



THE REPUBLIC OF UGANDA

FORESTRY DEPARTMENT

**DEPARTMENTAL STANDING
ORDERS (DSO)
1997 EDITION**

*Revised under the auspices of the EC Financed Natural Forest Management and
Conservation Project*

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ACKNOWLEDGEMENTS AND FOREWORD

This 1997 edition of Departmental Standing Orders (DSOs) replaces the 1970 edition which, unfortunately, has not only been well overdue for revision, but it also has been out of print. Consequently, many staff members have never seen DSOs. The revision was initiated and supervised by M/s Kamugisha, JR and Tony Finch of the Natural Forest Management and Conservation Project, financed by the European Union which also financed the revision. The Department is very grateful for this assistance. I thank the two for the vision, editing and work well done. The revision has been carried out by M/s Isaac Kapalaga, Forest Officer and Martin Rukuba, formerly Chief Conservator of Forests. I should also acknowledge the contributions by M/s Mupada, E., Kiwuso, P. of FORI, Mubiru, G. and Elungat, D. Ms. J. Mbogga did a splendid work in word processing the several versions.

DSOs have been used in the Department for about 40 years. Experience has shown that they are necessary for recording information required for planning purposes and for attracting investment in a long term activity like forestry. All staff have in the past found DSOs to be useful, more especially those who have no access to required information. Now that we have DSOs, I expect staff to carry out their administrative and technical duties much faster and produce results within the stipulated period. I expect, therefore, to receive full reports and returns described in the DSOs, starting with the financial year (1996/97).

Because of the general shortage of funds, many forestry activities have been dormant for many years. Staff should, therefore, read through the DSOs to familiarise themselves with the various techniques and administrative procedures and to note where these are located in the DSOs so that they can be referred to when required. DSOs will be held personally by all Rangers and Assistant Forestry Officers. When transferred to another station they will take their own personal copy of the DSO with them. Officers above these ranks will keep office copies, which will be available to their assistants and others. These office copies will remain in the office to which they were issued and will not be taken away by the incumbents when they are transferred.

Some of the sections are instructions which must be carried out as stipulated. However, there are many sections which are only guidelines and staff are at liberty to use their own judgement in reaching decisions. Proposals for amendments will come from either HQ or from field staff. Amendments will be sent out from time to time and must be entered promptly. If it is a short amendment, the correction may be made in the page, but if it is a long one, a note should be made in the margin to refer to the actual amendment which will be filed at the front. If the amendment takes more than three-quarters of a full page, then the whole page will be replaced.

The DSOs are expensive to produce. Officers must, therefore, ensure that their own copy and those of their staff are kept safely and up-to-date.

E.D. Olet
Commissioner for Forestry
Forestry Department, Nakawa
August, 1997

INTRODUCTION

This edition of the DSOs has incorporated amendments and changes in forestry practices since the last revision in 1970. The changes and additional materials included are explained below:

Use of the term “Forestry”: It was decided by CFF and FD senior staff that “Forestry” will now be used instead of “Forest”, e.g. Forestry Department, Forestry Policy, etc.

Numbering of Sections: The sections are numbered in roman numerals, i.e. Section I-V, while sub-sections have been numbered in Arabic numerals with the first figure representing the section (in Arabic numeral), the first decimal representing the subsection and the rest are paragraph numbers e.g. 5.3 Management Plans which is a sub-section of Section V. Its first paragraph is numbered 5.3.1.

Abbreviations have been transferred from App. V.1 to the front pages of this edition. Abbreviations for weights and measures have been left out as they are quite familiar in FD. Some designations not in use currently have been retained because they will be encountered in some publications, old correspondences and in legislations, e.g. CCF (Chief Conservator of Forests).

Section I was not included in the 1970 edition. This section contains salient features of forestry policy (App.I.1 is the current policy), legislation (formerly under section V) and departmental organisation.

Section II is a combination of the old section II (staff) and (III) Group Employees). All personnel matters including senior staff and forest workers are included here. Most of the section is based on the Government Standing Orders (GSOs) on staff matters. Note that Forest Guards (FGs) and former group employees are now called support staff, but FD recognises the traditional status of FGs as supervisors.

Section III deals with stores, equipment and vehicles and is the old Section IV. Some new instructions have been added.

Section IV is the old section V with title changed to Forestry Administration. Legislation has been transferred to Section I, survey, mapping and aerial photography to Section V. Arrangement for FD estimates have been revised in the text and in App. IVA. The format for quarterly and annual reports has been revised extensively to ensure that important matters are not excluded from these reports. The Annual Report (AR) will be accompanied by 17 tables shown in App.IV.16. Some of these tables will accompany quarterly reports and be used for records and returns described in Section IV, e.g. expenditure, revenue, timber harvesting returns, etc.

