fell each compartment linked to the identification of the extent of the Timber Utilisation Contract (TUC) area.
- Award of timber utilisation contracts
- 100% stock surveys of compartments scheduled for felling  
yield calculation and yield approval and selection of trees to be extracted

*Management Prescriptions - detailed*

Formation of Compartments

2.4 In order to ensure adequate control over operations, it is necessary to subdivide the reserve into compartments. For most reserves, compartments have already been identified (at least on paper) for those areas identified as being outside the original Protection Working Circles as used in the first management plans. Following re-zoning of the reserves it may be necessary to re-examine the layout of the compartments. If changes have to be made the opportunity should be made to ensure that boundaries follow natural features (streams, ridges, slope breaks etc.) as much as possible, to limit the problems of identification in the forest.

2.5 The identification of compartments on a map should cover all forest zones. However, where there are large contiguous blocks of Hill Sanctuaries, then compartment numbers are of less importance in terms of the management plan. The mapping section of FMSC may need to prescribe compartment numbers to all areas, however, for purposes of maintaining the map data base.

2.6 The standard compartment dimensions of 1 mile x 0.5 mile or 1,600 x 800 m approx. (equivalent to 128 ha) does not need to be rigidly adhered to but a compartment size of 100-150 ha is of the right order. Changing compartment boundaries for those reserves where there are already well documented compartment records should be avoided because of the need to maintain a continuous record of operations carried out within a particular area and to ensure that any one area is not re-entered prior to the 40 year period. Compartments are demarcated by fixed pillar. Prior to harvesting the boundary lines are cut.

#### Harvesting Scheduling

2.7 In order to adhere to the management regime of a 40 year felling cycle, it is necessary to allocate each compartment within the timber production area into five year felling coupes to fit as closely as possible to a forty year period between planned felling and the time of last entry. This process is described in detail in the MoP Section E. In order for this process to be properly carried out details of compartment history are needed and for this reason, the maintenance of a compartment register is essential.

2.8 The area available and the age structure of the regeneration within the timber production area of a single reserve will in many cases be insufficient to provide adequate timber for an economically viable TUC. Even where the strategic management plan has been prepared for a Forest Management Unit of total area (all zones) of around 500 km<sup>2</sup>, the area available for timber production might still be considered inadequate. In such circumstances re-grouping of reserves for purposes of timber production may be necessary. For details on the process of operational planning for TUCs on reserve including the award of the TUC contract, you are referred to MoP Section F.

#### Stock Surveys and Allocation of Yield.

2.9 The Forest Service has adopted a procedure of 100% stock surveys following the award of TUCs. All commercial species of diameter in excess of 50 cm (and 30 cm for a few species) are measured and recorded and their position noted on survey sheets. All Black Star species are recorded (regardless of their size). The survey is used not only to record the position of potential harvestable trees but to detail information required for the implementation of fine-grained protection rules, this takes into account such matters as:-

- distribution of trees within the compartment
- condition of the forest canopy and understorey
- need to retain more trees in sensitive areas
- need to retain seed trees
- protection of 25m wide riparian strips
- slopes, swamps and rocky areas
- protection of any rare species

2.10 Strict rules set the number of trees that can be felled per ha and the total cut allowed for each species is fixed by application of one of two yield formula (referred to as “standard” and “reduced”). The process of stock surveys and yield allocation are the subject of MoP Section D. Yield approval is given in the form of a felling permit which lists the stock survey number and species of all trees that can be felled.

*Indicative Level of Production*

2.11 The plan should provide an indicative level of production expected from the timber production zone, based on information derived from pre-exploitation inventories or from actual yields derived from this reserve or an adjacent reserve where conditions are similar.

2.12 Assistance from FMSC may be required on this aspect, though the DFO will be supplied with all relevant information taken from the national forest inventory plus any other subsequent studies as part of the Part 1 exercise.

*Rights and Responsibilities:*

2.13 The following rights and responsibilities apply to this zone:-

- a) The Forest Service has the responsibility for ensuring that the TUC is allocated only within the timber production areas of the reserve and ensuring that the consultation process has been correctly adhered to with respect to the preparation of the Timber Operational Specifications and the Social Responsibility Agreements required under the TUC procedures.
- b) The Forest Service has the responsibility for ensuring that the concessionaires adhere to the regulations of the Logging Manual in all respects.
- c) The Forest Service also has the responsibility for ensuring that all payments are collected on behalf of the landowners and the Government and that accounts of all such receipts are properly maintained for inspection .
- d) The communities have the responsibility of adhering to the TUC and allowing unfettered access to the site by the contractor, providing he has adhered to the contract. They have the joint responsibility with the Forest Service and the contractor of controlling illegal logging, encroachment and forest fire.
- e) The contractor has the responsibility to respect the rights of the landowners and to ensure that the all aspects of the contract are adhered to.
- f) The communities have a restricted right to collect specified NTFPs . The range of NTFPs to be agreed at the time of plan preparation.
- g) The contractor has the right to access to the site and the removal of timber in accordance with the terms of the contract and the procedures of the implementation of the TUC.
- h) The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.
- i) The Forest Service has the right to stop the operation of the contractor if he is seen to operating in breach of the TUC agreement

### **3. NTFP Production Areas**

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>
NTFP Production Areas	Areas identified by rights holders as important NTFP collecting grounds which do not fall into the protection designations.	Sustainable production of NTFPs for local and commercial use

*Measurable Objectives:*

3.1 Sustainable production of NTFPs (including bushmeat) for domestic use by local communities and for meeting the demands of controlled commercial trading .

3.2 The type of NTFPs traditionally collected and traded by the local communities will have be defined during the initial field investigations (refer Instruction Sheet 2.4) and the collection sites identified. Although the collection of NTFPs will be a right for the local communities (with some controls) in all the zones - with the exceptions of the SBPAs and the Fauna Protections Areas; this zone defines special collection areas to be set aside where normal logging is excluded. In such areas a measurable objective will be that the harvestable volume is maintained or increased, and that the boundaries of the area are respected by other forest users.

3.4 *Management Regime*

No commercial logging. Selective felling to create light gaps to encourage the growth of selective NTFPs permissible

3.5 *Management Prescriptions*

- All compartments with more than 65% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- No commercial logging
- The selective opening the of canopy and removal of undergrowth to be undertaken in accordance with the silvicultural requirements of the NTFPs being encouraged
- Propagation of NTFPs to be undertaken in suitable sites, but any extensive opening of the tree canopy permissible only on a case by case basis.
- Hunting to be controlled through the issue of licences and agreed quotas

*Indicative Level of Production*

3.6 The plan should provide an indication of the level of production to be expected for any commercially traded product. Figures will in most cases have to be based on historical trade figures supported where possible by local knowledge on number of headloads etc. removed. The assistance of the Community Forestry Management Unit in FMSC should be consulted for background information on the standard production levels to be expected to assist in completing this section.

3.7 It is unlikely that the district team will feel that they have adequate information to differentiate the target level of NTFP production from this zone from the expected production from all the other zones where NTFP collection is acceptable practice. In most plans, the total production for the entire reserve/FMU will be the best that can be achieved.

3.8 *Rights and Responsibilities:*

- a) The Forest Service has the responsibility for ensuring that the NTFP Production Area is excluded from the TUC area.
- b) The communities have a responsibility for ensuring that no tree felling is undertaken without a permit and no cultivation is undertaken except for the production of recognised NTFPs

- c) The communities have a responsibility for ensuring that no fire is used for clearing undergrowth and that any such work is only undertaken as part of an approved programme.
- d) The communities have a responsibility for ensuring that all hunters are duly licensed and adhere to self-managed quotas
- e) The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.
- f) The community have the right to keep the revenue generated from the sale of the NTFPs less any royalty that has been defined within the plan.

#### 4. Plantation Production Areas

Area Category	Characteristics	Objectives of Management
<b>Plantation Production area</b>	Existing stands of artificially regenerated areas	Income generation from timber pole and fuelwood production maximised in accordance with professional forestry technical and commercial principles

4.1 *Measurable Objectives:* Regular production of marketable produce providing a commercial return on investment

4.2 *Management Regime:* Plantations established by use of seedling stock (rarely direct seeding) and managed in accordance with well tested silvicultural principles specific to the particular species using thinning at defined intervals to maximise production of material of commercially desirable diameters.

4.3 *Management Prescriptions- summary*

- Plantation area divided into compartments of 50 ha approx.
- seedlings raised in nurseries as potted stock
- standard silvicultural regimes applied for:-
  - weeding
  - thinning
  - pruning
  - and the timing of final felling
  - method of crop replacement
- Extensive use of contract labour to undertake all operations
- Possible use of taungya principles for crop replacement and initial establishment
- Competitive bidding for sale of produce
- Competitive bidding for the incorporation of existing plantations into new plantation development projects.

*Management Prescriptions -detailed*

#### Formation of Compartments

4.4 Compartments of approximately 20- 50 ha are to be used. Where this mean making use of the standard natural forest compartment of 128 ha then it will be divided into four and numbered in

accordance with the old compartment number but with an additional suffix ( i.e. 48/1, 48/2 etc.). Compartments should be pillared and the boundaries kept clean. (Refer Plantation MoP Section A)

4.5 A compartment register is required to be maintained providing information on the compartment location and all activities undertaken and a 1:10,000 scale compartment map prepared.

#### Seed Production and Collection

4.6 Seed has been traditionally collected from locally identified seed stands or from standard stock. this has led to the use of material of poor genotype and in the future the standard practice will be only to use seed approved by FORIG for the plantations on-reserve

#### Forest Nurseries

4.8 Planting stock is raised as tubed stock using direct sowing into the polythene pots or tubes or making use of separate germination beds where seed is known to demonstrate irregular germination. Reference should be made to the Plantation MoP Section B.

#### Silvicultural Operations

4.9 Weeding is required until canopy closure. The prescribed treatment being clearance of the planting lines for a width of 2 m as often as is required during the season (refer Plantation MoP Section C). All weeding is by hand. In the future, where slope and site access permits, the selective use of mechanical weeding will be necessary for large scale plantation development..

4.10 Silvicultural selective thinning is standard and prescribed thinning regimes are available for teak, Cedrela/Ofram and Gmelina, (Plantation MoP Section C). Regimes for other species will be made available from FORIG as required. Pruning in order to reduce knot incidence will be essential for the final crop if international markets are being aimed for or the material is destined for peeling.

4.11 Past practice has been to make use of taungya for plantation establishment. This practice can still be used for small areas and where old plantations are being replaced under the direction of the Forest Service. However it is unlikely to be a standard practice where large scale plantation development is being undertaken under commercial contracts.

#### Competitive Bidding

4.12 The use of competitive bidding and fixed contracts for thinning and other operations should be considered the normal practice, since the Forest Service will not maintain a sufficient permanent labour force to undertake such work. Local communities should be encouraged to bid to undertake such operations in order to retain as much income as possible within the community.

#### *Indicative Level of Production*

4.13 The plan should provide an indicative level of production expected from the plantations, based on the age structure and details of the stocking and standing volume provided by the recent national inventory. This should be in a summary form covering a period of about 20 years if the DFO feels that the data is adequate to show this. The level of planting or replanting would be indicated based on the expected time of clear felling.

4.14 As an attachment to the strategic plan, there will be five year operational plans (refer MoP Section B), in which as much detail as possible will be required on the level of activities and level of production over the next five years.

4.15 Assistance from FMSC may be required on this aspect, though the DFO will be supplied with all relevant information taken from the national forest inventory plus any other subsequent studies as part of the Part 1 exercise.

4.17 *Rights and Responsibilities:*

- a) The Forest Service has the responsibility for ensuring that the plantations are managed in a commercially and technically responsible manner.
  
- b) The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

**5. Conversion Areas**

<b>Area Category</b>	<b>Characteristics</b>	<b>Objectives of Management</b>
Conversion or Plantation Development Area	Areas where forest cover and regeneration is minimal and might be suitable for conversion to plantations. A guide of 5m <sup>2</sup> basal area or less would suggest this condition.	To restore tree cover on severely degraded areas of the forest reserve, through the establishment of plantations, in order to restore environmental functions and to generate revenue for the resource owners.

5.1 *Measurable Objectives:* Degraded forest land restored to productive use through the establishment of commercially viable plantations.

5.2 *Management Regime:* Land initially identified as supporting very degraded forest, confirmed to be classified as condition class 6 and unsuitable for regeneration. It is set aside for plantation development by the private sector

5.3 *Management Prescriptions:*

- Initially zonation from satellite imagery, supported by reconnaissance, to indicate extent of the degraded area.
- More detailed surveys to confirm forest is generally condition class 6 and that the frequency of regeneration is too low to be viable.
- All compartments with more than 65% of its area falling in this zone to be managed in accordance with the approved regime. Otherwise the compartment can be subdivided and managed separately.
- Maps of the zone made available at appropriate scale (1:10,000 - 1,50,000) depending on extent, and boundary descriptions prepared
- Private sector investment for an approved forestry plantation programme initiated
- Forest Service to undertake site assessment studies in order to assist private sector investors on possible sites and growth potential.
- Would-be investors required to undertake feasibility studies and business development plan for consideration.
- Would be investors required to undertake a full EIA and SIA
- Plantation developers enter into an agreement with the resource owners which specifies property rights, social responsibilities and benefit-sharing arrangements.
- Plantation development undertaken under a fixed (long) term contract with guidelines on the technical requirements expected from the Forest Service.

5.4 *Indicative Level of Production:* The plan should provide an indicative level of production expected from the plantations development area, based on average production levels for key indicator plantation species likely to be suited to the site. Assumptions will need to be made on the amount of land likely to be found suitable for planting .

5.5 *Rights and Responsibilities:*

- a) The Forest Service has the responsibility for ensuring that the land is put into useful production as soon as possible.
- b) The Forest Service has the responsibility of ensuring that the selection of the contractor is carried out in fair and transparent manner and to the satisfaction of the land owners
- c) The Forest Service has the responsibility of monitoring the programme and ensuring that all the guidelines relating to quality of stock, silvicultural management and protection are fully adhered to.
- d) The successful contractor has the responsibility of developing the site in accordance with the management proposal.
- e) The contractor has the right to develop the site without interference providing all aspects of the contract are adhered to.
- f) The community has the right to be kept informed of the selection process for the contractors and the reasons for selecting a particular candidate. The approval of the landowners will be required before the contract can be issued.
- g) The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**

**Instruction Sheet A2.8 Provisional management planning for local people**

**1. Introduction**

1.1 This instruction sheet provides guidance on management planning for provision of benefits to the local communities and the land owners.

**2. Revenue From Forest Reserve Management**

2.1 *Management objective:* To ensure that as owners of the reserve, the people of ..... shall receive the gross revenue arising from the utilisation of the forest reserve in accordance with this management plan, less any deductions the Forest Service is authorised to make by law in order to carry out its operations

2.2 *Management regime:*

Forest Service will collect all revenue on behalf of the owners and will disburse the revenue to the Administrator of Stool Lands for onward distribution to the Stool, Traditional Authority and District Assembly in a timely manner and in accordance with the 1992 Constitution.

2.3 *Management prescription:*

- Service agreement with forest owners to stipulate that the Forest Service will be required to extract maximum market value from forest exploitation and make deductions for management expenses only against activities that have been agreed in the management plan.
- Accounts on all transactions to be maintained and summarised on a monthly basis as part of the standard monthly reporting procedure. A financial report to be prepared as part of the annual report for each reserve/FMU (refer Instruction Sheet 2.11) each of which should be made available to the public.
- All records of revenue disbursements to traditional authorities, stools and district assemblies will be made public in order to ensure the members of the resource owning communities are fully apprised of transactions being made on their behalf.

2.4 *Indicative levels of revenue:*

Forest Service should be able to make projections of the likely revenue flows in the period of the plan based on the TUC agreements and historical levels of NTFP marketing.

2.6 *Rights and responsibilities:*

- a) The Forest Service has the responsibility of ensuring that full records of all receipts and expenditure are maintained and available for public scrutiny
- b) The Forest Service has the responsibility for ensuring that all revenue owed to the land owners is returned to them without delay on the basis of quarterly transfers
- c) The Forest Service has the responsibility of presenting an annual financial statement as part of the annual reporting programme. Such reports will be in the public domain
- d) The land owners/communities have the right to request details of all transactions carried out on their behalf.

- e) The land owners/communities have the right to be informed of how the Forest Service has made use of the management fees retained under the agreements
- f) The resource owners have the right to sue the Forest Service for any failure to collect and disburse revenue or for delays in forwarding revenue. The resource owners have the right to receive interest on any late disbursements.
- g) The Forest Service has the right to retain a fee for their services, providing it does not exceed the stated terms of the agreements

### 3. Access To Forest Products

#### Domestic Use

*3.1 Measurable objective:* To maintain a perpetual flow of forest produce to communities with domestic user rights in order to fulfil some of their household requirements for forest produce.

*3.2 Management regime:* Local communities identified as having domestic user rights will be allowed free and unhindered access to the reserve to collect forest produce in accordance with the harvesting rules agreed between representatives of all communities and the Forest Service.

*3.3 Management prescriptions:*

- Harvesting rules can be agreed for all management zones, however in the case of SBPAs and Fauna Protection Areas there may be severe restrictions on the collection at least for the core areas.
- Socio-economic assessment of the critically important NTFPs and other forest produce, harvesting levels, traditional controls, marketing processes, scale of use within the community, household needs assessment and level of export out of the area.
- Resource assessment of each critical NTFP
- Formulation of rules and agreements for harvesting of each NTFP on sustainable basis, incorporating as much as possible the traditional practices and controls.

*3.4 Indicative levels of production:* The Forest Service should be able to stipulate the amount each household can take based on the agreed rules and historical levels of collection.

*3.5 Rights and Responsibilities:* Specific rights and responsibilities will be defined in each domestic use agreement. General provisions are:-

- The Forest Service has the responsibility of ensuring that surveys and negotiations required to develop domestic use agreements are undertaken.
- The Forest Service has the responsibility of periodic monitoring of exploitation according to the harvesting rules and periodic monitoring of the condition of the resource.
- The Forest Service has the responsibility of ensuring that no NTFPs are harvested by the TUC holder and his employees and that TUC operations are sympathetic to NTFP production.
- The Forest Service has the responsibility of ensuring that all FS staff are aware of the agreed domestic use rights.
- The FS has the responsibility to prosecute outsiders not in the possession of domestic use rights who harvest forest produce unlawfully.
- All members of the communities with user rights have the responsibility for adhering to the rules and for ensuring fellow members the community do so and that outsiders do not enter the reserve.

- The holders of domestic use rights have the right to harvest NTFPs unhindered and free of charge as long as they adhere to the terms of the agreement.
- The holders have a right to be compensated for severe restrictions imposed in the interests of global biodiversity conservation.

### Commercial Collection and Marketing of NTFPs

*3.6 Measurable objective:* To formulate a ceiling for the sustainable level of the production of NTFPs within a reserve and ensure that production is maintained as close to this as possible in order to provide a direct revenue to the local community. The level of production to be constantly reviewed in the light of changes to the forest resource.

*3.7 Management regime:* Sustainable harvesting of NTFPs by forest user groups with rights to the reserve. The level of collection to be controlled by locally defined rules relevant to the specific forest management zone. Collection to be concentrated within the NTFP Production Area. Permits for the collection of NTFPs on a commercial basis will be issued by the Forest Service (refer the Guidelines on NTFP Production). If the communities with local user rights have no wish to harvest a particular NTFP, the Forest Service can issue a permit to a commercial collector from outside of the area. The same harvesting rules will apply. Tariffs will be set and revenue returned to the resource owners.

### *3.8 Management prescriptions:*

- Socio-economic assessment of the critically important NTFPs, harvesting levels, traditional controls, marketing processes, scale of use within the community, household needs assessment and level of export out of the area.
- Resource assessment of each critical NTFP
- Formulation of rules and agreements for harvesting of each NTFP on sustainable basis.
- Formulation on rules on number of individuals/groups to be allowed to collect
- Fixing of local tariffs
- Silvicultural interventions to increase production within the NTFP Production Areas

*3.9 Indicative levels of production:* The Forest Service should be able to stipulate the amount to be harvested following resource assessments and analysis of historical levels of collection. Levels will need to be constantly reviewed.

### *3.10 Rights and responsibilities:*

- a) The Forest Service has the responsibility to ensure that the collection of NTFPs is in accordance with the guidelines agreed for each management zone and to stop excessive cutting or where damage is being done to the forest.
- b) The Forest Users have the responsibility to adhere to all guidelines set for the level of harvesting and to respect the restrictions placed on specific management zones.
- c) The Forest Users have a right to increase the level of production of NTFPs when appropriate, within the NTFP Production Areas by removal of competing undergrowth and manipulation of light in accordance with prescriptions provided by the Forest Service
- d) The Forest Users have the right to freely collect such products without hindrance providing the locally agreed guidelines are adhered to
- e) The Forest Service has the right to warn, restrain or prosecute anyone who infringes the forest laws and wilfully damages the forest in this zone.



**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**  
**Instruction Sheet A2.9      Compilation of Part 1**

**1. Introduction**

1.1 This Instruction Sheet deals with the compilation of the Part 1 of the Management Plan. Part 1 should provide the reader with an overview of the present condition of the forest reserve/FMU in terms of the resource and its recent management. It should provide key information on the land owners with respect to their location and their property rights. Furthermore it should provide the main aspects relating to existing infrastructure and the administration that has controlled the reserve(s).

1.2 An important conclusion to Part 1 will be a SWOT analysis i.e. an examination of the **strengths** and **weaknesses** of the reserve/FMU in terms of its past management and the state and value of the resource coupled with an examination of the **opportunities** and **threats** to the future management of the reserve/FMU.

1.3 Part 1 should be focused on the main facts and should not dwell too much on the distant past unless figures (on production etc.) are readily at hand and are relevant to understanding the present situation and the future management. There is for example probably little need to collect revenue and production figures beyond 10 years in the past - unless there is a major change in trend to be emphasised and the data is available without excessive research.

1.4 The main task of compiling Part 1 will fall to the regional planning team with active support of the district staff and FMSC. The latter should assist in synthesising all the relevant information from the national inventories and providing the location maps for Part 1, together with the zonation maps that will be required for compilation of Part 2

**2. Structure of Part 1**

2.1 The composition of Part 1 of the plan can be varied in accordance with local conditions, however the regional teams are strongly recommended to use the following framework where relevant. Notes explaining the content of some of the sections are given in italics.

**PART 1:      CURRENT SITUATION**

**SECTION 1: LOCATION AND EXTENT**

- 1.1 Geographical location [*and 100,000 map*]
- 1.2 Area, perimeter
- 1.3 District Administration

**SECTION 2: PROPERTY RIGHTS**

- 2.1 Ownership of the reserve
- 2.2 Date of gazettment and management rights  
*(dates of any excisions)*
- 2.3 Domestic usufruct rights /customary rights
- 2.4 Timber harvesting rights

- 2.5 NTFP commercial harvesting rights
- 2.6 Others (*e.g. prospecting or mining rights  
plantation development rights*)

### SECTION 3: LOCAL CONTEXT

- 3.1 Demography
- 3.2 Economy
- 3.3 Local people's relations with the reserve
- 3.4 District Development Plan

### SECTION 4: STATE OF THE FOREST RESOURCE

- 4.1 Physical features
- 4.2 Natural forest  
(*extent, composition, condition class, GHI etc. and reference to summaries  
from the national inventory included as appendices*)
- 4.3 Plantation forest  
(*extent, composition, condition- details of the national inventory and summaries of  
the relevant tables provided as appendices*)
- 4.4 Non timber forest product resources
- 4.5 Wildlife resources
- 4.6 Factors affecting the forest resource  
(*fire, encroachment, illegal felling, etc.*)

### SECTION 5: PAST MANAGEMENT FOR PROTECTION AND RESEARCH

- 5.1 Environmental protection areas
- 5.2 Biodiversity protection areas
- 5.3 Fauna protection
- 5.4 Fire protection
- 5.5 Research areas (*including PSPs*)

### SECTION 6: PAST MANAGEMENT FOR PRODUCTION

- 6.1 Timber production areas  
(*compartments, harvesting schedule, progress map, production levels  
over the last 10 years*)
- 6.2 Plantation production areas  
(*compartments, planting final felling and thinning over the last 10  
years, other operations over the last five years, summary of  
production over the last 10 years*)
- 6.3 Non timber forest production (inc. bushmeat)  
current management, markets and opportunities, main results from  
NTFP survey, issue and control of hunting licences)

**SECTION 7 PAST MANAGEMENT FOR LOCAL PEOPLE**

- 7.1 Domestic use rights
- 7.2 Revenue collected and distributed to owners in last 10 years
- 7.3 Cultural sites

**SECTION 8: INFRASTRUCTURE and ADMINISTRATION**

- 8.1 Access roads, tracks, pillars, forest stations, FG posts, forest nurseries
- 8.2 FD responsible office and staffing
- 8.3 Income & expenditure ratios

**SECTION 9: CONCLUSION**

- 9.1 Strengths and weaknesses of past management
- 9.2 Opportunities and threats to future management

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**  
**Instruction Sheet A2.10                      Compilation of Part 2**

**1. Introduction**

1.1 The compilation of Part 2 of the management plan is outlined in this Instruction Sheet. This will be compiled by the regional planning team, the district staff and support from FMSC as required. The latter will be required to provide overlay maps of all the provisional management zones

**2. Structure of Part 2**

2.1 The composition of Part 2 of the plan can be varied in accordance with local conditions, however the regional teams are strongly recommended to use the following framework where relevant.

**PART 2: PROPOSALS FOR FUTURE MANAGEMENT**

**SECTION 1: GOAL OF FOREST RESERVE MANAGEMENT**

**SECTION 2: BENEFICIARIES of FOREST RESERVE MANAGEMENT**

- 2.1 The national interest
- 2.2 The resource owners

**SECTION 3: GENERAL OBJECTIVES AND ZONATION OF THE FOREST RESERVE**

- 3.1 Protection objectives and zones
- 3.2 Production objectives and zones
- 3.3 Beneficiary objectives and zones

**SECTION 4: MANAGEMENT FOR PROTECTION**

- 4.1 Hill Sanctuaries
  - 4.1.1 Measurable objective
  - 4.1.2 Management regime
  - 4.1.3 Management prescriptions
  - 4.1.4 Rights and responsibilities
- 4.2 Swamp Sanctuaries
  - 4.2.1 Measurable objective
  - 4.4.2 Management regime
  - 4.4.3 Management prescriptions
  - 4.4.4 Rights and responsibilities
- 4.3 Provenance protection areas
  - 4.3.1 Measurable objective
  - 4.3.2 Management regime

- 4.3.3 Management prescriptions
    - 4.3.4 Rights and responsibilities
- 4.4 Special biological protection areas
  - 4.4.1 Measurable objective
  - 4.4.2 Management regime
  - 4.4.3 Management prescriptions
  - 4.4.4 Rights and responsibilities
- 4.5 Cultural Areas
  - 4.6.1 Measurable objective
  - 4.6.2 Management regime
  - 4.6.3 Management prescriptions
  - 4.6.4 Rights and responsibilities
- 4.6 Research Areas
  - 4.7.1 Measurable objective
  - 4.7.2 Management regime
  - 4.7.3 Management prescriptions
  - 4.7.4 Rights and responsibilities
- 4.7 Fauna Protection Areas
  - 4.8.1 Measurable objective
  - 4.8.2 Management regime
  - 4.8.3 Management prescriptions
  - 4.8.4 Rights and responsibilities
- 4.8 Fire Buffer Zone
  - 4.9.1 Measurable objective
  - 4.9.2 Management regime
  - 4.9.3 Management prescriptions
  - 4.9.4 Rights and responsibilities
- 4.9 Fire Shelterbelts
  - 4.10.1 Measurable objective
  - 4.10.2 Management regime
  - 4.10.3 Management prescriptions
  - 4.10.4 Rights and responsibilities
- 4.10 Convalescence (and Enrichment) Areas
  - 4.11.1 Measurable objective
  - 4.11.2 Management regime
  - 4.11.3 Management prescriptions
  - 4.11.4 Rights and responsibilities

## SECTION 5: MANAGEMENT FOR PRODUCTION

- 5.1 Timber Production Area

- 5.1.1 Measurable objective
- 5.1.2 Management regime
- 5.1.3 Management prescriptions
- 5.1.4 Indicative levels of production
- 5.1.5 Rights and responsibilities
  
- 5.2 NTFP Production
  - 5.2.1 Measurable objective
  - 5.2.2 Management regime
  - 5.2.3 Management prescriptions
  - 5.2.4 Indicative levels of production
  - 5.2.5 Rights and responsibilities
  
- 5.3 Plantation Production Area
  - 5.3.1 Measurable objective
  - 5.3.2 Management regime
  - 5.3.3 Management prescriptions
  - 5.3.4 Indicative levels of production
  - 5.3.5 Rights and responsibilities
  
- 5.4 Conversion / Plantation Development Area
  - 5.4.1 Measurable objective
  - 5.4.2 Management regime
  - 5.4.3 Management prescriptions
  - 5.4.4 Indicative levels of production
  - 5.4.5 Rights and responsibilities

## SECTION 6: MANAGEMENT FOR LOCAL PEOPLE

- 6.1 Revenue from forest reserve management
  - 6.1.1 Measurable objective
  - 6.1.2 Management regime
  - 6.1.3 Management prescription
  - 6.1.4 Indicative levels of revenue
  - 6.1.5 Rights and responsibilities
  
- 6.2 Access to forest products for domestic use
  - 6.2.1 Measurable objective
  - 6.2.2 Management regime
  - 6.2.3 Management prescription
  - 6.2.4 Indicative levels of production
  - 6.2.5 Rights and responsibilities

## SUPPORTING MAPS

*[note the scales mentioned relate to the accuracy of the source material. Since the information is to be recorded in digital format within a GIS, it is theoretically possible to produce the maps at any desired scale]*

1. Location map [100,000 scale]
2. Reserve boundaries, administrative boundaries, main rivers, settlement centres [50,000]
3. Protection zones:
  - Hill Sanctuaries [1:50,000]
  - Swamp Sanctuaries [1:50,000]
  - Provenance protection areas [1:10,000]
  - Special Biological Protection areas [1:10,000]
  - Synthesis of high fire risk area [1:50,000 ]
  - Shelterbelts [1:20,000]
  - Cultural/sacred areas [1:10,000]
  - Research areas [plus PSPs] [1:10,000]
4. Production zones:
  - Past compartment map [1:20,000 scale]
  - Progress map [1:20,000]
  - New compartment map [if different] with harvesting schedule [1:20,000]
  - Special NTFP collection areas [1:20,000]
  - Regenerating forest areas (Convalescence) [1:20,000]
  - Conversion Areas/ Plantation development areas [1:10,000]
  - Plantation Production Areas (compartment maps) [1:10,000]

Note: the above information will be held in FMSC in the form of GIS overlays. In order to minimise the number of maps that need to be referred to by the manager, it would be expected that a combination of the above themes would be used in such a manner as to reduce the separate sheets to a minimum without compromising clarity.

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**A2. Forest Reserve Management Plans**  
**Instruction Sheet A2.11    Compilation of Part 3**

**1. Introduction**

1.1 Part 1 and Part 2 will form the main part of the plan. However there should be final section which lays out the method of implementation of the plan and in particular to clarify the management and financial responsibilities of the Forest Service acting as the manger of the forest on behalf of the landowners and the nation.

1.2 Furthermore, the monitoring and reporting procedures need to be stated and the targets for achievement spelt out. At this stage detailed operational planning is not required, that is carried out for intervals of five years and follows on after the strategic planning process has been completed.

1.3 Once the strategic objectives of forest reserve management have been established, the manager will carry out programmes of operations to deliver the objectives to the clients to the agreed standards. Some operations such as timber harvesting will require the manager to engage the services of contractors. Other activities such as boundary clearing and maintenance of fire breaks could be carried out on an annual contract with local community work groups. The establishment of this new relationship between the manager, client and contractor is critical to the successful operation of the new reserve management system:-



**2. Outline of the Structure of Part 3**

2.1 Below is a suggested structure for Part 3:-

**PART 3: PROPOSALS FOR IMPLEMENTATION**

**SECTION 1: ADMINISTRATION AND FINANCE**

- 1.1 Infrastructure development and maintenance
  - 1.1.1 Types of Activity
  - 1.1.2 Operational Arrangements
- 1.2 Reserve/FMU administration
  - 1.2.1 Responsibilities
  - 1.2.2 Operational Planning Process
- 1.3 Reserve finance
  - 1.3.1 Objective
  - 1.3.2 Financial agreement

**SECTION 2: MONITORING and REVISION**

- 2.1 Monitoring system
  - 2.1.1 Objectives [accountability, transparency, assess progress]
  - 2.1.2 Parameters/indicators.
  - 2.1.3 Records and reporting
- 2.2 Procedures for revision of the plan

2.2 The plan will need to detail the method to be used for administering the area and set out the overall responsibilities of the Forest Service and the community/land owners in terms of resource management and financial accountability.

2.3 Since the Forest Service is not going to have access to a continuous pool of labour, most maintenance work will be carried out using contract labour. Much of this work could be undertaken in collaboration with the local communities living around the reserve - such arrangements would have the benefit of ensuring that revenue generation stays within the area and gives a greater incentive for the communities to protect the reserve. For the large scale developmental operations - Timber production and plantation development - the Forest Service would intend to use contracts awarded on a competitive system. The local communities would have the right to take up such contracts provided they were able to meet the standards required.

2.4 The DFO as the manager of the reserve/FMU will be required to prepare an operational plan covering a five year period. This will synthesis the work to be carried out over the next five year period and will therefore require the setting of priorities. Such a plan would need to be roughly costed and incorporated into the Annual Programme of Works for the district. The community would be expected to approve such a plan (reference should be made to MoP Section B)

2.5 The management plan will need to spell out the arrangements for the return of revenue to the land owners and the proposed level of management fee to be deducted by the Forest Service. Methods of recording this information will need to be detailed and the endorsement to the financial arrangements would be needed as part of the consultation process. Annual accounts would be part of the standard annual reporting procedures (see below)

#### Monitoring

2.6 For a strategic plan to have any real value, there must be a series of well defined targets and indicators of achievement in order that the management abilities of the Forest Service can be judged. All plans are subject to revision and amendment and the need for such revision will be made on the basis of how well targets have been achieved. For the forest reserve management plans the following indicators will be appropriate:-

1. Have all the management zones been maintained in accordance with their original boundaries?
2. Have all the prescriptions been adhered to ?
3. What has been the incidence of fire - has there been a measurable reduction in the incidence of fire and the level of damage?
4. Has the timber production area been leased out in accordance with a recognised TUC agreement?
5. Has the contractor fulfilled the conditions of the TUC in terms of the Social Responsibility Agreements and payment of royalties?
6. Has the Forest Service provided annual statements of the income and expenditure for the reserve and ensured that the full financial entitlements of the community have been handed over in a satisfactory manner?
7. Have there been regular meetings between the Forest Service and the community representatives on matters of mutual interest.?
8. Has the number of disputes between the Forest Service and the communities and any contractors been kept to an acceptable level and showing no annual increase?

2.8 The DFO should be in a position to summarise the main information that will answer these questions for each **reserve** under his control on an annual basis.

**BOX 1**  
**OUTLINE OF FOREST RESERVE ANNUAL**  
**REPORT**

1. Protection Activities
2. Production Activities
  - TUCs in Operation
  - Compartments being logged
  - Deviations (if any) from plan
  - Volume of timber felled and extracted
  - Statement of royalty owed
  - Statement of Royalty collected
  - Statement of revenue disbursed to owners
3. Other income-generating activities
  - Details of products and quantities
  - Statement of income generated
  - Statement of Income disbursed
4. Activities by the Communities
5. Expenditure by Forest Service
  - Statement of Staff expenditure and Maintenance of  
Structures
  - Statement of operational expenditure
6. Summary of work achieved and income raised against targets
7. Conclusions on Progress and Problems encountered

Plan Revision

2.9 The strategic plan would only be revised if there was a major change in the state of the resources or overall management strategy that made such a revision necessary. However the plan should be regularly reviewed and those sections that are clearly out of date revised. As a rule of thumb, the strategic plan can be assumed to have a life of 20 years. It would probably need to be extensively revised if there should be new inventory or mapping exercise requiring a modification of the present zones.

2.10 The operational plan prepared for each reserve will be for a fixed period of five years.

**Manual of Procedures - Forest Resource Management in the HFZ**  
**MOP Section A - Strategic Planning**

**Part 2. Forest Reserve Management Plans**  
**Instruction Sheet A 2.12 The Consultation Process**

**1. Introduction**

1.1 The Forest Service manages the forest reserves on behalf of two clients: the resource owners and the nation. A portion of the revenues accruing to the resource owners from the harvesting of their resource will eventually be retained to pay for the implementation of the management plans. It is a legal requirement that the support of the resource owners is sought before the plan can be implemented. This instruction sheet explains the processes for formal consultation, review and endorsement.

1.2 Experience has clearly shown that unless the landowners are actively involved in the decision process, the plan and the forest itself will be seen to be government property and the communities will have little interest in protecting the resource.

1.3. There is a legal requirement for the consultation process as indicated in Part II of the 1998 Forest Act:-

The Forest Service is required to:-

- a) consult with relevant land owners, communities and District Assemblies regarding proposed management of resources in their areas;
- b) based on such consultations, prepare a draft management plan for every forest reserve or group of reserves to be managed as a unit;
- c) submit each draft forest reserve management plan to the Forestry Commission for review
- d) publicise every draft plan in order to obtain the support of the owners or users of the concerned lands and any concerned persons

**2. Overview of consultation process**

2.1 The basic steps in the process are:

- Early discussions with community leaders and the District Assemblies to inform them of the intention of carrying out the plan preparation and explain its scope (refer Instruction Sheet 2.2)
- Collection of basic information on the reserve including community rights (Instruction Sheet 2.2)
- Detailed consultations with forest user groups as part of the field reconnaissance process (Instruction Sheet 2.4)
- Distribution of the draft management plan to community leaders
- Reserve Planning Workshop to explain the zonation and management prescription being recommended
- Revision of the plan on the basis of suggestions received
- Distribution of the amended plan and second workshop if considered necessary
- Endorsement by representative of the land owners and District Assemblies

### 3. Reserve Planning workshop

3.1 The most efficient way of consulting the communities and involved groups is to organise a reserve planning workshop within the area. In those cases where the strategic plan is covering a series of separate reserves - it may prove necessary to hold such a workshop separately at each reserve - it will depend on the distance between the reserves and the number of communities linked to a particular area. Prior to the workshop the planning team should distribute copies of the draft plans to all the invitees.

3.2 The objectives of the workshop are to:

- Introduce the general concept of integrated forest reserve management to the resource owners, District Assemblies and selected stakeholders
- Present the plan, explain how proposals were arrived at and review it with the resource owners, District Assemblies, local FD staff and other stakeholders
- Invite comments and changes to the plan based on the local knowledge and aspirations of the resource owners and use the opportunity to gather key information on such matters as NTFP use and marketing processes etc.
- Reach a consensus on the forest reserve management plan [objectives, zoning and main prescriptions] with the resource owners and gain their support for its implementation.
- Agree on a programme to implement the plan
- Establish a monitoring system to oversee implementation and to provide for review..