Section V (formerly Section VI). There are many changes in this technical section. Revisions included termite control, survey and mapping, NHF Permanent Sample Plots and controlled burning in savanna reserves. New sub-sections are on resource assessments, conservation, environment impact assessment, collaborative forest management and environmental education. Note paragraph 5.8.23 where Alder and Synnott are quoted on the need for establishing PSP in Nature Reserves. FD should do so and persuade UWA to do the same.

The use of arboricides and charcoal burning as techniques in the refining of NHF have been left out of the DSO as FD has stopped using the techniques. Should it be necessary to reintroduce them in the future, FD can refer to the references shown in App. V.6.

Appendices. In the 1970 edition appendices followed the respective section but in this DSO edition, they have all been put together at the end of Section V. The appendices are numbered in Arabic numerals

following section number (Roman numeral). Where the appendices refer to a related subject a letter is used to separate them e.g. App.III.4A, III.4B. Some of the appendices are on standard FD forms whose number is also on the appendix. In most cases, the relevant paragraph in the text is also shown e.g. App. IV.91, FD Form 3, DSO 4.7.9.

Appendix IV.2: FD forms have been reviewed extensively to indicate method of reproduction in the future and some forms are no longer needed. The reason for some of the changes is to economise on printing costs.

ACRONYMS

ACF	Assistant Commissioner for Forestry
ACAO	Assistant Chief Administrative Officer
AFO	Assistant Forest Officer
aod (l)	absent on duty (leave)
AP	Aerial Photograph
AR	Annual Report
asap	as soon as possible
AWP	Annual Works Programme
CAO	Chief Administrative Officer
ACR	Annual Confidential Report
BOU	Bank of Uganda
CCF	Chief Conservator of Forests
CO	Charge Officer (FD)
Cpt.	Compartment
CFI	Commonwealth Forestry Institute
CFA	Commonwealth Forestry Association
CFF	Commissioner for Forestry
CFR	Central Forest Reserve
dbh	diameter at breast height
DAO	District Agricultural Officer
DC	District Council
DCFF	Deputy Commissioner for Forestry
DFO	District Forestry Officer
DSO	Departmental Standing Orders
DWt	Departmental Warrant
DS	Diagnostic Sampling
EI	Establishment Instruction
EN	Establishment Notice
EAAFRO	East African Agricultural and Forestry Research Organisation (abolished)
FD	Forestry Department
eta(d)	estimated time of arrival (departure)
FORI	Forestry Research Institute (of Uganda)
F.Ent.	Forest Entomologist
FFW	Forest Field Work
FAO	Food and Agriculture Organisation
FG	Forest Guard
fi(fyi)	for information (for your information)
FM	Forestry Manual
FO	Forestry Officer
FR	Forest Ranger
FRP	Forestry Rehabilitation Project
FRV	Forest Reserve
GP	Government Printer
GSO	Government Standing Orders
HO	Head Office (Forest Department) changed to HQ
HQ	FD Headquarters
ICRAF	International Council for Research in Agroforestry
i/c	in charge
IMS	Industry and Marketing Section

IFS	Information Filing System
ITU	Indigenous Trees of Uganda
Int. T.U.	Introduced Trees of Uganda
LG	Local Government
LD	Leading Desirable
LFR	Local Forest Reserve
LPO	Local Purchase Order
MFP	Minor Forest Products
MC	Management Circle
MP	Management Plan
MPA	Management Plan Area
MPR	Management Plan Record
MPS	Management Plan Section
MoW	Ministry of Works
N/A	Not Available
NARO	National Agricultural Research Organisation
NFC	Nyabyeya Forestry College
NHF	Natural High Forest
no.	number
noo	not on original
NEMA	National Environment Management Authority
NP	National Park
NRM	National Resistance Movement
NRV	Nature Reserve
OFI	Oxford Forestry Institute
PF(C/PF)	Personal File (Confidential PF)
P/NFC	Principal Nyabyeya Forestry College
PRES	Public Relations and Extension Section
PRO	Public Relations Officer
PS	Permanent Secretary
PSC	Public Service Commission
PSP	Permanent Sample Plot
SAFO	Senior Assistant Forestry Officer
SAR	Staff Appraisal Report
SI	Statutory Instrument
SNR	Strict Nature Reserve
sph	stems per hectare
SRP	Silvicultural Research Plan
TAI	Treasury Accounting Instructions
THF	Tropical High Forest
TOA	Treasury Officer of Accounts
TSP	Temporary Sample Plot
UCB	Uganda Commercial Bank
UEB	Uganda Electricity Board
UPDF	Uganda Peoples Defence Force
UPTC	Uganda Posts and Telecommunications Corporation
URC	Uganda Railways Corporation
UWA	Uganda Wildlife Authority
WB	World Bank

S E C T I O N I

FORESTRY POLICY, LEGISLATION AND DEPARTMENTAL ORGANISATION

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Section 1

Forestry Policy, Legislation and Departmental Organisation

1.1 GENERAL

1.1.1. DSOs are orders which must be followed by all staff. However, there are many sections of the DSOs where staff may use their discretion. DSOs may require amendments from time to time arising from either practical experience on a wide scale, or from special studies, or from research findings. Proposals for such amendments will be submitted to CFF for his approval.

1.2 FORESTRY POLICY

1.2.1. The Forestry Department is a Government Department charged with the following broad functions:

- * The protection and management of forest reserves (forest estate), control of harvesting of trees on public land (unalienated land), and advise on sound management of private forests.
- * To carry out extension service and collaborate with the local communities.

1.2.2. In carrying out its responsibilities, the FD is guided by a Government declared Forestry Policy. However, FD is expected to carry out its responsibilities whether or not a formal policy exists.

1.2.3. Forestry Policies have been declared by Government since the establishment of FD nearly a century ago. The latest policy was gazetted by the then Minister of Environment Protection on 12 October, 1987 and published in the Uganda Gazette, Vol. LXXXI No. 2 on 15 January, 1988 (Appendix I.1).

1.3 OTHER GOVERNMENT PLANS AND DIRECTIVES

From time to time, Government may issue plans or directives which will affect forestry e.g. degazetting of FRs, Uganda's Development Plans, Annual Budget Proposals, policies on Privatisation, Environment, Land and Water, Wildlife, Agricultural Research, Decentralisation, etc. These policies and directives have to be implemented together with the forestry policy.

1.4 IMPLEMENTATION OF THE FORESTRY POLICY

In implementing the forestry policy, five broad lines of approach will be followed, viz:- reservation and protection, management, conservation, research and extension.

1.5 RESERVATION AND PROTECTION

1.5.1. Because of Uganda's dependence on agriculture, the continuing increase of population and the rapid expansion of industrialisation, it is necessary to limit the size of the forest estate to the minimum area which will achieve the objectives set out in the forestry policy.

1.5.2. It is, therefore, necessary to protect the existing estate, to resist further excisions as much as possible and if opportunity arises for further reservation, especially for conservation purposes, such opportunity should be taken. The estate (including Kibale, Semliki and Mt. Elgon National Parks), of approx. 1,458,895 ha or 7% of the total land and swamp area, is considered adequate to achieve the policy objectives (1997) provided funds are made available and that efficient management practices are applied.

1.5.3. Protection will cover the acts described in Section 14 of the Forests Act and Rules thereof.

1.6 MANAGEMENT FOR PRODUCTION

1.6.1. Management of the forest estate will use the sustained yield principle and will aim at sustainable production of wood from natural high forests (NHF) and plantations. Products will be as defined under the Forests Act.

1.6.2. Efficient methods will be applied in harvesting and converting wood with the aim of producing wood for the highest value products e.g. the remaining NHF should be managed to produce high grade veneer, plywood, parquet flooring and sawnwood. Pruned logs from plantations should go for plywood. Non-timber products will also be harvested and marketed.

1.6.3. Harvesting from public land and savanna woodlands may not be on a sustained yield, but there must be high efficiency in harvesting and processing. Valuable trees e.g. Mvule, Mahogany, Musizi, Muwafu should go for veneer logs and high grade sawnwood.

1.6.4. Uganda should be able to produce most of its needs of forest products and for export of pulp, paper, plywood, veneer, other panel products and sawnwood. The country has adequate forest land, trained manpower, suitable soil, climate and techniques in forest management and conservation are well established.

1.7 CONSERVATION AND RECREATION

1.7.1. Previous forest policies included environmental conservation. However, there is much more environmental concern the world over than was the case say twenty years ago. The State of the Environment Report for Uganda, published by the Ministry of Natural Resources, National Environment Information Centre in 1994 states as follows:

“For its size, Uganda has extremely rich and diverse forests and wildlife. Uganda is among six African countries regarded as internationally important for biodiversity with species and habitats ranging from dry savanna/semi-desert type to those of temperate conditions in the mountain areas higher than 3000 m above sea level. Seven of the mainland Africa's 18 bio-geographic regions are found in Uganda, more than in any other country”.

1.7.2. FD is, therefore, expected to carry out forest management and the production of forest products combined with the protection of water and soil resources and the conservation of biodiversity and gene pool resources.

1.7.3. Recreation in the form of eco-tourism, picnicking and fishing shall be encouraged and supported.

1.8 RESEARCH

1.8.1. It is part of the function of FD to commission research to produce more appropriate techniques and technologies required to support more efficient protection and management of forests, environmental conservation, harvesting and utilisation of forest products.