#### Participants:

3.3 A suggested list of participants is given below, there will be local modifications:-

- All resource owners - paramount and stool chiefs
- Representatives of the concerned District Assemblies - in particular the Chairmen of the Environmental and Development Committees
- Representatives of all communities with user rights
- Representatives of each of the different interest groups, i.e.
  - Leading farmers
  - Timber contractors
  - Possible investors in plantations
  - NTFP collectors and dealers
  - Hunters

3.4 The workshop should be jointly organised by district and regional forestry staff ensuring that the technical officers working in the reserves are in attendance. Assistance from FMSC can be requested especially in the production of the maps and to provide advice on the presentation of the findings.

#### Preparations

3.4 The planning team will need to put together the following materials:

- large scale outline map (1:10,000 -25,000 scale) depicting the reserve(s) boundaries, the key approach roads and any utilisable tracks within the reserve. The same map can be used to depict the extent of the Hill Sanctuaries

- overlays of all the protection zones (ideally as a series of transparent overlays at the same scale as the base map)
- overlay of existing compartment map and progress map
- production zones
- compartment maps of the plantations
- convalescence and possible conversion areas
- copies of the draft management plan

### Activities

3.5 Below is an indication of the programme and activities to be covered in such a workshop. Expanded guidelines on organising such a workshop are available from FMSC.

- 1) Opening ceremony
- 2) Expectations of the workshop
- 3) Workshop overview: state of the nations forests and new policy
- 4) Workshop objective
- 5) Importance of planning and the role of the forest reserve management plan
- 6) Review of part 1
- 7) Review of Part 2
- 8) Review of Part 3
- 9) Evaluation of comments received
- 10) Proposed timetable for modifications etc.

3.6 The timetable for such a meeting is difficult to predict, but matters should not be rushed and a time range of 1-4 days should be allowed depending on the complexities of the area.

3.7 In making the presentations there are certain key points and issues that will be common to most reserve plans that should be got over to the audience, for example:-

- The critical change in the type of management now being put into practice and the changes in the forest law that have been made to empower these changes. The role of the Forest Service as the manager meeting the needs of its clients, and hence the acceptance of accountability.
- National interest in protected areas - the large grained protection areas serve a need outside that of the immediate land owners and changes to the extent of these zones could only be considered if the workshop was able to demonstrate an overwhelming reason for such a modification
- Community needs *vis a vis* the type and location of NTFP collection areas. The sort of traditional controls that are relevant. The local interest in NTFPs and the importance to local income including hunting.
- Clarification on the location of culturally sensitive areas and the restrictions to be imposed
- Experiences of past logging activities and the views on the extent of the timber production areas. Forest staff will need to outline the levels of production to be expected and any initial plans for TUCs. The opportunity should be taken to explain the TUC system and the controls that are being put into place. Limited attention could be given to the type of Social Responsibility Agreements that would be required.
- Level of interest in plantation activities should be gauged. The Forest Service staff should provide an indication of the level of production expected from the plantations and the sort of areas likely to be available for Plantation Development Areas.
- Interest by local groups in undertaking forestry operations on a contract basis
- History of fire damage and the reasons. Suggestions for its control and the possibility of recruiting volunteer watchers.
- Discussion of the SWOT analysis at the end of Part 1
- The monitoring process to be put into place and the reporting procedures

#### **4. Revision of the Plan**

4.1 Two members of the FS team should act as reporters of the meeting in order that all comments and possible changes are recorded. The DFO, the RFO or his deputy should go over the main points received before closing the meeting to ensure clarity of understanding. Minutes of the meeting should be made available as soon as possible and no more than 2 weeks.

4.2 Those changes that can be made should be completed quickly and the amended plan circulated whilst matters are still fresh in the participant's minds. If necessary, a second workshop might need to be called to explain the changes made. Such a meeting would likely be for 1 day only, unless the first draft was heavily criticised .

4.3 A formal endorsement will be required from the representatives of the land owners and the representatives of the District Assemblies before the plan can be forwarded to the Forestry Commission .

## **Forest Resource Management Planning in the HFZ Section A - Strategic Planning**

### **A3. District (and Regional) Forestry Development Plans Instruction Sheet A3.1 Introduction to the Plans and their Preparation**

#### **1. Introduction**

1.1 The Environmental Committees of the District Assemblies will in future have the responsibility for ensuring that a District Forestry Development Plan is prepared for a five year period and regularly updated. The District Assemblies have a right (see below) to request assistance from the Forest Service on completing this task.

1.2 The direct responsibility for ensuring that this work is done will be the RFO, but it is expected that the bulk of the work would be delegated to the respective DFO working as a part of a team alongside representatives of the local authorities, other agencies, NGOs and local interest groups. Much of the work off-reserve will be beyond the expertise of the DFO e.g. trees in farming systems.

1.3 The district planning process is an opportunity to explore the potential for forestry to support the development aspirations of the district. For instance, forestry can help maintain soil fertility for agriculture, it can generate revenue for community development projects and it can supply wood for rural forest-based enterprises.

1.4 The strategic planning process will examine the forest and timber resources of the area and the requirements of the local population for forest products and forest resources in support of district development aspirations. Strategic objectives and programmes to be pursued in order to develop the forestry potential of the area will be formulated.

1.5 In formulating the plan, the DFO will need to combine

- a) all the forest reserve management plans for the area;
- b) agreed and proposed TUCs off-reserve;
- c) the local forestry development programmes identified during the strategic planning process such as reforestation, dedicated forests, agroforestry initiatives, fallow management, NTFP production, fire control and the development of forest-based enterprises.

#### **2. Overview of the Planning Process**

2.1 The district forestry development plan will be part of the overall development plan for the district and as such it will require to fit into the format used for compiling the other sectors. The format for the plan may therefore be subject to district variations. Such plans are required at intervals of five years.

2.2 It will be the responsibility for the Chairman of either the District Environmental Committee or the District Development Committee to oversee contributions from each sector and to ensure that all contributions fit into a unified plan.

2.3 The plan should be seen to be strategic in content - providing guidance on the direction of development within the district and setting priorities for each sector and laying down the basis for mutual support between the various natural resource agencies. The plan should avoid becoming too enmeshed with operational details, since detailed breakdown of activities and the required budgets will

be dealt with at a later stage during the preparation of the DFO's Three Year rolling Plan and the Annual Programme of Works (refer MoP Section B). Figure 1 details the links between the two stages (refer Instruction Sheet 2.1)

2.4 The planning process will be a participatory one; different agencies, authorities and interest groups will be encouraged to form a planning team and to consult as widely as possible. Under the guidance of the Forest Service, the team will analyse the resource situation from available data (such as off-reserve inventory reports, and the reserve management plans) backed up by field visits.

### **3. Structure of the Plan**

3.1 The plan will need to cover the following aspects:-

#### Forest Resources and Production

- The total extent of the forest resources within the district - on reserve and off-reserve
- The extent of timber production areas identified on-reserve
- The present and future (5 years) situation with respect to TUCs on reserve and off-reserve
- The AAC for the district on reserve and off reserve
- The current and projected (5 year) level of permits
- The extent of plantations within the district on-reserve
- Their projected cut
- The area of plantation development areas believed to be available on-reserve
- The potential for off-reserve plantation development
- The present extent and potential for Designated Forests.
- Interest (on-going), or likely in the future, by investors in plantation development

#### Industries

- The number and distribution of timber industries within the district
- Their capacity versus current harvesting volumes
- NTFPs collection and marketing
- Potential developments

#### Extension and Farm Forestry

- Forest nurseries, demand and sales, seed supplies
- Community planting programmes
- NGOs, schools, community groups involved in forestry, agroforestry activities
- Potential developments

#### Environmental Problems

- Fire
- Illegal logging and controls
- Encroachment
- Critical areas identified for afforestation
- Potential developments

#### Administration and Cross-sectoral links

- Staff and resources of the Forest Service
- Revenue generation within the district and distribution
- Operating costs of the Forest Service
- Operational strengths and weaknesses
- Proposed changes and developments

3.2 The bullet points provide guidance only and will need to be adapted to suit the needs of the district and the particular directions of the district assemblies

#### **4. Preparation of the District Plan**

4.1 The DFO will need to refer to all the forest reserve management plans that have been prepared in order to summarise the main information on forest resources and production levels. For those plans that have been through the full planning process there will be 5 year Operational Planning Annexes for each reserve providing priority work to be carried out within a five year time frame. (Unfortunately there is no guarantee that the five year period of the forest reserve plans and the district development plans will coincide).

4.2 For those reserves where TUCs have been formulated and awarded, TUC Operational Plans (five years) will have been prepared as part of the operational procedures. Similarly for off-reserve TUCs, five year plans should be available (refer the Logging Manual for details).

4.3 For those DFO operating without a functional strategic management plan or indeed operational TUCs, estimated production can still be calculated on the basis of the national forest inventory data coupled with projected harvesting schedules. In such circumstances, DFOs may need to seek the advice of their RFOs and the FMSC.

4.4 In order to objectively analyse the priorities for extension activities and assess the relative importance of critical areas requiring afforestation inputs, the District Assembly will ideally need to conduct a series of field reconnaissance visits to supplement any reports from Technical Officers or community leaders on development proposals. The district planning team will attempt through local meetings and surveys to identify and rank the contributions forestry can make to district development.

4.5 The plan should attempt to fix priorities for potential development work and an indicative cost, leaving detailed costing to the 3 year Rolling Plan (refer MoP Section B).

#### Approval of the Plan

4.6 The draft plan should be presented to a district workshop run on similar lines to that for the strategic planning workshop for forest reserves. The participants should include traditional and local government authorities, government agencies, NGOs, farmers groups and TUC holders.

4.7 The plan should be reviewed by the RFO before forwarding to the District Assembly . After approval by the District assembly and incorporation into the District Development Plan, the plan should be copied to the RFO bringing to his attention any changes that have been requested by the Chairman and his committee.

#### **5. Preparation of a Regional Plan**

5.1 As an extension to the district planning exercise, regional staff may wish to amalgamate the district development plans into an overall regional plan, in order to gain an overview of targets for the forestry sector within the five year period. Some Regional Co-ordinating Councils may indeed request that this is carried out.

5.2 Under the Local Government Service Act, the Regional Co-ordinating Councils will be regarded as part of the Local Government Service and have a role of monitoring and co-ordinating development programmes. The region is expected to become the central focus for planning in the new

Forest Service with some of the roles of Planning Branch being devolved to the regional staff as their capability increases. Below is a suggested format with some of the key headings that might be used for such a plan:

### **Regional Forest Plan**

#### *1. Forest Resources*

- 1.1 on reserve
- 1.2 off reserve

A tabular summary of all the forest reserves indicating the regional totals of the various management zones. For the timber production zone a total indicative standing volume should be provided based on the TSP data and an indication of the sustainable cut.

Regional allocation for off-reserve felling (if available)

#### *2. Forest Production*

Statement of the TUCs either in operation or under preparation broken down for on and off-reserve. A summary statement of the level of production achieved over the last five years, plus a tabular summary of the proposed level of production for the forthcoming five years from a synthesis of the existing TUCs.

Summary of NTFP production on a commercial or at least semi-commercial level

#### *3. Industrial Development*

Statement of the capacity and disposition of the existing industries within the region and any firm proposals for expansion.

Major NTFP utilisation

#### *4. Forest Plantations*

Summary of existing plantation resources

Proposals for expansion

#### *5. Revenue Production*

Tabular statement of the district incomes over the last five years and projected income from timber, plantations and NTFPs.

#### *6. Fire and Environmental Protection*

Description of level of losses from fire, forest pests and illegal felling

### **6. Monitoring and Indicators of Achievement**

6.1 On an annual basis the RFO should be in a position to report to the Regional Co-ordinating Director and the Council, as well as to HQ, on the level of success that the Forest Service is having in fulfilling its management duties. The format of such a report should include:-

#### **Forest Management**

Number of reserves with and without vetted harvesting schedules. Comparison to previous year.

### **Timber Production**

#### On-reserve

Tabular statement by districts of the total timber extracted for current year and (for comparison) the previous year. Comparison to figures within regional plan.

TUCs in operation plus the area and number of TUCs not yet taken up

Area under logging for current year c.f. previous year, plus target for next year

#### Off -reserve

Number and area of operational TUCs

Identified TUCs still to be allocated

Tabular statement by districts of the total timber extracted for current year and previous year

Comparison to figures within the regional plan

#### Plantations

New planting

Tabular statement of timber extracted by districts

#### Royalties

Income generation by districts -summary of level of actual disbursements to landowners

Comparison to regional plan

### **NTFP Production**

District totals of commercial NTFP activities by quantity/value

### **Protection**

Number and extent of fire damage for the current and previous year

Number of infringements and illegal activities reported

### **Industry**

Although the Forest Service is not responsible for the state of the industrial sector, the report could present key facts i.e.

Number of mills/plants by district -significant changes through then year

Level of utilisation - comparison of TIF data (total tree volume) with LIF data (log volume) -

**MANUAL OF PROCEDURES**

**FOREST RESOURCE MANAGEMENT PLANNING IN THE HFZ**

**SECTION B - OPERATIONAL PLANNING**

**GHANA FOREST SERVICE**

**MARCH 1998**

# **Manual of Procedures - Forest Resource Management Planning in the HFZ**

## Preface

The Manual of Procedures for Forest Resource Management Planning prescribes the important tasks to be carried out in order to adequately plan for forest resource management in the high forest zone in the interest of the nation and for the benefit of the resource owners.

The planning process can be divided into strategic and operational planning. Strategic planning sets objectives to guide forest resource management in the long term. Operational planning ensures that programmes of operations to achieve strategic objectives are adequately planned and sufficiently resourced. The new planning process will also provide for local consultation in resource management planning. The Manual is produced in two sections:

Section A - Strategic Planning: Prescribes the requirements for strategic planning at national, forest reserve and district levels. Instruction sheets describe the procedures to be undertaken by the Forest Service in ALL high forest zone districts in conjunction with the resource owners and District Assemblies and other interest groups.

Section B - Operational Planning: Prescribes the requirements for planning of forest operations for forest reserves and TUC operations off reserve by the Forest Service in ALL high forest zone districts in order to successfully implement strategic plans.

The Manual has been written to guide forest officers responsible for preparing and implementing forest resource plans but will also be of value to other interest groups outside of the Forest Service particularly the resource owners and District Assemblies.

Forest resource management planning is a core activity at the very heart of our new Forest Service, we expect that the services we provide in this regard will be of the highest standards as set down in this Manual. It is beholding on all officers to be very cognisant with the procedures laid down in this Manual: "ignorance of the law is no excuse for committing an offence."

Procedures documented in this Manual represent the best practice at the time of writing. It is important that individual Instruction Sheets are kept up to date and new Instruction Sheets added as our knowledge improves and techniques are refined.

This Manual replaces all previous guidelines on management plan preparation.

**MANUAL OF PROCEDURES  
FOREST RESOURCE MANAGEMENT PLANNING IN THE HFZ  
SECTION B - OPERATIONAL PLANNING**

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# 1. THE PLANNING PROCESS

## Manual of Operations Section B - Operational Planning

### B1. The Planning Process

#### Instruction Sheet No. B1.1 Introduction to the Planning Process

##### 1. General

- 1.1 Forest resource management planning takes place in two stages; strategic and operational. Strategic planning sets objectives for forest resource management and prescriptions for achieving those objectives. The time frame for strategic planning is medium to long term. Section A of the MoP prescribes the requirements for strategic planning.
- 1.2 Operational planning follows on from strategic planning, it details the operations and resources required to implement the prescriptions. The time frame for operational planning is short to medium term. Section B of the MoP prescribes the requirements for planning of forest operations to ensure that the strategic resource management plans are successfully implemented.
- 1.3 The MoP is to be used primarily by regional and district staff of the Forest Service to:
  - (a) Operationalise forest reserve management plans.
  - (b) Operationalise any portions of district forestry development plans that the Forest Service has agreed to implement.
  - (c) Plan for administration of timber harvesting in TUC areas outside reserves
- 1.4 The new Forest Service is required to operate in a business like manner on behalf of its clients. The following principles are to be upheld during planning of all forest operations:

**Accountability:** the Forest Service will have to account to its clients for all retained revenues on reserve and service charges outside reserves. We must therefore be able to justify resources that we intend to use and account for them afterwards

**Cost effectiveness:** the manager must ensure that all operations are properly costed and that minimum resources needed to complete the operation to the required standard are used. This will include the effective use of contracts to undertake specific tasks, rather than maintaining unnecessarily large labour forces

**Quality.** The Forest Service has a duty to ensure that its planning and subsequent implementation and monitoring are carried out to the highest professional standards, not only to meet the demands of the land owners, but also to satisfy the international certification requirements for sustainable forest management.

##### 2. Outline of Procedures

- 2.1 The District Forest Officer with assistance from the regional office, will be required to examine the (strategic level) forest reserve management plans for all reserves under his control and to itemise five year targets in terms of protection ( length of fire lines to be constructed, fire breaks to be maintained etc.); production (areas to be surveyed and logged, areas to be planted, thinned, harvested

etc.); infrastructure (road and track improvement, building and maintenance etc.) and community development over the next five years. The output from this exercise will be an Operational Planning Annex to each forest reserve management plan.

2.2 The District Forestry Development Plan is a strategic planning document prepared by the District Planning Officer and members of the District Assembly Environmental Committee. Aspects of its preparation have been covered in Section A of this MoP series. It will tend to concentrate on off-reserve forestry activities, though not entirely so and it will be part of an overall district programme covering other sectors such as agriculture, water, mining and wildlife. The inference being that the structure of these particular plans is unlikely to be uniform around the country. However they should all provide a list of targets for a five year period.

2.3 Separate TUC (5 year) Operational Plans will have been produced for both on and off reserve by the contractors which are subject to a standard approval process by the DFO and the RFO as part of the TUC management system (refer MoP Sections C and F in this series)

2.4 Under the programme for commercial plantation development, separate plans may have been drawn up with private sector investors to plant convalescence areas unsuited to natural regeneration on reserve. Again the details of these projects will need to be summarised and those activities that have relevance to the Forest Service in terms of staff inputs need to be listed. Proposals for off-reserve plantation development will feature in the District Forest Development Plan.

2.5 Lastly, for those reserves under threat of fire, the DFO will be required to prepare a fire plan. For many reserves this will be adequately covered in the strategic plan, but there will be critical reserves where the level of interventions are such that a separate programme has to be embarked upon and in such circumstances a five year Fire Plan will have been prepared as a separate step. In such circumstances this plan will also need to be reviewed as part of the process of determining the priorities for the operational plan for the district.

2.6 Programmes for the development of NTFPs will normally be covered adequately within the Operational Planning Annex for on-reserve or within the District Forestry Development Plan for the expansion of marketing opportunities in the district as a whole. Similarly, the programme for floral and fauna biodiversity and watershed protection will be covered within the Forest Reserve Operational Planning Annex, which will summarise any work required to survey, demarcate or monitor the coarse grained protection areas. The identification of the fine-grained protection areas is an activity which is part of the stock survey process (refer MoP Section D).

2.7 The strategic plan may indicate that certain forest reserve operations, for instance boundary maintenance can be undertaken in collaboration with the local communities. Such intentions should have been indicated within the Operational Planning Annex. Separate guidelines are being produced which will further assist staff in operational planning for collaborative resource management.

2.8 The DFO needs to draw all these plans and proposals together and identify the inputs that the Forest Service will need to provide in order for the various programmes to be kept on target. This is done in the form of a three year rolling plan which itemises those activities that the district forestry staff and work force will need to provide time and physical resources to. Those forestry activities that are being carried out in the district for which the Forest Service does not need to devote specific staff time or labour, and hence funds, need not be included within the rolling plan. The first year of the plan will be completed in the most detail since this is the Annual Programme of Work and should have all labour, subsistence, operational costs and developmental costs itemised. The planning process is illustrated in Figures 1 and 2.

2.9 This MoP does not contain technical recommendations on forest operations. The relevant technical MoP must be consulted to help identify activities to be carried out.

**Plantations**

- MoP A MoP for Plantations Planning
- MoP B MoP for Nurseries
- MoP C MoP for Plantations Field Operations
- MoP D MoP for Plantation Thinning Operations

**High Forest Management**

- MoP A Strategic Planning
- MoP C Timber Production (On-reserve)
- MoP D MoP for Stock Survey and Yield Allocation  
(also covers fine-grained protection)
- MoP E Harvesting Schedules
- MoP F Timber Production (Off-reserve)

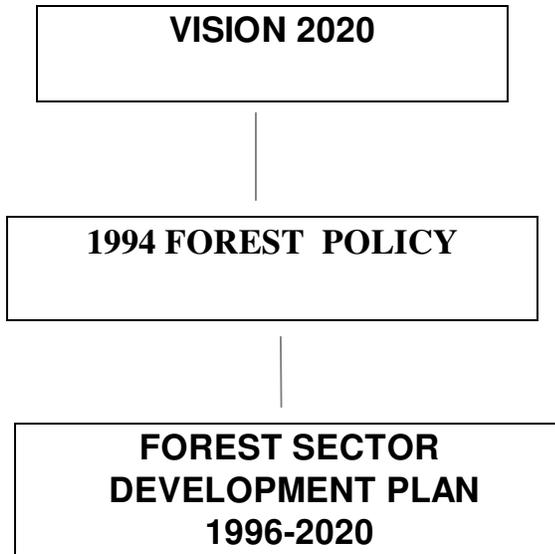
The Logging Manual

**Guidelines**

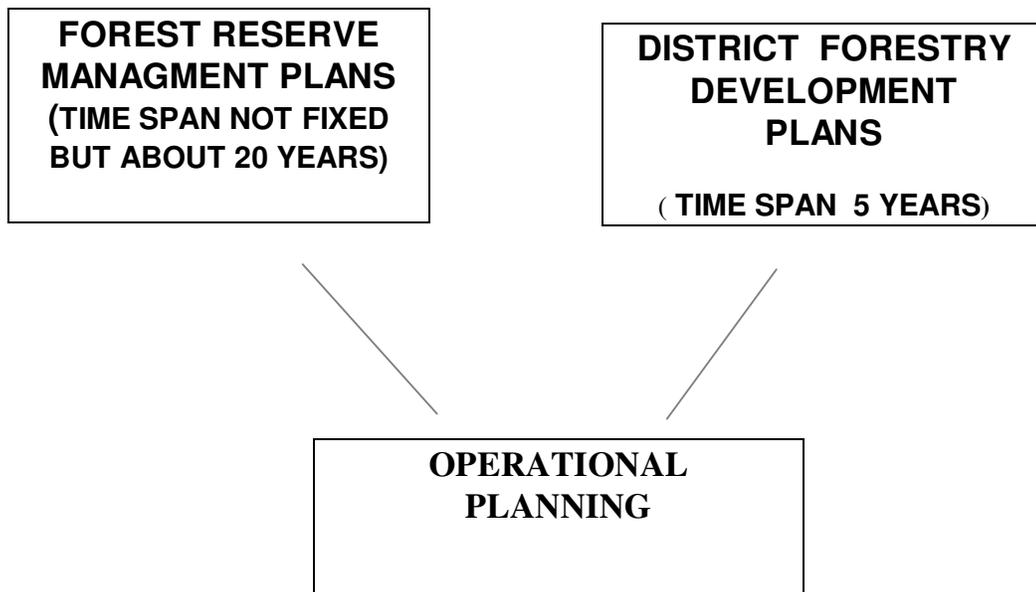
- Forest Protection in Ghana (Protection Strategy )
- Fire Control Guidelines,
- Guidelines for Plantation Development
- Collaborative Forest Management Guidelines

**Figure 1 The Planning Process**

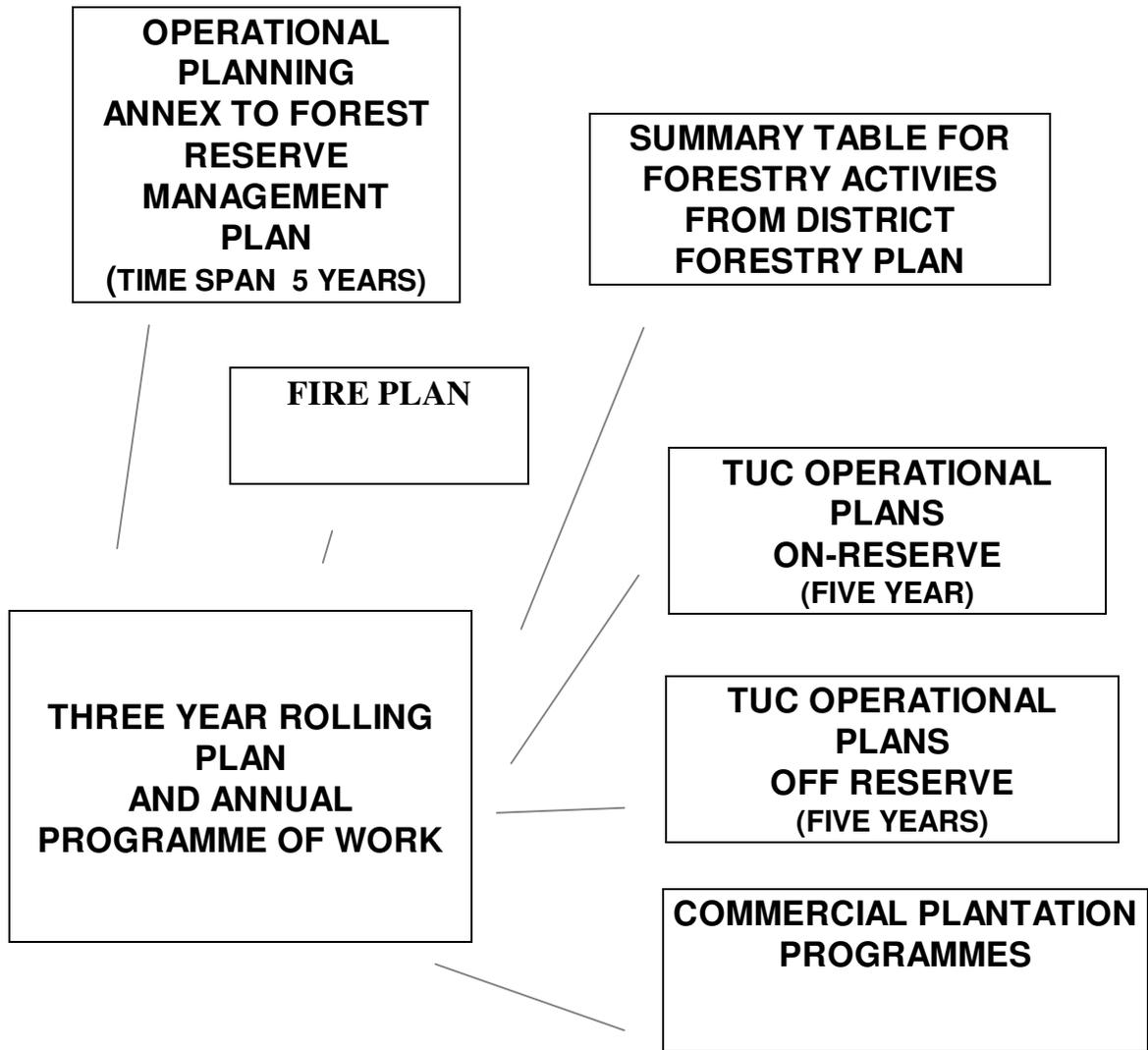
**National Planning**



**Strategic Planning**



**Figure 2 Operational Planning**



## **2. METHODOLOGY**

### **Manual of Operations Section B - Operational Planning**

#### **B2. Operational Planning Methodology**

##### **Instruction Sheet No. B2.1 The Operational Planning Annex**

### **1. Introduction**

1.1 This Instruction Sheet provides guidance on the processes required to identify those key activities to be carried out under the Strategic Forest Reserve Management Plan for the next five years.

1.2 For those reserves with no strategic plan fully prepared, it will still be possible to pull together a provisional programme of operations, to be supplemented by information from TUC Operational Plans, Plantation Programmes and a Fire Plan. Assuming the strategic plan is completed within the five years, it would then be necessary to revise the annex accordingly.

1.3 The Annex for the first five years should be completed as part of the preparation of the forest reserve management plan as a natural continuation of the planning process taking advantage of the additional support from the regional planning team that should be available at the time of the strategic planning process.

### **2. Forest Reserve Operational planning: an overview**

2.1 Part II of each forest reserve management plan contains proposals for:

- \* management zones for protection objectives
- \* management zones for production objectives
- \* management for beneficiary objectives

For each management zone the proposals will state:

- \* measurable objective [performance standard]
- \* management regime
- \* management prescriptions
- \* rights and responsibilities

For each management zone, a provisional programme of operations should be prepared by the DFO in order to carry out the prescriptions. All the programmes for the reserve are then reviewed by the DFO, prioritised and compiled together along with the appropriate maps to produce a five year operational plan.

2.2 The DFO prepares the provisional programme of operations covering the next 5 years for each management zone using the composite Form OP 1. A target for the end of the five years should be entered for each main activity, entering a zero for those activities regarded as not applicable to the reserve. At this stage operations are not broken down into detail, the emphasis being to get the broad picture. Where the DFO feels confident in entering targets for the intermediate years then this should be done. The last column of Form OP1 (remarks/implementor) can be used to indicate the type of labour to be used (local contract, direct community support -either voluntary or paid, Forest Service workers etc.)

2.4 Ideally, at the stage of preparing the 3 year rolling plan, the district staff will be in possession of not only a current strategic plan for the reserve, but TUC Operational Plans, Commercial Forest Plantation Agreements and an overall Fire Plan for the reserve. That ideal situation may not be in place for some years and the DFO may be faced with putting together a 3 Year Rolling Plan with little supportive documentation. In such circumstances, a best attempt has to be made with the preparation of all these plans put as a top priority for years 1 and 2 and an acceptance that the 3 Year Rolling plan will be heavily modified as additional information becomes available.

### **3. Structure of the Operation Planning Annex**

3.1 The annex is brief and covers the following sections:-

#### **1. Overview of Programmes for Years.... to ....**

Biodiversity Protection.

*Summary of any expansion of areas to be protected in the period by sub zones and any key activities with respect to demarcation or improvement of protection.*

Fire Protection

Main aspects of the fire plan

*Area of high fire risk. Existing fire protection measures*

*Establishment/expansion proposed during period*

*Patrolling proposed*

Timber Production

*Status of existing TUCs. Proposals for new TUCs*

*Expected volume production over period*

Plantation Development

*Existing resources to be maintained*

*Expansion by Forest Service/Taungya under period*

*Plans for commercial forestry development*

Convalescence Areas

*Changes expected from status quo over the period*

*Enrichment Planting proposed*

NTFP Production

*Any particular developmental proposals*

Community Development Aspects

*Formation of user groups, community assistance in protection*

Infrastructure Developments

*Road /bridge construction by community, forest service or contractor*

*Buildings proposed*

#### **2. Summary of Main Activities and Targets**

**Table OP 1 Refer example**

### 3. Indicative Revenue Generation

#### Summary of Expected Income for years 1-5

Category	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Target 5 years
Timber						
Plantation thinning						
Plantation final fell						
NTFP						
Others						
Total						

### 4. Comments:

- i. Previous Planning Period - Successes/failures, lessons drawn
- ii Assumptions (does programme require a major increase in investment and operating costs)

Prepared by: ..... Date:  
DFO

Approved by: ..... Date:  
RFO

..... Date  
(for District Assembly)

### 5. Reporting

- 5.1 The District Forest Officer will be required to report to the RFO and to the clients (i.e. the land owners and District Assembly representatives) on progress being made against the five year operational plan.
- 5.2 The structure of the Annual Report for the forest reserves is discussed in the section on reporting in the MoP Section C, Timber Harvesting on Reserves (refer Instruction Sheet No.C5.1 )

**Table OP 1 Forest Reserve Operational Planning  
Summary of Main Activities and Targets**

Forest Reserve .....

Planning Period .....

Operations	Units	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	5 yr Target	Implementor / Remarks
<b><u>1 Boundaries</u></b>								
Boundary maintenance	km							
Re-survey	km							
Pillaring of external boundaries	no.							
Pillaring of internal compartments	no.							
Others								
<b><u>2 Fire Protection</u></b>								
Establishment of new fire lines	km							
Maintenance of existing fire lines	km							
Fire-break establishment	km							
Existing fire-break maintenance	km							
Early burning	ha/km*							
Intensive fire patrolling (for fire sensitive areas)	ha/km*							
Demarcation of Fire Protection Block	ha							
Fire tower construction	no.							
Others:								
* delete as appropriate								

Operations	Units	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	5 yr Target	Implementor / Remarks
<b><u>3. Biodiversity and Site Protection</u></b> Demarcation of Provenance Protection Areas Demarcation of SBPAs Demarcation of FPAs Other:	 ha/km* ha/km* ha/km*							
<b><u>4. Timber Production Areas</u></b> Identification and award of TUC Stock Surveys Monitoring and Supervision of logging Logging Programme (under TUC) Others	 ha ha ha ha							
<b><u>5. Plantation Production</u></b>  (i) <u>Forest Service Plantations</u> Demarcation of compts Maintenance of existing plantations Thinnings Final Felling New Taungya (not fire-breaks) Enrichment planting	  km ha ha ha ha ha							

Operations	Units	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	5 yr Target	Implementor / Remarks
(ii) Commercial Plantation Site selection demarcation consultation process/feasibility studies Establishment Thinnings Final Felling	ha ha no. ha ha ha							
<b>6. NTFP development</b> Demarcation of NTFP collection areas Surveys of extent and condition of collection areas Regeneration and active management	ha ha ha							
<b>7. Infrastructure</b> Road/track construction (non TUC) Road/track construction (under TUC) Forest Service Buildings - new  Others:	km km m2							

Completed by .....

Designation .....

Date: .....

Approved by .....

Designation .....

Date: .....

## Manual of Operations Section B - Operational Planning

### B2. Operational Planning Methodology Instruction Sheet No. B2.2 Summarising TUC Activities

#### 1. Introduction

1.1 The programme of work to be undertaken as part of the development of the TUCs will be clearly defined in the 5 year Operational Plans produced for the on and off reserve areas. This Instruction Sheet describes the procedures needed to initially summarise those activities that will be required to be undertaken by the Forest Service as part of its responsibilities.

#### 2. Responsibilities of the Forest Service for the TUCs

##### On-Reserve

**Table 2.2.1 Responsibilities of the Forest Service for on-reserve TUCs**

Activity	Officers involved	Remarks
1. Preparation Of Management Plans For Each Forest Reserve.	Planning Branch DFO, RFO Community representatives	Basic outline prepared by FMSC with assistance from DFO. Local workshop to fix details and amendments with communities
2. Identification Of TUC Area With Fixing Of Clear Boundaries.	FMSC, DFO and RFO	Critical where TUC area borders protected areas
3. Definition Of Compartments And Scheduling Of Felling	as above	Refer MoP Section E
4. Preparation Of Timber Operation Specifications To Include Preparation Of Social Responsibility Agreements Following Consultation Process.	DFO with support from Regional staff	
5. Award Of Contract agreement of initial TUC Area Plan	Timber Rights Evaluation Committee	TUC Area Plan prepared by contractor as part of evaluation process
6. Pre-Felling Inspection With Contractor	DFO	Refer MoP Section D
7. Stock Survey And Yield Allocation including regular 10% check surveys	DFO/RFO/FMSC	Refer MoP Section D Random check by FMSC
7. Random check surveys	FMSC	New proposal, arising from concern of present standards
8. Approval Of TUC Five year Plans and Compartment Logging Plan and TUC Area Plan (revised)	DFO, RFO	Approval should be made at regional level, but advice of FMSC (and HQ) can be sought.
9. Issue Of Tree Information Forms, checking of Log Information Forms and issue of Log Conveyance Certificates.	DFO	Responsibility for completing the LIFs rest with the contractor
10. Overall Supervision And Monitoring and issue of compartment closure certificates	DFO	RFO to monitor field returns and follow up with field inspections.

2.1 The responsibilities of the Forest Service with respect to on-reserve TUCs are listed in tabular form (Table 2.2.1).

2.2 For those reserve, where the TUCs are still to be identified, the DFO will need to allocate time for checking the state of the forest and for completing discussions with the communities for the preparation of the Timber Operational Specifications (TOS) and the Social Responsibility Agreements (SRA).

2.3 For those reserves where the TUC has been awarded and hence the Timber Operational Plan has been prepared, then the district staff will need to allocate time and physical resources for the stock surveys and the pre-felling inspections that are required (refer MoP D for a technical description of the processes involved).

2.4 At this stage, it is only necessary to list the numbers of those compartments involved for each year, using a simple table similar to the example given below (Table 2.2.2)

**Table 2.2.2 Summary of TUC Status and tasks needed for TUCs**

Activity	Compartment No.		
	Yr 1	Yr2	Yr3
Compts already being logged			
Compts where closure certificate needed			
Compartments for initial selection			
Pre-survey inspection			
Compartment demarcation			
Yield survey, approval of logging plan			
Logging			
Identification of new TUCs			
Preparation of TOS/SRAs			

2.5 Listing the operations that will be required for each TUC provides the DFO with an initial idea of how he will need to organise his time for this activity. The same process should be repeated for off-reserve TUCs.

Off -Reserve

2.6 The responsibilities by the Forest Service for the off-reserve are similar to those already described, except that a yield survey would not be part of normal practice. On the other hand, the preparation of the TOS and SRAs will need to be carried out in greater detail with a more time allocated to consultation.

**Table 2.2.3 Summary of the responsibilities of the Forest Service off-reserve**

Activity	Officer involved	Remarks
Check of availability of unallocated land	Contracts Unit. HQ	1:250,000 scale maps of unencumbered land made available
Identification of possible TUCs	DFO/RFO	
Consult with District Assemblies	DFO	
Derivation of TOS/SRAs	DFO	Support from regional team
Advertisement	Contracts Unit	Preparation of contract information requires assistance of DFO and regional staff.
Award of contract for TUC	Timber Rights Evaluation Committee	
Evaluation of TUC Coupe Plan and annual plans	DFO/RFO	
Pre-felling inspection and approval	DFO	Pre-felling inspection to include community representatives.
Issue of tree inspection forms and log conveyance forms and checking of log inspection forms	DFO	
Overall supervision and monitoring	DFO	Community encouraged to monitor operations and communicate with district staff when problems arise

2.7 As for the situation on-reserves, the DFO will need to summarise the extent of the major tasks that he will be involved in over the course of the next three years, constructing a table similar to that below (Table 2.2.4).

**Table 2.2.4 Summary of operating status and tasks needed for off-reserve TUCs**

Activity	Total Area Involved (ha)		
	Yr 1	Yr2	Yr3
Approved and operational annual coupes			
Final Inspection of completed annual coupes, check on TOS/SRAs			
Approval of new annual coupes			
Pre-survey inspection			
Approval, compensation agreed.			
Approval of logging plan			
Logging, TIF/LIFs to be issued			
Approval of new five year coupes			
Preparation of TOS/SRAs			
Identification of new TUC areas.			

## **Manual of Operations Section B - Operational Planning**

### **B2. Operational Planning Methodology**

#### **Instruction Sheet No. B2.3 Summarising Plantation Programmes**

##### **1. Introduction**

1.1 This Instruction Sheet has been written to assist district staff to initially prepare summaries of their work commitments for the coming three years for the development and maintenance of the on-reserve plantations.

1.2 As part of the move towards promoting investment in plantation development by the private sector, plantation development programmes will be initiated for those reserves where there is adequate convalescence forest land to attract long-term investment.

1.3 For those reserves where plantation operations are restricted to the care and maintenance of existing former FD plantations plus small scale taungya development, then the summary sheet Form OP 1 will provide a satisfactory working base for planning the work programme by the Forest Service. However, where the state of the plantation programme within the reserve is such that commercial agreements have already been put into place, then the DFO will obviously need to refer to these agreements, in order to adequately summarise his responsibilities in terms of the district work programme.