1.8.2. Forestry research is now expected to be carried out by the Forestry Research Institute (FORI) of the National Agricultural Research Organisation (NARO). FORI will carry out research in consultation with FD and it is the responsibility of FD to ensure that appropriate priorities are included in all research programmes.

1.9 FORESTRY EXTENSION

1.9.1. Presently, there is much awareness in Uganda about the importance and value of forests, trees and forest products. It is the responsibility of FD at all levels to ensure that this awareness is maintained, and where possible, increased. FD shall try to reach, advise and assist as many target groups as possible. Local authorities are important and useful focal points for forestry extension.

1.9.2. Extension service shall cover all aspects of forestry including harvesting and conversion methods, selection, installation and operation of forest industrial machinery and equipment.

1.9.3. The FD will seek formal mechanisms at all levels in its organisation for pursuing consultative actions within and outside the department. In particular, linkages shall be forged with the Unified Agricultural Extension (UAE) programme of the ministry responsible for agriculture.

1.10 LEGISLATION

1.10.1. The Uganda Constitution: Article 237(1) and (2) are of importance to forestry in particular and natural resources in general. It is quoted below:

“237. (1) Land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with the land tenure system provided for in this Constitution.

(2) Notwithstanding Clause (1) of this article—

(a) The Government or a local government may, subject to article 26 of this Constitution, acquire land in the public interest; and the conditions governing such acquisition shall be as prescribed by Parliament; and

(b) The Government or a local government as determined by Parliament by law, shall hold in trust for the people and protect natural lakes, rivers, wetlands, forest reserves, game reserves, national parks and any land to be reserved for ecological and touristic purposes for the common good of all citizens.

1.10.2. Legislation exists which supports the forestry policy, forest protection and trade in forest products. These Laws and Regulations are described in App.I.2. There are other laws which affect forestry including:

1.10.3. The Forests Act: is an enabling law for forestry, was last revised in 1964 when the name was changed from Forests Ordinance. It is now Chapter 246 (Cap.246) of the Laws of Uganda. Since then, there have been several important revisions and additions to the legislation.

1.10.4. The Statutory Instrument (SI) 1970 No. 121: “The Weights and Measures Order” prohibits the use of imperial measures e.g. timber sizes, lengths and diameters of poles.

1.10.5. Compensation for Offences (Compounding): Section 28 of the Act contains the authority for DFOs to accept compensation for offences as a way of avoiding time-consuming court proceedings.

1.10.6. Free Issues: People exempted from paying forest fees are set out in the Third Schedule to the Forests Rules. Note that the privilege of taking free forest produce is NOT extended to reserved species or plantation fuel, poles or timber. If the privilege of taking free forest produce is abused to the detriment of the forest, then an area may be closed under Rule 13 of the Forests Rules, although of course, every effort should be made to find an alternative area for the exercise of this privilege. Free issues are only made where the produce is not for sale (Rule 12). If it is sold, then the forest fees shall be paid.

1.10.7. Forest Officers Appointed Court Prosecutors. As quoted below, all FOs are court prosecutors:

“IN EXERCISE of powers conferred upon me by Section 255 of the Magistrates Courts Act 1970, I HEREBY APPOINT generally the following persons to be PUBLIC PROSECUTORS in any Magistrates court within Uganda, for the purpose of prosecuting offences under the Forests Act.

OFFICERS OF THE RANK OF FOREST OFFICER AND ABOVE

Dated at Kampala this 5th day of October, 1983.”

1.10.8. Charge Officers shall keep their copy of the Forests Act and amending Statutory Instruments in a separate (Forest Legislation) binder. They shall be kept constantly up to date, and where applicable, amended information copied into the Reserve Register.

1.10.9. The Mining Act (Cap.248): allows the holder of a prospecting licence the privilege of taking unreserved forest produce free of charge outside Forest Reserve or village forest (Section 33(b)). The CFF shall regulate this where the clearing of trees might adversely affect the environment. Also the privilege has been modified by the Third Schedule of the Rules made under the Forests Act, where the holder of a prospecting licence is restricted to Class III and IV trees of unreserved species. He/she shall also take bush fuel for his own domestic use.

1.10.10. When a person is mining a location he no longer enjoys the privilege of free forest produce but is liable to forest fees where applicable. Note that Sec. 45 of the Mining Act gives him/her the right

to trees on his location i.e. whether or not the trees are reserved species, but he/she shall pay the fees that are due.