1.4 The MoP for Plantations, Section C- Field Operations should be referred to for guidance on both implementing and planning plantation operations. In particular, staff should be aware of the use of Form P33 for summarising labour requirements when preparing the Annual Programme of Works.

##### **2. Responsibilities of the Forest Service for Plantation Activities**

2.1 The responsibilities of the Forest Service can be summarised as those below:-

###### (i) Commercial Programmes

- initial zoning of the reserve and identification of sites
- advertising for investors where necessary
- selection of companies for plantation establishment and maintenance
- overseeing the preparation of the land contract agreements with the land owners
- approving the plantation programmes
- provision of general technical advice as required
- ensuring correct selection of planting stock
- monitoring of general silvicultural standards and fire controls
- collection of any fees agreed and subsequent payment to the landowners
- maintenance of key records and maps

###### (ii) Maintenance of former FD plantations

- provision of general protection and monitoring
- employment of contract labour for weeding and maintenance of fire breaks
- over-seeing the operation of thinning and felling contracts

- undertake replanting and modest expansion where appropriate
- maintenance of plantation records and maps

2.2 In the case of the commercial plantations, the responsibilities of the district staff are therefore restricted to the identification of the areas suitable for planting, assisting in the preparation of contracts and providing a general monitoring function. Where such a programme is in place or expected to be within the next three years then time will need to be allocated to these tasks, using a summary table similar to that presented in Table 2.3.1 below:-

**Table 2.3.1 Summary Table of Tasks related to Commercial Forestry at the District/Regional Level**

<b>Activity</b>	<b>Units</b>	<b>Yr 1</b>	<b>Yr 2</b>	<b>Yr 3</b>
Initial screening of sites within the convalescence zone				
Demarcation as required				
Preparation of location maps				
Discussions with land owners on proposals				
Preparation of draft agreements and information package				
Review plantation programme by successful company				
General monitoring of operations				
Collection of fees and maintenance of records				

2.3 The tasks listed above therefore will involve only senior district staff.

2.4 For those reserves where the Forest Service has an appreciable plantation resource to be managed then it will be necessary to examine in more details the operations that will need to be carried out over the next three years. The summary table presented as Form OP 1 not being adequate for this purpose.

2.5 It will be the intention to use contract labour for all production thinning and final felling. The form of contract to be used is specified in MoP Plantations Section C (Form P37). For non-production activities and general maintenance, the DFO will employ labour on a task basis. As for the commercial plantations, the DFO will need to summarise the expected main tasks to be undertaken over the course of the next 3 years (Table 2.3.2)

**Table 2.3.2 Summary Table of Tasks related to Plantation Management  
at the District/Regional Level**

Activity	Units	Yr 1	Yr 2	Yr 3
Survey and re-survey of compartments	ha			
Boundary cleaning	km			
Fire break construction	km			
Fire break maintenance	km			
Nursery Establishment	'000.			
Stock production	'000			
Planting	ha			
Beating up	ha			
Weeding 1 year	ha			
Weeding Yr 2	ha			
Weeding Yr 3	ha			
Pre-commercial thinning	ha			
First commercial thinning	ha			
Second thinning	ha			
Third thinning	ha			
Brashing	ha			
Pruning	ha			
Coppicing	ha			
Final felling	ha			

## Manual of Operations Section B - Operational Planning

### B2. Operational Planning Methodology Instruction Sheet No. B2.4 Fire Protection Operations

#### 1. Introduction to the Planning of Fire Control Measures

1.1 In the northern sections of the HFZ, fire is the most serious threat to the continued existence of the forest reserves. Since the drought of 1983, large sections of the reserves in the transitional zone have been reduced to open grassland and scrub.

1.2 Forest managers are able to minimise the level of damage that will occur in those reserves under their charge, by directing the resources they have in terms of manpower and equipment, to those areas defined as critical; and by taking practical steps to control the spread of fire through the establishment of fire breaks complemented by early burning.

1.3 Education through public awareness campaigns are also an essential step in the fight against forest fire. First of all, making it clear to forest-using communities of the need for their support in the avoidance of burning at critical times of the year and to request their assistance in the maintenance of reserve boundaries and fire breaks. Formal training of volunteers and fire crews into practical methods of fire control will also pay dividends.

#### 2. Identification of High Risk Areas

2.1 As part of the strategic planning process, it will be possible to assign indicative value scores to the management zones (refer Instruction Sheet A 2.3).

**Table 2.4.1 Indicative Value Scores for Fire Protection**

Score	Fire Protection Area
1	Areas demarcated for conversion
2	Young plantations and convalescence areas
3	Timber Production Areas, mature plantations
4	Important conservation areas -SPBAs, FPAs
5	Locations close to settlement

This basic zoning can then be linked to an assessment of the fire risk derived from a consideration of the following factors:-

1. **Canopy Closure** - the Forest Condition Index supplemented by observations on grass growth and acheampong cover.
2. **Fuel type** - incidence of grass cover, dead and dying tress, presence or absence of recent fires to modify levels of fuel.
3. **Weather** - current rainfall pattern, average wind strength, maximum temperature
4. **Topography**- slope, aspect and elevation will modify the fire risk
5. **Infrastructure** - on the basis of planning blocks of 5 compartments it is possible to score each block for the average crew strength/km<sup>2</sup>, accessibility from the main station, average access

time to a water source and the expected detection time based on the frequency of patrols or coverage by a lookout tower.

2.2 Further guidelines on the process of deriving fire risk values will be produced by FMSC as a separate technical manual - following the completion of current pilot investigations on the most suitable methodology.

2.3 Knowledge of the comparative “value” of areas to be protected coupled with an assessment of their risk to future fire damage will provide the manager for the basis of working out an operational fire plan.

### 3. Preventive Measures

#### Green Fire Breaks

3.1 Use has been made of both green (living) fire breaks and cultivated, cleared strips to provide a barrier to the spread of fire. Green fire breaks have certain advantages in that they are cheap to establish and maintain since the approach is normally using local communities to plant the fire breaks under taungya. After establishment, the fire break tends to be self maintaining, except for the possible need for a light early burn of accumulated leaf litter.

#### *Selection of species*

3.2 Various tree species have been selected as candidates for green firebreaks. Selection is based on merit of their relative fire tolerance, ability to re-sprout following fire injury, fast growth rate, evergreen foliage, wide crown canopy and low leaf litter production. Below is a list of recommended green firebreak species.

Alsonia boonei [NYAMEDUA]  
Albizia adianthifolia [PAMPENA]  
Albizia ferruginea [AWIEMFOSAMINA]  
Albizia lebeck [LEBBECK] *Exotic*  
Azadirachta indica [NEEM] *Exotic*  
Blighia sapida [AKYE]  
Cassia siamea [CASSIA] *Exotic*  
Cordia millenii/platythyrta [TWENEBOA]  
Dialium guineense [ASENAA]  
Erythrophleum sauveolens [syn. E. guineense, ODOM]  
Ficus spp [AMANGEYEDUA]  
Funtumia elastica [FRUNTUM]  
Khaya senegalensis [ESRESO MAHOGANY]  
Millettia thonningii [MILLETTIA]  
Morus mesozygia [WONTON]

#### *Planning Issues*

3.3 The local communities will need to be approached to see if they would like to take part in such a programme. At such a meeting it will be necessary to raise the following points:

- The location of a the community nursery to produce enough seedlings to serve their needs. Seedlings raised should include not less than five different species from the recommended green firebreak species. Tree seedlings could be provided to the Forest Service on a contract basis.
- It should be borne in mind that controlled farming in Forest Reserves is not of primary consideration; the tree crop should always have priority over the food crop. Farmers are not allowed

to clear more land than is allocated by the Forestry Department. They should be ready to leave the plot by the third/fourth year.

- Farmers shall be entitled to all harvest from their plots for as long as they stay on their farms.
- A management committee shall be formed from among the participants. This would act on behalf of the group by signing an undertaking to abide by all rules and regulations governing the green firebreaks establishment.

#### *Establishment*

3.4 For green fire breaks established under the taungya system, the community would undertake clearing of the area. If clearing of an area is done on an individual basis, the area will be divided into plots after demarcation, if done on a communal basis, as should normally be the case, the division into plots will be done after clearing. Clearing must be done thoroughly while leaving all existing trees and poles standing. Burning of slash should be done under the supervision of either members of a village fire volunteer squad, personnel from the Ghana National Fire service or the Forest Service.

3.5 Pegging of the area will be done by the Technical Officer and assisted by the forest guard and representatives from the community. Wooden pegs of not less than two meters long will be provided by the farmers. Spacing of the pegs will be according to the planting design. No planting or sowing of food crops will be permitted until pegging is completed. No permanent food crops are also allowed to be planted on the plots. Cassava may only be allowed under special conditions.

3.6 Current recommendations are for fire breaks of minimum width of 15 m and a maximum width of 40 m. In earlier trials individual plots of 40 x 100 m have proved to be of the right order. Planting distances of 4 x 4 metre have been acceptable, but some modification depending on the habit of the particular species and the expected survival is to be expected.

3.7 All participating communities must establish community nurseries to cater for their needs. The Technical Officer in-charge of the range shall assist the community to choose a suitable site and provide technical support. The farmers collect seeds of the selected plant species, supplemented by quality seed from the Forest Service. An extra 30% of the required planting stock should be made available for beating up.

3.7 Standard nursery equipment and tools would normally be donated or lent to the community by Forestry Service to help in their nursery work. This equipment should be in the custody of the executives of the management committee.

#### *Tending*

3.8 Plots will be weeded two to three times every year as required. The farmer must ensure that all dead seedlings are replaced as he weeds. He must also ensure that there is only one seedling per planting hole. After the tree is well established at a height of 5-6 m, it may be beneficial to pollard the stem at a height of around 1.5-2.0 m in order to encourage the development of lateral branches and a wider crown. This will be achieved by cross cutting using a bow saw, not an axe. The cut should be clean without tearing bark from the wood. A useful product from pollarding is fuelwood, leaf mulch and sometimes fodder from some species.

#### Cleared Fire Breaks

3.9 Standard bare-ground firebreaks and fire traces represent the simplest form of fire control. Where topography allows, the use of farm tractors and disc harrows enable the forest manager to establish and maintain long stretches of fire breaks. In most reserves, however, recourse has to be made to hand preparation and maintenance. The width of such breaks should be a minimum of 5 m

3.10 Fire tracing is the use of fire to burn off all flammable fuel within a strip of land to mineral soil below along the external boundary; in order to serve as a buffer. The strip should be wide enough to prevent creeping fires from encroaching forest reserves. Fire traces are most effective around degraded forests especially in the savannah and grassland vegetation zones where crown fires are uncommon. With the exact timing and under strict supervision, fire traces are very effective especially in controlling grassland fires. The recommended width for a fire trace is 10m. This width could, however, be increased especially along slopes, badly degraded forest colonised by elephant grass, *acheampong*, (*chromolaena odorata*) or where there is considerable fuel load in the surrounding forest that will increase the chances of flying embers in the event of a wildfire. Fires driven by fast moving winds can easily cross such firebreaks so this system may be used only as a temporary measure until green firebreaks are established. For areas earmarked for conversion, green firebreaks establishment will go hand in hand with any reforestation effort or plantation establishment.

3.11 The District Forestry Officer or his representative demarcates of fire prone areas along forest reserves that need fire tracing. A band of forest of width 10m is demarcated along the external boundary of the reserve. This should be done just before the onset of the fire season. All flammable material is gathered within this area to ensure a total burn out. Fire traces have to be placed where topography will not affect their potential for stopping fire. A rule of thumb to remember for fire tracing across slopes is that the steeper the slope, the wider the fire traces needs to be. The larger fallen logs, which lie across fire traces or which are in the path of construction, will have to be removed. Appropriate time to carry out the burn should be early mornings or late evenings of a sunny day when fuel moisture content is very minimal to ensure a complete burn out. It is also important to avoid constructing fire traces on windy or turbulent days.

#### Early Burning

3.12 This is a method of fuel management where an area is burnt under controlled conditions in order to reduce the fuel available for late burns when conditions are more favourable for wildfires and the fire intensity is that much worse. Early burning should be carried out between September and November when there is still an appreciable fuel moisture to allow for a complete burn yet not too dry to risk the fire escalating into protected areas. This will also reduce the fire intensity so that the impact on juveniles and soil microbes will be minimal. This is very feasible in the savannah vegetation zones and grassland areas within the savannah-forest transition zones. Since this operation could cover very extensive areas, a one week warning and education should be given to people for them to harvest or remove all their property from surrounding farms which are likely to be affected by the burn.

3.13 To effectively use fire as a fuel management tool, the right type of equipment and personnel must be employed to be able to achieve the specific objective. Personnel from the Forest Service with training in fire management are required to supervise all early burning activities. At the community level, personnel from Ghana National Fire Service, Village Fire Volunteer Squad or the Ministry of Food and Agriculture with the requisite training can supervise early burning in other protected areas off-reserves. The following basic equipment is required to effectively carry out early burning at any level: Protective clothing, shovels, mattocks, cutlasses, drip torch and hand pumps.

#### Fire Patrols

3.14 During the critical months, regular fire patrols need to be maintained. Depending on the terrain, one patrol guard or volunteer should be able to keep control of 1 - 4 km. This task is one which should be more and more undertaken by village fire workers operating on a volunteer or partly paid basis.

3.15 Basic training in fire suppression and local fire organisation will be a standard requirement for all Forest Service field staff and the DFO and his technical staff will need to develop an integrated network of volunteer fire watchers to supplement their FS staff.

#### 4. Operational Planning for Fire Control

4.1 In order to plan for the use of labour and resources for fire control, the manager needs to be aware of the timing of the main operations. Table 2.4.2 below provides an indication.

**Table 2.4.2 Calendar of Fire Control Activities**

Task	J	F	M	A	M	J	J	A	S	O	N	D
1. Early burning									█	█		
2. Fire Tracing												
Identification of areas									█	█		
Clearing traces											█	█
Conducting the burn	█	█										
3. Green fire breaks												
Nursery Establishment				█	█	█						
Demarcation of plots				█	█							
Clearing of plots				█	█	█						
Pegging					█	█						
Planting					█	█						
Weeding						█	█	█				
Pollarding					█							
4. Fire breaks												
Identification						█	█					
Line Clearing								█	█	█	█	
5. Patrolling	█	█	█	█	█							

## **Manual of Operations Section B - Operational Planning**

### **B2. Operational Planning Methodology**

#### **Instruction Sheet No. B2.5 Preparation of the 3 Year Rolling Plan**

##### **1. Introduction to the Three Year Rolling Plan**

1.1 The forest reserve management plans, the TUC Operational Plans and any other forestry activities specified in the District Forestry Development Plan will need to be distilled into a costed action plan for the more immediate future. It is recommended that district and regional staff now adopt a three year planning period as standard procedure (though should all of the above plans conveniently start and end in the same year, five years hence, the DFO might wish to extend his rolling plan for the full five year period). But for the coming three years at least, the main operational tasks to be undertaken are listed and prioritised.

1.2 For the first 12 months the programme must be set out in detail and this becomes the Annual Programme of Works (APW). The three year rolling plan therefore provides a detailed 12 month programme with a more flexible programme for the remaining two years. Toward the end of the current operational year, the plan is extended by a further year and the detailed programme for the next APW is worked out taking into account the actual achievements to date and the level of resources that are expected to be available. The APW should be designed to be as realistic as possible, not too optimistic in terms of the budget required but it should ensure that, as much as possible, all the high priority tasks are included.

1.3 The basis of good operational planning is the use of work-breakdown structures - essentially breaking down tasks into a series of activities or work elements which can be closely defined in terms of the inputs required and the responsibilities of particular individuals in carrying out these activities. The degree to which tasks can be broken down into work elements will vary, with minimal breakdown being possible or relevant for those tasks that have been identified to be undertaken in Year 3. For those tasks to be undertaken in the coming year i.e. within the framework of the APW, then a complete listing of all work elements is required to enable full costings to be prepared.

1.4 The three year plan will be composed of a series of separate components:-

1. For years 1, 2 and 3 a list of tasks , priority rating and indicative time frame
2. Outline costs for years 2 and 3

1.5 The Annual Plan of Works covering year 1 only will further have:-

1. List of tasks, broken down into activities or work elements, plus a time frame for each activity
2. Gantt chart for Task./activities plus responsibility chart
3. Detailed breakdown of labour and material inputs.- costs for year 1

##### **2. Process of Preparing the 3 year Rolling Plan**

2.1 In order to prepare the district three year rolling plan, the DFO will need to assemble the following material :-

- (i). The five year operational annex from each of the forest reserve plans supported if necessary by a separate fire plan
- (ii). All current TUC 5 year Operational Plans for on-reserve TUCs
- (iii). All current TUC 5 year Operational Plans for all off-reserve TUCs.
- (iv). Commercial Forestry Programmes
- (v). The current District Forestry Development Plan

2.2 From these plans, the DFO will be able to extract those main activities that need to be carried out within each of the next three years, using the summary tables indicated in Instruction Sheets B2.1 B2.2, B2.3, B2.4 in the case of (i) -(iv) listed above. For the District Forestry Development Plan, the DFO should carefully identify all activities not already covered under the programmes for the TUCs or the forest reserves and give a rough breakdown of the inputs required. Such activities are likely to include extension activities, participation in soil amelioration projects, community forestry projects, commercial plantation programmes and support to cross-sectoral activities.

2.3 Form OP 2, should be used to arrange the work programme. This provides a framework of all the principal tasks needed to be completed over the next three years. Form OP 3 is used to provide indicative budgets for years 2 and 3 of the rolling plan. Finally, the costed work programme for the first year (the APW) is worked out making use of Form OP 4

Completion of Form OP 2

2.4 The main components of the form are indicated below, but you are referred to the worked example at the end of this section for assistance.

**Table 2.5.1 Form OP 2 - Three Year Work Programme**

Task	Units	Yr 1 Quantity	Yr 1 Priority	Yr 1 Target	Yr 2 Quantity	Yr 2 Priority	Yr 3 Quantity	Yr 3 Priority

2.5 The example provided indicates the type of tasks and activities to be entered. An attempt should also be made to put a priority to these tasks and set a target completion date for those activities in year 1. For many tasks, there will be a seasonality which needs to be respected, fire lines need to be clean before end of the year and the on-set of the dry season; planting stock needs to be ready for the field at the start of the rains and so forth. The priority system used is not important, it is simply to provide a degree of rationale if resources do not allow all tasks to be completed by the target date; but a suggested system would be:-

- 1 High Priority task, this task must be carried out within the year and, if possible, within one month of the target date.
- 2. Medium Priority task. Should be completed within the year and, if possible within 3 months of the target date.
- 3. Low priority task. Should be completed within the year, with slippage minimised.

4 Task could be allowed to run-over to the following year if necessary.

Completion of Form OP 3

2.6 The next stage is to attach some more detail in terms of costs to the activities to be undertaken in years 2 and 3. The work under year 1, will be linked to the APW and is separately considered.

**Table 2.5.2 Form OP 3 Year 2 and Year 3 Outline Costs**

Tasks	Yr 2 labour input (md)	Yr 2 Cost '000 cedis	Yr 3 labour input (md)	Yr 3 Cost '000 cedis

2.7 Calculation of the costs of the labour require the use of standard work outputs modified by local knowledge of specific conditions (refer Table 2.7). RFOs should compile their own standards based on the averages of actual achievements over the past 10 years. Staff should made use of Form P33 in MoP for Plantations Section C for summarising labour inputs.

**Table 2.5.3 Standard working rates for some forestry operations**

Operation	Unit	Quantity
Demarcation, pillaring and surveying	man-days/km	15
Line cutting	man-days/km	1
Line clearing (2 m width)	man-days/km	9
Pillaring only	man-days/km	2.5
Line survey	man-days/km	2.5
Compartment demarcation	man-days/km	15
Fire protection	man-days/ha	2
Stock survey	man-days/ha	2.5

2.8 After compiling the labour costs, additional details of the proposed budget could be added including such items as:-

- Assumed subsistence requirements for staff
- Vehicle operation costs of existing fleet
- Vehicle hire
- Maintenance of buildings and plant
- Construction works

## **Manual of Operations Section B - Operational Planning**

### **B2. Operational Planning Methodology**

#### **Instruction Sheet No. B2.6 Preparation of the Annual Programme of Works**

##### **1. Introduction**

1.1 The previous instruction sheet has detailed the processes necessary for preparing the three year rolling plan and has provided guidance how the work programme for years 2 and 3 can be completed. This present instruction sheet is concerned with the next and final stage, the preparation of the Annual Programme of Works (APW).

1.2 The APW should detail all activities that the district office intends to be concerned with over the course of the year. At the minimum level, it must provide a listing of all activities where labour (either permanent or contract) is to be employed, together with a listing of all building material, office material, nursery material, vehicle operation, etc., so that the operational budget for the district can be drawn up. Ideally, it should also include an assessment of how staff time is to be used, their responsibilities over the year and an indication of the how tasks are going to be slotted into the 12 month period.

##### **2. Preparation of the APW**

2.1 The preparation of the APW will go through the following stages:-

1. Preparation of the tables indicated in the previous instruction sheets (Forms OP 1, 2, and 3)
2. Preparation of the Work-Breakdown Structure (Form OP 4)
3. Preparation of time charts - Gantt charts (Form OP 5)
4. Cost break down for the APW. (Form OP 6)

##### Work Breakdown Structure

2.2 The earlier tables will not have gone into too much detail concerning a particular task, but in order to put reliable costings to a particular task to be done, it is necessary to consider the individual activities that make up the task. For example the task of constructing a new access track to a forest post will in Forms OP 1 -3 have been most likely have been considered as just that one single, overall activity and it will have been roughly costed on the basis of the average cost of putting in a 1 km of track, But in fact this particular task is made of several distinctive activities such as:-

- a) determination of a suitable alignment on the map
- b) pegging out alignment in the forest
- c) clearing undergrowth and tree felling
- d) hiring dozer if necessary
- e) contracting supply of ballast for wet areas
- f) etc.

2.3 Obviously the degree of detail that each task is broken down into will vary depending on the complexity of the particular task, for many i.e. second weeding of teak, no further breakdown of the task is required, since it can be costed and timed well enough as a single activity. The Form OP 4 can be used for this stage, reference should be made to the worked example at the end of this section.

**Table 2.6.1 Form OP 4 Work Break Down Structure**

Task /Activities	Units	Quantity	Priority	Target Date
Task 1				
Activity 1.1				
1.2				
1.3				
Task 2				
Activity 2.1				

Preparation of Time Charts or Gantt Charts

2.4 It will assist overall organisation of the work programme if the DFO marks out the proposed start and end date of each main task /activity, to check that there will not be a conflict of resource needs in terms of allocating supervisory staff, labour and vehicles. As an additional modification to the Gantt Chart is to consider those staff to be allocated to supervising the job, thereby building up a work programme for the district staff.

2.5 The Gantt Chart is just a very simple time chart, as indicated in the worked example at the end of this section. The format used is provided as Form OP 5.

**Table 2.6.2 Form OP 5 Time and Responsibility Chart**

Task	1	2	3	4	5	6	7	8	9	10	11	12	Responsible staff	Others
Task 1														
Task 2														
Task 3														

Cost break-down

2.6 The final step is to determine the cost of each activity in terms of labour, incremental staff costs and materials. Form OP 6 provides the framework for doing this.

**Table 2.6.3 Form OP 6 Cost Break-down for Activities for APW**

1	2	3	4	5	6	7	8
Activity	Quantity	Units	md/unit	Total man-days	Labour cost '000 cedis	Incremental Staff costs	Material costs '000 cedis

Where column 1 is the particular task/activity. It is intended that during the course of implementation of the new procedures that all tasks and activities likely to be undertaken by a DFO as part of his normal duties, will be given a code number. This will enable easier

comparison of costs between districts and regions, and the summation of costs for a particular task.

Column 6 is the product of column 5 and the current standard rate for labour. It might be necessary to have a separate line for those activities where there is a wide range in grades of labour.

Column 7 refers to the any costs that will need to be allowed for such items as staff overtime, subsistence, travel etc. in order to get the activity completed.

Column 8 will be any material that need to be purchased to complete the task

### Annual Budget

2.7 There are other costs that will need to be considered tin order to derive the total annual operating budget for the district office. These will be made up of such items as:-

1. Maintenance and operation of offices/guard posts (including power and water)
2. Telephone and postal charges
3. Office materials
4. Standard operating costs for district vehicles
5. Any other fixed charges
6. Staff salaries.

## **ANNEXES**

### **EXAMPLES OF OPERATIONAL PLANNING FORMS**

<b>FORM OP 1</b>	<b>FOREST RESERVE OPERATIONAL PLANNING</b>
<b>FORM OP 2</b>	<b>THREE YEAR WORK PROGRAMME</b>
<b>FORM OP 3</b>	<b>YEARS 2 AND 3 OUTLINE COSTS</b>
<b>FORM OP 4</b>	<b>WORK BREAKDOWN STRUCTURE</b>
<b>FORM OP 5</b>	<b>TIME AND RESPONSIBILITY CHARTS (GANTT CHART)</b>
<b>FORM OP 6</b>	<b>COST BREAKDOWN FOR ANNUAL PROGRAMME OF WORKS</b>



### Example of three year rolling plan

District.....

Region .....

Period of plan .....

#### Form OP 2 3 Year work Programme

Task	Units	Year 1	Priority	Target	Year 2	Priority	Year 3
Management of TUCs on-reserve							
Closure certificate due	compt	FMU 34 - C11	1	June	FMU 34 - C23 FMU33 C24	1	FMU33 C24
New compartment demarcation	compt	x5	1	Sept.	x7	1	x7
Yield survey	compt	x3	1	Nov.	x9	1	x9
TOS preparation	TUC	TUC 81	1	April	x2	1	x2
<b>Protection Activities</b>							
Boundary demarcation	km	15	2	Aug	15	2	15
fire break scuffling	km	8	1	Aug	8	1	8
track maintenance	km	12	2	Sept	15	2	20
track construction	km	3	3	Nov	5	3	0
<b>Plantations</b>							
Weeding	ha	50	1	July	50	1	0
Pruning	ha	25	3	May	50	3	50
<b>Extension</b>							
Nursery establishment	nursery	x2	2	Nov.	x1	2	0
seedling distribution	plants	10,000	2	June	15000	2	20,000
soil erosion protection planting	ha	4.5	2	July	10	2	10
School visits	No.	20	3	all year	20	3	30

#### Indicative Budgets for Years 2 and 3 - Main tasks requiring labour inputs

##### Form OP 3 Year 2 and Year 3 Outline Costs

Tasks	Yr 2 man-days	Yr 2 '000 Cedis	Yr 3 mds	Yr 3 '000 Cedis
Management of TUCs on-reserve				
New compartment demarcation	475	1425	475	1425
Yield survey -labour - subsistence	2925 100 md	8775	2275 75 md	6825
<b>Protection Activities</b>				
Boundary clearing	135	405	135	405
fire break scuffling	72	216	72	216

track maintenance	150	450	200	600
track construction	100	300	0	
Plantations				
Weeding	750	2250	0	
Pruning	400	1200	400	1200
Extension				
Nursery establishment	100	300	0	
seedling distribution				
soil erosion protection planting	200	600	200	600
School visits				

Additional details of the proposed budget could be added including such items as:-

Assumed subsistence requirements for staff  
Vehicle operation costs  
Maintenance of buildings and plant  
construction works

#### Annual Programme of Work - (Year 1) Form OP 4 Work Breakdown Structure

Task	Units	Quantity	Priority	Target
<b>Management of TUCs on-reserve</b>				
T1. Closure certificate due	compt.	FMU 34 - C11	1	June
T2 New compartment demarcation	compt.	x5	1	Sept.
field survey of boundaries	km			July
boundary cutting	km			Sept
T3 Yield survey	compt.	x3	1	Nov.
check survey	compt.	x3	1	Dec
map production	compt	x3		Oct
yield calculation and approval	compt	x3		Nov
T4 TOS preparation	TUC	TUC 81	1	April
establishment of social responsibility agreements	TUC			Jan
setting environmental protocols	TUC			Feb
approval by traditional councils	TUC			March
<b>Protection Activities</b>				
T5 Boundary demarcation	km	15	2	Aug
T6 fire break scuffling	km	8	1	Aug
T7 track maintenance	km	12	2	Sept
T8 track construction	km	3	3	Nov
check new alignment	km			Aug
arrange transport of ballast	loads			Oct
contract construction crews				Oct
<b>Plantations</b>				

T9 Weeding	ha	50	1	July
2 nd weeding of teak C57	ha	20		May
2nd yr weeding of Cedrela C85	ha	30		July
T10 Pruning	ha	25	3	May
3rd pruning of teak C 58	ha			May
<b>Extension</b>				
T11 Nursery establishment	nur- sery	x2	2	March
School nursery at West Tano - agree site				Jan
assistance on nursery bed construction				Feb
provide materials				Feb
Rehabilitate East Tano community nursery				Feb
T12 seedling distribution	plants	10,000	2	June
establish 3 temporary nurseries for distribution				April
move stock form main FD nursery				May
T13 soil erosion protection planting	ha	4.5	2	June
Agree final site(s) with committee				Feb
Site preparation				May
Establish holding nursery				May
Planting				June
T14 School visits	No.	20	3	all year

**Table OP 5 Time and Responsibility Charts (Gantt Chart)**

Task	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Staff i/c	Others
T1					■	■							KFS	FSG
T2							■	■	■				KFS	MMD
T3										■	■		MMD	
T4	■	■	■	■										
T5								■	■				FSG	
T6								■	■				FSG	
T7									■	■				
T8								■	■	■			FSG	
T9					■	■	■	■					LLD	
T10					■	■							LLD	MMD
T11	■	■	■											
T12				■	■	■							LLD	SGD
T13		■	■	■	■	■	■	■	■				LLD	SGD



**Form OP 6 Cost Breakdown for APW**

Activity	Quantity	Units	md/unit	Total md	Labour Costs '000	Incremental costs
<b>T2</b> New compartment demarcation	5	compts.				
field survey of boundaries	25	km	2/km	50	150	5 nights subs.
boundary cutting	25	km	15/km	375	1125	
<b>T3</b> Yield survey						
field survey	3 = 390	compts ha	2.5/ha	975	2925	
map production						
yield calculation and approval						
<b>T4</b> TOS preparation	1 45,000	TUC ha				
establishment of social responsibility agreements						5 night subs.
setting environmental protocols						2 night subs.
approval by traditional councils						
etc						

**MANUAL OF PROCEDURES  
FOREST RESOURCE MANAGEMENT PLANNING IN THE  
HFZ**

**SECTION C  
SUSTAINABLE TIMBER PRODUCTION  
ON RESERVE**

**GHANA FOREST SERVICE  
MARCH 1998**

# **Manual of Procedures - Sustainable Timber Production on Reserve**

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# Manual Of Operations - Sustainable Timber Production On-Reserve

## C1. Introduction

### Instruction Sheet No. C1.1 Overview of Procedures

#### 1. General

1.1 This Manual of Operations has been prepared for regional and district staff of the Forest Service to assist them to manage and monitor the timber harvesting activities on-reserve. The MoP will also have a role in providing training material for such institutions as Wood Industries Training Centre and the Sunyani Forestry School. Timber production is but one of the outputs from the reserves, though it is the most obvious one and the one which has the most direct economic value to the country. This manual is concerned only with natural timber production - not plantations.

1.2 Ghana has established 266 forest reserves of which 216 fall within the High Forest Zone (HFZ) and cover an area of 1,634,100 ha. The inventories carried out during the period 1986-94 have provided basic information on the composition and state of the forest. Currently, some 762,000 ha has been allocated for timber production after allowing for those areas excluded for permanent protection or for convalescence. A programme of preparing strategic management plans for each reserve is under way (refer MoP Section A) and it is possible that there will be some modifications to the present boundaries of the timber production areas after this process is completed for each reserve.

#### **A definition of “Sustainable forest management”**

*Sustainable forest management is the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.*

ITTO (1992)<sup>2</sup>

#### 2. Timber Production Areas

2.1 The strategic planning undertaken for each reserve in turn provides the basic definition of the area into its respective management zones. Those areas requiring permanent protection either on the basis of condition (slope, swamps, etc.) biological value or susceptibility to fire are excluded from the potential timber production areas along with those areas that are currently too understocked to be considered for production.

2.2 The general objective of management of the timber production areas is:-

*The sustainable production of timber to provide a perpetual flow of wood products to domestic and export markets and provide revenue for the resource owners; and to*

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<sup>2</sup>Criteria for the sustainable tropical forest management. Policy Development Paper 3.

*fund forest management whilst maintaining environmental quality and social responsibility*

2.3 There is a national management regime for timber production within the HFZ - namely the use of a polycyclic selection felling silvicultural system using a cutting cycle of 40 years. Detailed rules defining the selection of harvestable trees and the setting of the allowable cut have been put into practice.

2.4 The Ministry of Lands and Forestry has embarked on a strategy through application of the Timber Rights Act to manage concessions both on and off reserve through a process of competitive tender and the issue of Timber Utilisation Contracts (TUCs). This MoP deals with the aspects of management of the TUC system by the Forest Service. The Logging Manual prescribes a code of practice for timber operations that all TUC holders are required to adhere to as part of the TUC agreement.

### **3. Annual Allowable Cut**

3.1 The term “Annual Allowable Cut” - AAC is the maximum volume that can be felled each year without reducing the long-term sustainability of the forest resource; it is analogous to the taking of interest (growth) from a bank account without eating into the capital. A national annual allowable cut of 500,000 m<sup>3</sup> has been set for the forest reserves using the results of the inventories and applied to 64 economic species making use of the current (referred to as “Interim”) yield formula and the adoption of a rotation of 40 years. The 64 species have been grouped in accordance with their level of cut related to the total stocks, namely: 18 Scarlet Star species comprising the main traditional commercial timbers now under threat of economic extinction where the level of cut is greater than 200% of the sustainable level; 16 Red Star species significantly being over cut and will eventually become economically extinct, the level of cut being between 50-200% of the level considered to be sustainable; and finally, 30 Pink Star species, some of which are being exploited but not at a rate to cause concern, i.e. less than 50% of the sustainable cut.

#### Annual sustainable Yield form Forest Reserves

Species Category	Stems	Volume (m3 )
Scarlet Star	5,460	115,900
Red Star	15,300	208,700
Pink Star	38,660	358,500
Total	59,420	683,100

(ref: Forest Development Master Plan, MLF, 1996)

3.2 The figure of 683,100 m<sup>3</sup> has been rounded down to 500,000 m<sup>3</sup> since many of the Pink Star species are currently regarded as unsaleable. The Annual Allowable Cut (AAC) has presently also been set at 500,000 m<sup>3</sup> for off -reserves, to give a national figure for the total AAC of 1 million m<sup>3</sup>.

3.3 At the level of a compartment, the allowable cut is calculated on the basis of a 100% survey of commercial species and the application of the interim yield formula on a species by species basis. Fine-grained protection rules define those areas that must be excluded from logging either on the basis on environmental concerns (excessive slopes, closeness to watercourses) or biological conservation (protection of Black Star species). On average, around 14% of the harvestable area of the compartment area is reduced by adherence to these rules.

## 4. Overview of the Management Procedures for timber production

4.1 The Ministry of Lands and Forestry has embarked on a strategy through application of the Timber Rights Act to manage concessions both on and off reserve through a process of competitive tender and the issue of Timber Utilisation Contracts (TUCs). The TUCs seek to tighten the planning controls on timber utilisation and at the same time ensure that the interests of the communities and land owners are fully taken into account through the definition of the Social Responsibility Agreements.

4.2 The activities can be summarised as follows:-

### *Identification of TUC areas*

- progress maps updated
- initial scheduling of compartments for harvesting
- field checks
- consultation with communities and land owners
- endorsement of the Timber Contract Advertisement Consent Form
- fixing of boundaries where area borders protection zones

### *Preparation of the contract*

- preparation of the Timber Operational Specifications (TOS) and the Social Responsibility Agreements (SRA)
- advertisement of the TUC
- submission of applications by interested companies
- evaluation and award of contract

### *Management of the TUC areas*

Following on from the preparation of the TUCs and the award of the contract, the following procedures are followed:-

- preparation of the TUC Operation Plan
- pre-survey compartment inspection
- stock survey, check survey and preparation of a stock map
- yield estimation and preparation of a yield map and list of approved trees for harvesting
- preparation of the Compartment Plan
- tree felling plus tree volume estimation
- cross-cutting and estimation of log volume
- issue of Log Conveyance Certificate
- compartment inspection and issue of a Closure Certificate

**Table 1.1 Responsibilities of the Forest Service for on-reserve TUCs**

<b>Activity</b>	<b>Officers involved</b>	<b>Remarks</b>
1. Preparation Of Management Plans For Each Forest Reserve.	Planning Branch DFO, RFO Community representatives	Basic outline prepared by FMSC with assistance from DFO. Local workshop to fix details and amendments with communities
2. Identification Of TUC Area With Fixing Of Clear Boundaries.	FMSC, DFO and RFO	Critical where TUC area borders protected areas
3. Definition Of Compartments And Scheduling Of Felling	as above	
4. Preparation Of Timber Operation Specifications To Include Preparation Of Social Responsibility Agreements Following Consultation Process.	DFO with support from Regional staff	
5. Award Of Contract agreement of initial TUC Area Plan	Timber Rights Evaluation Committee	TUC Area Plan prepared by contractor as part of evaluation process
6. Pre-Felling Inspection With Contractor	DFO	
7. Stock Survey And Yield Allocation	DFO/RFO/FMSC	Refer MoP Section D
8. Approval Of TUC Five year Plans and Compartment Logging Plan and TUC Area Plan (revised)	DFO, RFO	Approval should be made at regional level, but advice of FMSC (and HQ) can be sought.
9. Issue Of Tree Information Forms, checking of Log Information Forms and issue of Log Conveyance Certificates.	DFO	Responsibility for completing the LIFs rest with the contractor
10. Overall Supervision And Monitoring and issue of compartment closure certificates	DFO	RFO to monitor field returns and follow up with field inspections.

## 2. DESIGNATION OF TIMBER PRODUCTION AREAS

### Manual of Operations - Sustainable Timber Production On-Reserve

#### C2. Designation of Timber Production Areas

#### Instruction Sheet No. C2.1 Definition of Timber Production Areas

##### 1. Introduction

1.1 The extent of the timber production areas is defined at the Strategic Planning Stage on a reserve by reserve basis, linked as appropriate to the Forest Management Units (FMUs).