1.10.11. The Public Lands Act: is Act No. 13 of 1969: DFO's must be familiar with this and its amendments. This Act will almost certainly be replaced by Parliament in 1997. Amendment of this paragraph will be circulated. The points below should in particular be noted:

- * All public land, including Forest Reserves, is vested in the Uganda Land Commission (ULC). However, Section 48 of the Act states that nothing in the Act shall affect the law relating to forestry as it affects public land. This implies that gazetted reserves may not be leased, so de-gazetting is necessary before lease by the Land Commission;
- * Before reservation and once local agreement has been reached on the reserving of a particular area, then details with a map, should be sent to CFF for approval by ULC;
- * Where a degazetted forest reserve is taken over by another Government Department no compensation is payable, so plantation trees on the land should be felled and sold; and
- * Section 26 of the Act states that public land granted in freehold or lease becomes the property of the person to whom the grant is made, **but that person must pay for reserved trees before his title can be registered.** This payment will be made to the Ministry of Housing and Physical Planning (generally the local officer of the Lands and Surveys Dept.) as agreed in CFF's letter 646 of 23.1.68 to Commissioner of Lands and Surveys.

1.10.12. Other legislation affecting forestry include those establishing NEMA, UWA, NARO, Decentralisation and the Local Government Act. DFOs should be familiar with these laws and rules thereof.

1.11 RELATIONSHIP WITH LOCAL COUNCILS (LCs)

1.11.1. Local Councils have been established in all the districts of Uganda, covering villages (LC 1), parishes (LC2), sub-counties (LC3), counties and municipalities (LC4) and at district level (LC5). These LCs have administrative, legal, financial and political powers conferred on them by Parliament through the Local Government Act and the Government's Decentralisation Policy. Most services and responsibilities which used to be controlled by the Central Government have been devolved to LCs. Forestry is one of the exceptions. Please note that some small FRs have reverted to the "Local Forest Reserve" status as prescribed under the Forests Act.

1.11.2. Although forestry is not decentralised, LCs are so important and useful that FD staff should make full use of and co-operate with them especially in forest protection, harvesting on public land and forestry extension.

1.12 FORESTRY DEPARTMENT ORGANISATION

1.12.1. Most forestry officers work in remote areas in isolation from their colleagues. The responsibilities placed on most officers are extremely important. They include the protection of forests, collection of revenue, environmental protection, staff training and discipline, research, use and maintenance of vehicles and equipment, etc. Staff, therefore, are expected to be well trained, dedicated, disciplined, motivated, honest and transparent.

1.12.2. Accordingly, the Commissioner for Forestry (CFF) will select and post staff to fit into the responsibility to be covered. CFF will organise the FD to ensure that the objectives set out in the forestry policy and its implementation are achieved in the most efficient manner and at a high standard.

1.12.3. Presently (1997), the Department is headed by the CFF assisted by a Deputy Commissioner (DCFF) and three Assistant Commissioners for Forestry (ACF). There are three divisions, viz:

The Resources Management and Extension Division
The Forest Industries and Marketing Division
The Planning, Administration and Training Division

1.12.4. The Departmental Organisational Chart is shown in Appendix I.3.

SECTION II

PERSONNEL MANAGEMENT

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Section II

Personnel Management

2.1 GENERAL

This Section covers all personnel in the Department including support staff i.e (Forest Guards previously covered in Section II of the 1970 DSOs, Group Employees covered in Section III of the 1970 DSO Edition). The section also covers appointments, staff training and salary scales.

2.2 SUPPORT STAFF

Circular Standing Instruction (CSI) No. 9 of 1994 abolished the Group Employee Scheme and introduced a new cadre of support staff. Effective 1st July 1995, support staff were integrated into the mainstream civil service on permanent and pensionable terms.

The basis of this sub-section is the GSO Chapter on Support Staff. The GSO has been quoted at some length because not all officers who hold DSO may have GSO. Some extracts from GSO have an explanation of their meaning in FD terms following them.

It is of the greatest importance that the GSO regulations are strictly adhered to.

2.2.1. Definitions

2.2.1.1. All the definitions in this paragraph are from GSO II.

2.2.1.2. **Responsible Permanent Secretary** means the PS of the ministry for the time being responsible for the Public Service.

2.2.1.3. **Regular Employee** means a Support Staff who has satisfactorily completed a qualifying period of probationary employment for twelve months and has been declared by his Responsible Officer to be a Regular Employee.

2.2.1.4. **Probationary Employee** means a Support Staff who has completed a one hundred and eighty three days' qualifying period of service with Government and has been declared by his Responsible Officer to be a Probationary Employee.

2.2.1.5. **Casual Employee** means any other Support Staff.

2.2.1.6. **Qualifying period** means a period of continuous employment with Government and includes Sundays and Public Holidays which fall therein. Periods of absence because of sickness cannot count as part of the qualifying period but paid sick leave will not in itself cancel previous continuous service.

2.2.1.7. **Probationary employment** means employment with Government as a Probationary employee.

2.2.1.8. Breaks in Service have the following effects:-

- (a) a break of two years shall exclude all previous service;
- (b) if at any date the breaks in service aggregate five years, all service prior to that date shall be excluded;
- (c) short periods of work of less than six months will be excluded if preceded and followed by periods during which the employee was not in the service of the Government, both of which exceed the short period of service.

2.2.1.9. Working Day means 8 working hours in a period of 24 hours.

2.2.1.10. Task means in any one day six times the amount of work an average man can accomplish in one hour during which he works normally under direct supervision and without interruption.

2.2.1.11. Overtime means any period of time worked in excess of 8 hours on a working day.

2.2.1.12. Weekly rest means 24 continuous hours free from work.

2.2.1.13. Effective date except where otherwise stated, means the effective date of these revised conditions as printed at the foot of each page.

2.2.1.14. Child for the purposes of this Chapter means a person who:-

- * has not reached his or her 16th birthday;
- * is unmarried;
- * is not gainfully occupied; and
- * is the child of the officer or legally adopted by him.

For the purposes of this Chapter of Standing Orders:-

2.2.1.15. The Public Service means service in a civil capacity of the Government of Uganda;

2.2.1.16. Support Staff means a person who is an employee of the Government of Uganda and who is employed on the terms and conditions of service prescribed by Chapter 2 of GSO.

2.2.2. Appointments

All appointments of support staff are in line with Public Service Commission Regulations and Procedures, and the probationary period is one year.

2.2.3. Terms and Conditions of Service

Support staff are governed by Chapter 2 of the GSO which has been duly revised spelling out their new terms and conditions of service.

2.2.4. Entry Points

Scale USS3

- * O' Level certificate holder will enter the scale at the 4th segment from the bottom;
- * Secondary Education holders (Senior 1 to 4 without O' Level Certificate) will enter the scale at the 2nd segment from the bottom;
- * Primary Leaving Certificate Holders (PLE) will enter the scale at the bottom.

Scale USS2

All support staff appointed in this scale will start at the bottom.

Scale USS1

The arrangement here will be as in USS2.

2.2.5. Termination of Service: Termination of services of Support Staff is at the discretion of the PSC. (From GSO II A - a:).

- * Except in cases of dismissal for disciplinary reasons, the employment of Support Staff may be terminated as follows:
 - regular employees by giving 30 consecutive days' notice in writing;
 - probationary employees by giving 14 consecutive days' notice in writing; and
 - casual employees at the close of any working day without notice.

For avoidance of doubt consecutive days' notice includes Sundays and Public Holidays which fall therein and shall exclude the day of service but include day of discharge.

- * At the absolute discretion of Government and subject always to paragraph 2.2.5.2(a) above, the employment of the following Support Staff may be terminated at the close of any working day by Government paying wages in lieu of notice as follows:
 - a regular employee by paying him 26 days' pay; and
 - a probationary employee by paying him 12 days' pay.
- * Notice will run concurrently with any leave to which a Support Staff might be entitled on the date of ceasing work.
- * Paragraphs b and c above will not apply in cases of dismissal.
- * Support Staff, who under paragraph b above, are eligible in certain circumstances for notice when their employment is terminated by Government, are expected to give similar notice when leaving the service voluntarily, rather than merely walking out on the Government.

2.2.6. Pay

2.2.6.1. Rates of pay as at 1st July 1996 are set out in Appendix II.1. The salaries of Support Staff shall be paid in arrears at monthly intervals. A casual employee whose employment is determined by the employing officer will be paid any wages up to and including the day the employee stops work. The rates of wages laid down for payment to Support Staff, with the exception of night watch men, are based on a working day”.

2.2.6.2. Deductions from pay for disciplinary reasons are dealt with in para 19 of GSO. All other deductions from pay must be shown on the pay roll e.g. union dues, Development tax etc.

2.2.6.3. Employees shall sign the pay sheet or make a thumb mark, when they have received their pay.

2.2.7. Hours of Work

2.2.7.1. The working day is an 8 hour day (see Definitions, 2.2.1).

2.2.7.2. The working hours of night watchmen shall not exceed 16 hours in any period of 24, and will be paid for all working periods within any one period of 24 hours at the rate of 1½ times their salary rate of pay, and subsection A - c of Chapter 2 does not apply (See Overtime, 7).

2.2.7.3. There are instances where Support Staff work normal office hours which are not as much as a “Working Day” of 8 hours, as laid down in the “definitions” in the Chapter of Standing Orders. This does not mean that all Support Staff are to be made to work 8 hours daily. They can be so required, if necessary.