**Table 2.1.1 Forest management areas or zones**

Area Category	Characteristics
<b>PROTECTION</b>	
<b>Hill Sanctuaries</b>	Healthy or regenerating forest. Slopes $\geq 30\%$ , water sources, permanently inundated areas, or otherwise fragile soils to prevent erosion which in turn will compromise water quality..
<b>Swamp Sanctuaries</b>	Permanent wet areas
<b>Provenance Protection Area</b>	Area with high populations of key economic species.
<b>Special Biological Protection Area</b>	Areas of high plant GHI or presence of rare fauna species.
<b>Fire Buffer Zones</b>	Intact areas surrounding 'valuable' forest in fire prone areas.
<b>Shelterbelts</b>	Areas with a large boundary to area ratio which are therefore vulnerable.
<b>Cultural sites</b>	Culturally important areas identified during the settlement procedure or in special cases areas identified since and archaeological sites.
<b>Research Area</b>	Research Working Circles
<b>PRODUCTION</b>	
<b>NTFP Production Areas</b>	Areas identified by rights holders as important NTFP collecting grounds which do not fall into the protection designations.
<b>Timber Production Areas</b>	Healthy productive forest. $>15m^2/ha$ . basal area (characteristics need refining according to zone and soil type) which does not fall into protection, research or NTFP area designation.
<b>Convalescence forest</b>	'Regenerating forest' which is healthily regenerating forest but below the stocking limit or basal area in which logging should be allowed. The current basal area limit for this is between $5-15m^2/ha$ . This is only a guide, and needs to be linked to an assessment of the quality of the regeneration.
<b>Conversion forest</b>	'Conversion forest' which is heavily degraded forest which has no regeneration of indigenous tree species and may be available for afforestation. The current basal area limit for this is below $5m^2/ha$ .
<b>Plantation area</b>	Existing stands of artificially regenerated areas

1.2 The Manual of Procedures for Strategic Planning in the HFZ (MoP Section A) should be consulted for details of this process. Greater emphasis is now being placed on the zonation of the reserves in accordance with the need to meet national needs for timber and preservation of bio-diversity and water-catchments; and at the same time, ensuring that the wishes of the local communities are incorporated into future plans to the extent that good forest management practice allows. Future management plans will identify as many of those zones indicated in Table 2.1.1 as appropriate to the conditions of the particular forest reserve.

1.3 The Timber Production Areas will therefore be represented by the forest land that remains following the identification of all protected areas, convalescent areas and the existing plantations. Even where a formal management plan has not been prepared, it will be possible to plan the setting out of a TUC, providing that there is in existence the map series needed to identify the location of each of the zones. As much as possible, the Forest Management Support Centre (FMSC) will provide the DFOs with the basic map series required to identify the Timber Production Areas, these should be field checked and any inconsistencies noted and reported to FMSC. All future maps will be prepared digitally hence allowing easy modification and updating when required.

## **2. Formation of Compartments**

2.1 Compartments form the basic planning unit on-reserve. All operations including logging should be recorded and monitored with respect to individual compartments. They will have already been demarcated -at least on paper - for most reserves. Where this is the case and there are records of operations carried out and the quantity of logs extracted, then the existing boundaries should be retained; it will cause major confusion if records refer to two sets of compartment numbers<sup>3</sup>. Where, however, compartments are still to be identified then they should be laid out so that the area available for logging is around 100 -150 ha (more or less conforming to present practice, since the standard compartment was based on the imperial dimensions of 1 mile x 0.5 mile, or about 1,600 m by 800 m equivalent to 128 ha). However, in those areas subject to extreme changes in topography and vegetation cover and where timber production is not of importance then smaller compartments are likely to be more appropriate.

2.2 As much as possible, the boundaries of compartments should be linked to natural topographic features - steams, ridges or changes in slope, in order to aid field staff and the contractor with respect to establishing location in the forest. This needs to be based on the 1:50,000 scale Survey of Ghana maps (or a suitable enlargement), since the contours ensure a more logical fit. Where no such features are available then the former system of straight lines will have to be retained.

2.3 At this stage compartment demarcation will probably remain at the office level, but where there are concerns as to the suitability of an areas, then an early visit must be made to check on the status of the forest. It has been standard practice that the identification of compartments is not applied to large cohesive blocks within the protection zones - particularly the Hill Sanctuaries. However, where there are smaller protected areas within a timber production areas, then it is less confusing if they are given a compartment number, though they continue to be excluded from consideration for timber. Many individual compartments will be composed of both large-grained protection areas as well as timber production areas. As long as the protection areas do not exceed 60% of the total area of the compartment, the compartment can still be considered as part of the TUC.

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<sup>3</sup> Note some reserves already have multiple compartment numbers adding to the problem of maintaining useful records.

2.4 Following the fixing of compartments on the base map, it is necessary to identify a selection of the compartment corners or other key positions on the ground to ensure that future demarcation can be easily completed. Cutting of the compartments boundaries is not required at this time. The use of a hand-held global positioning systems (GPS) will allow the team to quickly locate their position and allow the fixing of compartment markers relatively quickly without the need to resort to detailed trigonometric surveying. This work should be undertaken by the district survey teams. Guidance on the use of a GPS can be obtained from FMSC if required.

### 3. Harvesting Schedules

3.1 Harvesting schedules set the order in which compartments should be logged on the basis of their suitability or readiness for logging. This subject has been dealt with in detail in the MoP Section E covering the Preparation of Timber Harvesting Schedules for Forest Reserves which should be consulted in this context. In outline, the processes are as follows:-

- summarising the previous logging history for each compartment
- grouping compartments on the basis of similar treatment and hence likely to have a similar date of re-entry based on the 40 year logging cycle
- modification of groups taking into account practical problems of road construction and need to minimise extraction damage.
- field checking of those compartments known to be degraded through disturbance or site conditions. Those compartments classified as condition score 4 (mostly degraded) or worse should be excluded from the present cycle and put under the convalescence zone.

3.2 The main source of information on the state of the compartments with respect to previous logging history should be the Compartment Registers. In practice, many of these have not been well maintained. Where this is unfortunately the case, recourse has to be made to the felling registers, annual control reports, concessionaire files and monthly and quarterly reports. Planning Branch has also started to maintain a logging register which should be consulted if necessary.

3.3 It will gradually become standard procedure that an electronic database of all compartments will be maintained at the regional level. Unless a picture is built-up of previous logging operations within each compartment, the allocation of the felling schedule might become somewhat arbitrary and would need to be determined by field reconnaissance supported as much as possible by the results of the previous forest inventories.

3.4 The Harvesting Schedule MoP details the systematic summarising of the key information into three forms:-

#### **FD/CR1 Compartment Information**

Felling Series	Compt. No.	Size (ha)	District Assembly	Stool	Lease or TUC No.	Area Designation	Remarks

#### **FD/CR2 - History of Timber exploitation**

Felling Series	Compt. No.	Year	Operation	No. of trees removed	Remarks

**FD/CR3 - Preparation of the Harvesting Schedules**

Felling Series	Compt. No.	Year of last entry (a)	Number of trees	Total trees harvested	Average basal area	Condition Score	Ideal Harvest Year a+40	Harvest Year (c)	Disc repanty (c) -(b)	5 yr coupe	Remarks
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3.5 Ideally no compartment should be scheduled for re-entry following logging prior to the standard rotation of 40 years. MoP Section E provides guidance on how the best compromise can be reached where this is not possible and the additional factors that need to be taken into account to minimise the practical problems of logging. For example, grouping compartments where possible in order to minimise road construction and extraction damage. In some cases, the period of re-entry can be reduced if it is known that the previous exploitation was particularly light (i.e. less than 2 trees/ha); however since logging damage is directly proportional to the number of entries, the 40 year rule should be adhered as closely as possible. Under no circumstances should re-entry be allowed in under 25 years - no matter how minimal previous logging had been, as this would extremely deleterious effect on regeneration.

### 3. PREPARATION AND AWARD OF THE TUC

#### Manual of Operations - Sustainable Timber Production On-Reserve

#### C3. Preparation and Award of the TUC

#### Instruction Sheet No. C3.1 Identification of the TUC

##### 1. Introduction

This instruction sheet is designed to cover the processes that need to be gone through in order to identify and define the extent of the TUC area following the definition of the timber production areas within the reserves and the initial definition of compartments.

##### 2. Determination of the extent of the TUC Area

2.1 The size of the TUC will be determined by three factors:

- i. The condition of the forest
- ii The extent of the timber production area within the respective reserve, and:
- iii. The suitability of adjacent reserves for incorporation within the same TUC.

2.2 Currently, the concept of the FMU (forest management unit) has been used to group forest reserves into a geographically focused block covering roughly 500 km<sup>2</sup>. Although the existing FMUs are a useful starting point for considering the extent of the TUC, there will, in future, be more flexibility in this respect. The critical point is to group reserves in such a way that there is a commercially viable volume of logs available from the TUC area. This might require the grouping of additional reserves outside the immediate confines of the present FMU. The TUC is by definition concerned only with timber production areas and the total area of protection areas within the reserves has little relevance.

2.3 Under the present rules concerning yield allocation (refer MoP Section D), the appropriate yield formula for the particular ecological zone is applied to determine the overall volume to be extracted of each commercial species with the proviso that overall the limit on the number of trees to be logged does not exceed:-

<u>Vegetation Zone</u>	<u>Limit on number of trees/ha</u>
Dry Semi-deciduous (DS )	2
Moist Semi-deciduous north-west subtype (MSNW)	2
Moist Semi-deciduous north-west subtype (MSSE)	3
Moist Evergreen (ME)	3
Wet Evergreen (WE)	3

2.4 In the past, the number of trees approved for logging has, on a per hectare basis, tended to slightly exceed these limits - but in the future they will be more actively adhered to (unless research indicates that a modification one way or the other is beneficial). The national average for the mean tree

volume for commercial species is 10.75 m<sup>3</sup> indicating that the expected volume per hectare to be exploited will around 20 - 32 m<sup>3</sup> depending on the vegetation zone; equating to a volume production on a compartment basis of 2,200 - 3,500 m<sup>3</sup> (assuming 14% loss for fine grain protection).

### **SETTING A SUITABLE SIZE FOR THE TUC AREA**

1. Try and set the size of the TUC such that it will ensure an adequate minimum volume of logs each year to ensure that the contractor is able to operate in a viable way. For a small-scale operator this is unlikely to be below a single compartment per year i.e. 50 km<sup>2</sup> on the basis of a 40 year cycle.
2. A moderately-well equipped contractor will be easily able to log 25-30,000 m<sup>3</sup> /year utilising a loader and four skidders. Equating to 10 compartments per year, or 500 km<sup>2</sup> on a full cycle. This should be taken as the maximum for a TUC area. A company needing additional material will need to compete for another contract area.
3. Remember that the extent of the TUC area is linked solely to the timber production areas. The total area of the reserve(s) linked to the TUC will probably be 1.5-2.5 times greater in extent.

2.5 Following the first attempt at scheduling of compartments within the reserve (and for those reserves within the FMU), it will be necessary to decide whether the level of production will be in accordance with the guidelines given above. If the level of production would still appear to be too low, then it will be necessary to re-examine the status of other reserves that could be incorporated. In doing this it will be necessary to determine:-

- if the adjacent reserves are unencumbered with respect to other logging commitments
- their logging history and condition is such that they will be able to contribute a sufficient timber resource to warrant their incorporation
- their geographical position is such that linkage appears to be logical.

2.6 In some instances it might be possible to link what is seen as a low-production TUC on reserve with one off- reserve to ensure adequate commercial viability. However, if this is done, it would still clearly require two separate agreements as there would be a different set of land owners involved and a different set of timber operational specifications.

## **Manual of Operations - Sustainable Timber Production On-Reserve**

### **C3. Preparation and Award of the TUC Instruction Sheet C3.2 Timber Operational Specifications and Social Responsibility Agreements**

#### **1. Introduction**

1.1 As part of the legal contract document which is drawn up between the logging company and the Forest Service/community representatives are five schedules attached to the end of the contract:-

1. A description of the area of land contained within the TUC
2. A description of those areas explicitly excluded from the contract area
3. 1:50,000 or larger scale map of the TUC area
4. The Social Responsibility Agreements
5. (Other sections of the) Timber Operational Specifications

1.2 The purpose of this instruction sheet is to describe the composition of the both the Timber Operational Specifications (TOS) including the Social Responsibility Agreements.(SRA) and their purpose. Since the composition is essentially the same for the on and off-reserve, this Instruction Sheet can be used for both situations. Where there are slight differences of emphasis between the two, they have been indicated in the text. Use can be made of Form CAI/1 for both on and off-reserve for summarising the TOS to be included within the contract.(attached at the end of Part C3 of this MoP).

#### **2. The Timber Operational Specifications (TOS)**

2.1 The TOS are to provide location-specific conditions on the way in which the TUC should be operated and managed and are relevant both to on and off-reserve . They are a series of instructions to the contractor on extra restrictions over and above those conditions laid out in the Logging Manual. The Logging Manual prescribes a Code of Practice to be adhered to by all contractors but can not cover all eventualities that may be relevant to a particular site. The term “Timber Operational Specifications” includes both environmental factors as well as the more specific Social Responsibility Agreements.

2.2 There may, for example, be the need to avoid using specific roads after heavy rain or at the other extreme, the need to mount 24 hour fire watch at specific times of the year. They will include details of any environmental controls that need to be addressed by the logger. The need (or not, as the case may be) for these TOS will become apparent during discussions with the community and the DFO’s own knowledge of the area.

#### **3. Social Responsibility Agreements (SRA)**

3.1 The Social Responsibility Agreement is a mechanism for ensuring that all TUC operations are carried out in a socially responsible manner with due respect for all the rights of the land-owning communities. The SRA is a Schedule of the TUC and as such constitutes one of the terms and conditions of the contact. The SRA is intended to normalise relations between the TUC holder and the local communities, providing for uninterrupted operations as long as the terms of the SRA are respected.

3.2 The SRA is entered into between the contractor and representatives of the landowners. It is witnessed by the Forest Service and the FS will negotiate the key provisions of the SRA with the communities in advance of the contract being advertised.

3.3 The Social Responsibility Agreements are applicable both to the on and off-reserve situation but are usually more detailed and critical off-reserve. The SRAs are composed of two parts, namely -

- i. Code of Conduct; and
- ii. Social Obligations

i. Code of Conduct

3.1 The Code of Conduct stipulates the manner in which the contractor must operate to ensure that all timber operations are conducted with due respect for the rights of the communities inside or adjacent to the TUC area. The code of conduct will include provisions to ensure respect for local customs and beliefs, local infrastructure and livelihoods.

*(a) On-reserve*

3.2. In drawing up the Code of Conduct for on-reserve areas it will be recognised that timber production is the primary land use of the area. The Code of Conduct recognises that the following rights of the land owning communities be respected during TUC operations:

- respect for cultural norms such as taboo days
- respect for right of access to forest products for domestic use
- respect right to consultation concerning location of logging roads etc.
- respect right to receive prompt share of the revenue from harvesting
- respect for local infrastructure by minimising the wear and tear on roads and bridges and the need for contractors to make good any damage.
- respect for all sacred sites, NTFP collection areas, springs etc.

Furthermore the contractor should be clear that a TUC does not give him any rights to the collection of NTFPs, all such harvesting would be illegal. The contractor must ensure unhindered access to the area for the landowners to harvest NTFPs for domestic consumption, accept where there is direct physical danger from logging activities..

3.3. The Code of Conduct for forest reserve TUC areas will specify how the two parties have agreed to ensure these rights are respected. Specific cultural sites and NTFP production areas that have been excluded from the TUC area should be made known to the contractor.

*(b) Off-reserve*

3.4. In drawing up the Code of Conduct for off-reserve TUC areas it must be recognised that the primary land use in these areas will normally be farming. The Code of Conduct recognises that the following rights of the land owning communities be respected during TUC operations:

- respect for farming operations and need to minimise disruption to agricultural activities and damage to farms and roads
- respect for cultural norms
- respect for local rights to non timber forest products
- respect right to consultation during planning of operations
- respect right to receive a share of the revenue from harvesting
- respect for local infrastructure
- respect right of farmers to receive payment for tree tending
- respect right of landowners to receive prompt payment of concession rent and royalty.

3.5. The Code of Conduct for off-reserve TUC areas will specify how the two parties have agreed to ensure these rights are respected.

### Social Obligations

3.6 Social obligations are specific agreements drawn up between the community and the contractor for the supply of materials or services over and above the legally controlled royalties and fees. The contractor may have undertaken to build a bridge or to provide building material for a school. There may have been an agreement with the community to employ a minimum number of local workers. Whatever has been agreed, it is important that the details are placed in the contract and signed by all parties. Similarly, the contractor may have given unfettered access to a series of named roads, such details should be clarified.

3.7. The need for Social Obligations on-reserve may be reviewed by the Forest Service at a future date if other returns to the land owning community from timber harvesting are deemed to have substantially increased to the point at which social obligations are regarded as unnecessary. However this situation is less likely to arise off-reserve.

3.8. The Social Obligations will be itemised by the DFO during TUC area identification procedures. The DFO will ensure the requests are reasonable and in line with the richness of the TUC area and the number of communities involved. The DFO and his team must not be seen as dictating the terms and conditions. The community are free to extract what conditions they can from the contractor - particularly so off-reserve; however it is the responsibility of the Forest Service to act a responsible arbiter . The benefits arranged as part of the social obligations are paid/delivered to the **land owning communities** and not to the office of the stool chiefs.

# **Manual of Operations - Sustainable Timber Production On-Reserve**

## **C3. Preparation and Award of the TUC**

### **Instruction Sheet C3.3      The Consultation Process**

#### **1.      Introduction**

1.1      This Instruction Sheet is concerned with aspects related to consultation by the Forest Service with the land owners on-reserve.

1.2      The finalisation of the TUC agreements requires consultation at various levels with all the stakeholders. The level of consultation is particularly extensive for the off-reserve areas, but even on-reserve it has to be remembered that the Forest Service is acting as the agent for the land owners and needs to seek their endorsement for operations by a particular contractor.

1.3      During the strategic planning phase when the forest reserve management plans were being finalised there is a particular intensive period of consultation with the local communities to ensure the plan reflects their requirements. This has been described in MoP A (Strategic Planning). At a slightly later time when the TOS / SRAs are being prepared there will again be intensive consultation with the communities and with the district assembly officers on the conditions to be included.

#### **2. Objectives**

2.1      To ensure that the wishes of the land owners, involved communities and local administrators are taken into account when formulating the terms of conditions for the operation of the TUCs both on and off-reserve.

#### **3. The Consultation Process**

##### District Assemblies

3.1      The DFO should formally notify the District Assemblies and in particular the Secretary of the District Environment and Management Committee that the Forest Service is intending to identify TUC areas either on or off-reserve. Member of the Committee might wish to suggest possible areas, otherwise the DFO will need to initiate the process himself. Following the initial selection of the rough boundaries of the TUC, the reaction of the District Assemblies and the affected landowners must be fully sought.

##### Landowners

3.2      The DFO will identify and arrange meetings with the owners of the land including a meeting with the Traditional Council of the land-owning stool. The boundaries of the TUC on-reserve should not be subject to extensive discussion since they will be related to the condition of the compartments and their previous logging history and this is a professional decision to be made by the Forest Service as managers of the reserves. Access to the TUC areas will however be a point of discussion and where it will be necessary for the contractor to either build a new road or expand an existing one, obviously full consultation will be essential.

3.3      It is desirable to ask the Traditional Councils affected by the developments to nominate a person who can be contacted by the DFO on all future discussions of the areas

3.4 Off-reserve, agreement needs to be reached on the boundaries of the TUC and those specific areas to be excluded. These will be detailed in Section 5 of Form CAI/1. The length of the contract needs to be defined in Form CAI/1. On-reserve, this will be dictated by the condition of the compartments involved and there will be very little flexibility.

#### **4. Formulation of the Timber Operational Specifications**

4.1 Following initial consultation with the land owners on the extent of the contract area, district staff will be required to prepare both the timber operational specifications (TOS) including the social responsibility agreements (SRAs).

4.2 It is intended that the derivation of the TOS will be undertaken by a dedicated regional team in the first instance in order to diminish the expected back log of requests following the new legislation. Later this type of work will be undertaken by the district staff as part of their normal duties.

##### Methodology

4.3 Some of the initial consultation process will have been undertaken by the socio-economic teams used to collect data for the preparation of Part 1 of the strategic planning process. Information such as the use made of the forest and the various perceived traditional rights (including any conflicting claims made by different communities), will be a useful starting point for the teams preparing the TOS/SRAs.

4.4 Those teams mobilised for this specific task will be provided with a list of standard questions provided under separate guidelines to be made available by the CFM Unit within the Forest Management Support Centre. Those issues that will need to be discussed will include:

- Examination of any possible conflicts with respect to the extent of the Timber Production Area and cultural sites or areas of special interest (such as prime NTFP collection areas). This should have been well covered during the strategic planning process, when initial zoning was agreed; however, the TUC process will, in some cases, have to be initiated before a full planning process has been undertaken.
- Any expected problems arising from the movement of logs on local access roads prior to trucks reaching the main road system
- Taboo days to be respected
- Agreement on the rights of the local communities to enter the Timber Production Area for the lawful collection of NTFPs etc.
- Agreement on a complaints procedure if the either side has issues to raise
- Undertaking on the proportion of labour to be employed from within the communities
- Agreements on any infra-structural support to be provided by the contractor
- Agreement on mutual assistance for fire control measures

4.5 Contact will need to be made with the traditional authorities and the each of the land-owning stools in order to brief the elders on the TUC process . As far as possible the chief and the elders of each stool should be present, as well as the assemblymen, unit committee members and representatives of each of the affected communities. All details of the TOS/SRAs should be entered on Form CAI/1.

4.6 During the discussions as well as raising the issues listed above (para 4.4), the team should identify current development plans for the area: electrification, feeder roads, schools etc., in order to be sure there will be no conflicts.

## **5. Finalisation of the Proposals**

5.1 The Timber Operational Specification agreed by the community and summarised by the DFO on Form CAI/1 should be made public for three weeks. If there are no changes the DFO should seek endorsement from the land owners and the caretaker chiefs. The forms then need to be further endorsed by the District Assemblies and ratified by the Lands Commission to the effect that the land as delineated on the map is not encumbered and can be used for the purposes of the TUC.

5.2 Following these endorsements the form should be forwarded by the DFO to the RFO with all the attachments.

### Recommendations by RFO

5.3 The RFO should inspect the completed form and all the attachments and make any further enquiries that he feels are necessary in order to prove the veracity of the statements. The RFO should pay special attention to any special environmental or social responsibility conditions and ensure that these are highlighted for the attention of the Timber Rights Evaluation Committee. The completed forms are then to be forwarded to the Chairman of the Evaluation Committee at the Forest Service Headquarters, Accra.

## **Manual of Operations - Sustainable Timber Production On-Reserve**

### **C3. Preparation and Award of the TUC**

#### **Instruction Sheet C3.4 The Process for Selection of the Contractor**

##### **1. Introduction**

1.1 This Instruction Sheet details the processes required for the selection of the contractor to be awarded with the TUC. The process is almost the same for the on and off-reserve contract areas.

1.2 There are three steps

- (a) initial registration by the contractor and pre-qualification
- (b) submission of the documentation including re-forestation plan and TUC Area Plan(On-reserve) or TUC Operational Plan (Off-reserve) by the contractors
- (c) evaluation of the proposals and selection of the preferred company by the Timber Rights Evaluation Committee.

This Instruction sheet will cover all these stages

##### **2. Pre-qualification**

2.1 The Company will be required to complete Form CV1 The Timber Rights Evaluation Form obtained from Forest Service HQ for a set fee. (An example is included in Appendix 4 of the Logging Manual) . The company is at liberty to apply for pre-qualification at any time, once approval is given, the company is allowed to directly apply for a specific contract for up to 6 months. After that time the pre-qualification process must be repeated. A list of nine attachments are indicated as being required for this form:-

- evidence of status as a registered company
- business plan and income and expenditure over the last three years
- income tax and Social Clearance Certificates
- audited accounts for the past three years
- bankers certificate of credit worthiness
- evidence of full payment of royalties and other forest fees
- evidence of membership of a relevant trade association
- copies of vehicle insurance and road worthiness certificates for all vehicles and plan
- summaries of qualifications and work experience of key forestry staff

2.2 The purpose of Form is to provide the opportunity for an initial screening of applicants for a TUC and to ensure that the documentation required for the next stage of the evaluation process is only sent to those companies that demonstrate the minimum standards of expertise and operational capacity and have fully paid up all outstanding forest fees and levies. Form CV/1 should be sent to the Secretary for the Timber Rights Evaluation Committee, the address of whom is given on the form

2.3 Providing the above checks are satisfactorily completed the company will be sent the Pre-qualification Form CV/2 (refer Appendix 4 of the Logging Manual) together with the associated documentation which describes the scope of the contract, the timber operational specifications and (for on-reserve TUCs) a synthesis of the forest management plan and key maps. All such material will be supplied by the Contracts Unit with the assistance of the FMSC and the regional/district staff.

### **3. Application for a specific TUC**

3.1 On application, pre-qualified companies will be sent Form CV/2 . This form is brief and provides an opportunity for the applicant to make any modifications to CV/1 (if there has been a time lag) and to comment on the forest reserve plan, the timber operational specifications and any problems that have arisen following discussions with the land owners.

3.2 The critical part of the application lies with the attachment, since this will comprise the TUC Area Plan, which should provide an overview of the main aspects of management for the reserve with additional detail with respect to the first five year coupe. As part of the TUC area Plan are the associated maps indicating firstly the whole concession area and providing as much detail as possible on the main access roads to be used. A separate map is also expected to cover in more detail the first five year coupe and give a better idea of the access roads to be built or improved and the location of the camps and main log dumps.

3.3 It should be noted that in the case of an application for a TUC off-reserve, the TUC Area Plan can be substituted by the first provisional Timber Operational Plan. This covers the first five years of the concession only. It is considered that for the off-reserve TUC, it would be difficult for the company to comment on their programme beyond that time frame, since the extent of the resource will not be fully known and changes can be expected over the initial period of five years that would be out of the control of the Forest Service.

### **4. TUC Area Plan**

#### Purpose

4.1 The TUC Area Plan is intended to provide an overview of the operations to be carried out within the TUC over the entire 40 year period (or less, if specifically indicated so) and in more details for the initial five year coupe. It is an essential requirement for the TUC application and will be used by the Timber Rights Evaluation Committee as a means of judging the technical competence of the company along with information on the staffing and the equipment operated. The plan is revised every five years for the remaining period at the time of preparation of the TUC (five year) Operations Plan.

### **Extract from the Logging Manual**

#### Attachments to the Pre-Qualification Form FS/CV/2

1. The TUC Area Plan. This is to be completed in accordance with the approved format and attached guidelines. Applicants are reminded that this will form the major part of this application and care should be taken over its preparation.

2. Maps - as part of the TUC Area Plan, applicants are reminded that they must submit two maps :-

a) Copy of the Forest Service Compartment Map at a scale of 1:50,000 or a suitable enlargement defining the compartment boundaries and extended to indicate the main access roads to be used during the contract period and expected location of main camps. Areas under protection should be clearly identified where they adjoin the timber production area. In the case of the TUCs off-reserve, individual compartments are not identified.

b) Enlargement of base map to indicate details of the first five year coupe - suggested scale being 1:25,000 or greater. Map to show the expected position of log yards, base camp, new roads, bridges and those roads to be maintained by the contractor. Protected areas within the coupe should also be indicated.

#### Structure

4.2. The components of the TUC Area Plan are summarised in the Box below.

4.3 Since the responsibility for putting together this Plan lies with each individual contractor, detailed guidelines are provided in the Logging Manual along with a specimen forms to assist in the correct presentation.

4.4 At this time the responsibility of the district and regional staff would be to assist the contractor with any specific queries related to the contract and provide guidance on community representatives affected by logging operations to discuss the TOS and SRAs. The DFO should refrain from completing any of the forms or plans on behalf of the contractor, since this is used in the judging process and is required to show the level of technical competence of the company. The DFO should, however, ensure that contractors are familiar with the contents of the Logging Manual and provide guidance on where to obtain a copy. The TUC Area Plan is forwarded directly to the Timber Rights Evaluation Committee along with all required information.

**Summary of Requirements  
for TUC Area Plan.**

- 1. HARVESTING SCHEDULE - CONTRACTOR'S UNDERSTANDING OF PRESENT DIRECTIVES AND ANY PROPOSED MODIFICATIONS OR CONCERNS**
- 2. LEVEL AND RATE OF LOGGING, SPECIES TO BE USED**
- 3. OUTLINES OF MAIN ACCESS ROUTES TO THE AREA. PLANNED LOGGING YARDS OR HOLDING AREAS.**
- 4. ESTIMATED RESOURCES REQUIRED FOR LOGGING AND EMPLOYMENT GENERATION.**
- 5. SECURITY ISSUES - CONTROL OF ILLEGAL FELLING.**
- 6. TIMBER OPERATIONAL SPECIFICATIONS -INTERPRETATION.**
  - PROTECTED AREAS**
  - FIRE CONTROL MEASURES**
  - ENVIRONMENTAL CONTROLS**
  - SOCIAL RESPONSIBILITY AGREEMENTS**
- 7. POST LOGGING ACTIVITIES - (INCLUDING REAFFORESTATION WHERE APPROPRIATE)**

**MAPS:**

- a) Compartment layout Map: to show protection areas and main access routes -1:50,000 or better**
- b) First five year coupe - location, main access and management zones -1:25,000 or better**

## **5. The Evaluation Process**

5.1 In accordance with the Timber Resources Management Act, an Evaluation Committee will be formed to evaluate applications for TUCs and identify the preferred company to be allocated the contract. The committee is to be composed of the following members:-

Director of the Forest Service or a suitable deputy  
The Head of the FMSC  
Chief Administrator of the Forestry Commission  
The Administrator of Stool Lands  
The representative of the Lands Commission currently serving with the Forestry Commission  
Representative of the Ghana Institute of Professional Foresters  
One other person to be appointed by the Minister

In addition, the Committee may co-opt such persons as it feels necessary. The respective RFO and DFO are likely to be called to assist.

5.2 The evaluation is carried out by scoring the company with respect to:-

- Financial performance - profitability
  - liquidity
  - solvency
  - social responsibility
- Company's performance in supporting plantation programmes -either directly or through investment with others (the Re-afforestation Plan)
- Staffing - numbers of qualified foresters and engineers against minimal levels needed for effective management.
- Road construction equipment
- Logging extraction equipment
- Processing capacity - considering the present operating capacity against potential capacity
  - proportion of logs being converted to sawn timber
  - proportion being converted to plywood or veneers
  - proportion being converted in to tertiary products

The quality of the TUC Area Plan (or TUC Operations Plan for an off-reserve contract) will be judged separately, with attention paid to:-

- the interpretation of the forest reserve management plans
- interpretation of the TOS and the SRAs
- quality of the maps
- indication of post-logging activities
- range of species to be utilised

5.3 The scoring system being used for a particular evaluation will be made public.

**Manual of Operations - Sustainable Timber Production On-Reserve**

**C3. Preparation and Award of the TUC**

**APPENDIX - FORMS**

**Form FS/CAI/1 Contract Area Identification Form**

**For:**

**Form FS/CV1 Timber Rights Eligibility Form**

**Form FS/CV2 Timber Rights Pre-qualification Form**

**please refer Appendix 4 of the Logging Manual**

## **Timber Contract Area Advertisement Consent Form for on-reserve and off-reserve.**

Disclaimer: This form does not constitute a legal document in respect of the land delimited on the attached map and described herein. The only right given over by signatories of this form is that of being able to refuse consent for the advertisement of the area for operation under a Timber Utilisation Contract.

### **I. Administration of area**

A. Name of area or reserves \_\_\_\_\_

B. Forest District \_\_\_\_\_

C. District Assembly: \_\_\_\_\_

Contact (name, position) \_\_\_\_\_

D. Traditional Council: \_\_\_\_\_

Contact (name, address) \_\_\_\_\_

### **II. Signatories for contract (landowning stools or alienation holders)**

A. Name: \_\_\_\_\_

being: \_\_\_\_\_ of the \_\_\_\_\_

Contact (name, address) \_\_\_\_\_

B. Name: \_\_\_\_\_

being: \_\_\_\_\_ of the \_\_\_\_\_

Contact (name, address) \_\_\_\_\_

C. Name: \_\_\_\_\_

being: \_\_\_\_\_ of the \_\_\_\_\_

Contact (name, address) \_\_\_\_\_

**III. Witnesses to contract**

A. Caretaker chief for \_\_\_\_\_ community

Contact (name, address) \_\_\_\_\_

B. Caretaker chief for \_\_\_\_\_ community

Contact (name, address) \_\_\_\_\_

C. Caretaker chief for \_\_\_\_\_ community

Contact (name, address) \_\_\_\_\_

**IV. General location of the area** (general description of locality, size and agreed boundaries)<sup>4</sup>

**Description of areas to be excluded from the Timber Contract Area**

A. Cultural areas (sacred groves/sites etc.)

B. Environmentally sensitive areas (riverine buffer strips, steep hills etc.)

C. Areas where operations are to be restricted because of farming considerations (e.g. cocoa farms)

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<sup>4</sup> Continue on separate sheet if necessary

**V. Proposed duration of contract**

**VI. Special conditions for inclusion in the Timber Operational Specifications of the advertisement**

A. Environmental specifications (type of machinery to be used etc)

B. Restrictions on logging activities (seasonal bans etc)

C. Code of Conduct (taboo days etc)

D. Social responsibility for the resource (planting, tree protection proposals etc)

E. Support for social infrastructural development (if any)

**VII. Endorsements <sup>5</sup>**

We the undersigned representatives of the communities and landowners of the area delimited

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<sup>5</sup> Cross through any spaces not required and add any extra names at the bottom of the page.

on the attached map and subject to the recommendations made above do hereby endorse the identification of the said area and the conditions for operating the area contain herein to be advertised for grant of a Timber Utilisation Contract.

A. Representatives of landowning stool/alienation holders

1. Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_
2. Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_
3. Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_

B. Caretaker chiefs

1. Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_
2. Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_
3. Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_

C. Representative of Traditional Council

Name: \_\_\_\_\_ Signed: \_\_\_\_\_  
Position: \_\_\_\_\_ Date: \_\_\_\_\_

**VIII. Confirmation of District Assembly consultation**

I confirm that the District Assembly of the area delimited on the attached map above has been duly consulted concerning the identification of the said area and that the Assembly are aware of the recommendations made by the communities and landowners.

A. District Chief Executive

Name: \_\_\_\_\_ Signed: \_\_\_\_\_

Date: \_\_\_\_\_

B. District Coordinating Director

Name: \_\_\_\_\_ Signed: \_\_\_\_\_

Date: \_\_\_\_\_

**IX. Ratification by Lands Commission (for off-reserve only)**

I confirm that the area of land delimited on the attached map and referred to above is not encumbered by any existing timber rights and there is no other reason with regard to assignment of other rights why the said area may not be advertised for granting of a Timber Utilisation Contract.

Name: \_\_\_\_\_ Signed: \_\_\_\_\_

Rank: \_\_\_\_\_ Date: \_\_\_\_\_

**X. Attachments**

A. Contract Area map attached Yes/No

B. Boundary schedule attached Yes/No

C. District Forest Officer's site inspection report attached Yes/No

D. Other submissions attached: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**XI. Statement of District Forest Officer**

I hereby declare that I have done all that is required for the purposes of identifying and consulting with the appropriate authorities concerning the area delimited on the attached map. The map, the information contained on this Form and the attachments are to the best of my knowledge complete and representative of the views of the people of the said area.

Name: \_\_\_\_\_ Signed: \_\_\_\_\_

Rank: \_\_\_\_\_ Date: \_\_\_\_\_

**XII. Statement of the Regional Forestry Officer**

I confirm that the above details are correct and recommend advertisement of the area identified on the attached map subject to the Timber Operations Specifications below by the Timber Contract Unit.

OR<sup>6</sup>

I confirm that the above details are correct and do not recommend the advertisement of the area identified on the attached map for the reasons stated below.

Regional Forest Officer for \_\_\_\_\_ Region

Name: \_\_\_\_\_ Signed: \_\_\_\_\_

Date: \_\_\_\_\_

**XIII. Timber operational specifications** (for inclusion in the advertisement and contract area plan)

**XIV. Reasons for not approving area for advertisement**

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<sup>6</sup> Delete as appropriate

## 4 TIMBER HARVESTING PROCEDURES

### Manual of Operations - Sustainable Timber Production On-Reserve

#### C4. Timber Harvesting Procedures

##### Instruction Sheet No. C4.1: Overview of Procedures for timber harvesting within Forest Reserves

### 1. Introduction

1.1 Part 4 of this manual deals with timber harvesting procedures on reserve. However there are certain aspects of these procedures that have already been covered in other MoPs and in such instances will not be considered in any detail here.

1.2 The timber harvesting control systems have slowly evolved into the present system which uses a combination of varying minimum diameter limits of (50), 70, 90 or 110 cm depending on the species with further constraints set by the condition of the forest and the utilisation class of each species (species star code). The fine grained protection rules have been formulated to restrict logging within environmentally susceptible areas located within the timber production areas. The standard rotation has been set at 40 years and restrictions have been set on re-entry to logged areas. The overall intention being that if these harvesting rules are fully followed, the forest resource can continued to be logged in a sustainable manner.

### 2. Activities related to Timber Harvesting

2.1 Following on from the preparation of the TUCs and the award of the contract, the following procedures are followed:-

- Preparation of the TUC Operation Plan
- Pre-survey compartment inspection
- Stock survey, check survey and preparation of a stock map
- Yield estimation and preparation of a yield map and list of approved trees for harvesting
- Preparation of the Compartment Plan
- Tree felling plus tree volume estimation
- Cross-cutting and estimation of log volume
- Issue of Log Conveyance Certificate
- Compartment inspection and issue of a Closure Certificate

#### The TUC Operation Plan

2.2 This is the responsibility of the contractor. It provides greater detail on the operations to be carried out within the next five years, concentrating on the problems of access for the particular compartments involved and meeting specific TOS. The structure of the plan is considered in Instruction Sheet 4.2.

#### Pre-survey Inspection

2.3 The procedures for this work have been dealt with in detail in MoP Section D to which reference should be made. A joint inspection of each compartment due for harvesting must be made by both district staff and the contractor before embarking on the stock survey. The purpose is two-fold;

firstly, to confirm that the area is suitable for logging from the viewpoint of stocking and topography; and to therefore ensure that the major investment of work required for a stock survey will be worthwhile. Secondly to determine if there will be any particular problems with the site in terms of access or conforming with the TOS. During this activity the contractor will be collecting some of the information needed for the Compartment Plan.

### The Stock Survey

2.4 This subject has similarly been described in detail in MoP Section D. It is a major exercise involving a standard team of up to 15 people and the field work taking an average of 20 days. During this activity all commercial Class 1 species of diameter greater than 50 cm (and 30 cm in the case of Aprozuma and Afena) are recorded by species and diameter. In addition protected species belonging to the classes “Restricted Timber Species” and “Black Star” are separately identified but not measured. Slope and forest condition are measured at regular intervals and all tracks and streams identified and mapped..

2.5 The Forest Service is responsible for ensuring that a stock survey to the correct standards has been carried out. In most cases this work is undertaken by the Forest Service itself, costs being met by the contractor. Those contractors with adequate in-house expertise can elect to carry out the work themselves, after the Forest Service has verified that the team are fully capable in this type of work.

2.6 A separate Check Survey (covering 10% of the compartment) is carried out by the Forest Service regardless of whether the main survey was conducted by the contractor or the Forest Service itself. A different team leader should be used for this check survey and ideally a different team. The check is carried out within one month of the completion of the main survey.

### Stock Map Preparation

2.7 A stock map at a scale of 1:1,250 or 1:2,500 is required detailing the position of all trees recorded indicating the species and diameter class. It is normally prepared by the Drawing Officer of the concerned DFO. Those companies with the expertise to undertake this work themselves could do so, but the resulting maps would need to be checked by the district office for approval. Full instructions on the completion of the stock map are provided in the Stock Survey and Yield Allocation MoP Section D. A series of approved species codes and symbols have been devised. The stock map also indicates:

- the location of the survey lines,
- the direction and gradient of the slopes
- the position of skid tracks, roads and paths
- watercourses
- location of swamps, farms, rocky outcrops.