2.2.7.4. Every Support Staff shall be allowed weekly rest and wherever practicable it shall be on Sundays.

2.2.8. Task Work

2.2.8.1. This will be applicable for forest workers and nursery attendants.

2.2.8.2. From GSO II A-a: “Task work may be allocated when it is necessary to do so, but as a general rule Government discourages this form of labour”.

2.2.8.3. In spite of this the FD has relied heavily on task work. If officers find that the system of tasks is being abused they should rectify it or consider introducing time work (i.e. a full 8 hour day) after consultation with CFF. In this case work shall be adequately supervised.

2.2.8.4 Another unsatisfactory feature of task work is that workers do not stop for a rest and refreshment during the day, with the consequence that they are too tired to maintain good quality work at the end of the day. Forest workers shall be encouraged to have a short break and something to eat in the middle of their tasks.

2.2.9 Overtime (From GSO II - A-c:)

2.2.9.1 Officers authorised by accounting officers for this purpose may approve overtime for Support Staff in their charge only when it is essential for the public interest and Government liability may be discharged by time off in lieu.

2.2.9.2 Where the provisions of paragraph 2.2.9.1 above are not practicable (and excepting drivers and night watchmen), overtime shall be paid at the hourly overtime rate, which is approximately one and a half times the standard rate of pay.

2.2.9.3 When a worker is required to perform duty on the day he is supposed to be resting, the question of overtime should arise only when he works hours in excess of 8 or 5 as the case may be. He must be given time off in lieu of working on a rest period, a rest period is compulsory and cannot be commuted for cash.

2.2.9.4. Any period of overtime is admissible provided it is approved under paragraph 2.2.9.1 above.

2.2.9.5. Drivers will be paid overtime in accordance with the following rules:

- * responsible officers should ensure that drivers are not unnecessarily employed outside normal working hours, and that where possible and practicable drivers should be given time off in lieu of any overtime worked;
- * in those cases where (a) is not practicable, drivers should be paid overtime at the following rates:

<u>Overtime worked</u>	<u>Rate.</u>
0-10 Hours per month	Nil.
11-30 “ “	5 per cent of salary
31-60 “ “	10 per cent of salary
Over 60 Hours per month	20 per cent of salary

2.2.9.6. The arrangements in GSO IIC-a 6 will apply to all grades of drivers of any Government vehicle.

2.2.9.7. This subsection does not apply to night-watchmen.

2.2.9.8. Time off in lieu of overtime should be given wherever possible.

2.2.9.9. Drivers must keep a notebook to record overtime. Every day that overtime is worked must be verified and signed by a responsible officer.

2.2.10. Redundancy (See GSO II A-e:)

2.2.11. Annual Increments

2.2.11.1. It should be noted that all support staff will earn one increment annually on satisfactory performance of their duties.

2.2.11.2. Support staff for FD as at 31/12/96 are:

Office Attendant	}	integrated into the main stream
Driver	}	Civil Service on permanent and
Askaris	}	pensionable terms.
Forest Workers	}	to be employed on Contact
Nursery Attendants	}	terms.

2.2.12. Service Record Cards and Labour Tickets (From GSO II A - b:)

2.2.12.1. A Service Record Card, shall be kept up to date at all times for each Support Staff. It is important that the employing officers should comply with this sub-section. The form of Record Card to be used is set out at Appendix II.4.

2.2.12.2. When appointing support staff, an employing officer shall find out from the employee if he or she has previously worked for the Government elsewhere and if so, the employing officer shall obtain the employee's previous card from the previous employing officer.

2.2.12.3. Every worker shall be issued with a labour ticket at the beginning of each month (UER sec. 21). This ticket belongs to the worker and it is his responsibility to look after and safeguard it. He shall keep it and produce it for marking by the headman under whom he is working at the end of each day's work. If a worker loses his ticket a duplicate should be issued.

2.2.12.4. Before a worker is issued with a labour ticket, the FR, or whoever is in charge shall enter all the details which are asked for on the front of the ticket. If the worker has a Labour Record Card (which must contain all these details) then only the worker's name, personal number, muster roll number, rate of pay and designation need be entered on the labour ticket.

2.2.12.5. If a headman has a permanent gang which never works under anyone else, he/she shall keep a muster roll. In places where a worker may work in more than one gang during the month, then the headman shall write down each day the names of the workers whose tickets he has marked. Where the headmen keep daily lists of the names of the porters who have worked, they shall report with their lists to the FR at the end of each day's work so that the details can be entered by the FR on the muster roll. At other areas where the headman keeps the muster roll, he/she shall retain the muster roll until the workers are paid at the end of the month. The headman who marks the labour tickets will also put his initials in the same space, so that it can be known who has marked the tickets for the day concerned.