### Yield Estimation and Yield Map Production

2.8 Reference should be made to Instruction Sheet D5 of the MoP. The derivation of the approved yield can only be done by the district office and is subject to approval by the RFO and checking by FMSC. The selection of those trees for harvesting requires consideration of the following factors:-

- the need to ensure a good distribution of trees after logging
- no more than 2 trees/ha (MSNW and DS zones) or 3 trees/ha (other zones) can be removed
- need to favour removal of damaged, but utilisable trees

The fine-grained protection rules provide restrictions:-

- no harvesting within 25 m of small watercourses and 50m of rivers.
- no logging on slopes above 30%

- black star species to be protected by a variable exclusion zone of up to 100m for trees.
- open areas in the forest (condition class 5/6) excluded.

2.9 The documentation required before yield approval can be given includes:-

- the stock map
- the yield map
- yield summary
- compartment inspection (Form FD 50 of September 1994 or its replacement)
- check survey form
- application to fell special permit species (if relevant)
- the Compartment (Logging) Plan
- the Yield Approval Checklist (Form FD 52 of September 1994 or its replacement)

#### The Compartment Plan

2.10 This is prepared by the contractor and indicates the operations to be carried out in a single compartment. Reference should be made to Instruction Sheet - No. 4.3 in this MoP and the Logging Manual for details.

#### Tree and Log Measurement

2.11 Use of mean tree volumes for the estimation of royalty payments is no longer to be used and instead total utilisable tree volume (prior to cross-cutting) is assessed making use of the Tree Information Forms (TIF). Details on the use of this form are given in Instruction Sheet 4.4. The responsibility for making carrying out these assessments are with the Forest Service since they are the basis for calculation of the forest fees. The assessment team will need to work closely with the tree felling gang so that cross-cutting and extraction are not delayed.

2.12 The use of the Log Information Form (LIF) will continue, however, the responsibility for measurement and recording of the logs following cross-cutting resides with the contractor. The main purpose of the LIF is to ensure that all logs being removed from the forest are recorded and to provide the basis for the issue of the Conveyance Certificate.

2.13 The Conveyance Certificate is issued on a vehicle by vehicle basis and remains with the vehicle until it reaches a TIDB (FIPB)<sup>7</sup> checkpoint. It is then surrendered in exchange for the Log Measurement Certificate (LMC). TIDB will then return the Conveyance Certificate to the issuing DFO. The TIDB have instructions not to issue an LMC unless the driver can produce a Conveyance Certificate. The continued use of the LMC is being questioned and with the developing role of TIDB a rationalisation of present practices is likely.

#### Monitoring and Compartment Closure

2.14 The DFO and his staff are responsible for monitoring of harvesting practices and drawing to the attention of the contractor any unacceptable methods. Particular attention is to be paid to the adhering of fine-grained protection and any special restrictions itemised within the TOS. Under normal operating procedures, a contractor is only able to work in one compartment at a time. It is in his interests to obtain a compartment closure certificate from the Forest Service as soon as possible as failure to do so will restrict his working in other compartments. The procedures relating to the compartment closure are detailed in this manual - refer Instruction Sheet 4.4

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<sup>7</sup> Timber Industry Development Board the expected replacement for the Forest Products Inspection Bureau.

## **Manual of Operations - Sustainable Timber Production On-Reserve**

### **C4. Timber Harvesting Procedures Instruction Sheet C4.2 The TUC (5 year) Operational Plan**

#### **1. Introduction**

1.1 Following the award of the contract, the successful company will be required to produce a five year operational plan covering aspects of the logging to be undertaken within the first five year coupe. This will be the responsibility of the company but district staff may need to assist in ensuring that the company is using the most up to date information on the resource and is fully aware of all the TOS for the site.

#### **2. Purpose**

2.1 The purpose of the Plan is to enable the Forest Service to ensure that operations in the five year felling coupe are well planned and meet general FS standards and the TOS of the area. . Subsequently, new plans will need to be prepared prior to moving into the next five year coupe.

2.2 The five year plan provides an opportunity to review the level of success of the contractor in adhering to the long-term plan for the entire contract area

#### **2. Structure**

2.1 An outline of the composition of such a plan is given below, but the details concerning its formulation are provided in the Logging Manual

#### **OUTLINE OF A TYPICAL 5 YEAR TUC OPERATIONAL PLAN**

- 1. DETAILED HARVESTING SCHEDULE FOR PERIOD**
- 2. EXPECTED LOG PRODUCTION**
- 3. UTILISATION/CONVERSION PLANS**
- 4. ROAD AND LOGGING TRACK LAYOUT, BRIDGES, LOG YARDS.**
- 5. PROTECTION/ENVIRONMENTAL ISSUES FROM TIMBER  
OPERATIONAL SPECIFICATIONS**
- 6. POST LOGGING ACTIVITIES**
- 7. SOCIAL RESPONSIBILITY COMMITMENTS**

**MAPS: Approx. 1:25,000 scale or better. Harvesting sequence and access.**

**Indicate access roads, camps, main log yards, source of road making material and protection areas.**

2.2. The DFO will provide information to the contractor on which compartments can be entered in the first five years according to the harvesting schedule. The plan that is required from the contractor should be for these compartments only.

### **3. Review of Plan**

3.1. The DFO should review the TUC Operations Plan and make any comments before forwarding to the Regional Forest Officer for approval. The decision on whether to accept the five year plan is taken at regional level, but the RFO may accept the guidance of FMSC or HQ if required. Since there is no element of competition at this stage,<sup>8</sup> the DFO should not feel constrained to assist the contractor in preparing the plan to an acceptable standard and ensuring that the full requirements of the TOS and the SRAs are being considered.

3.2. Particular issues to review are:-

- does the harvesting schedule indicated by the contractor accord with the intentions of the FS?
- do the volumes and the species composition accord with the PSP data and any recent stock surveys?
- will there be any problem in using the access roads proposed, has there been agreement on the proposed alignment of new access roads to the area.?
- has the contractor properly identified the areas of coarse-grained protection?
- has the company adequately summarised the main aspects of the TOS and the SRA that will effect operations in this particular coupe?

3.3. Once approved, the contractor is expected to implement the Plan to the satisfaction of the Forestry Service. The plan will be used to help monitor and assess the contractor's performance in the TUC area in the first five years and in subsequent coupes.

3.4 In those instances where the contractor has demonstrated non-adherence to the former 5 year plan without justified reasons or approval, then the DFO should notify the RFO accordingly and indicate whether continuation of the contract should be considered. For all breaches of the code of practice as detailed in the Logging Manual, the DFO should suspend current operations until the situation has been rectified.

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<sup>8</sup> However, note that off-reserve, the TUC Operational Plan is used in the evaluation process and hence the amount of direct assistance provided to the contractors in initially preparing the plan has to be restricted.

## **Manual of Operations - Sustainable Timber Production On-Reserve**

### **C4. Timber Harvesting Procedures Instruction Sheet C4.3 Compartment Logging Plan**

#### **1. Purpose**

1.1 The Compartment Logging Plan provides the details of all operations to be carried out within a single defined compartment. Its main function is to indicate the proposed road/track alignment and ensure that this is done with respect to the topography, avoiding excessive slopes.

1.2 The Logging Plan is prepared by the Contractor based on the compartment map, and information from the pre-survey compartment inspection, the stock survey, the contractors own survey and assessment of the compartment, and must incorporate the restrictions detailed in the TOS.

1.3 Preparation of the Compartment Plan is undertaken after or close to the finalisation of the stock survey (refer MoP Section D). Prior to commencing on detailed planning within the compartment, it is important that the DFO, or his representative, visits the selected compartment with the contractor and undertakes the initial inspection to ensure that the compartment is indeed suitable for logging. At this time form FD 50 is completed (Pre-stock survey compartment inspection form). Details on completion of this form are provided in MoP Section. D.

#### **2. Structure**

2.1 The Compartment Plan should be brief (little more than a page) and is mostly made up of the attached map which should be prepared at a scale of 1:10,000 or better. The map will indicate:-:

- proposed road plan
- proposed bridges and culverts
- skid track location
- log yard location
- felling direction
- fine-grained protection

The base map should be derived from the 1:50,000 Survey of Ghana maps indicating the contours. Streams and existing roads and tracks should be clearly demarcated..

2.2 The Compartment Plan will be attached to the yield application submitted through the DFO to the RFO for approval. Felling can only commence once approval is given. Reference should be made to the Logging Manual for details on the format of the Compartment Plan. The Plan should be accompanied by those maps and forms detailed in the Manual of Procedures (D) for Yield control and Stock Survey,. The DFO is required to forward the following maps and documents to the RFO and FMSC:-

- 1:2,500 scale stock map (or 1:1,250 if more than 1500 trees in the compartment) suitably colour coded as detailed in the MoP
- 1:2,500 scale yield map, also colour coded
- yield summary in tabular form
- compartment inspection form
- check survey form
- application to fell special permit species if relevant

- Compartment logging plan - as prepared by the concessionaire with map depicting all logging tracks and log yards as described above.

2.3 In those instances where the contractor has elected to undertake the stock survey and mapping himself, then it is permissible for the stock map and the road/track to be combined at a scale of 1:2,500, providing the resulting map is not over-complicated to be properly understood in the field - such a map would however need to be contoured.

### **3. Review of the plan and operations**

3.1 It is the responsibility of the district office to ensure that the operations are being carried out in accordance with the plan and that the contractor is adhering to both good logging practices and the particular conditions of the contract.

3.2 The DFO should monitor that the TOS are being adhered to and that any agreed payments - for compensation to crops during extraction etc. are paid in accordance with the conditions of the contract.

3.3 The Contractor would be expected to complete all operations within the compartment within a period of **two years or less**.

## **Manual of Procedures - Sustainable Timber Production On-Reserve**

### **C4. Timber Harvesting Procedures** **Sheet C4.4 Supervision and Monitoring Responsibilities of the Forest Service for On-reserve TUCs**

#### **1. Introduction**

1.1 The DFOs and the regional staff have a responsibility for ensuring that the contractors are following the guidelines of the Logging Manual and are fully adhering to the TOS/SRAs . In particular the field staff should ensure that the Compartment Plans is being followed and that all the conditions relating to broad and fine-grained protection are being adhered to.

1.2 Consequently, the DFO and his staff should be fully conversant with the code of practice specified in the Logging Manual.

#### **2. Objectives**

2.1 To ensure that a functioning system is in place for all districts where TUCs are being operated which provides regular feedback on the standard of logging practice and ensures that only approved yield trees are removed whilst environmental, and safety levels are adhered to. The system must also ensure that all payments are made in accordance with the contract agreements.

#### **3. Monitoring Requirements**

3.1 The DFO should ensure that all logging operations both on and off-reserve are inspected following approval of the yield. Staff should be asked to examine: the following aspects:-

##### Logging and Environmental Standards

1. No trees are felled on slopes in excess of 30%, trees felled on slopes 20%+ have only been felled following sanction by the district staff.
2. Directional felling techniques to be used in order to minimise felling damage to retained trees.
3. Logging tracks laid out in accordance with the detailed road networks in the compartment plans and not allowed to exceed 25% slope
4. All stream boundary areas fully protected and unlogged within 25 m of each side of a stream, but 50m to be left clear on either bank in the case of a river.
5. No soil deposited in the waterways
6. All logs have been properly marked in accordance with the approved codes, no black star species or restricted species felled. Stumps must also be marked with the tree identification number.
7. All drainage canals and culverts regularly cleaned
8. Contractor removes all trees within the approved yield
9. Logging activities stopped in very wet periods, if there is obvious excessive site damage being caused by skidding.
10. Logging activities under the control of a skilled supervisor at all times
11. All protected areas have been properly identified in the field and the felling crews properly briefed.
12. Logging crews taking adequate fire precautions during the dry season
13. All refuge and waste material removed after the completion of logging activities
14. Log yards cleaned up and compacted areas ripped to encourage regeneration at the end of operations.

## Safety Standards

3.2 In addition, the district staff have duty to ensure that logging is being undertaken with proper respect to normal safety practices. Logging crews to be properly equipped with protective clothing and safety boots. Due attention must be paid to closing roads and tracks at times of tree felling and warning the general public.

3.3 The company is required to nominate a logging supervisor responsible for the technical and safety aspects of operations. This person should be conversant with all standard operations.

## Adherence to Social Responsibility Agreements

3.4 As well as the technical aspects of logging, the DFO has a duty to ensure that the contractor is abiding to the terms of the SRA. In particular he should ensure that all compensation payments are being made in time and that the contractor is arranging his working activities to minimise disruption to agricultural practices. Non-compliance to the agreements drawn up with respect to the provision of infra-structural developments should also be noted.

3.5 Continual failure by the contractor to meet the terms of the agreement should be reported to the RFO. If a satisfactory outcome can not be negotiated the RFO must sanction the renewal of the concessionaires property mark.

## Closure Certificates

3.6 As a means of ensuring that contractors are not operating over too wide a geographical area at any one time, regulations have been tightened to the effect that on-reserve only two compartments can be open. The contractor is required to obtain a closure certificate for compartment No. 1 before moving into compartment 3. In order to obtain a closure certificate for any compartment, the DFO or his field staff must satisfy themselves that the following has been covered:-

- all waste material has been removed,
- all logs have been taken of the site
- the contractor has extracted all the yield
- water ways have been cleaned of debris
- logging yards have been cleaned up and ripped.
- all waste material from the camp and vehicle maintenance areas has been removed

An example of a closure certificate is appended to the end of Section 4..

3.7 The Logging Manual allows two exceptions to the “two compartment” rule for the following conditions:-

*i. Unexpected Wet weather* - a logger might need to be allocated compartments in a better drained area if the compartments under current logging need to be temporarily closed due to extreme conditions. However, it is not considered good logging practice to continue logging in periods of heavy rainfall and efforts should be made to build up log stocks prior to the on-set of the main wet season. The logger can not be guaranteed that there will be a suitable compartment available with access in the wet season.

*ii. Large-scale operators* requiring one or more compartments per month to meet their requirements may be given special dispensation to operate in more than two compartments at any one time. This decision will be made by the RFO. In no

circumstances should the total number of open compartments be allowed to exceed five.

3.8 The communities and the District Assemblies have the right to inspect all logging activities at any time whether it be on reserve or not. If they are unhappy about the conditions and standards being followed they are entitled to make their concerns known to the district staff and request action to their grievances.

3.9 The current practice of keeping compartments nominally open for up to three years should cease. Operations should continue progressively through the compartment and then be officially closed following the issue of the Closure Certificate. **After closure, companies have no rights to return within the current contract. The normal maximum time that a compartment will remain open will be set at 2 years, but the issue of a closure certificate means that the company must not re-enter the compartment - even though the two year period has not been reached.**

#### Control of log movements

3.10 Following the introduction of the Interim Measures for the control of logging off-reserve, a series of forms and procedures are now in place for both on and off-reserve to ensure that there is an adequate record of the movement of logs. Most of the procedures brought in under the Interim Measures are now regarded as standard practice.

3.11 **Tree Information Form (TIF).** This is a new form introduced to meet the request from the contractors to ensure that the royalty assessment is calculated on the true measured volume and not using average volumes as had been earlier practice. Soon after tree felling, the field staff should measure the tree length, measuring from the point of felling to the limit of commercial utilisation. This should be taken as the upper point where the wood could still be sawn and should not be necessarily linked to the point of branching. Diameter is measured at both ends-taken two readings at right angles. An example of the new Tree Information Form is included at the end of this section. Field staff should complete most of the form in the forest ensuring that species, tree reference number, tree length and the four diameter measurement are entered.

3.12 In the office, district staff should enter the species code number and calculate the tree volume. A set of ready reckoner tables have been distributed by the FMSC to simplify the calculation.

3.13 The distribution of the forms is:

- 1 copy to the permit holder
- 1 copy retained by the DFO
- 1 copy to be forwarded to the office of the RFO.
- 1 copy to FMSC

3.14 The contractor is required to pay a proportion of the estimated royalty prior to the commencement of logging operations. The contractor will be allowed to remove logs up to the value of the royalty paid, after which a further payment must be paid. i.e. the contractor will be required to maintain a positive cash balance at all times..

3.15 **Log Information Forms (LIF).** The introduction of the TIF has removed the need for the LIF to be completed by the Forest Service. However the form, in a slightly modified format, is still to be used in the approval process; the emphasis for its completion falling to the contractor in order that the log conveyance form can be released. The purpose of the LIF is to ensure that all logs after cross cutting are numbered and to provide the link between the tree information on the TIF and the

Conveyance Certificate. Use of the form also provides an indication of the performance of the contractor with respect to waste.

3.16 After cross-cutting into logs, the contractor should measure the butt diameters for each log (two measurements at right angles at each end) and record the total log length. The correct tree number should be shown against each log .

3.17 The district staff should complete column 1 (TIF number) and column 13 (log volume). The latter is derived from a summation of the individual log volumes for each tree. At this time the DFO should check the log volumes against the information he is holding for the tree volumes (taken from the TIFs). In all cases the total log volume should be just less than the total tree volume, but the difference should not be more than 20%. If a contractor regularly submits LIFs which indicate differences greater than this then it indicates wasteful practices with too much material being left in the forest. A field inspection to determine the problem is then needed.

3.18 The distribution of copies of the forms are as follows:-

Original copy	RFO
Duplicate copy	Applicant's copy
Triplicate copy	DFO
4th copy	TO's copy (retained in the book)

The Regional Forest Office will capture the data on the LIF and make it available to FMSC, HQ and other sectors.

3.19 **Log Conveyance Certificate.** A certificate of conveyance is needed to transport logs, lumber, charcoal, fuelwood or canoe timber anywhere. The certificate is issued by the DFO or his representative following post-logging inspection or in the case of a TUC after the LIF has been properly completed by the contractor. An example of the Conveyance Certificate is attached at the end of section 4. The function of the Conveyance Certificate is to inform concerned officials including TIDB that the logs being conveyed out of the forest are legal.

3.20 The permit holder is provided with 2 copies of the Conveyance Certificate, one of which is handed over to TIDB<sup>9</sup> in exchange for the Log Movement Certificate (LMC). The other copy is stamped by the TIDB and temporarily held by the contractor . The contractor sends these copies of the LMCs to the DFO at the end of each month, so that a check can be made that all the trees felled can be properly accounted for.

3.21 The distribution of the conveyance certificates is as follows:-

Original Copy	FMSC
Duplicate copy	TIDB (FPIB) copy through the applicant
Triplicate copy	Applicant's copy to be returned to DFO and then to RFO
4th copy	DFO copy

FMSC will analyse the conveyance certificate data and make the information available to other concerned parties

---

<sup>9</sup> The Forest Products Inspection Bureau is soon expected to combine with the Timber Export Development Board to form the Timber Industry Development Board (TIDB). The role of the new TIDB in the inspection of logs and the issuing of LMCs may then be amended.

3.22 ***Log Measurement Certificate.*** This final certificate is issued by TIDB (FPIB) against a properly completed Log Conveyance Certificate. The LMC should not be issued without such documentation. The location of the TIDB check points close to industrial areas and main towns mean that most log trucks can be stopped and inspected.

3.23 The FPIB has a series of roles, one of which is to ensure that all logs going into the mills have been fully documented by the Forest Service and that a running record is maintained of the number of logs extracted against a particular contract. The Bureau is therefore providing a monitoring function and attempting to ensure that a particular contractor has not been over-cutting his allocation of individual commercial species.

3.24 A re-assessment of the structure and functions of the present FPIB is expected in the near future following its reorganisation into the TIDB and it is possible that the present LMC systems will be removed or amended.

**Manual of Operations - Sustainable Timber Production On-Reserve**

**C4. Timber Harvesting Procedures**

**APPENDIX - FORMS**

**1. Tree Information Form (TIF)**

**2. Log Information Form (LIF)**

**3. Certificate of Conveyance**

**4. Closure Certificate**



# Forest Service

## LOG INFORMATION FORM

Contractor /Applicant ----- Property Mark -----

Location ----- Department Seal No. ....

Reference No. Permit/Pre-inspection/Yield -----

Forest District	Locality Mark	Stool Landowner	District Assembly

Reserve Code	Stock Survey No.	Contractor Tree No.	Species	Code	Log No.	L	Db1	Db2	Dt1	Dt2
			Trade Name							

Technical Officers Name -----

Signature ----- Date -----

Contractors Name -----

Signature ----- Date -----

THIS IS NOT A PERMIT TO FELL TREES OR A CONVEYANCE CERTIFICATE

# FOREST SERVICE

## CERTIFICATE OF CONVEYANCE

Contractor/Applicant ----- Property Mark -----  
-----

Locality Mark ----- Forest District -----  
-

Drivers Name ----- Vehicle No. ----- Destination -----  
-

Log Informaiton Form No. -----

Reserve Code	Compt. Coupe No.	Stock Survey No. or tree No.	Contractors Tree No.	Species Name	Species Code	Log No.	Volume (m3)

These Logs/Lumber have been inspected by a representative of the Forest Service and approval to transport them is hereby granted

-----  
Signature of Authorising Forestry Officer

-----  
Date of Issue

-----  
Name of Authorising Officer

-----  
Expiry Date

Conveyance Certificate Fee Receipt No. -----

## COMPARTMENT CLOSURE CERTIFICATE

FOREST RESERVE -----

COMP. NO. -----

CONTRACTOR -----

As an authorised officer of the Forest Service , the above checks have been made by me of the condition of the above numbered compartment:-

1. All streams and water courses have been cleared -----
2. No litter or other waste has been left on the site -----
3. All trees marked for extraction, have been duly removed -----
4. All logs have been taken from the compartment -----
5. Log yards have been ripped and camps have been removed -----
6. Remaining roads/tracks have been properly drained -----
7. Bridges and culverts have been left in original (or better) condition -----

I therefore accept that this compartment can be regarded as closed and should not be re-entered until the next felling schedule.

Signed -----

Date -----

Officers Name -----

Designation -----

## **SECTION 5 RECORDS, REPORTING AND AUDITING PROCEDURES**

### **Manual of Procedures - Sustainable Timber Production On-Reserve**

#### **C5. Records, Reporting and Auditing Procedures**

##### **Instruction Sheet C5.1 Records and Reporting Procedures**

### **1. Introduction**

1.1 Good records and reporting procedures are essential for any modern enterprise. The standard of record keeping has not always been maintained at an acceptable level. This has led to problems in determining the scope of past treatments and activities undertaken in forests and in specific compartments. In order for the Forest Service to fulfil its management responsibilities, the standard of record keeping must be brought up to high, common standard throughout the country.

1.2 Reporting should be a two-way process and HQ and the Regions are required to make information available for the districts as well as requesting basic production and revenue data from the district level.

1.3 This instruction sheet will detail the type of forms and information to be collected and stored at each level.

### **2. The District Forest Office**

2.1 The DFO is responsible for ensuring that field data on tree felling are properly documented and a full set of ledgers are maintained to record all financial transactions.

2.2 The following registers are required at the district office:-

- Compartment Register
- Annual Coupe (off-reserve) Register
- Felling Register
- TIF Register
- LIF Register
- Log Conveyance Certificate Register.

and the following ledgers:-

- Yield and Revenue Ledger(forest reserves)
- Yield and Revenue Ledger (off-reserve)
- Statement of Accounts (contractors)
- Revenue Disbursement

#### **Compartment Register**

2.3 On reserve, the compartment is the main planning unit. It is essential that a continuous record is maintained of the main activities that have been carried out within every compartment. An expandable clip file should be maintained as a compartment register for all compartments that have been identified within each forest reserve. Records should be maintained as follows:

### COMPARTMENT REGISTER

Forest Reserve ..... Compt No. .... Date formed .....  
 Previous number if any ..... Gross Area .....

Protection areas ..... Net production area .....

Stool ..... District Assembly .....

Slope ..... Distinctive features .....

.....

<b>A</b>  <b>WORK/MAINTENANCE RECORDS</b>	<b>B</b>  <b>INCIDENCE OF FIRE/DAMAGE</b>	
<b>DATE    TREATMENT    REMARKS</b>	<b>DATE</b>	<b>EXTENT OF DAMAGE</b>

On reverse side of form:-

#### **Felling Record**

#### **FELLING RECORDS**

SUMMARY OF APPROVED YIELD		SUMMARY OF REMOVALS	RESIDUAL
SPECIES	QUANTITY	QUANTITY	QUANTITY

2.4 The compartment register should therefore maintain a record of all activities that have taken place within an individual compartment - silvicultural management, harvesting and the incidence of fire etc. The record of felling on the reverse of the form is a summary, listing the total removals by species. The Compartment Register is essential if a realistic harvesting schedule is going to be derived in the

future. This register needs to be maintained in electronic format at the RFO level, with regular updates been sent to Planning Branch. For those districts fortunate to be equipped with a computer, they should also place the information on to a suitable database. FMSC/RFO can assist in this. However, a paper record must be maintained in case of data loss.

The Felling Register

2.5 The Felling Register, which has been generally poorly maintained, provides a record of felling for all compartments but on an individual tree basis.

**FELLING REGISTER**

Compt. No..... Date yield approved .....  
 Date of entry ..... Expected completion date .....

Species	Yield FD No.	Dbh (cm)	Date felled	Date Billed	Remarks

District Timber Revenue Returns

2.6 Returns should be prepared on a monthly basis for each TUC, indicating:-

- number of trees approved for felling
- number of trees felled
- volume of trees felled
- expected royalty
- actual royalty collected
- balance of trees to be felled (from the approved yield)

2.7 A copy of these returns should be maintained and filed for each TUC in order to maintain a running record of income received and outstanding revenue due. Officials of the District Assembly and relevant stool would be entitled to examine such records to ensure that all revenue being earned on their land is being properly collected.

<b>District Region</b>	<b>DISTRICT TIMBER REVENUE RETURNS</b>	<b>Month/year</b>
----------------------------	--	-------------------

Contractor	TUC or Compt	No. of trees approved bal B/F	No. of trees felled in month	Total volume m3	Royalty B/F cedis	Payments cedis	Balance cedis	Remarks

Monthly District Billings

2.8 The DFO is responsible for the preparation of monthly bills for all contractors indicating the trees removed and the corresponding amount of royalty to be paid

**Monthly Billing Statement for TUC Ref: .....**

**To: .** ..... **From :** .....  
 .....  
 .....

Date	Particulars	Debit	Credit

Re-scheduled Debts:

Previous Balance .....  
 Payment Received .....  
 Balance Outstanding .....

**3. The Regional Forest Office**

3.1 The Regional Forest Office should prepare a monthly summary of timber revenue for all districts within the region based on the district returns. On-reserve returns should be kept separate from those relating to off-reserve.

## REGIONAL SUMMARY OF TIMBER HARVESTING AND REVENUE

Region .....

Month/year .....

District	TUC	No. of trees approved bal B/F	No. of trees felled during month	Total volume m3	Royalty B/F cedis	Actual received cedis	Balance C/F cedis	Remarks

### TIF /LIF Database

3.2 The Regional Offices are currently maintaining a database of the LIFs collected throughout their region . With the introduction of the TIF forms, the regional offices will also be maintaining a database on the TIFs as well.. Maintenance of this data allows the RFO to generate the following summaries:-

- Volume extracted by species by compartments
- Proportion of volume extracted compared to approved yield
- Royalty collected by reserves/compts for each district
- Royalty collected by TUC holders/property marks.

### Forest Reserve Annual Progress Report

3.3 It is the responsibility of the RFO to ensure that the district assemblies and the land-owners are provided with an annual statement of the income and revenue for each reserve under the jurisdiction of the regional office. It is a management decision of the RFO on how much of this responsibility should be delegated to the respective DFOs, but it is likely that some of the information required can best be summarised at the regional level. A suggested format for such a report is given below, but some flexibility is to be expected.

## **OUTLINE OF FOREST RESERVE ANNUAL REPORT**

1. Protection Activities
- 2.. TUCs in Operation
  - Compartments being logged
  - Deviations (if any) from plan
  - Volume of timber felled and extracted
  - Statement of royalty owed
  - Statement of Royalty collected
  - Statement of revenue disbursed to owners
3. Other income-generating activities
  - Details of products and quantities
  - Statement of income generated
  - Statement of Income disbursed
4. Activities by the Communities
5. Expenditure by Forest Service
  - Statement of Staff expenditure
  - Maintenance of Structures
  - Statement of operational expenditure
6. Summary of work achieved and income raised against targets
7. Conclusions on Progress and Problems encountered

## **Manual of Procedures - Sustainable Timber Production On-Reserve**

### **C5. Records, Reports and Auditing Procedures**

#### **Sheet C5.2 Monitoring and Auditing the Performance of the Forest Service**

##### **1. Introduction**

1.1 Instruction Sheet 4.4 has discussed the monitoring and supervisory roles of the Forest Service and the previous Instruction Sheet 5.1 has detailed the recording and reporting procedures to be followed by district and regional staff. Since the Forest Service are acting as agents for the land owners and for the nation, there needs to be procedures whereby our own performance can be rated by others.

1.2 Independent audits of the revenue and expenditure flows will provide an assessment of the financial performance of the Service on a national level. but there is a need to review the qualitative performance at all levels. This instruction sheet indicates some of the procedures to be followed for meeting this need. Some aspects of monitoring are easily available from the information already generated under the standard reporting procedures and this will be discussed under Section 2. There will however be specialist monitoring team established to ensure that national standards of TUC management are followed. These aspects are considered in Section 3.

##### **2. Monitoring of Performance from Standard Progress Reports and Databases**

###### District Level

2.1 The suggested structure of the annual report for the forest reserves will automatically provide an assessment of the performance of the Forest Service if it is conscientiously completed. The statements of the revenue owed, revenue collected and the amount disbursed to the community for each TUC operating within the reserve will provide an assessment of the performance of the district office in this respect. This should be reflected in the monthly district revenue returns which at the end of the year should indicate the same information for all TUCs both on and off-reserve.

2.2 The RFOs are required to monitor that all DFOs conform to this reporting process and that the quality of the reports are acceptable. The Annual Report for each forest reserve should be checked and signed by the RFO before being made public.

2.3 The RFO should ensure that a sample of the reserves under his charge are inspected each year in the accompaniment of district assembly officials and concerned land owners. The team should ensure that:-

1. the annual reports for the reserves have been prepared in accordance with the agreed format
2. the reserve is being managed in accordance with the approved zonation plan
3. the TUC(s) are being implemented in accordance with the harvesting schedule
4. the TOS and the SRAs are being properly implemented
5. all the stakeholders are fulfilling their commitments
6. that the incidence of fire damage reasonable
7. the community is content with the degree of co-ordination between their representatives, the FS and the contractors

### Regional Level

2.3 The RFO will as part of the preparation of the summaries of the timber harvesting and revenue collection (refer Instruction Sheet C5.1) will be in a position to prepare an annual statement for the region as a whole on its performance in terms of revenue collection and disbursement.

2.4 In Part A of this MoP (Strategic Planning), a suggestion was made as to the structure of annual regional reports prepared for the Regional Co-ordinating Director which would in turn be used to monitor the level of achievements compared to the predictions in the Regional Forest Plans. Comparisons should be made on

- the area being logged under TUCs compared to the previous year and the target for the present year for on and off-reserves
- level of planting, investment and harvesting in the plantations
- income generation by districts
- level of fire damage compared to previous figures

### National Level

2.5 It will be the responsibility of the FMSC to monitor the effectiveness of the Forest Service

**Table 5.2.1 Technical Evaluation of the effectiveness of the Forest Service**

<b>PRINCIPLE</b>	<b>CRITERIA</b>	<b>INDICATOR</b>
Sustainable timber production	Polycyclic logging on a 40 year cycle	Return to compartments at or close to 40 years
	Logging restricted to well stocked forest	No logging allowed in areas below the mean stocking for the vegetation zone
	No excessive opening of the canopy	No. of trees removed not to exceed 2 trees/ha in DS <sup>10</sup> and MSNW <sup>11</sup> zones and 3 trees/ha on other zones
	move towards normal distribution within entire reserve	No. of compartments logged each year at or close to 1/40 of total no. of compartments in timber production area.
Permanent conservation areas maintained	Conservation strategy enforced	No logging in areas outside the timber production area
Adequate Fire Protection Provided	Adequate resources for fire protection made available	Level of damage progressively reduced each year, not allowed to exceed 3% of total reserve area

2.6 Data for making this annual audit is provided from a series of data bases listing a running record of the approved yields, harvesting schedules, compartment registers and management status of compartments (protection or production) maintained by the FMSC, whose responsibility would be to complete an assessment each year.

<sup>10</sup> Dry Semi-deciduous Forest

<sup>11</sup> Moist Semi-deciduous - North-west subtype

### **3. Supplementary Monitoring**

3.1 Regional monitoring teams are planned for some or all of the HFZ regions to ensure that logging and management standards are being maintained and that contractors are carrying conveyance certificates and that all log marks have been satisfactorily made.

3.2 A separate national monitoring team with an operational base at the FMSC is also planned with the role of checking that provincial and district records and databases are being properly maintained and to undertake spot checks on the quality of logging practice and ensure that the procedures indicated in this manual and in the Logging Manual are being properly applied.

3.3 In accordance with the needs to meet the criteria for international certification , additional audit measures might be necessary by an independent assessor to certify that the timber is being produced in a sustainable manner.

# **Manual of Procedures**

## **High Forest Management**

## **Section D – Stock Survey and Yield Allocation**

# ***Forestry Department***

## **Planning Branch**

**March 1995**

### Instruction Sheets

1. Pre-survey compartment inspection
2. Stock survey
3. Checking of stock surveys
4. Stock map preparation
5. Yield allocation
6. Measurement of diameter on buttressed trees

### **Forms**

FD50	Pre-stock survey compartment inspection
FD51	Check survey summary form
FD52	Yield approval checklist
FD53	Planning Branch – Yield check certificate

## Manual of Procedures – Stock Survey and Yield Allocation

The Manual of Procedures for Stock Survey and Yield Allocation documents the steps to be taken and operations that

are carried out to ensure that trees are felled in production forest reserves on sustained yield basis.

The manual has been written to provide a reference for concessionaries on whose behalf Stock Surveys are carried out, technical officers who carry out the field operations and supervise field teams, Drawing Officers who convert data into a two-dimensional pictorial form, as well as staff responsible for vetting and allocating trees to be harvest.

The manual is in six sections.

Section 1:- Pre survey Compartment Inspection: - Provides an assessment of whether or not a compartment should be harvested as well as the factors that will affect the planning of harvesting operations. It also commits the concessionaire to abide by all logging rules.

Section 2:- Stock Survey: - Provides information necessary to identify all FIP Class 1 species of 50cm diameter or larger in a compartment.

Section 3:- Stock Survey Checks: Confirms the accuracy of the Stock Survey by a more Senior Forestry Department Staff.

Section 4:- Stock Map Preparation translates the Stock Survey data into a two dimensional pictorial form.

Section 5:- Yield Allocation outlines the criteria used to arrive at the number of trees to be given out for harvesting.

Section 6:- Measurement of diameter on buttressed trees:  
- Describes how the diameter of buttressed trees is determined.

The procedures outlined in this manual represent the best practice at the time of writing. It may be refined when our knowledge on the subject improves.

Ben Aninakwa  
Planning Officer  
March 1995

Manual of Procedures – High Forest Management

Instruction Sheet No. D1

Pre-survey compartment inspection

## 1. Introduction

1.1 Harvesting of compartments that make up the production area within a forest reserve is carried out in a sequence determined by the Harvesting schedule. This schedule lists the compartments that can be considered for harvesting in each year, for the period of the felling cycle (currently forty years).

1.2 Before harvesting takes place, a stock survey is carried out which provides information for the calculation of the yield, and for the identification of specific trees to be removed. The process of stock survey and yield allocation may take up to one year so it is important to begin well before harvesting operations are planned to commence.

1.3 Before a stock survey is carried out, a Pre-survey compartment Inspection is made by the District Forest Officer with either the Concessionaire or a representative appointed by the Concessionaire. The purpose of this inspection is to:

- Provide an assessment of whether or not the compartment should be harvesting, (and hence whether or not the stock survey should be carried out);
- Allow both the District Forest Officer and the Concessionaire to become familiar with factors that will affect the planning of harvesting operation; particularly the topography and vegetation of the compartment.

- 1.4 The stock survey will provide quantitative information which will be used to determine whether or not the compartment can be harvested. Stock survey is an expensive and time consuming operation; a Pre-survey Compartment Inspection can ensure that this expense is not wasted on a compartment that may prove to be unsuitable for harvesting.
- 1.5 This instruction sheet outlines the important stages of the pre-survey inspection and describes the inspection form that must be completed by both the DFO and Concessionaire.

## **2. Compartment demarcation schedule**

- 2.1 Forest Districts should have a compartment demarcation schedule for all compartments under the production working circle. This schedule must be both written and in map format at 1: 10,000 scale. If a schedule is not available compartment boundaries will have to be re-survey and a new schedule prepared.
- 2.2 Before harvest planning begins, a compartment map is produced by the Drawing Officer from the written schedule. The map must not be traced from any existing map. Distances should be in meters and compass bearings to magnetic north. The map must be signed by the Drawing Officer. The map should be used for both pre-survey compartment inspection and for stock survey.

## **3. Preparation**

- 3.1 Before the field inspection, all available information on the compartment should be compiled by the District Officer. This may include information from previous

harvesting operations, fire records, information on roads and access tracks, etc. physical features should be marked on the compartment map; e.g.:

- Roads, tracks, bridges, culverts;
- Forest classes; (intact, degraded, burnt etc.);
- Areas previously logged, protection areas, sacred sites etc;
- Farm boundaries, boundaries of encroachment;
- Water courses, rocky areas, steep areas etc.

3.2 The compartment map will become the basis for the logging plan. It will be updated with information from the pre-survey compartment inspection, the stock survey and the Concessionaire's own survey and assessment of the compartment.

3.3 The pre-survey Compartment Inspection should be planned on the map. Access to the compartment should be chosen and the area to be inspected sketched on the map before traveling to the field. The inspection should aim to visit three separate areas within the compartment and to cover about one fifth of the total compartment area (normally about 25 hectares).

#### **4. Field inspection**

4.1 The District Forest Officer and the Concessionaire or his representative should visit the compartment

together and agree on an assessment of its condition and suitability for harvesting.

4.2 In each of the three areas visited they should record the following information in the tables of the Compartment Inspection form:

- Topography: whether the area is generally flat, rolling or there are steep slopes. Steep areas either cannot be logged or will inhibit access for logging;
- Stocking of Class I species: whether the stocking of class I species appears to be high, medium or low. If the stocking is too low it may not be economic to harvest the area;
- Forest canopy; if the canopy closed, open, or patchy. An area with an open canopy should not be further disturbed by harvesting;
- Forest understorey: the condition of the understorey provides an indication of the health of the forest. The understorey should be open and composed of a mixture of shrub species and natural regeneration. Disturbed forest will have a high proportion of a pioneer species in the understorey. Very disturbed forest will have an understorey with grasses, thickets of pioneer climbers and herbs (Marnataceae, Urticaceae, Zingiberaceae) and in extreme cases *Chromolaena odorata* (Acheampong). Areas of very disturbed forest should not be logged.

4.3 On the compartment map the District Forest Officer should mark any important features that will have to be considered in the logging plan, especially:

- Riparian areas, swampy areas, rock outcrops etc., that will be excluded from the productive area;
- Access: especially road and skid track location, the position of river crossings etc.,
  
- Suitable sites for log yards

4.4 Once the compartment inspection has been completed, the District Forest Officer and the Concessionaire should make a decision whether or not to proceed with a stock survey. If substantial areas of the forest are heavily disturbed or if poor access or topography will mean that much of the compartment cannot be harvested, a stock survey should be carried out. It is important to remember that the Concessionaire has to cover the full cost of stock survey, whether or not approval to harvest is subsequently given.

## **5 Compartment Inspection Form**

5.1 The District Forest Officer should indicate on the Compartment Inspection form (Form FD50) whether or not therefore if stock survey should be carried out. If the decision has been made to proceed with stock survey the Concessionaire should also sign the form. By signing the form the Concessionaire undertakes to pay the subsequent costs of the stock survey and confirms that he understands the provisions of, and undertakes to comply with, the Logging Manual and harvesting rules.

5.2 If it is decided that the compartment is suitable for harvesting the Compartment Inspection Form is latter attached to the request for yield approval that is sent to the Regional Forest Officer after stock survey and yield allocation.

5.3 If the compartment is found to be unsuitable for harvesting the Compartment Inspection Form should be copied to both the Regional Forest Office and the planning Branch together with a short report from the District Forest Officer and recommendations on future compartment management.

Planning Branch  
Kumasi 9/94

Pre-stock survey compartment inspection

District: \_\_\_\_\_

Forest Reserve: \_\_\_\_\_

Compartment: \_\_\_\_\_

Concessionaire:

---

---

Date of last harvesting operation:

---

Has the compartment ever been burnt: Yes/No Date last burnt: \_\_\_\_\_

Observations from field visit to three areas within the compartment (circle most appropriate description under each heading):

Topography	Stocking of Class I species	Forest canopy	Forest understorey
------------	-----------------------------	---------------	--------------------

General  
comments \_\_\_\_\_  
\_\_\_\_\_

---

The compartment is recommended/not recommended for  
survey (delete one).

Signed: \_\_\_\_\_  
District Forest Officer

**IF THE COMPARTMENT IS RECOMMENDED FOR  
STOCK SURVEY:**

I request that the Forestry Department commence stock  
survey operations for which I will pay in advance/I will carry  
our a stock survey of the compartment (delete one). I  
understand that should the stock survey results indicate that  
the compartment is not suitable for harvesting the costs  
associated with this stock survey can not be reimbursed. I  
have read and understood the Forestry Department Logging  
Manual and Handbook of Harvesting Rules and agree to  
comply with their requirements.

\_\_\_\_\_

# Concessionaire

## Instruction Sheet No. D2

### Stock survey

#### **1. Introduction**

- 1.1 The harvesting of compartments that make up the production working circle within a forest reserve is carried out in a sequence determined by the Harvesting Schedule. This Schedule lists the compartments that can be considered for harvesting in each year, for the period of the felling cycle (currently forty years).
- 1.2 When a compartment is due for harvesting, the District Forest Officer and Concessionaire carry out a Pre-survey Compartment Inspection (see Instruction Sheet number D1). If the compartment is found to be suitable for harvesting stock survey operations can commence.
- 1.3 The stock survey provides quantitative information upon which a final decision on whether or not to harvest is made. The stock survey provides information necessary to identify all FIP Class I species in a compartment, to select the specific trees to be removed during harvesting, to identify areas that should not be disturbed during harvesting, and to assist with harvest planning.
- 1.4 This instruction sheet outlines the requirements for planning a stock survey and describes the field survey procedures.

## **2. Stock survey team**

- 2.1 The stock survey team should be permanent, specialist unit made up of 15 people as follows:
- One Technical Officer of higher, experienced in stock survey, to act as Team Leader;
  - Two Forest Guards or higher, also experienced in stock survey, to act as Technical Assistants;
  - Twelve labourers to assist with cutting survey lines and compartment boundaries, at least eight of which should be experienced tree spotters who are also to identify all FIP class I species;
- 2.2 The Team should be tested periodically and their competence in stock survey procedures certified by the Planning Branch.
- 2.3 A stock survey team should be able to complete a survey of a standard compartment (128 hectares) within 20 days

## **3. Equipment**

- 3.1 Each stock survey team should be supplied with:
- Three prismatic compasses;
  - One Suunto clinometer;

- Six diameter tapes, four metres in length and calibrated to the nearest rounded down centimeter;
- One 30 metre measuring tape or survey chain;
- One 50 metre measuring tape;
- Two upper stem diameter hypsometers or tangent sticks;
- Six tree scribing knives and sharpening files (chainsaw files);
- Cutlasses;
- Two field survey books;
- Compartment map used for Pre- survey inspection, written compartment schedule and a Progress map;
- A copy of this instruction sheet.

Access to the compartment from an identifiable starting point (boundary or compartment pillar) should be marked on the compartment map, as well as alternative access in case the first pillar cannot be located.

3.2 If the stock survey team is required to camp in the field they also be equipped with:

- Two eight-man tents;
- One two-man tent;

- Three water filters;
- Fifteen camp filters
- Fifteen mattresses
- Mess equipment
- First aid kit.

3.3 Teams must be fully equipped before they begin a stock survey. The Team Leader is responsible for ensuring that all equipment is kept in good condition.

#### 4. Compartment boundary demarcation

4.1 Before the stock survey begins, the compartment boundary is re-surveyed by following the survey instructions on the schedule. The boundary must be cleared of all vegetation to ground level and to a width of 2 metres.

4.2 As the compartment is surveyed a new record of the schedule, and of all important features along the boundary is kept by the Technical Officer. If there are discrepancies between the original schedule and the new survey, these should be noted in the survey book and on the sketch map.

4.3 Physical features that should be recorded during the boundary survey include:

- Ground slope; i.e. the gradient of the slope perpendicular to the contour (not the slope of the boundary line). Slope is measured every 60 metres using the percentage (left hand) scale of the Suunto clinometer. The direction of slope is recorded in the field book with an arrow;
- Roads and footpaths showing the direction and width, and whether or not they are currently in use;
- Rivers and watercourses showing the direction of flow and width, and whether they are permanent or seasonal;
- Swamp areas, farms and rocky outcrops.

4.4 Any missing compartment pillars are to be replaced. All compartment pillars must be inscribed with the letters “CP” and they should be re-painted with blue oil paint so that they can be easily identified. It is important that the boundary is easily visible at all points along the perimeter.

## **5. Demarcation of strip lines**

5.1 On the compartment map the longest compartment boundary is selected as a baseline and labeled as “A”. The opposite boundary is labeled “B”. Strip lines are marked running from “A” to “B” at 30 metre intervals along the length of the compartment. The lines are numbered sequentially (figure D2.1). The compass bearing (forward and back bearings) is then calculated for the lines.

5.2 Demarcation of strip lines begins from one corner of the compartment along the “A” boundary. Survey lines (every odd numbered strip lines) are cut on a continuously monitored compass bearing. Flank lines (every even numbered strip lines) are started on a compass bearing and then the line cutter is guided by a Forest Guard or competent labourer. Lines must be parallel. Lines are cleared to ground level to a width of 2 metres.

5.3 A wooden post is erected at the beginning and end of each strip line. The post is numbered sequentially and is given a suffix “A” depending whether it is on the A or B boundary (figure D2.1).

## 6. **Stock survey enumeration**

6.1 The stock survey team is allocated tasks as follows:

- Team Leader supervises all operations and acts as booker;
- Technical Assistants act as sweepers moving between the flank lines and the survey line. They are responsible for ensuring all trees are recorded, for checking species identification and for checking tree measurements;
- Tree spotters who identify tree species, measure the diameter (non-buttressed trees) and scribe the stock survey number on the tree;

- Hypsometer or tangent stick man and assistant who measure the diameters of buttressed trees;
- Two other labourers who assist with cleaning of the survey line;
- Four extra labourers who continue cleaning the compartment boundary.

6.2 The stock survey team should be arranged as shown in figure D2.2. Two strips on either side of the survey line are enumerated at a time (to make up one enumeration drift 60 metres wide). The central survey line acts as the reference point for all operations. The flank lines demarcate the edge of the enumerations drift.

6.3 A sample field book page is shown as figure D2.2. The book is opened by recording the reserve name, compartment number, strip line number, bearing and date of survey. The Technical Officer must sign the book. The book and the flank line numbers at either side of the page.

6.4 Every tree that has a diameter of more than 50 centimetres and belongs to FIP Class I is recorded. (Class I species are listed in table D2.1.) Note that for *Antrocaryon micraster* (APROKUMA) and *strombosia glaucescens* (AFENA), which have a minimum felling limit of 50 centimetres, trees in the 30-50 centimetre class should be measured. FIP Class 2 species are not enumerated during stock survey, unless specially requested by the concessionaire.

6.5 The following information is recorded for each tree (see figure D2.3):

- The distance along the survey strip to the nearest metre;
- The perpendicular distance from the survey line which is estimated and recorded to the nearest 5 metres;
- The species code (see attached table D2.1);
- The stock survey number for the tree which is a serial number given to every tree in the compartment.

6.6 Trees are measured for diameter using the fiberglass tape for non-buttressed trees or the hypsometer or tangent stick for buttressed trees (see Instruction Sheet No. D6, Measurement of Diameter on buttressed trees). On non-buttressed trees, diameters are measured at 1.3 metres above ground level on the uphill side of the tree. If the tree stem is buttressed or otherwise abnormal at this point the tape is moved to a position 50 centimetres above the convergence point or defect. Diameters are recorded to the nearest centimeter rounding down (diameter tape), or to the nearest 10 centimetres rounding down (tangent stick or hypsometer).

6.7 Once the diameter has been measured, the stock survey number is marked on each tree with the scribing knife, in a position that will not be disturbed if the tree is felled: i.e. low down the bole at a location that will remain as part of the stump..

6.8 As diameters are measured the species and diameter are called out to the booker. The “call-back” system is used to ensure information is recorded accurately. The booker repeats the species and diameter and the tree spotter repeats the stock survey number.

## **7. Special classes of trees**

7.1 Trees of exceptionally good form should be retained within the compartment as seed trees. Seed trees should be marked in the field book and on the bole next to the stock survey number with an “S”. A potential seed tree should be a main timber species and have either:

- A straight, clean, cylindrical bole and be dominant or co-dominant in the canopy;
- Located in an area with heavily disturbed lower strata;
- A species which is poorly represented in the compartment

Trees of poor form are not to be considered as seed trees, however trees that have been damaged by fire, logging or wind may be included if there are not alternative trees to choose from.

7.2 If a tree is merchantable **damaged** it is recorded in the field book with a double circle around the **stock survey number**. Such trees will be given high priority for inclusion in the yield, as they will not survive to the subsequent felling cycle.

7.3 Black star species should be identified in the field book and marked clearly as “**Black Star**”. Current black star species that should be recorded during stock survey are:

***Afrostryax lepidophyllus***

*Chrysophyllum azagueianum*

*Lecaniodiscus punctatus*

*Neolemonniera clitandrifolia*

*Pierreodendron kerstingii*

*Placodiscus bancoensis*

*Pteleopsis habeensis*

*Sapium aubrevillei*

*Synsepalum aubrevillei*

*Talbotiella gentii*

*Trichoscypha chevalieri*

7.4 Special Permit species of a size greater than the felling limit should be marked in the field book and on the bole with a “P”. Current special species are:

Copaifera salikounda

ENTEDUA

Diospyros sanza-minika

SANZA-MULIKA

Periocopsis elata

KOKRODUA

Tieghemella heckelii

BAKU

7.5 Wawa that are potentially good for canoe trees should be marked with a letter “C” and not considered in the yield. Canoe trees should be of large diameter (more than 110

centimetres) and can be trees of poor form (heavy branching, low crown ect.) There should be at least one wawa tree per compartment left as a canoe tree.

7.6 Trees on slopes of more than 30 per cent (16 degrees). Trees in swamps or on swampy ground, trees that are within 50 metres of a water course and trees on farms should all be marked in the field book and on the bole with an "x" to indicate they should not be felled.

## 8. Site information

8.1 Ground slop should be recorded at every 60 metres along the survey line. Slope is measured perpendicular to the contour (not along the survey line) with the Suunto clinometer. Mark the direction of slope in the field book with arrows and record as a percentage.

8.2 Indicate the width and direction of roads with a double line and of skid tracks with a single line showing. Indicate footpaths in a similar way with a double dashed line and rivers and streams with a dashed line and an arrow showing the direction of flow.

8.3 Indicate the location and starting and finishing points of swamps. Farms, rocky outcrops.

8.4 If there is any evidence that the forest has been damaged by fire in the past indicate this clearly in the field book. Fire damaged areas should be excluded from the area to be harvested.

## 9. Forest condition

9.1 The forest condition should be assessed at 60 metre intervals along the strip line. Record a condition score in a square box in the center of the field book.

9.2 Condition scores are based on a visual assessment of the area in the immediate vicinity of the observer (for an approximate radius of 20 metres). The score reflects the physical appearance of the understorey of the forest which is a guide to the general health of the forest.

9.3 Use the following descriptions to select the most appropriate score (1 to 6) at each observation point:

- Condition score = 1. forest condition is excellent. The understorey is typical of undisturbed forest with visibility extending to 20 metres in all directions. Less than 5% of the understorey is occupied by thickets of pioneer herbs, saplings or climber tangles. No stumps are visible;
- Condition score = 2. Forest condition is good throughout. Less than 20% of the understorey shows signs of degradation, i.e. is occupied by pioneer thickets or climber tangles. Visibility extends for 20 metres in at least 75% of the sample area;
- Condition score = 3. Forest condition is degraded. Up to 50% of the understorey shows signs of degradation, i.e. is dominated by pioneer thickets and/or climber tangles. Visibility may not extend for 20 metres in any direction except along skid trails, recently burnt areas etc;
- Condition score = 6. Non-forest. The understorey has been destroyed and replaced with agricultural crops or plantations, or is dominated by savanna grass species.

Note that if there is any evidence of burning the area should be given a condition score of 6.

10. Check Survey

10.1 Once the stock survey has been completed for a compartment the field book is handed to the District Forest Officer who will arrange for a 10% check survey to be carried out (see Instruction Sheet No. D3, Checking of Stock survey).

Planning Branch  
Kumasi 9/94

Table D2.1

Felling limits for FIP Class I species





## Manual of Procedures – High Forest Management

Instruction Sheet No. D3

Checking of stock survey

### 1. Introduction

1.1 Procedures for stock survey are outlined in Instruction Sheet No. D2. As well as routine monitoring of the activities of the stock survey team by

the District Forest Officer, a formal check of the stock survey for each completed compartment is required. This check survey is necessary to confirm the accuracy of field work and hence the validity of subsequent yield allocation.

- 1.2 a check survey should be carried out by senior Forestry Department staff from the District Office within one month of completion of the stock survey. The check should be carried out by a new Team Leader, and preferably by a different stock survey team.

## 2. Sampling intensity

- 2.1 a check survey should comprise a 10% sample of the stock survey. For a standard 128 hectare compartment (1600 x 800 metres) re-enumeration of four standard stock survey drifts would be required. (Each drift covers a width of 60 metres and length of 800 metres and comprises a central surveyed strip line and two flank lines). Drifts selected for the check survey should not be adjacent to each other.

- 2.2 A check survey will normally take two days to complete.

## 3. Procedure

- 3.1 A check survey comprises a complete remeasurement of each of the selected drifts. Check survey data should be recorded in a new field book without reference to data from the original survey.

3.2 Sampling should be carried out using standard stock survey procedures specified in Instruction Sheet No. D2. Field recording is the same as illustrated in figure D2.3. The stock survey number of each tree from the original survey is recorded together with species code, diameter, the distance along the survey line and the distance towards the flank line.

3.3 When a tree is located that has been missed from the original survey it is allocated the stock survey number of the nearest tree, together with a suffix "A". If further trees are found to have been missed sequential suffixes, "B", etc are allocated.

4. Special classes of trees (used trees, damaged trees ect.) are to be recorded as well as site information (see Instruction sheet No. D2, sections 7 and 8).

4.1 Data from the check survey and from the initial stock survey are compared on a tree by tree basis. The following discrepancies between the two data sets should be noted on the check survey summary Form:

- The number of trees that were missed in the original survey (numbered with a suffix "A", "B", ect.);
- A difference in diameter that would result in the tree being placed in a different diameter class.
- Ficititious tress; i.e. recorded in the initial stock survey but not found during the check survey;
- Missing or incorrect protection information;

- A difference in the recorded location of trees by a distance of 10 metres or more.

4.2 on the Check Survey Summary form calculate variation between the initial and check surveys for each type of discrepancy and express this as a percentage of the total number of stems enumerated during the check survey. If this percentage value exceeds ten percent for any one type of discrepancy, the stock survey is unacceptable and must be repeated. If the stock survey is determined to be of acceptable accuracy but the required protection information is inaccurate or missing the stock survey must also be repeated.

## 5. Check Survey Summary

5.1 The Check Survey Summary form should be completed and signed by the checking officer. If the stock survey is rejected the form should be copied to the Regional Forestry Officer and to the Planning Branch with a note from the DFO explaining the reasons for the rejection.

5.2 If the stock survey is found to be acceptable, the form is attached to the stock map and yield schedule when these are sent to the Regional Forest Officer for approval. The yield can not be approved without a completed Check Survey Summary form.

## 6. **Planning Branch Monitoring Unit**

- 6.1 a further random check of stock surveys will be carried out from time to time by the planning Branch. District forest Officers will be informed in advance of such checks.

Planning Branch

Kumasi 9/94

Manual of Procedure – High Forest Management

Instruction Sheet No. D4

Stock map preparation

## **1. Introduction**

- 1.1 Once stock survey has been completed and checked (see instruction sheets D2 and D3), a stock map showing the location of all trees assessed is prepared from the field data by the District Drawing Officer. The stock map summarizes the stock survey information and serves as a basis for yield selection.
- 1.2 The stock map should be prepared as soon as possible after the stock survey is completed. If stock survey data is more than one year old it should be discarded and the compartment reserved.
- 1.3 The officer in charge of the survey should go over the field book with the DFO and the Drawing Officer to

agree on the information provided before the Drawing Officer takes custody of the field book.

## **2. Mapping Procedure**

2.1 The stock map is normally prepared on tracing paper at a scale of 1:2500 (1 centimetre equal to 25 metres). If there are more than 1500 trees recorded in the compartment, a scale of 1:1250 (1 centimeter equal to 12.5 metres) should be used.

2.2 The map should have a title bar detailing:

- District, Forest Reserved and FMU number;
- Compartment number;
- Concessionaire's felling series and lease number;
- Area of compartment in hectares calculated from the new compartment demarcation survey;
- Name and rank of the forestry officer in charge of stock survey;
- Data of the stock survey;
- Name and rank of the drawing officer who prepared the map;
- Date of map preparation;
- The scale of the map;

- A diagram showing the direction of both true and magnetic north and the magnetic variation in degrees and minutes.

2.3 Compartment boundaries should be plotted from the stock survey field book. These should be checked against the original compartment schedule and any discrepancies noted.

2.4 All site information recorded in the field survey book should be transferred to the map using the mapping symbols shown in figure d4.1. This information should include:

- The location and number of all survey lines and flank lines;
- The direction and gradient (percent) of slopes;
- Roads, skid tracks and footpaths, with their width indicated in metres;
- Watercourses with arrows showing the direction of flow. A dotted line showing the boundary of riparian reserves either side of water courses should be marked;
- The location and size of swamps, farms and rocky outcrops;
- Forest condition scores marked with a square.

2.5 The location of all trees recorded during the stock survey should be plotted on the stock map by following the distances along and from survey lines that were recorded in the field book. These will normally be class I species. Trees with diameter above the minimum felling limit (see table D2.1) should be marked with circle, those the felling limit with a square.

2.6 The species code, diameter and stock survey number of all trees is marked within or beside the circle or square.

2.7 Special classes of trees should be indicated as follows:

- Trees identified as “damaged but merchantable”, represented with a double circle;
- Seed trees indicated with an “S” beside the stock survey number;
- Black star species with “Black Star” written beside the stock survey number and an exclusion zone of 100 metres radius around the tree location;
- Special permit trees indicated with a “P” beside the stock survey number;
- Trees on slopes of more than 30 percent, trees in swamps and in riparian reserves with an “X” beside the stock survey number.

### 3. Stock Summary

3.1 A tabular summary of trees in the compartment showing the stock survey numbers by species and diameter class should be prepared in the following format:

Species			Diameter class (cm)							
Code	Local name	Symbol	30	50	70	90-100	110	130	150+	Total
			-	-	-	10	-	-	0	
			49	69	89	9	129	149	+	

The total number of trees assessed in each diameter class should be summed at the table.

3.2 The following classes of trees should be identified in the summary table by adding the following suffixes to the stock survey number:

- Damaged but merchantable trees – suffix “M”;
- Seed trees – suffix “S”;
- Black star species – suffix “\*”;
- Special permit species – suffix “P”;
- Trees on slopes of more than 30%, trees in swamps or riparian reserves – suffix “X”;
- Trees in condition classes 5 and 6 – suffix “XX”.

#### **4. Map checking and copying**

4.1 Once the stock map has been completed it should be signed by the Drawing Officer and checked by the District Forest Officer. The District Officer should also sign the map to confirm that it accurately reflects the information recorded in the field book.

4.2 After checking, six copies of the stock map should be prepared. Each copy should then be coloured following the codes in figure D4.3.

Planning Branch  
Kumasi 9/94

Manual of Procedures – High Forest Management

Instruction sheet No. D5

Yield allocation

1. Introduction

1.1 Harvesting will only be permitted in compartments where the total stocking of FIP class I species >50cm dbh is greater than the average stocking of the vegetation type within the FMU is situated.

1.2 The compartment stocking is calculated by dividing the total number of FIP Class I trees recorded during stock survey by the compartment area in hectares. This figure should be compared with the average stocking values for the vegetation type shown below:

<b>Vegetation Zone</b>	<b>FIP Class I stocking per hectare (&gt;50cm dbh)</b>
WE	12.9
ME	17.4
MSSE	15.5
MSNW	17.2
DS	10.0

1.3 Compartment with a stocking higher than the figure shown in the table can be considered for harvesting. The calculation of the yield for those compartment is described below.

## 2. Condition index

2.1 The condition index is a numerical expression of the condition of the forest understory within a compartment. The condition index is therefore a measure of the health and regenerative capacity of the forest. The yield from a compartment is varied depending on the condition index.

2.2 The condition index is calculated by counting the number of observation for each condition score (1, 2 and 3), that was recorded during stock survey, and dividing this by the number of all condition scores (1 to 6) in the compartment, multiplied by 100.

Condition index (%) =

$$\frac{\text{Number of condition scores 1, 2 and 3}}{\text{Number of condition score 1 to 6}} \times 100$$

The condition index therefore provides an estimate of the percentage of the area of the compartment which has condition scores of 1, 2 and 3. It allows the District Forest Officer to decide whether the extent of good forest within the compartment is sufficient for the compartment to be considered for harvesting.

2.3 Harvesting will only be permitted if the condition index for the compartment is greater than 40%, and for selected reserves in the DSFZ and MS zones if the condition index is greater than 60%. A list of reserves and required condition indicates are given in table D5. 1.

### 3. Condition score

3.1 As a further check on the condition of the compartment the occurrence of condition scores 1, 2 and 3 is checked. If the occurrence of condition score 3 is more than that of either condition score 1 or 2, the yield will be reduced as follows:

- Selected reserves in DSFZ and MS zones (see table D5.1), no harvesting will be permitted;
- Other reserves where condition index is 40 to 60 per cent, a reduced yield formula will be applied.

#### 4. Yield formula

4.1 The yield formula to be used for a compartment is selected according to the criteria described above. (Table D5.1 lists these criteria for all reserves.)

	Selected reserves in DS & MS zones	All other reserves
Condition index less than 40%	No harvesting	No harvesting
Condition index between 40-60%	No harvesting	No harvesting
Condition score 1 or 3 predominant	No harvesting	Reduced yield formula applied
Condition score 1 or 2 predominant	Reduced yield formula applied	Standard yield formula applied

The standard yield formula is currently:

$$Z = 0.5Y + 0.2X$$

and the reduced yield formula is currently:

$$Z = 0.25Y + 0.2X$$

Where

Z = number of trees to be removed above the felling limit.

Y = number of trees in the diameter class equal to or above the felling limit.

X = number of trees in the diameter class immediately below the felling limit.

4.2 The following rules take precedence over the calculated yield:

- If z is greater than the number of trees above the felling limit a minimum of two trees above the felling limit of the species in question must be retained;
- Any species which has 5 or fewer trees in the diameter classes above and immediately below the felling limit must not be considered for exploitation, unless two trees above the felling limit are within 100 metres of each other (4 centimetres on a 1:2500 scale map or 8 metres on a 1:1250 scale map)
- Once the yield for one species has been determined using the prescribed formula, it cannot be transferred to another species. This prevents over cutting of any particular species.
- Scarlet star species are those tree species approaching economic extinction. For such species yield should be calculated using the formula:\

$$Z = 0.25Y + .2X$$

The following species are classified as scarlet star species:

*Albizia ferruginea*

AWIEMFOSAMINA

*Aningeria spp.*

SAMFENA

**Daniellia spp.**

SOPI

*Entandophragma*

EDINAM

*Entandophragma angolense*

PENKWA-

AKOA

*Entandophragma candollei*

PENKWA

*Entandophragma utile*

EFOOBRODEDWO

*Guibourtia ehie*

ANOKYE-

HYEDUA

*Khaya anthotheca/grandifoliola*

KRUMBEN

*Khaya ivorensis*

DUBINI

*Milicia excelsa/regia*

ODUM

*Nauclea diderrichii*

KUSIA

*Pericopsis elata*

KOKRODUA

*Pterygota macrocarpa*

KYERYE

*Terminalia ivorensis*

EMIRE

*Tieghemella heckelii*

BAKU

*Triplochiton scleroxylon*

WAWA

- The number of trees to be removed (Z) is always rounded down to the nearest whole number.
- All trees marked “X” (located on slopes >30%, near water courses, swamps, and areas of condition score 5 or 6) should not be included in the yield calculation.

- On slopes of between 21 and 30% that are more than 200 meters in length the yield should be reduced so as to prevent excessive forest disturbance and soil erosion.
- Special permit trees (“P” trees) are not to be included in yield calculation

## 5. Yield selection

5.1 Once the yield has been calculated for each species, trees to be removed during harvesting are selected by the District Forest Officer.

5.2 The yield must be allocated evenly throughout the compartment so as to minimize damage harvesting and encourage forest regeneration.

5.3 The yield should be mapped on a sheet of tracing paper placed over the stock map.

5.4 The yield should be calculated for one species at a time.

5.5 Trees for each species should be marked using different sizes of wood screws to represent diameter classes; i.e.:

a 1 centimeters screw for the 50=69 cm diameter class;

a 2 centimeter screw for the 70-89 cm diameter class;

a 3 centimeter screw for the 90-109 cm diameter class;

etc.

The screws should be placed over the circular symbols on the stock map according to the diameter classes. This process gives a three dimensional perspective of the distribution and size of the species being considered.

5.6 As a tree is selected for exploitation the screw should be removed and replaced by a small disk to mark its position. In this way subsequent trees can be selected to avoid excessive opening of the canopy.

5.7 Trees should be selected taking into consideration the distribution of all other selected trees. As trees are selected their stock survey numbers should be recorded in a yield table showing species and size class.

5.8 The following guidelines should be followed during yield selection:

- No trees with diameter below the minimum felling limit are to be included in the yield;
- No seed trees are to be included in the yield;
- Trees to be retained after harvest should be evenly distributed through the compartment;
- No more than threes should be removed per hectare (4 centimeters by 4 centimeter square on a 1:2500 scale map), or no more than two trees per hectare in the MSNW and DSFZ;

- No trees in areas of condition score 5 or 6 are to be removed;
- Trees within riparian areas must not form part of the allocated yield. Riparian areas are marked on water courses as identified on a 1:50, 000 watercourse with a channel width of greater than five meters;
- Trees on slopes of between 20% and 30% should not be included in the yield;
- Trees designated as “damaged but merchantable” during the stock survey should be the first to be selected;
- Black star species should be clearly marked and a buffer zone 100 meters wide should be identified in which no felling, skidding or roading will be permitted;
- Special permit species must not be included in the yield.

## 6. Yield map

6.1 Once the yield selection has been completed the yield map should be prepared. The yield map should be at 1:2500 scale and should show:

- All topographic features;
- Forest condition zone

- The position, species, diameter and stock number of all selected trees;

6.2 There copies of the yield map are required. These will be distributed with the stock map, stock summary and yield summary to the Regional Officer (2 copies) and one copy to be held at the District.

## 7. Yield approval

7.1 Once the yield has been selected, two copies of the following documents are sent to the Regional Forestry Office together with:

Stock map;

Yield map;

Stock summary;

Yield summary”

Compartment inspection form;

Check survey form

Application for special permit species;

An approved logging plan;

Certificate of renewal of the property mark which must be valid beyond the approved harvesting commencement data.

7.2 These should be accompanied by a Yield Approval Checklist (Form FD52) completed and signed by the DFO.

7.3 The yield can only be approved by the Regional Forestry Officer after it has been checked by the Planning Branch. The Regional Forestry Officer is responsible for forwarding one copy of the above documents for checking by the Planning Branch. The Planning Branch must complete a Yield Check Certificate (Form FD53) to show that it has received and checked the yield calculation and allocation.

7.4 The following checks should be carried out before yield approval:

- That the compartment conforms to the schedule of exploitation as set out in the PMU harvesting schedule;
- That the Compartment Inspection Form and Check Survey Form have been completed and signed. The accuracy of the stock survey should be confirmed on the Check Survey Form;
- That the logging plan shows log dumps and skid roads in accordance with the requirements of the Harvesting Rules;
- That the correct yield formula has been used and yields have been correctly calculated;

- That yield selection has been made in accordance with the above guidelines;
- That the stock survey was carried out within the past 2 years;
- That the concessionaires property mark is valid.

7.5 Once the yield has been approved, three copies of the stock map, stock summary, yield map, and yield summary should be distributed by the District Forest Officer to the following: Technical Officer in charge of the range, Forest guard in charge of felling checks, and the concessionaire. The Regional Forest Officer, District Forest Officer, and Planning Officer should already have copies.

Planning Branch  
Kumasi 9/94  
Table D5.1



Form FD52  
September

1994

Yield approval checklist

To: Regional Forest Officer

\_\_\_\_\_  
\_\_\_\_\_

Please find attached the following documents, in respect to the proposed yield, for:

Reserve: \_\_\_\_\_

Compartment:

Concessionaire: \_\_\_\_\_ Lease:

- A. 1:2500 scale stock map, with colour coding
- B. 1:2500 scale yield map, with colour coding
- C. Stock summary in tabular form
- D. Yield summary in tabular form
- E. Signed and completed Compartment Inspection Form
- F. Signed and completed Check Survey Form

- G. Application for permission to fell special permit
- H. Species, (if required by concessionaire)
- I. An approved Logging Plan
- J. Certification of the concessionaire's registered or renewed property mark, the validity of which extends past the proposed commencement of exploitation

I hereby declare that I have checked all the above documents thoroughly and believe them to be in order.

Signed: \_\_\_\_\_

District Forest Officer ( \_\_\_\_\_ ) District

Date: \_\_\_\_\_

This form is to be completed and signed by the District Forest Officer only

This form is to be attached to the front of the yield that is being sent for approval. The yield cannot be approved unless all the documents detailed above have been completed and are attached.

Two copies of this form and all attachments are to be sent to the Regional Forest Officer

Form FD53  
October

1994

Planning Branch – Yield check certificate

To: Regional Forest Officer

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MANUAL OF PROCEDURES  
HIGH FOREST MANAGEMENT

SECTION E

PREPARATION TIMBER HARVESTING SCHEDULES  
FOR FOREST RESERVES

February 1997

Planning Branch, Forestry Department

## List of Acronyms

DFO	District Forest Officer
FD	Forestry Department
FMU	Forest Management Unit
RFO	Regional Forest Officer
TO	Technical Officer
TSP	Temporary Sample Plot
TUC	Timber Utilisation Contract (note that new concessions are called 'TUC' areas)
MOP	Manual of Procedure

## PREFACE

Selective harvesting of compartments that make up the timber production area within a forest reserve is carried out in a sequence determined by the harvesting schedule. The schedule lists the compartments that can be considered for harvesting for each year of the period of the felling cycle. The Manual of Procedures for the Preparation of Harvesting Schedules for Forest Reserves prescribes the steps to be followed in the design of the sequence of harvesting of compartments to ensure a sustainable supply of timber over the period of the felling cycle.

The Manual comprises a set of five instruction sheets and four completed specimen forms. The procedures prescribed in the Manual represent the best practice at the time of writing. It incorporates three new forest management tools:

- Forest Protection strategy
- Forty year felling cycle
- Five-year felling coup size

Information sources which provide the necessary data include compartment exploitation histories, progress maps, temporary sample plot data and field visits.

The Manual is to be used by:

- District Forestry Officers who are responsible for the preparation of harvesting schedules.
- Regional Forestry Officers who are responsible for the approval of harvesting schedules.
- Planning Branch staff who are responsible for the endorsement of harvesting schedules.
- Timber Utilisation Contract holders who will be consulted during the preparation of harvesting schedules.

It is therefore binding on all District Forestry Officers to get harvesting schedules on timber production areas in Forest Reserves approved before stock surveys can be considered.

Planning Officer

Planning Branch, 1997

## CONTENTS

### Instruction Sheets

No. E1. Collection of Ghana of Compartment Information

No. E2. Compilation of Timber Exploitation History

No. E3. Determination of the Sequence of harvesting in a Timber Production Area

No. E4. Field Checking of Compartment Information.

No. E5. Adoption of Harvesting Schedules

**Specimen Forms (Completed Examples)**

1. FD/CR1      Compartment Information
2. FD/CR2      History of timber exploitation
3. FD/CR3      Preparation of Harvesting Schedule
4. FD/CR4      Compartment Condition

**Appendices**

Appendix 1: Reserves of which TSP inventory data available.

Appendix 2: Condition Scoring.

Appendix 3: Procedure for carrying out a basal area sweep.

*Instruction Sheet No E1*

*Collection of General Compartment Information.*

**1.0 Introduction**

Forest reserves in the high forest zone are divided into compartments of about 128ha for management purposes. In order to identify those compartments which can form a timber production area it is first necessary for the District Forestry Officer to compile general information on each of the compartments in the forest reserve. This information is compiled on Form FD CR1, as the Compartment information record. Information on any forest operation that has been carried out in any compartment in a forest reserve can be obtained in a compartment register.

## 2.0 Preparation of Compartment Information Record

2.1 The Compartment Information record on each Forest reserve should be prepared according to the format below:

Felling series	Compt . No.	Size (ha)	District Assembly	Stool	Lease no. or TUC no.	Area designation	Remarks

2.2. To prepare the compartment information record the following information will be compiled:

- **Compartment Number:** List all the compartments in the reserve according to the most up-to-date progress map in use at the District Forest Office.
- **Felling series:** Record the name of the felling series from the TUC holders felling file kept at the District Forest Office.
- **Size:** Record the compartment size in ha from the compartment acreage book (1 ha = 2.47 acres).
- **District Assembly and Stool:** Obtain information on allocation to District Assemblies and Stools from District Assembly maps, Progress maps or, if necessary, stool maps from the Lands Department.
- **Lease No:** Record the lease or Timber Utilisation Contract number covering the compartment.

**Area designation:** Record whether the area is currently designated as under permanent protection, conversion or research. Check on protected area designation from lists of protected compartments recently prepared by the Planning Branch. These include Hill Sanctuaries, Swamp Sanctuaries, Special Biological Protection Areas, Provenance Protection Areas and Fire Protection Areas. Convalescence Areas are also to be recorded but note that convalescence is not a permanent protection category and the affected compartments will normally be removed from the schedule for one cycle only. If the list does not coincide with your own recommendations please contact the Planning Branch to discuss the matter. The DFO often has better knowledge of the physical condition of a reserve than the Planning Branch. It is the responsibility of the DFO to bring any anomalies in the Planning Branch recommendations to the notice of Planning Branch.

Also record information on conversion and research areas. Areas that are not in any of the above categories can be designated as Production Areas.

- Under 'remarks' any unique comment on the compartments may be recorded. For example if the compartment has been re-numbered or if the compartment is in an expired concession, (in which case record the year the TUC or concession lease expired).
- Refer to specimen form No.1 which shows a completed example of FD/CRI (Compartment Information Form).

## Instruction Sheet No E2

### Compilation of Timber Exploitation History

#### 1.0 Introduction

1.1 The polycyclic selective felling system adopted by the Forestry Department of Ghana requires that timber can be harvested from a particular compartment only once during felling cycle. Once a compartment is logged it cannot be logged again until the next felling cycle. The logging history of compartments in a forest reserve must therefore be compiled in order that past exploitation can be accounted for in the harvesting schedule.

Felling series	Com pt. No.	Year of operation	Logging Operation	Number of trees felled	Remarks

- **Compartment Number:** A compartment might have been logged for two or more consecutive years. Use a new line for each year that logging took place. Record every year logging took place regardless of whether repeated entries are part of the same operation.
- **Year of Operation:** Record the year in which logging took place. When recording the year of the operation from control reports use the year in which the period started and not the last year of the period e.g. for 1987-1988 control report, record operations as occurring in 1987.
- **Provide as complete a history of logging as possible** using information from Felling Registers, Compartment Registers, Felling File for contractors, Yield and Revenue Ledger, Control Forms, Control Reports, Monthly Reports, Quarterly Reports and Annual Reports. The Control Reports should only be used as a last resort if more detailed information is not available or as a check on the logging history collected.
- **Number of trees felled:** Record the number of trees felled in each logging operation. If the control reports have to be used because information is not available elsewhere, distribute the total number of trees logged evenly between the compartments entered. For example if 152 trees were logged from compartments 15 and 16 then allocate 76 ( $=152/2$ ) trees to each. If this is done note under 'remarks' that the number of trees is estimated and not actual.

**Remarks:** Indicate how the number of trees felled was obtained. If the control reports are used because information is not available elsewhere, distribute the total number of trees logged evenly between the compartments entered. For example of 152 trees were logged from compartments 15 and 16 then allocate 76 ( $=152/2$ ) trees to each. Note that the number of trees is estimated and not actual. In some cases there is record of logging but not the number of trees. This should be noted under 'remarks'.

Refer to Specimen 2 Form FD/CR2 for a completed example.

*Instruction Sheet No E3*

**Determination of the sequence of harvesting in a Timber Production Area**

1.1 Introduction

1.1 The sequence of timber harvesting of compartments in a timber production area is planned by Forestry Department to ensure that a continuous and sustainable supply of timber is produced from TUC areas over the entire felling cycle. In order to achieve this, the number of compartments that constitute a timber production area is divided by forty to coincide with the forty year felling cycle. The sequence in which logging of compartments will be permitted is then determined and the year in which each compartment is to be logged is assigned.

2.0 Planning

2.1 For each compartment in the timber production area, the year to be logged is calculated according to the timber exploitation history. This is determined by preparing

Form FD/CR3 as follows:

1	2	3	4	5	6	7	8	9	10	11
Felling series	Cmpt No	Year of last logging (a)	Number of entries	Total trees harvested	Average basal area	Average condition Score	Ideal harvest year (a)+40 (b)	Harvest year (c)	Discrepancy years (c)-(b)	5 year coupe

- Columns 1-5: Complete the first five columns of the table for the designated timber production area using information from Forms FD/CR1 and form FD/CR2.
- Year of last logging: Record the last year that trees were logged from the compartment either legally or illegally.
- Number of entries: Record the number of times a compartment was logged. Do not record consecutive logging within a 3 year period as separate entries. Logging in a compartment for 3 consecutive years is considered one entry. For example if a compartment was logged in 1966, 1978 and 1980 record this as 2 entries as 1978 and 1980 could be considered part of one operation.
- Total number of trees harvested: Record the total number of trees harvested in the past 40 years. In the above example for compartment 1 this is 115 + 67 (from form FD/CR2 ) which equals 182 trees.

- Average basal area: provide estimates of basal area from TSP data maps, (if the map is available and is not considered out of date). For each compartment, estimate and record the average basal area from the range of basal areas for TSP plots nearest to it. Reserves for which TSP data is available are listed in Appendix 2.
- Average Condition Score: Record the average condition score of each compartment. It is not easy to assess the condition of a compartment without visiting it but for this exercise a visit to each compartment is not expected. Forest Guards and Technical Officers which.....

schedules or a particular reserve should be able to assess the condition of particular compartments using the scale below:

- 1 - excellent
- 2 - good
- 3 - partly degraded
- 4 - mostly degraded BA < 15 m<sup>2</sup> ha<sup>-1</sup> - Not to be logged in the present felling cycle.
- 5 - very poor
- 6 - not forest

Compartments with condition scores of 4 or with an average basal area below 15 m<sup>2</sup>ha<sup>-1</sup> must be put under convalescence and excluded from the current harvesting schedule. A list of these compartments must be attached to the proposed harvesting schedule explaining the reasons for their removal from production. Amend Form FD/CR1 accordingly.

- Ideal harvest year: To calculate the ideal harvest year, add 40 years to the year of last logging. This is the ideal year of next entry into the compartment of logging.

Columns 9-11 can only be filled in after completion of the harvesting schedule. The harvesting schedule will not automatically be a list of the ideal felling years. This is because the sequence of compartments obtained by following the ideal felling years may not place the compartments into groups which can be logged together from a practical perspective and it is also unlikely to spread the compartments evenly over the 40 year period. The method for shuffling the compartments to obtain the actual harvesting schedule is described below.

**The harvesting schedule preparation exercise**

- Within the TUC area prepare a 5 x 8 cm card for each compartment by cutting sheets of A4 paper into 16 (halve the paper 4 times). Do not prepare cards for protected or research compartments.

Record the following on each card:

Compartment No. ....	(12)
Year of last logging ...	1963                      2003
Ideal harvest year ...	.....
Total no of trees felled .....	352

Fig 1. The completed card

- Obtain a recent progress map to refer to. Clear a work surface upon which the cards can be laid out.

- For each TUC area, sort the cards into piles according to the ideal year of harvest. So that, for example, all cards with the ideal harvest year of 2003 are in the same pile.
- Imagine that you have eight lines on your work surface, one line for each 5 year felling coupe. Place the piles of cards in the lines such that the ideal harvest year is placed in the appropriate ideal 5 year felling coupe. For example if you had a harvesting schedule running from 1995 to 2034 the following layout would be formed on your work surface.

1995	2000	2005	2010	2015	2020	2025	2030
1996	2001	2006	2011	2016	2021	2026	2031
1997	2002	2007	2012	2017	2022	2027	2032
1998	2003	2008	2013	2018	2023	2028	2033
1999	2004	2009	2014	2019	2024	2029	2034

- The layout you produce may contain some empty spaces, for example if there were no compartments which could ideally be entered in 1996, 2007, 2030 and 2033 etc. Do not worry about this for the moment.
- Divide the total number of compartments in the productive area by 8 to give the number of compartments which may be harvested in each five year coupe (X). In this example let us say that we have 80 compartments so X=10. Start with your first line and try to get 10 compartments which could practically<sup>12</sup> be logged together in to this five year coupe (refer to the progress map).
- If there are odd compartments in the first line that could not be practically logged with other compartments in the line then take their cards out of the line and keep them to one side in another pile (a pile of odd compartments).
- If you have not X compartments in the first line then examine the second line and see if there are any compartments in it which could practically be logged with compartments in the first line. Avoid assigning compartments for logging too early by adhering to the following rules a and b:
  - a. In the period of the schedule running from 1996 to 2005 compartments can be logged a minimum of 20 years since they were last logged, e.g. a compartment logged in 1977 may be logged as early as 1997 and thus may fall into the 1997-2001 coupe. Do not assign this compartment to a coupe which commences before 1997. This rule should only apply to compartments which have had a total of less than 2 trees/ha removed in the past 40 years<sup>13</sup> (more than 256 trees in a compartment of 128 ha over 40 years, check back to FD/CR1 for compartment size).
  - b. For the period of the schedule after 2005 compartments may be assigned for logging a minimum of 35 years since they were last logged, e.g. a compartment logged in 1970 may be logged any time after 2005. This rule should only apply to compartments which have had a total of less than 2 trees/ha removed in the past 40 years.

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<sup>12</sup>See section below for a list of factors to consider for practical logging.

<sup>13</sup>If more than 2 trees per ha have been logged then damage to the compartment may be high and early logging is to be avoided.

- You should allocate less than X compartments to a five year coupe if you are not able to get X compartments in the coupe using the rules stipulated here. If, using the above rules, you can identify no more than X/2 (in this example 5) compartments to the first five year coupe then the start of the harvesting schedule should be delayed 5 years. Thus the harvesting schedule would start in the year 2000 instead of 1996. You may also need insert to periods of no logging into the schedule at other times.
- Once you have allocated X (or less) compartments to the first line move on to the second line and follow the same procedure for this coupe. You should bring in compartments from the pile of odd compartments, placing them in coupes with adjacent compartments for practical logging. Make sure all the time that you are not logging compartments too early. A few compartments may be an exception to this rule if logging them earlier makes sense from a practical perspective. If in the first few coupes it is only possible to allocate less than X compartments then the last few lines will have to each contain more than X compartments. Make sure that these extra compartments are distributed evenly over the later coupes. For example lines 1-3 may have 8 compartments leaving 6 extra compartments. Lines 4-10 should each have 10-12 compartments.

• **Factors to consider for practical logging.**

- When referring to the progress map think about the position of hills and streams, think about where the road might pass and avoid crossing streams or placing roads over steep slopes.
- A five year coupe should consist of one or two groups of adjacent compartments. Avoid disturbing other compartments that are not in the five year coupe before or after the particular coupe you are considering. Where possible, coupes should be situated so access need not pass through compartments outside the coupe. However, where this is unavoidable peripheral coupes should be logged before internal coupes as this will discourage illegal logging and is practical in terms of initial investment in roads. For example see Fig 2.

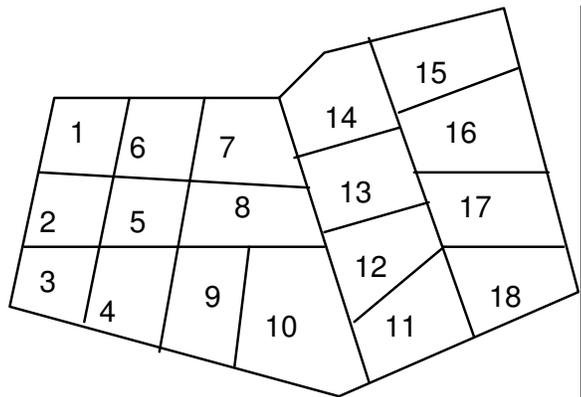


Fig 2. Ideally compartments 9 and 10 would form one coupe and compartments 7 and 8 another. If, however, compartments 9 and 10 forms coupe 1 and compartments 8 and 13 form coupe 2 (because compartment 7 is not due for logging but compartment 13 is due for logging) then coupe 1 should be logged before coupe 2 as access will be through coupe 1.

- Note that rules should not be compromised when decisions are made regarding the order in which to assign coupes for logging.
- Once all the cards have been allocated to coupes, record the midpoint of the 5 year coupe on the bottom right hand corner of each card as in Fig. 3 below. For example for the 1996 - 2000 coupe the harvest year recorded will be 1998.

	(12)	
1963		2003
	352	1998
		----- Harvest year

Fig 3 The completed card

- Fill in column 9 on FD/CR3 using the logging year indicated on the bottom right hand corner of the cards. Indicate the 5 year coupe in column 11.
- Then calculate column 10 which is the harvest year minus the ideal logging year.
- Calculate the sum of column 10. If the total is less than -3 then the harvesting schedule has not been prepared correctly and compartments have been allocated for logging too early.

### Notes on special cases

- When current concessions are rationalised, small concessions will be combined to form single TUC areas. As a result the new TUC areas may contain more than one felling series. If each of these felling series are small (having less than 40 compartments) then they should be combined into one felling series with one harvesting schedule. Using the procedures described above for the preparation of harvesting schedules it is likely that each *ideal* coupe will contain a few compartments from each felling series because of the history of exploitation. Under these circumstances the final coupes proposed by the DFO should be planned such that they alternate between the two former felling series. Thus the contractor will be required to work for five years in one felling series and then for five years in the other felling series - or for 10 years in one and then 10 years in the other, depending on the exploitation history. In this scenario it is very important to make sure that compartments are grouped in each five year coupe so that when a contractor returns to the felling series after a five year break previously logged compartments are not disturbed. This also applies to TUCs that contain more than one reserve which, in the past were logged on different felling series and which each contain less than 40 compartments.
- If, in the past, two reserves within a concession were worked under one felling series then a similar sequence of exploitation will have to be followed as was followed in the first cycle because this will be reflected in the history. For example if reserve A was logged from 1951 to 1970 and reserve B was logged from 1971 to 1990 then in the new cycle reserve A should be logged before reserve B. Because logging the two reserves by alternating 5 year coupes would cause many compartments in reserve B to be logged too early.

## Instruction Sheet No E4

### Field Checking of Compartment Information

#### 1.0 Introduction

1.1 It is important to carry out sample field checks once the harvesting schedule is prepared to ensure that the present condition of the forest is not significantly different from that compiled from historical records.

2.1 Once the schedule is prepared field checks must be carried out by the District Forestry Officer and Forestry staff who are in charge of the forest reserve. Form FD/CR4 should be filled in during the field inspection. Records of compartments checked should be prepared according to the format provided below:

Compartment								
Sample No.								
BA m <sup>2</sup> /ha								
Condition Score								

- **Randomly** select five compartments which have been allocated for logging in the first 10 years of the felling cycle. In addition identify the five compartments which have had the most trees removed in the past 40 years and are included in the current harvesting schedule.
- Visit each of these 5 compartments, determine the average basal area stocking of less than 15 m<sup>2</sup>/ha or an average condition score greater than or equal to 4 should not be included in the harvesting schedule.
- In addition any compartments assigned for logging in the next 5 years should have an average basal area not less than the national average of 23 m<sup>2</sup>/ha.
- If the field data indicates that either of these conditions have not been met then the whole harvesting schedule will require revision and the steps outlined in this MOP will have to be followed again.
- The situation will normally only arise where the historical data is inaccurate or where areas severely damaged by events other than logging such as fire, wind throw or silvicultural operations have not already been placed under convalescence. The District Forestry Officer should immediately recommend to Planning Branch that the compartments be put under convalescence.

## Instruction Sheet E5

### Adoption of Harvesting Schedules

## 1.1 Introduction

Before a proposed harvesting schedule can be adopted the schedule must be approved by Regional Forestry Officer and endorsed by the Planning Branch. The procedures for approval and endorsement are described in Instruction sheet E5 along with the criteria to be used ensure that the harvesting schedule meets the required forest management standards.

## 1.2 Harvesting Schedule Standards

In order to ensure harvesting is planned to meet the required forest management standards, criteria for the preparation of harvesting schedule have been prepared. Any harvesting schedule that does not meet any of these criteria must be queried:

- a) Each TUC area in a Forest Reserve should have a harvesting schedule.
- b) Permanently and Temporarily Protected areas as well as Conversion and Research Areas should be excluded from the schedule.
- c) The period of the schedule should be 40 years.
- d) The duration of each felling coup should not exceed 5 years.
- e) Each 5 year coupe should be allocated an eighth ( $\pm 10\%$ ) of all compartments in the TUC area.
- f) Coupes which commence in the years 1996 - 2004 should contain compartments which were previously harvested a minimum of 20 years ago.
- g) The net discrepancy years should not be less than - 3. Where the harvest year is the middle year of the relevant coupe.
- h) The harvesting schedule should be practical in that coupes consist of one or two groups of adjacent compartments and that access to coupes does not need to pass through coupes which are not immediately before or after the coupe in question.

### *1.3 Ratification of Harvesting Schedules*

1.3.1 Completed forms FD/CR1, FD/CR2, FD/CR3 and FD/CR4 along with a copy of the progress map and a covering letter explaining any unusual aspects of the prepared schedule should be submitted to the Regional Office for approval. The Regional Office will make sure that the submitted harvesting schedule meets the following criteria stipulated in 1.2.

1.3.2 The Regional Forestry Officer will then check the completed forms as follows:

- a) Check that all forms have been completed correctly and in full.
- b) Check that Protected compartments listed on FD/CR1 conform with the protected area list prepared by the Planning Branch and have been excluded from the harvesting schedule.
- c) Check that the history of timber exploitation provided in form FD/CR2 matches control report records kept at the Regional Office.
- d) Compartments in the first 20 years of the schedule have an average condition score of 3.5 or less.
- e) All compartments on the schedule have an average basal area stocking greater than 15 m<sup>2</sup>/ha. Compartments in the first 5 years of the schedule have an average stocking above or equal to the national average of 23 m<sup>2</sup>/ha.
- f) Data from compartment information forms (FD/CR1) and exploitation history forms (FD/CR2) are correctly transcribed to the harvesting schedule form (FD/CR3) and the calculations of total trees harvested, ideal harvest year and discrepancy year are correct.
- g) Compartments in coupes which start between 1996 and 2004 are not being proposed for logging less than 20 years since they were last logged (column 9 should not contain figures less than -20). And compartments in coupes commencing after 2004 are being proposed for logging not less than 35 years since they were last logged (column 9 should not be less than -5).
- h) The total of column 9 should not be less than -3.
- i) Compartments proposed for logging in each five year coupe are grouped in a sensible manner such that access through compartments outside the each coupe only occurs in coupes which are to be logged immediately before or after the coupe in question.

1.4.1 If satisfied the Regional Office then submits a copy of all forms and maps to the Planning Branch with an approval letter for endorsement. The Planning Branch ensures that the above points have been checked and if satisfied endorses the harvesting schedule. A copy of the new schedule is placed on the management file for the FMU as well as on the timber exploitation file at the Planning Branch. The logging history and the new schedule are entered onto a computerised compartment register kept in the Planning Branch. A letter is sent to the Planning Officer to the Regional Forestry Officer endorsing the schedule.

1.4.2 The Regional Forestry Office approves the schedule and furnishes the District Forestry Office with an official letter of approval with the Planning Branch endorsement attached.

## 1.5 Implementation of harvesting schedules

1.5.1 Once the harvesting schedule has been approved stock survey may take place for compartments in the current coupe. Stock survey may take place up to one year before the commencement of logging in a new coupe. No logging will be permitted in any coupe other than the present coupe. Great care must be taken in the preparation of the schedules to avoid the situation where compartments allocated for the current year are too poorly stocked to be logged.

1.5.2 The harvesting schedule may be altered at the request of the contractor when the contractor produces valid records of entry into compartments which do not appear on form FD/CR2. If this occurs the schedule will have to be revised following the procedures laid out in this document in order to account for this new historical evidence.

1.5.3 A compartment will not be released for logging if it does not appear in the harvesting schedule.

### Appendix 1: Reserves for which TSP inventory data available

<b>Reserve</b>	<b>No of plots</b>	<b>Sampling period</b>
Aboniyere Shelterbelt	14	Sep-Oct 91
Afao Hills	9	Feb-Jun 89
Afia Shelterbelt	5	Oct 90
Afram Headwaters	51	Jul-Sep 86
Afrensu Brohuma	8	Jun-Jul 91
Aiyoala	8	Dec 86
Amama Shelterbelt	12	Sep 86
Angoben Shelterbelt	8	Mar 88
Anhwiaso East	30	Feb-Apr 89
Anhwiaso North	1	Mar 89
Anhwiaso South	5	Feb-Mar 89
Anum Su North	11	Dec 86-Jan 87
Anum Su South	2	Dec 86
Apamprama	9	Dec 86
Aparapi Shelterbelt	6	Jul-Sep 93
Asenanyo River	60	Feb-Aug 86
Asubima	15	Jun-Jul 91
Asukese	63	Aug-Sep 86
Atewa Range	56	Nov 88
Atewa Range Extension	9	Nov 88
Auro River	2	Nov 87
Awura	26	Aug-Sep 90
Ayum	30	Mar 87
Baku	2	Aug 91
Bandai Hills	39	Dec 86-Jan 87
Bediako	3	Dec 86
Bemu River Blocks I, II & III	8	Jan 92
Ben East	6	Jan 88
Ben West	16	Jan-Feb 88
Bia Game Production Reserve	59	Aug-Sep 87
Bia Shelterbelt	5	Oct 91
Bia Tano	50	Oct 88
Bia Tributaries North	87	Sep-Nov 89

Bimpong	25	Aug-Sep 91
Birim	10	Nov 91
Birim Extension	3	Nov 91
Bobiri	8	Aug 90
Boi Tano	30	Feb-Mar 89
Boin River	75	Jan-Feb 87
Bonkoni	19	Oct 91
Bonsa Ben	38	Jan 88
Bonsa River	39	Apr-Jun 91
Bonsam Bepo	32	Sep-Oct 91
Bosumkese	35	Jul-Sep 93
Bosumtwi Range	17	Nov-Dec 90
Bowiye Range	28	May-Jun 90
Bura River	25	Mar-Apr 88
Cape Three Points	13	May 91
Chirimfa	22	Jul-Aug 90
Dadiaso	35	Apr 91
Dampia Range	17	Aug-Sep 91
Denyau Shelterbelt	2	Jul 88
Disue River	6	Apr 91
Dome River	19	Apr-Jun 88
Draw River	57	Mar-May 90
Ebi River Shelterbelt	7	May 90
Esem Epam	6	Dec 90
Esuboni	12	Dec 91
Esukawkaw	29	Dec 91
Fum Headwaters	18	Sep-Oct 90
Fure Headwaters	41	Oct-Nov 86
Fure River	49	Mar 90
Goa Shelterbelt	6	Oct 91
Jema Assankrom	16	Feb-Mar 89
Jeni River	5	Oct 90
Kajeasi	7	Jan 91
Kontintin Shelterbelt	3	Oct 90
Krochua	3	Sep 91
Krokosua Hills	115	Jun-Aug 87
Kunsimua Bepo	3	Oct 87
Kwamisa	21	Jul 91
Mamang River	12	Nov-Dec 87
Mamiri	13	Nov 86
Mankrang	20	Jun 91
Minta	6	Jan 88
Mirasa Hills	17	Aug 90
Mpameso	86	Apr-May 87
Muro	16	May 94
Ndumfri	18	Dec 90
Neung North	4	Dec 90
Neung South	29	Dec 90-Feb 91
Nkonto Ben	3	Feb 88
Nkrabia	26	Apr 88
North Fomangsu	10	Aug 90
Nuensa	14	Dec 86
Numia	13	Oct 90
Nyamibe Bepo	8	Oct 90
Oboyow	15	Oct-Nov 91

Ochi Headwaters Block I	2	Sep 91
Ochi Headwaters Block II	1	Sep 91
Oda River	40	Jun-Jul 88
Ofin Shelterbelt	14	Jan-Feb 90
Onuem Bepo	8	Oct-Nov 90
Onuem Nyamibe Shelterbelt	4	Oct 90
Onyimsu	1	Oct 90
Opon Mansi	31	Jun-Jul 90
Opro River	30	Aug 91
Pamu Berekum	42	Dec 90
Pra Anum	30	Nov 87
Pra Birim North	3	Nov 91
Pra Birim South	1	Nov 91
Pra Suhien Block I	23	May-Jun 91
Pra Suhien Block II	25	May-Jun 91
Prakaw	3	Aug 90
South Fomangsu	4	Aug 90
Southern Scarp (Akim)	28	Dec 91-Jan 92
Subim	57	Jul-Aug 89
Subin Shelterbelt	6	Jun 88
Subri River	134	Jan-Apr 91
Suhuma	89	May-Aug 89
Sui River	82	Feb-Mar 90
Supong	9	Aug 91
Supuma Shelterbelt	6	Aug 91
Tain Tributaries II	132	Aug-Oct 88
Tano Anwia	36	Apr-May 88
Tano Nimiri	51	Jan-Feb 89
Tano Ofin	102	Nov 89-Jan 90
Tano Suhien	22	May-Jun 88
Tano Suraw	7	May-Jun 88
Tano Suraw Extension	19	Jun 88
Tinte Bepo	30	Jun-Jul 86
Tonton	35	May 89
Totua Shelterbelt	18	Apr-May 89
Upper Wassaw	25	Apr 89
Wawahi	10	Aug 91
Worobong South (Akim)	30	Dec 91
Worobong South (Kwahu)	9	Aug 90
Yoyo River	57	Feb-Mar 88

## Appendix 2, Condition scoring

1. Excellent - 0 - 5% of lower strata structure disrupted.

Lower strata typical of undisturbed forest, visibility extends to 20 m (1 chain) in all directions. 0 to 5% of the lower strata occupied by thickets of pioneer herbs, saplings, or climber tangles. No old stumps visible.

2. Good throughout - 5 - 20% of lower strata structure disrupted.

Only 5 to 20% of lower strata is occupied by pioneer thickets or climber tangles. Visibility through undisturbed forest extends for 20 m in any direction in at least 75% of the sample area.

3. Degraded - 20 - 30% of lower strata structure disrupted.

20 to 30% of lower strata dominated by pioneer thickets an/or climber tangles. Visibility through undisturbed forest extends for 20 m in at least 30 % of the sample area.

4. Mostly degraded - 50 to 75% of lower strata structure disrupted.

50 to 75% of the lower strata dominated by pioneer thickets and/or climber tangles. Visibility may not extend for 20 m in any direction except along skid trails, recently burnt areas etc.

5. Very poor - 75 to 100% of lower strata structure disrupted.

75 to 100% of lower strata structure dominated by pioneer thickets. Visibility restricted in more than 50% of the sample area to less than 5 m. Include very recently burnt forest.

6. Not forest - Lower strata has been completely destroyed and replaced with non-forest species.

Lower strata dominated with agricultural crops, taungya or plantations which are being actively managed.

### Appendix 3 Procedure for carrying out a basal area sweep.

There are two methods at our disposal for carrying out a basal area sweep. The first involves the use of a Relaskop, if a Relaskop is not available then the second method can be used which involves the use of the thumb as an angle gauge.

#### **Method 1.**

At the point from which you wish to make a basal area sweep consider yourself at the centre of a circular plot. Then turn on the spot through  $360^\circ$  and count all the trees around you which are wider than two relaskop units (RU).

To determine if a tree is wider than two Relaskop Units hold the relaskop to your eye and set the height to zero by pressing the button at the front of the relaskop and letting the scale wheel settle to zero and release the button. After this do not touch the button again. Look at the tree stem through the relaskop and decide if it is wider than 2 RU. 1 RU is equivalent to one of the large white or black bands depicted in the figure below. In the Fig. 4 below the tree is larger than 7 RUs so is larger than 2 RUs and would be counted once.

Fig 4 Wide scale relaskop and giant tree (Bitterlich,1984)

As you turn it is not necessary to measure distances to trees. You will notice that the closer a tree is to you the smaller its diameter will be in order to be counted. Trees that are very close could be less than 5 cm in diameter but could still be counted (for the theory of this method refer to Philips (1983) or Bitterlich (1984)).

Basal area can then be calculated from the following formula

$$G = kz \quad (\text{Bitterlich, 1984})$$

Where  $G$  is the basal area in  $\text{m}^2/\text{ha}$ ,  $z$  is the number of trees counted in the sweep and  $k = (\text{RU})^2$  which in this case is 4, ( $\text{RU} = 2$ ).

## **Method 2**

This is very similar to the above method but instead of using the relaskop the thumb is used. All thumbs vary in width and therefore it is important to determine  $k$ , the basal area factor, for your own thumb. The graph on the next page is used for this purpose. To determine  $k$  for your thumb place the graph on the wall at eye level (obviously this will vary for different people so do not place the graph permanently on the wall). View the graph at one metre from the eye and hold the thumb up with the arm extended. The apparent width of the widest part of the thumb is then read off the graph giving a direct estimate of  $k$ . This is illustrated in Fig 5 below.

Fig 5 Calibration of the thumb (Bitterlich, 1984).

Once you have determined  $k$  for your thumb you can use your thumb in the field in a similar manner as you would use the relaskop described in method 1 above. Simply count all the trees in a circle around you which are wider than the width of your thumb held at arms length. This count will be equal to  $z$  and the basal area can be calculated using the same formula as above,  $G = kz$ .

Fig 4 Thumb calibration chart

**MANUAL OF PROCEDURES  
FOREST RESOURCE MANAGEMENT PLANNING IN  
THE HFZ**

**SECTION F  
CONTROLLED TIMBER PRODUCTION  
OFF RESERVE**

**GHANA FOREST SERVICE  
MARCH 1998**

# **Manual of Procedures - Controlled Timber Production Off Reserve**

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# Manual Of Operations - Controlled Timber Production Off-Reserve

## F1. Introduction

### Instruction Sheet No. F1.1 Overview of Procedures

#### 1. General

1.1 This MoP deals with the management and control of logging off-reserve. It applies only to natural occurring forest - not plantations. In August 1995 the so called "Interim Measures" were introduced<sup>14</sup>. These measures were designed to provide the same level of control over the management of the off-reserve resources as applied to the reserves. The export log boom of the period 1993-94 resulted in the uncontrolled felling of trees on farmers land with little consideration to the wishes of the land owners and with no thought to sustainability. The Interim Measures were generally considered to be a success and comprised interim felling procedures, legislation as well as public awareness issues. The interim felling procedures are now standard and replaced by the MoP. Under the Forest Policy (clause 5.3.2) a commitment has been made to the controlled timber harvesting off reserve : *Inclusion of unreserved forests under the Forestry Department's management system for regulation of uncontrolled harvesting, expeditious collection of relevant fees and ultimate conformity with criteria for sustainable resource management.*

1.2 Regional and district quotas for off-reserve resources have been calculated by the Forest Management Support Centre (FMSC) to limit the amount of the annual cut in any one particular locality as a means of extending the ultimate life of the resource.

1.3 Every tree that is felled must be inspected by the DFO or his representative before permission is granted and similarly approval must be given by the cultivator. A recording system has been implemented that provides log tracking from the forest to the mill.

1.4 Off-reserve, the Timber Operational Specifications, in particular the Social Responsibility Agreement is of major importance and no logging can go ahead until the consultation process has been properly followed and satisfactory agreements have been drawn up between the community and the contractor.

1.5 Agriculture is the primary activity off-reserve and it is forestry that has to fit into the farming system - not *vice versa*. District and regional staff must always bear in mind that the Forest Service has no ownership rights over the off-reserve forest resources; (indeed it does not have ownership rights over the reserves), but off-reserve its rights are even more tenuous. The Forest Service will provide a monitoring and advisory role. Off-reserve, the landowners have absolute right of veto on TUC identification.

1.5 The Timber Utilisation Contract (TUC) legislation being introduced under the Timber Resource Management Act of 1998 will apply equally to off-reserve areas. Companies requiring timber contracts will be subject to selection and approval by the TUC Evaluation Committee based on an assessment of the competence of the company. Felling of small numbers of trees under permit, will however be possible and will not be subject to TUC regulations.

#### 2. Overview of the Procedures

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<sup>14</sup> The Interim Measures to Control Illegal Timber Harvesting Outside Forest Reserves. Forest Department, 1995.

2.1 Many of the procedures are similar or identical to those for on-reserve.

(i) *Fixing district quotas*

(ii) *Identification of TUC areas*

- field checks of unallocated land
- consultation with communities and land owners
- agreement of the District Assembly
- identifying areas that need to be excluded and fixing of boundaries

(iii) *Preparation of the contract*

- preparation of the Timber Operational Specifications (TOS) and the Social Responsibility Agreements (SRA)
- endorsement of the Timber Contract Advertisement Consent Form
- advertisement of the TUC
- submission of applications by interested companies
- evaluation and award of contract

(iv) *Management of the TUC areas*

Following on from the preparation of the TUCs and the award of the contract, the following procedures are followed:-

- approval of the TUC Operation Plan
- inspection of all trees to be felled within the first year
- approval by land owners and cultivators and fixing any compensation payments
- preparation of the Annual Plan
- tree felling plus tree volume estimation
- cross-cutting and estimation of log volume
- issue of Log Conveyance Certificate
- post-logging inspection

**Table 1.1 Summary of the responsibilities of the Forest Service off-reserve**

<b>Activity</b>	<b>Officer involved</b>	<b>Remarks</b>
Check of availability of unallocated land	Contracts Unit. HQ	1:250,000 scale maps of unencumbered land made available
Identification of possible TUCs	DFO/RFO	
Consult with District Assemblies	DFO	
Derivation of TOS/SRAs	DFO	Support from regional team
Advertisement	Contracts Unit	Preparation of contract information requires assistance of DFO and regional staff.
Award of contract for TUC	Timber Rights Evaluation Committee	
Evaluation of TUC Coupe Plan and annual plans	DFO/RFO	

Pre-felling inspection and approval	DFO	Pre-felling inspection to include community representatives.
Issue of tree inspection forms and log conveyance forms and checking of log inspection forms	DFO	
Overall supervision and monitoring	DFO	Community encouraged to monitor operations and communicate with district staff when problems arise

## 2. DISTRICT QUOTAS

### Manual of Operations - Sustainable Timber Production Off-Reserve

#### F2. District Quotas

#### Instruction Sheet No. F2.1 Outline of the System

### 1. Introduction

1.1 The use of a quota system off-reserve is the equivalent to the annual allowable cut (AAC) for the reserves. However, unlike the forest reserves, where the overall guide is maintenance of the timber yield through sustainable harvesting practices, no such claim can be made for the off-reserve situation. The primary use of this land is agriculture and settlement; in such circumstances, aiming to achieve a level of natural forest regeneration equal to the level of exploitation is outside the control of the Forest Service and would only be achievable if the community is willing to embark on tree planting either small scale at the level of on-farm, or by allowing land allocation for larger scale plantation development.

1.2 The purpose of the regional and district quotas is to restrict severe overcutting and to eke out the resource for a period which is sufficient to allow on-farm and commercial planting to replace the natural forest - if this proves to be necessary.

### 2. Calculation of the Cut

2.1 The quotas have been derived from the national inventory carried out during 1994-95 and are based on the assumption that the national AAC off-reserve would be set at 500,000 m<sup>3</sup>. This figure was derived from previous levels of cut and was considered to be realistic. On this basis the total national stock was calculated to last 55 years. The approved cut for each species was separately calculated within each ecological region and converted to an area basis by regions and districts.

2.2 The quota for each district may vary if there has been over-cutting. The RFOs will be notified annually of the current quotas for their region and districts

2.3 The DFO is responsible for allocating the district quota amongst each of the TUCs operating within the district. In doing this account should be made of the needs for timber permits and salvage logging. A suggested balance would be:-

85% to TUCs  
10% for District Assemblies and timber permits  
5% for salvage logging

The balance will not be fixed and will depend on the particular circumstances of the district and the recommendation of the District Assembly members. The DFO must weigh the local needs for timber for rural development against the demand from TUC holders. In association with the District Assembly, the DFO should assess the demand for wood for local woodworking enterprises and for local development projects. In conjunction with the Assembly a decision should be reached on an appropriate allocation between the needs of the district and of the external market.

2.4 The DFO does not need to allocate all of the quota that has been given to the district, however he/she may not exceed the quota. It is allocated for a particular year and can not be accumulated.

### **3. Monitoring of the Quota**

3.1 The actual cut from the off-reserves is monitored against the quota at three levels, national, regional and district.

3.2 The FMSC is responsible for monitoring of the quota at the national level by comparing the total allocation against the harvesting records provided by the Log Measurement Certificates (LMCs) and the Conveyance Certificates.

3.3 The RFOs are responsible for monitoring their quota by examining the felling permit returns for each district . Likewise the DFO should maintain a register showing the allocation of his quota against the number of trees included in permits and Conveyance Certificates .

### **3. PREPARATION AND AWARD OF THE TUCs**

#### **Manual of Operations - Controlled Timber Production Off-Reserve**

#### **F3. Preparation and Award of the TUC**

#### **Instruction Sheet F3.1 Identification of the TUC**

##### **I. Introduction**

1.1 This instruction sheet is designed to assist district and regional staff to identify a TUC area off reserve and to make the initial preparations for having the area approved by district representatives and affected land owners. Instruction sheets C3.2 MoP Section C (Sustainable Timber Production On-Reserve ) deal with the structure of the Timber Operational Specifications including the Social Responsibility Agreements for both the on and off-reserve situations and Instruction Sheet C3.4 details the procedures for the selection of the contractor again for on and off reserve.

1.2 By Legislative Instrument, Parliament has provided for Regulations on Timber Harvesting Off-Reserve in accordance with the Timber Resource Management Bill. Staff should ensure that they are fully versed in these regulations.

##### **2. Overview of the identification TUC areas off-reserve**

2.1 The process of identification of TUC areas is involved, and requires a series of consultation stages with the local community representatives and individual farmers likely to be affected by the proposals. The main processes are summarised below.

2.2 Following the strategic planning activities, including screening of possible sites from 1:250,000 scale base maps of unencumbered land, the following processes apply:-

1. Preparation of base maps of the proposed TUC using the 1:50,000 Survey of Ghana maps to identify fixed easily identifiable boundaries .
2. Initial inspection to verify suitability and the extent of areas that will need to be excluded on the basis of environmental constraints.
3. Consultation and Endorsement -District Assembly, Landowners, Alienation holders using Form CAI/1 as the basis for discussion. Their endorsement necessary for matters to proceed.
4. Preparation of Timber Operational Specifications including the Social Responsibility Agreements.
5. Preparation of Contract Area Map defining areas to be excluded on the basis of slope, swamp, other protection issues including areas of religious or cultural significance, intensive agriculture etc. All external and internal boundaries to be clearly defined
6. Completion of CAI/1 and relevant attachments, comments by DFO
7. Checking and endorsement by RFO
8. Forwarding to Timber Rights Evaluation Committee

2.3 During discussions with the District Assembly, it will be necessary to ensure that the proposals for the TUC accord with the District Forest Plan - if such a document has already been prepared - and that all submissions for TUCs are regularly passed on to the district Local Government Service for incorporation into such a plan.

### **3. Checks on the unencumbered area map**

- 3.1 The DFO must check the mapped boundaries of unencumbered land with District records. Mark any inconsistencies on the unencumbered area map. If any discrepancies between District and HQ records are found, return an amended copy of the map with a report on the areas affected to the Timber Contract Unit, Accra. Include a photocopy of original lease document and site map to enable the Timber Contract Unit to cross-reference and if necessary update their records. The DFO should endorse the photocopy of the lease as a true copy.

### **4. Identification of areas to be screened as potential TUC areas**

4.1 The Timber Contract Unit will provide sketch maps of any areas that concessionaires have identified as being of interest to them as a concession. However, the DFO is free to add any other areas that in his/her opinion are suitable for consideration. The District Assembly, chiefs and prospective contractors may also recommend the consideration of other areas and should be notified of this right. However, the DFO should *not* solicit for Timber Contract Areas from these parties but advise them on the procedures to be followed.

4.2 Before preparing the detailed maps of proposed areas the District Drawing Officer (DDO) should check that the proposed areas do not cross forest district boundary or paramountcy boundaries. However, in exceptional circumstances this may be permitted to allow a more rational boundary to be identified. The DDO should identify the proposed area on the 1:50,000 scale topo sheets and select appropriate features to form the boundaries (e.g. rivers, roads and reserve boundaries). Bearings can be used to bridge areas without obvious features but should be kept as straight as possible. The proposed boundaries should be marked on tracing paper in pencil to facilitate changes as may be required during consultations.

### **5. District Inspections**

5.1 The DFO will undertake a site inspection of any prospective Timber Contract Areas paying particular regard to the integrity of its boundaries (i.e. see if they can be found on the ground). Determine whether there are any areas that should be protected from felling operations because they are environmentally sensitive. Such areas are riverine buffer strips, areas known to be subjected to seasonal flooding, swamps, steep slopes and any other area where timber harvesting operations will be detrimental to the environment. A report should be prepared by the DFO in which he/she should make observations concerning the general stocking of the area (the numbers of trees is not required as the prospective contractors will undertake any detailed surveys they consider necessary as part of their application) and environmental concerns.

5.2 The DFO should decide whether in his/her opinion the area is suitable to be operated under a TUC. If an area is deemed to be unsuitable for operation under a Timber Utilisation Contract this should be indicated on the District unencumbered area map and a short report including a sketch should be forwarded to the RFO. If during any of the consultations, it becomes apparent that the area should not be offered under a TUC, then the DFO should report as such, stating the reasons to the RFO and indicate the area on the unencumbered area map. Such areas will be listed and mapped as unsuitable for operation under a TUC by the Timber Contract Unit.

5.3 The Timber Operational Specifications (refer MoP Section C, Instruction Sheet 3.2 for details) provide an opportunity for the FS to communicate their wishes and standards for operations to the prospective contractors. The TOS need not include the provisions of the Logging Manual as the contractor will undertake to observe this as part of the Contract. However, there is a need to inform the applicants where certain regulations will apply, for example where stream-side buffer strips are required, the alignment of access roads, which is the taboo day etc. Particular attention should be paid to defining areas or conditions that are not mentioned in the Manual. Such things might be protection from logging of an area known to be an important water source but is not swampy or steep, indicating

that the harvesting operations will not be allowed during rainy season and whether a fire management plan is required and what it should contain. **[On form CAI/1, enter details in Section 5 (b) for excluded areas and 6 (a) for special restrictions.]**

## **Manual of Operations - Controlled Timber Production Off-Reserve**

### **F3. Preparation and Award of the TUC Instruction Sheet F3.2 The Consultation Process**

#### **1. Introduction**

1.1 This Instruction Sheet is concerned with aspects related to consultation by the Forest Service with the land owners for off-reserve. The process is similar for the on and off-reserve situation, however there are differences in approach. Instructions in bold refer to the sections within Form CAI/1.

1.2 The finalisation of the TUC agreements requires consultation at various levels with all the stakeholders. The level of consultation is particularly extensive off-reserve since the potential level of disruption to farm land is serious and will have a direct effect on the income levels of the community. The prior consent of the local authorities is required before an area can be advertised.

1.3 During the strategic planning phase when the forest reserve management plans were being finalised there is a particular intensive period of consultation with the local communities to ensure the plan reflects their requirements. This has been described in MoP A (Strategic Planning). At a slightly later time when the TOS and SRAs are being prepared there will again be intensive consultation with the communities and with the district assembly officers on the conditions to be included.

#### **2. Objectives**

2.1 To ensure that the prior consent of the landowners, concerned farming communities and District Assemblies is obtained before a TUC is advertised. Where their endorsement is obtained, to ensure that their views are taken into account when formulating the terms of conditions for the operation of the TUC.

#### **3. Consultations**

##### District Assembly

3.1 The RFO will send letters to the District Chief Executive to inform the Assembly that the Forest Service is commencing the identification of areas within the District to be advertised as Timber Utilisation Contracts. The letter should contain a brief description of the procedures to be followed and invite the Assembly to have the DFO address them at the next Assembly meeting if they wish any further clarification or information.

3.2 If a District has a functioning District Environment Management Committee and a Development Committee these should be both notified. The DFO should request that the District Assembly nominate a person who can act as a contact for each area being identified. The contact can be anyone nominated by the Assembly and they will be the contact that the DFO and prospective contractors will use to relay necessary information to the Assembly.

##### Landowners

3.3 The DFO will identify and arrange meetings with the owners of the land in question. It is

preferable to request a meeting with the Traditional Council of the landowning stool. The DFO should inform them about the procedures that FD is using for identifying Timber Utilisation Contract Areas and inform them of the areas within the stool land that are unencumbered and are under consideration for possible TUC advertisement.

3.4 The DFO should :-

- Request that the Council nominate a person through whom they can be contacted concerning TUC matters by the DFO and by prospective contractors.
- Request that the Council identify any alienation holdings within the area(s) and the terms of the alienation concerning the land and trees - these people will be co-signatories of a Contract and will need to be contacted for their consent. **[Form CAI/1 Section 2.]**
- Request that the Council identify the caretaker chiefs of communities within the proposed Contract Area(s) - these people will be witnesses to a contract. **[Section 3.]**

[If possible agreement should be reached concerning the division of timber revenues in the case of areas under dispute over stool status or landholdings, though do not aggravate any disputes - report and leave difficulties for the RFO to take up with the Traditional Council.]

#### Caretakers / Alienation holders

3.6 The DFO should contact each caretaker and/or alienation holders within the proposed Contract Area. At the initial meeting the Timber Utilisation Contract procedures should be explained carefully with particular regard to how this differs from what they are familiar with as concession leases and also how they relate to the Interim Measures. Try to explain as much as possible concerning points (a) to (g) below. Issues related to stool boundaries and whether there is likely to be general agreement about permitting a contractor to work in the area can be dealt with at this first meeting. Request that the chief and elders identify interest groups in the area, to inform them of the proposals and get their response to the identification of the area. Arrange a subsequent meeting with the chief, elders and spokespeople for the interest groups at a convenient time in the near future.

3.7 At the second meeting, summarise the main points arising from the discussions on the Form CAI/1 (Timber Contract Area Identification Form). The DFO should keep notes of the meetings for future reference but need not produce a formal report on the proceedings. Inform the meeting that anyone may make their own written submission concerning the views on the advertisement of their area and this will be treated confidentially and attached to the Form CAI/1 and used by the RFO in making his decision to forward the area for advertisement.

- a) Ask the community about their experience with concessionaires. Are there any problems they have experienced that they do not wish repeated? Was there anything they particularly liked about the way a concessionaire worked?
- b) Ensure that there is general agreement to the area being operated by a Timber Contractor. It is the communities prerogative to deny permission for advertisement but they must provide reasons which should be verified by the DFO.
- c) If the area is agreed, request that the boundaries of the area are identified. Boundaries should if possible follow undisputed land ownership boundaries and distinct natural features (rivers, roads etc.). The 1:50,000 topo maps together with the tracing overlay should be used as the basis for discussions and the area indicated by the DFO may be split or extended if there is adjacent unencumbered land. **[Section 4.]**
- d) Within the Contract Area parcels of land may be excluded from timber operations for any reason. Exclusions can be cultural (for example, sacred groves or burial grounds) **[Section 5 a)]**, for

- environmental protection (hills, swamps and riverine buffer strips) [**Section 5 b)**] or to protect perennial crops (such as cocoa) [**Section 5 c)**]. List, describe and sketch any areas the people identify as needing to be excluded from the Timber Contract. If the DFO has identified any areas for environmental protection these should be pointed out to the people and their agreement solicited.
- e) Request that the community indicate how long they wish to see the area worked under a Timber Utilisation Contract. They can indicate any period between 10 and 40 years (preferably in five year steps). The duration of the contract will depend on the stocking of the area and also on what the community plans to do with the land. For example, they may wish to manage the area to give a reliable income from timber harvesting over a long period, to clear an area quickly because they wish to establish an oil palm plantation or perhaps to liquidate part of the timber resource quickly to get a larger sum of money to invest now. Try and explain that the duration of the contract will affect what they can ask the contractor to do for them. [**Section 6.**]
  - f) The Timber Operational Specifications (TOS) are included in the advertisement. The RFO is responsible for preparing the TOS for the Contract Area advertisement and so sufficient information must be collected to enable these to reflect the requests of the affected communities. Since the communities will be approached by prospective contractors this meeting should be used as an opportunity to raise certain issues with the people and endeavour to keep them well informed on the conditions being imposed on contractors.
  - g) Explain to the meeting what recommendations concerning the environmental specifications for the area by the FD and discuss these with the community especially where issues such as fire protection are concerned. The community should be invited to add any other environmental specifications they wish to impose such as the exclusive use of pneumatic tyred vehicles on farmland. [**Section 7 a) for operational restrictions and 7 b) for seasonal restrictions.**]

#### **SOCIAL RESPONSIBILITY AGREEMENTS (SRAs)**

The SRA is a mechanism for ensuring that all TUC operations are carried out in a socially responsible manner with due respect for the rights of the land owners. It is a schedule of the TUC and is legally binding. It is made of two sections:-

Code of Conduct  
Social Obligations

It might also include a third section:-

Resource Development

if communities have an interest in forest regeneration.

The SRAs are negotiated by the Forest Service with the communities in advance of the contract being advertised.

#### **4. Social Responsibility Agreements**

- 4.1 During the consultation process the DFO should ensure a consensus is reached on proposals for a Social Responsibility Agreement. During the first workshop and subsequent meetings the DFO should

explain the concept of SRAs and assist in the formulation of the key elements of the proposal. It will help subsequent discussions if each community can identify a key contact point for future discussions.

#### Code of Conduct

- 4.2 The code of conduct stipulates the manner in which the contractor must operate to ensure that all timber operations are conducted with due respect for rights of the communities inside or adjacent to the TUC area. The code of conduct will include provisions to ensure respect for local customs and beliefs, local infrastructure and local livelihoods.
- 4.3 Ask the meeting to review prior experience with concessionaires, identify any problems and bad practices. If the community have had bad experiences with a particular contractor, this should be noted.
- 4.4 Reach a consensus on the manner in which the contractor should operate. In drawing up the Code of Conduct for off-reserve areas with representatives of the affected communities, it will be recognised that timber production is not the primary land use in the area. The Code of Conduct will specify the rights of communities residing in the area which are to be respected during TUC operations. Accordingly, the contractor may be required to agree to some or all of the following conditions:-
- ensure that company staff are courteous in their dealings with local people
  - respect cultural norms such as Taboo Days
  - respect the right of the communities to be consulted during the planning of logging operations, including the siting of access tracks
  - ensure that all operations are timed to minimise disruption to agricultural activities
  - respect community infrastructure (roads, bridges etc.)
  - respect all sacred sites, water collection points and NTFP collection areas.
  - agree on compensation rates for damage to agricultural crops prior to commencing operations and make good payments to farmers for compensation for crop damage on the spot.
  - agree on the levels to be paid for tree-tending fees to be paid to farmers directly before felling commences.
  - recognise that the TUC agreement does not give the holder rights to the collection of NTFPs or limits the access of the community to undertake their lawful activities.
- 4.5 The land owners, on the other hand, must ensure that all communities residing within the contract area will respect the rights of the contractor to operate without hindrance as long as the terms of the contract are being followed.

#### Social Obligations

- 4.6 This is the assistance that the contractor can provide in terms of infrastructure development of the area. The contractor may well need to construct roads within the area for the purposes of extracting trees and the community may wish to specify the alignment and specifications of some roads so that they can later be developed as feeder roads. They may also want the contractor to provide them with a certain number of beams converted from their trees for the purposes of constructing a school, clinic etc. Endeavour to keep the requests within reason, the contractor is not going to be able to meet all the aspirations of the community. Also emphasise that to be fair to the contractor once agreement has been reached the community will be required to abide by the agreement. The DFO should take care to remind the community that any developments they request should pass through the relevant sub-committee of the District Assembly, ideally before they are included in the TOS.

4.7 The Social Obligations could also include the need for the contractor to provide employment for a number of local workers

### Resource Development

4.8 In areas where the community is intending to maintain a viable resource, contractors may be able to assist in tree planting. Such assistance could be negotiated if both parties wish to embark on such a programme.

## **5. Finalisation**

### Preparation of contract area map

5.1 Once the DFO is satisfied with the boundary identification, the District Drawing Officer should complete the draft map. The final map should have the Contract Area boundary, major roads, rivers, towns and village locations indicated. In addition areas to be excluded should be sketched and environmentally sensitive areas (steep slopes and areas adjacent to important rivers and water sources) indicated. The map should be completed with a title, scale, date, north point and the name of the DDO and be prepared on tracing paper.

### Endorsements

5.2 The Timber Operational Specifications agreed by the community as reported by the DFO on the completed Form CAI/1. Sections 4. - 6. should be posted in a prominent location in the communities for a short period of time (three weeks). The content of the forms cannot be changed at this point but any further representations can be made in writing to the DFO and will be attached to the Form and forwarded to the RFO.

5.3 At the end of the posting period, the DFO will request that the landowners and caretaker chiefs or their representative should endorse the completed Form CAI/1. [**Section 8 b**] plus the attached SRAs and the Contract Area Map.

5.4 Endorsements are required from representatives of:-

- The Traditional Authority
- The Caretaker Stools
- The District Assembly
- The Lands Commission

Any of the above that has reservations regarding the TUC should send a written and signed submission to the DFO for consideration by the RFO. The DFO should then make his/her own endorsement of the completed Form CAI/1. [**Section 11.**]; and forward to the RFO

5.5 The RFO must inspect the completed report, form, reports and submissions. If necessary he should undertake investigations to ascertain the veracity of the reports and submissions. If all is in order and he judges the area suitable for operation under a Timber Utilisation Contract he should endorse Form CAI/1. [**Section 12.**]. The RFO should pay particular regard to any special environmental or social responsibility conditions required. The information in this section will be used in the advertisement of the area and made available to prospective contractors and will be used by the Timber Evaluation Committee in evaluating the applications. If necessary the RFO should attach a short report giving reasons for his judgements. [**Section 13.**]

5.6 The endorsement by all landowners and caretakers for the area is required for the area to be advertised and if any of these are unable to endorse the Form CAI/1 then the matter must be resolved either by arbitration or by removing some portion of the area from the proposed area..

5.7 If the RFO deems that the area is not suitable for operation under a Timber Utilisation Contract he should endorse the form [Section 12.] and elaborate his reasons for refusing the area. [Section 14.]

5.8 The completed Form CAI/1, map and attachments should be forwarded to the Chairman of the Timber Rights Evaluation Committee in FD Headquarters in Accra.

**N.B Refer Instruction Sheet C3.4 for a discussion of the procedures relating to the selection of the contractor. An example of Form CAI/1 is provided in Appendix C3.**

## **4. TIMBER HARVESTING PROCEDURES**

### **Manual of Operations - Controlled Timber Production Off-Reserve**

#### **C4. Timber Harvesting Procedures**

#### **Instruction Sheet C4.1 Overview of the Processes for Timber Harvesting Off - Reserves**

### **1. Introduction**

1.1 This Instruction sheet provides an overview of the activities and procedures that are applicable to areas outside the forest reserves related directly to timber harvesting.

1.2 These procedures encompass the so-called “Interim Measures” which are now part of the approved procedures. All large-scale logging will in the future be carried out under the TUC system, however the felling of a small number of trees will still be possible making use of a tree felling permit.

1.3 These measures allow both for pre-felling inspection as well as post-felling inspections. Compensation has to be paid for damage to agricultural crops and for tree tending directly to the farmer. A conveyance certificate is required for the movement of logs or sawn timber from the site.

### **2 . Activities Related to Timber Harvesting**

2.1 In the case of TUCs following the selection of the company, there will be the following activities:-

- Endorsement and modification, if necessary, of the draft TUC Operational Plan (as presented to the Timber Rights Evaluation Committee)
- Initial selection of trees by the contractor
- Pre-felling Inspection
- Issue of permit or yield approval (TUC)
- Preparation of the Annual Logging Plan
- Tree felling plus tree volume estimation
- Cross-cutting and estimation of log volume
- Issue of Log Conveyance Certificate
- Post-logging inspection
- Payment of compensation to farmers

For small-scale harvesting, the process is similar except that the permit replaces operational or annual plans. Following selection of individual trees by the applicant, a request is made for pre-felling inspection and the subsequent issue of a permit. Tree volume and log volume measurements are required together with the issue of a Conveyance Certificate if the material is being moved from the immediate environs.

#### The TUC Five Year Operation Plan

2.2 This will have been prepared as part of the submission for the TUC, covering aspects relating to the first coupe (five years). The preparation of this is therefore the responsibility of the contractor. Although one particular company has been selected as the most suitable to be awarded the contract, it does not necessarily follow that the plan is 100% correct and does not need to be amended. There may have been mistakes or misunderstandings that need to be corrected under the advice of the DFO..

### Initial Selection of trees to be felled

2.3 The contractor should then identify those trees he wishes to fell and if possible gain the approval of the farmer cultivating the land. The trees should be marked with a band of red paint which can be clearly seen. The contractor should record the location, species and girth of the trees selected.

### Pre-felling Inspection

2.4 The applicant must then provide the DFO with information on the trees identified and request a pre-felling inspection. Any tree felled off-reserve requires pre-felling inspection this applies equally to contractors operating under a TUC agreement and applicants for a small number of trees requesting a felling permit. These inspections can only be carried out for operators with a valid and current property mark and are undertaken against a fixed fee intended to cover administrative costs, amended from time to time. The applicant must also be ready to assist with logistical support for the inspection team. The DFO will set a suitable time and arrange for local representatives to join the team and prepare as much as possible the Pre-felling Inspection Forms CO2 (refer Instruction Sheet F4.4).

2.5 The inspection will be carried out by agents representing the applicant, the DFO, the stool and the local unit committee and any farmer on whose farm the proposed felling will take place. The team will assign a number to each tree they regard as suitable for felling and paint the number in a visible position. Those trees rejected for felling will not be numbered but will be marked by a large X.

2.6 The pre-felling inspection will provide the information needed by the DFO to process the permit or to prepare the concessionaires yield allocation. Those trees rejected at the time of inspection will not be included on the form. Any tree felled on a farm against the wishes of the farmer is illegal. Note that the same diameter restrictions apply off-reserve as for on-reserve.

2.7 Chain saw applicants applying to saw trees into boards can only apply for ONE tree only. The same Form CO2 can however still be used. In this case the applicant must be the owner of the chain saw. Chain saw operators must register with the District Assembly and separately with the DFO if the saw is to be used for production of boards.

### Felling Permit

2.8 All trees felled off-reserve require a permit, they can only be prepared following a successful pre-felling inspection. Form CO3 (refer Instruction Sheet F4.4) is used for this purpose.

2.9 Currently the DFO is only permitted to approve a single tree permit, all other permits must be endorsed by the RFO. It is possible that this limited ceiling will be amended at some future time. The DFO should submit Forms CO3 together with the Pre-felling Inspection Forms to the RFO with the current balance of his annual quota.

2.10 The permit specifies the date issued and the date of expiry. After felling the applicant should return the permit to the DFO. The duration of the permit for chain saw applicants remains at two weeks and for a canoe one month. In the case of permits issued under a TUC, the length of the permit will be for one year.

### Annual Plan

2.11 The TUC holder should then prepare his Annual Logging Plan listing the trees he intend to fell and providing information on the roads he intend to make us of plus any track or bridge construction that will be required. Approval of the plan enables the contractor to commence operations providing an initial royalty payment is made. The level of the pre-payment will determine the number of trees to be

removed. The contractor is required to maintain a positive cash balance with respect to royalty payments at all times.

2.12 Details of this plan are provided in Instruction Sheet F4.3 and in the Logging Manual.

### Tree and Log Measurement

2.13 Use of mean tree volumes for the estimation of royalty payments is no longer to be used and instead total utilisable tree volume (prior to cross-cutting) is assessed making use of the Tree Information Forms (TIF). Details on the use of this form are given in Instruction Sheet F4.4. The responsibility for carrying out these assessments lie with the Forest Service since they provide the basis for calculation of the forest fees.

2.14 The use of the Log Information Form (LIF) will continue, however, the responsibility for measurement and recording of the logs following cross-cutting resides with the contractor. The main purpose of the LIF is to ensure that all logs being removed from the forest are recorded and to provide the basis for the issue of the Conveyance Certificate.

2.15 The Felling Permit does not authorise transport of logs or boards, the Conveyance Certificate is required for this. It can only be issued after successful completion of post-felling inspection which will include confirmation that logs have been properly measured and marked, compensation has been paid for damage to crops and the tree tending fee has been paid to farmers; and all the stipulations of the TOS/SRA have been met.

2.16 The Conveyance Certificate is issued on a vehicle by vehicle basis and remains with the vehicle until it reaches a TIDB<sup>15</sup> checkpoint. It is then surrendered in exchange for the Log Measurement Certificate (LMC). TIDB will then return the Conveyance Certificate to the issuing DFO. The TIDB have instructions not to issue an LMC unless the driver can produce a Conveyance Certificate. The continued use of the LMC is being questioned and with the developing role of TIDB a rationalisation of present practices is likely.

### Monitoring

2.17 The DFO and his staff are responsible for monitoring of harvesting practices and drawing to the attention of the contractor any unacceptable methods. Particular attention is to be paid to the adhering to fine-grained protection, any special restrictions itemised within the TOS and the code of practice defined within the Logging Manual.

2.18 The DFO should also be aware of the situation regarding the payments of compensation and tree-tending fees to individual farmers. A contractor that refuses to meet his obligations should not be given further felling approvals in the next annual coupe, until the matter is properly sorted out. Any complaints about inadequate compensation payments should be brought to the attention of the Forest Service staff. Conveyance Certificates should be withheld if there appears to be substance to the complaints.

2.19 The entire community must be vigilant in monitoring the operations of chain saw operators and TUC holders to ensure that all felling is being carried out legally. Everyone has the right to ask a contractor working on their land to produce a felling permit and to check that drivers have been issued

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<sup>15</sup> Timber Industry Development Board. The Forest Products Inspection Bureau is soon expected to combine with the Timber Export Development Board to form the TIDB.

with a Conveyance Certificate. The DFO should ensure that community leaders are aware of the conditions of the TUC agreement.

## **Manual of Operations - Controlled Timber Production Off-Reserve**

### **F4. Timber Harvesting Procedures Instruction Sheet F4.2 The TUC (5 year) Operational Plan**

#### **1. Introduction**

1.1 For the off-reserve contract area, the companies competing for the contract will have been required to complete a draft TUC Operational plan covering their proposed programme of work over the next five years. Following the award of the contract, the successful company may be required to modify aspects of the five year operational plan.

1.2 In subsequent years, the company will be required to provide new Operational Plans for the next coupe (if there should be one within the current contract).

#### **2. Purpose**

2.1 The purpose of the Plan is to enable the Forest Service to ensure that operations in the five year felling coupe are well planned and meet general FS standards and the TOS of the area. . Subsequently, new plans will need to be prepared prior to moving into the next five year coupe.

2.2 The five year plan provides an opportunity to review the level of success of the contractor in adhering to the long-term plan for the entire contract area.

#### **2. Structure**

2.1 The structure of the plan is slightly different to that being used on reserve. An outline of the composition of such a plan is given below, but the details concerning its formulation are provided in the Logging Manual.

#### **OUTLINE OF A TYPICAL 5 YEAR TUC OPERATIONAL PLAN OFF RESERVE**

- 1. AREA COVERED UNDER THE PLAN (AND AREAS EXCLUDED)**
- 2. COMMUNITIES AFFECTED**
- 2. EXPECTED LOG PRODUCTION**
- 4. ROAD AND LOGGING TRACK LAYOUT, BRIDGES, LOG YARDS.**
- 5. PROTECTION/ENVIRONMENTAL ISSUES FROM TIMBER  
OPERATIONAL SPECIFICATIONS**
- 6. POST LOGGING ACTIVITIES**
- 7. SOCIAL RESPONSIBILITY COMMITMENTS**

**MAPS: Approx. 1:25,000 scale or better. Location and area included with rough break down of annual blocks  
Indicate access roads, camps, main log yards, source of road making material and protection areas.**

### **3. Review of Plan**

3.1. The DFO should review the TUC Operations Plan and make any comments before forwarding to the Regional Forest Officer for approval. The decision on whether to accept the five year plan is taken at regional level.

3.2. Particular issues to review are:-

- does the area to be logged over each year appear to be realistic and in accordance with the communities expectations ?
- do the volumes and the species composition seem to be sensible on the basis of local knowledge and the results of the off-reserve inventory?
- will there be any problem in using the access roads proposed, has there been agreement on the proposed alignment of new access roads to the area.?
- has the contractor properly identified the areas of coarse-grained protection?
- has the company adequately summarised the main aspects of the TOS/SRA that will effect operations in this particular coupe?

3.3. Once approved, the contractor is expected to implement the Plan to the satisfaction of the Forestry Service. The plan will be used to help monitor and assess the contractor's performance in the TUC area in the first five years and in subsequent coupes.

## **Manual of Operations - Controlled Timber Production Off-Reserve**

### **F4. Timber Harvesting Procedures**

#### **Instruction Sheet F4.3 The Annual Logging Plan**

##### **1. Purpose**

1.1 The Contractor must also prepare an Annual Logging Plan which describes all operations to be carried out during a calendar year. It is analogous to the Compartment Logging Plan on-reserve. Like the Compartment Plan it can only be prepared once the pre-logging inspection and the formal survey has been undertaken. The written part of the plan is brief, the main component being the accompanying maps required to infrastructure and also protection areas.

1.2 The Logging Plan is prepared by the Contractor who should make full use of the Survey of Ghana 1:50,000 topographic maps enlarged as appropriate and supplemented by information from the pre-felling inspection. During preparation he should ensure that he is keeping to the TOS and the operating standards detailed in the Logging Manual. Instructions on the suggested format for an annual plan are also provided in the Logging Manual.

##### **2. Structure**

2.1 The Annual Logging Plan can be a brief document indicating:-

- the number of trees to be removed (on the basis of the pre-felling inspection)
- road construction details
- approval of the landowners to the construction and felling activities.

Instructions call for the attachment of a map prepared at a minimum scale of 1:25,000 to show:-

- boundary of current annual programme
- all water courses
- any cultural sites or areas to be avoided
- proposed road plan
- existing roads
- proposed bridges and culverts
- skid track location
- log yard location
- protected areas

2.2 The Annual Logging Operations Plan will also include a total tally of those trees requested for felling within the annual coupe. and will be subject to pre-felling inspection before the Annual Plan can be approved. The standard pre-felling inspection forms (Form CO2) should therefore be completed by the applicant. The district staff should ensure that all trees are inspected and that all due payments have been paid after which the felling permit (Form CO3) can be issued. .

### **3. Review of the Plan and Operations**

3.1 The DFO needs to be certain that all work is being carried out in accordance with the TOS and that the location of all trees for felling have been marked on the an attached map that accompanies the Annual Plan.

3.2 In the field the DFO should check that:-

1. the trees being felled will not damage the crops of any farmer left outside the consultation process ,
2. they are in excess of the minimum diameter for the species.
3. they do not belong to one of the protected classes.
4. the trees are not within a riparian strip.

## **Manual of Operations - Controlled Timber Production Off-Reserve**

### **F4. Timber Harvesting Procedures Instruction Sheet F4.4 Supervision and Monitoring Responsibilities of the Forest Service**

#### **1. Introduction**

1.1 The DFOs and the regional staff have a responsibility for ensuring that the contractors are following the guidelines of the Logging Manual and are fully adhering to the TOS/SRAs . In particular the field staff should ensure that only trees under the permit are being felled.

1.2 Consequently, the DFO and his staff should be fully conversant with the code of practice specified in the Logging Manual.

#### **2. Objectives**

2.1 To ensure that a functioning system is in place for all districts where TUCs are being operated which provides regular feedback on the standard of logging practice and ensures that only approved trees are removed whilst environmental, and safety levels are adhered to. The system must also ensure that all payments are made in accordance with the contract agreements.

#### **3. Monitoring Requirements**

3.1 The DFO should ensure that all logging operations both on and off-reserve are inspected following approval of the yield. Staff should be asked to examine: the following aspects:-

##### Logging and Environmental Standards

1. No trees are felled on slopes in excess of 30%, trees felled on slopes 20%+ have only been felled following sanction by the district staff.
2. Directional felling techniques to be used in order to minimise felling damage to retained trees and agricultural crops.
3. Skidding tracks laid out in accordance with the Annual Logging Plan and not allowed to exceed 25% slope and aligned to minimise crop damage.
4. All stream boundary areas fully protected and unlogged within 25 m of each side of a stream, but 50m to be left clear on either bank in the case of a river.
5. No soil deposited in the waterways
6. All logs have been properly marked in accordance with the approved codes, no black star species or restricted species felled. Stumps must also be marked with the tree identification number.
7. All drainage canals and culverts regularly cleaned
8. No logging being carried out during very wet period when excessive site damage is likely
9. Removal of all logs and waste material after the completion of logging activities
10. Any log yards cleaned up and compacted areas ripped if requested.

##### Safety Standards

3.2 In addition, the district staff have duty to ensure that logging is being undertaken with proper respect to normal safety practices. Logging crews to be properly equipped with protective clothing and safety boots. Due attention must be paid to closing roads and tracks at times of tree felling and warning the general public.

3.3 Companies operating under a TUC are required to nominate a logging supervisor responsible for the technical and safety aspects of operations. This person should be conversant with all standard operations.

Adherence to Social Responsibility Agreements

3.4 As well as the technical aspects of logging, the DFO has a duty to ensure that the contractor is abiding to the terms of the SRA. In particular he should ensure that all compensation payments are being made in time and that the contractor is arranging his working activities to minimise disruption to agricultural practices. Non-compliance to the agreements drawn up with respect to the provision of infra-structural developments should also be noted.

3.5 Continual failure by the contractor to meet the terms of the agreement should be reported to the RFO. If a satisfactory outcome can not be negotiated the RFO must sanction the renewal of the concessionaires property mark.

Control of log movements

3.6 Following the introduction of the Interim Measures for the control of logging off-reserve, the processes for recording the felling, the extraction and movement of logs have been strengthened. Most of these procedures are now regarded as standard rather than interim. Examples of the forms are appended to the end of this section.

3.7 **Pre-felling Inspection Form CO2.** This form lists all the trees duly inspected by the DFO and community representatives . The inspection can only be carried out for those contractors or chain saw operators holding a valid and current property mark. Applicants are required to pay a specified fee to cover the administrative costs of the inspection and to provide transportation for the team.

3.8 The form is in two parts “A” and “B”. Part A lists the trees requested to be inspected grouped under the respective Stool, District Assembly and Unit Committees. Part B provides a list of all trees with columns for the species and diameter and a column for remarks. Copies of the Forms should remain with the Unit Committee member for two weeks in order that there is an opportunity for the community members to voice any concerns. A tree can not be felled against the wishes of the cultivator. Also it can not be felled if it is under-sized, unless it can be considered salvage following essential land clearing or because the tree is dying from fire damage.

3.9 There are 4 copies of the Form CO2 A and B, the distribution is:-

Original copy	Applicant’s copy
Duplicate copy	TO’s copy
Triplicate	Local Unit Committee copy
Quadruplicate	DFO

3.10 **Felling Permit Form CO3.** This form lists the trees that have been approved under the pre-felling selection. After authorisation by the RFO it will detail the expiry date. In the case of a TUC holder this will be one year after issue.

3.11 The permit itself is accompanied by a summary list of trees approved for felling. This provides the tree number ( the same as indicated on the pre-felling inspection form), species and diameter. There is also a remarks column which should be used to indicate if the tree is being felled as a salvage tree or if there are special conditions.

3.12 There are six copies of the Felling Permit, the distribution being:-

Original	Applicant's copy
Duplicate	HQ copy (for monitoring)
Triplicate	TO's copy
4 th copy	RFO
5th copy	FMSC
6th copy	DFO

3.13 **Tree Information Form (TIF).** This is a new form introduced to meet the request from the contractors and Government to ensure that the royalty assessment is calculated on the true measured volume and not using average volumes as had been earlier practice. Soon after tree felling, the field staff should measure the tree length, measuring from the point of felling to the limit of commercial utilisation. This should be taken as the upper point where the wood could still be sawn and should not be necessarily linked to the point of branching. Diameter is measured at both ends-taken two readings at right angles. An example of the new Tree Information Form is included at the end of this section. Field staff should complete most of the form in the forest ensuring that species, tree reference number, tree length and the four diameter measurement are entered.

3.14 In the office, district staff should enter the species code number and calculate the tree volume. A set of ready reckoner tables have been distributed by the FMSC to simplify the calculation.

3.15 The distribution of the forms is:

- 1 copies to the permit holder
- 1 Copy retained by the DFO
- 1 copy to be forwarded to the office of the RFO.
- 1 copy to FMSC

3.16 The concessionaire is required to pay a proportion of the estimated royalty prior to the commencement of logging operations. The amount paid will determine the number of trees that can be removed initially. A positive cash balance must be maintained at all times with respect to the royalty account of each contractor.. For the initial payment the calculation can be amde on the basis of the mean tree volumes.

3.17 Following felling and the collection of the TIFs over the course of the month, a check can be made of the actual and the assumed volumes and the royalty account modified accordingly.

3.18 **Log Information Forms (LIF).** The introduction of the TIF has removed the need for the LIF to be completed by the Forest Service. However the form, in a slightly modified format, is still to be used in the approval process; the emphasis for its completion falling to the contractor in order that the log conveyance form can be released. The purpose of the LIF is to ensure that all logs after cross cutting are numbered and to provide the link between the tree information on the TIF and the conveyance certificate. Use of the form also provides an indication of the performance of the contractor with respect to waste.

3.19 After cross-cutting into logs, the contractor should measure the butt diameters for each log (two measurements at right angles at each end) and record the total log length. The correct tree number should be shown against each log .

3.20 The district staff should complete column 1 (TIF number) and column 13 (log volume). The latter is derived from a summation of the individual log volumes for each tree. At this time the DFO should check the log volumes against the information he is holding for the tree volumes (taken from the TIFs). In all cases the total log volume should be just less than the total tree volume, but the difference

should not be more than 20%. If a contractor regularly submits LIFs which indicate differences greater than this then it indicates wasteful practices with too much material being left in the forest. A field inspection to determine the problem is then needed.

3.21 The distribution of copies of the forms are as follows:-

Original copy	RFO
Duplicate copy	Applicant's copy
Triplicate copy	DFO
4th copy	TO's copy (retained in the book)

The Regional Forest Office will capture the data on the LIF and make it available to FMSC, HQ and other sectors.

3.22 **Log Conveyance Certificate.** A certificate of conveyance is needed to transport logs, lumber, charcoal, fuelwood or canoe timber anywhere. The certificate is issued by the DFO or his representative following post-logging inspection or in the case of a TUC after the LIF has been properly completed by the contractor. An example of the Conveyance Certificate is attached. The function of the Conveyance Certificate is to inform concerned officials including FPIB that the logs being conveyed out of the forest are legal.

3.23 The permit holder is provided with 2 copies of the Conveyance Certificate, one of which is handed over to TIDB<sup>16</sup> in exchange for the Log Measurement Certificate (LMC). The other copy is stamped by the TIDB and temporarily held by the contractor. The contractor sends these copies of the LMCs to the DFO at the end of each month, so that a check can be made that all the trees felled can be properly accounted for.

3.24 The distribution of the Conveyance Certificates is as follows:-

Original Copy	FMSC
Duplicate copy	TIDB (FPIB) copy through the applicant
Triplicate copy	Applicant's copy to be returned to DFO and then to RFO
4th copy	DFO copy

FMSC will analyse the conveyance certificate data and make the information available to other concerned parties.

3.25 **Log Measurement Certificate.** This final certificate is issued by TIDB (FPIB) against a properly completed Log Conveyance Certificate. The LMC should not be issued without such documentation. The location of the TIDB check points close to industrial areas and main towns mean that most log trucks can be stopped and inspected.

3.26 The present FPIB has a series of roles, one of which is to ensure that all logs going into the mills have been fully documented by the Forest Service and that a running record is maintained of the number of logs extracted against a particular contract. The Bureau is therefore providing a monitoring function and attempting to ensure that a particular contractor has not been over-cutting his allocation of individual commercial species.

3.27 A re-assessment of the structure and functions of the present FPIB into its new structure as the TIDB is expected in the near future and it is possible that the present LMC system will be removed or amended.

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<sup>16</sup> Timber Industry Development Board is expected to be formed from FPIB and TEDB. The role of the TIDB in the inspection of logs and the issuing of LMCs may be amended from current practice.

**Manual of Operations - Controlled Timber Production Off-Reserve**

**F4. Timber Harvesting Procedures**

**APPENDIX F4 - FORMS**

**1. Pre-felling Inspection Form CO2**

**2. Felling Permit Form CO3**

**For:**

**Tree Information Form (TIF)**

**Log Information Form (LIF)**

**Conveyance Certificate**

**refer Appendix C4**

**FOREST SERVICE**

**PRE-FELLING INSPECTION OF TREES OFF-RESERVE**

Applicant .....

Contract Ref. No. .... Property Mark .....

OR Chainsaw Owner registration no. ....

Location ..... Locality Mark .....

**SUMMARY OF TREES INPECTED FOR FELLING DURING PRE-FELLING INSPECTION**

Tree Numbers	Stool	District Assembly	Unit Committee

Reference Numbers of attached Inspection Forms .....

**INSPECTION CARRIED OUT BY:**

FS Representative .....

Unit Committee Representative .....

Applicant's Agent .....

Other Team Members .....

INSPECTION DATE .....

Inspection Fee ..... cedis                      Receipt No. ....

Fee is to cover FS administrative costs; applicants to provide logistic support to inspection team directly.

**THIS IS NOT A PERMIT TO FELL TREES OR A CONVEYANCE CERTIFICATE**

**FOREST SERVICE**

**FELLING PERMIT TO FELL TREES OFF RESERVE**

Applicant ----- Registration No. -----

Machine Operator ----- Machine No. -----

Chainsaw Operator Registration No. -----

Pre-felling Inspection ref. No. -----

Purpose of the permit -----

Contract No. -----

Location -----

Forest District -----

**SUMMARY OF TREES AUTHORISED TO FELL ON PERMIT**

Tree Numbers	Stool (landowner)	Community Unit Committee	District Assembly
Total number of trees			

Ref numbers of attached forms -----

(detailing each tree authorised to fell)

Royalty/deposit paid ----- Cedis Receipt No. -----

Other fee ----- Cedis Receipt No. -----

**THE TREES DESCRIBED ON THE PERMIT HAVE BEEN INSPECTED BY THE FOREST SERVICE AND COMMUNITY REPRESENTATIVES AND APPROVAL FOR FELLING IS HEREBY GRANTED**

Issued by ----- Reference No. -----

Date issued ----- Date permit expires -----

Date permit collected by the Forest Service from the operator -----

## **SECTION 5 RECORDS, REPORTING AND AUDITING PROCEDURES**

### **Manual of Procedures - Controlled Timber Production Off-Reserve**

#### **F5. Records, Reporting Procedures**

##### **Instruction Sheet F 5.1 Records and Reporting Procedures**

### **1. Introduction**

1.1 The standard of record keeping has not always been maintained at an acceptable level, and the process of payment of royalties to the land owners has been poorly administered. In order for the Forest Service to fulfil its management responsibilities, the standard of record keeping must be brought up to high, common standard throughout the country.

1.3 This instruction sheet will detail the type of forms and information to be collected and stored at each level of relevance to the off-reserve situation, though there is some overlap with the on-reserve (MoP Section C).

### **2. The District Forest Office**

2.1 The DFO is responsible for ensuring that field data on tree felling are properly documented and a full set of ledgers are maintained to record all financial transactions.

2.2 The following registers are required at the district office:-

Annual Coupe (off-reserve) Register  
Felling Register  
TIF Register  
LIF Register  
Log Conveyance Certificate Register.

and the following ledgers:-

Yield and Revenue Ledger(forest reserves)

Yield and Revenue Ledger (off-reserve)  
 Statement of Accounts (contractors)  
 Revenue Disbursement

Annual Coupe Register

2.3 Off-reserve an annual coupe register is maintained, this being analogous to the Compartment Register for on reserve.

<b>ANNUAL COUPE REGISTER</b>	
Lease /TUC No. ....	Coupe ref. ....
Stool Land .....	District Assembly .....
Contractor .....	Property Mark .....
.....	

together with a summary of the trees removed

**FELLING RECORDS**

SUMMARY OF APPROVED YIELD		SUMMARY OF REMOVALS	RESIDUAL
SPECIES	QUANTITY	QUANTITY	QUANTITY

Felling Register

To be used for both on and off-reserve

**Felling Register**

Coupe Reference No..... Date Yield Approved .....

Date of Entry ..... Expected Completion Date .....

Yield Species	FD No.	Dbh (cm)	Date Felled	Date Billed	Remarks

#### District Timber Revenue Returns

2.4 Returns should be prepared on a monthly basis for each TUC, indicating:-

- number of trees approved for felling
- number of trees felled
- volume of trees felled
- expected royalty
- actual royalty collected
- balance of trees to be felled (from the approved yield)

2.5 A copy of these returns should be maintained and filed for each TUC in order to maintain a running record of income received and outstanding revenue due. Officials of the District Assembly and relevant stool would be entitled to examine such records to ensure that all revenue being earned on their land is being properly collected.

<b>DISTRICT TIMBER REVENUE RETURNS</b> <b>District</b> <b>Region</b>								
<b>Month/year</b>								
Contractor or Compt	TUC	No. of trees approved bal B/F	No. of trees felled in month	Total volume m3	Royalty B/F cedis	Payments cedis	Balance cedis	Remarks

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**3. The Regional Forest Office**

3.1 The Regional Forest Office should prepare a monthly summary of timber revenue for all districts within the region based on the district returns. On-reserve returns should be kept separate from those relating to off-reserve.

Monthly District Billings

2.10 The DFO is responsible for the preparation of monthly bills for all contractors indicating the trees removed and the corresponding amount of royalty to be paid

**Monthly Billing Statement for TUC Ref: .....**

To: . ..... From : .....  
 ..... .....

Date	Particulars	Debit	Credit

Re-scheduled Debts:

Previous Balance .....  
 Payment Received .....  
 Balance Outstanding .....

TIF /LIF Database

3.2 The Regional Offices are currently maintaining a database of the LIFs collected throughout their region . With the introduction of the TIF forms, the regional offices will also be maintaining a database on the TIFs as well.. Maintenance of this data allows the RFO to generate the following summaries:-

<b>REGIONAL SUMMARY OF TIMBER HARVESTING AND REVENUE</b>								
<b>Region .....</b>			<b>Month/year .....</b>					
<b>District</b>	<b>TUC</b>	<b>No. of trees approved bal B/F</b>	<b>No. of trees felled during month</b>	<b>Total volume m3</b>	<b>Royalty B/F cedis</b>	<b>Actual received cedis</b>	<b>Balance C/F cedis</b>	<b>Remarks</b>

- Volume extracted by species by annual coupes
- Proportion of volume extracted compared to approved yield
- Royalty collected by TUCs for each district
- Royalty collected by TUC holders/property marks.