2.2.12.6. Tickets and muster rolls or lists shall not be marked until the end of each day's work. All marks on labour tickets and muster rolls shall be made in indelible pencil or ink. No marks will be made just for a man being present, the mark must show whether or not the man has earned a day's pay and this cannot be known until the work has been finished.

2.2.12.7. The following marks shall be used both on labour tickets and on muster rolls:-

P =	Pay due for completing a proper day's work
(P) =	Pay due for Sunday or for a Public Holiday.
SP =	Sick Pay - this is given during sick leave or when off duty due to injury, sustained at work.
LP =	Leave Pay - this is given when a worker is on approved leave
A =	Absent from work.
TU =	Task uncompleted or present but the worker has not completed a proper day's work.

2.2.12.8. At the end of each month and before paying time, the number of days for which pay is due (that is all the days with a mark including the letter "P") shall be written at the bottom of each man's labour ticket together with the total pay he has earned in the month. The figures shown on the labour tickets must agree with those shown on the muster roll. When the workers receive their pay, they shall hand over their labour tickets to the paying officer. The labour tickets shall not be torn up, but returned to the worker.

2.2.13. Leave and Public Holidays (From GSO II B - a:)

2.2.13.1. Support Staff are entitled to public holidays (*see under C - h 1 of GSO I*) on full pay provided the exigencies of the service allow of their absence, and provided the employee works on both the day preceding and the day following the public holiday.

2.2.13.2. Those who, for service reasons shall work on a public holiday shall be paid at two and a half times the ordinary rate of pay for that day.

2.2.13.3. No Support Staff may be granted leave until he has completed six months' employment with Government without a break.

2.2.13.4. Thereafter he/she may be granted leave on full pay at the rates laid down in C-b 2 of GSO I.

2.2.13.5. Leave shall not be accumulated from one calendar year to another. Therefore, charge officers must prepare a leave roster annually.

2.2.13.6. Leave will start on the day following that on which the employee ceases work. No travelling time may be allowed.

2.2.13.7. Leave includes Saturdays, Sundays and Public Holidays if they fall within the leave period.

2.2.13.8. Monthly rates are based on a 22 working day month, excluding Saturdays and Sundays. Because the leave period includes Saturdays, Sundays and Public Holidays, an employee will be paid for those days while on leave. For instance, at the end of a month in which a support staff took his/her 18 days leave, which included 2 Sundays, he/she would be paid his monthly salary plus 2 days pay.

2.2.13.9. The Leave form is shown in Appendix II.3

2.2.13.10. Declared public holidays as at 31/12/96 are listed below, but Government can decide on holidays as it wishes:

New Year's day	1st January
NRM/A day	26th January

Idd el-Fitri day	date changeable
International Women's day	8th March
Good Friday	date changeable
Easter Monday	date changeable
Idd el Adhuha	date changeable
Labour day	1st May
Martyr's day	3rd June
Heroes day	9th June
Independence day	10th October
Christmas day	25th December
Boxing day	26th December

2.2.14 Sick Leave (From GSO II B - c:)

2.2.14.1. Absence from work because of illness or convalescence not exceeding twenty-four working days in any period of twelve months may be granted with full pay to any support staff provided such absence is confirmed by a certificate issued by a Government medical officer covering the whole period of absence, and is not due to the staff own misconduct or negligence.

2.2.14.2. Absence from work because of illness or convalescence in excess of twenty-four working days in any period of twelve months, or because of the employee's own misconduct or own negligence, will be without pay.

2.2.14.3. When a staff is prevented from working because of injury caused by an accident arising out of or, in the course of his or her employment, sick leave in excess of twenty four working days will be granted at half-pay, up to a maximum of ninety-six months. (*See section 9 of Cap 197, 1964 Laws of Uganda*)

2.2.15. Transport Concessions (From, GSO II B - b:)

2.2.15.1. Transport at public expense for the support staff, his or her spouse (one) and his or her children (not more than four) will be provided in accordance with Subsection E-b of Chapter 1 of GSO on termination of employment to the place of engagement;

2.2.15.2. Support Staff will be entitled to the baggage allowance set out in E-r 1 of Chapter 1 of GSO provided the employee qualifies at the same time for a transport concession under para. (a) above.

2.2.15.3. To avoid heavy commitments to transport of staff, forest workers shall be engaged at the work site and live nearby.

2.2.16. Rations

2.2.16.1. Ration Allowance, which is of a salary nature, was subsumed in the consolidated salary package. (See CSI No. 3 of 1996).

2.2.17. Subsistence Allowance (From GSO II C-e:)

2.2.17.1. When a support staff is absent from the station or the permanent base camp in which he or she is working and is travelling on duty, he or she shall be eligible for subsistence allowance in accordance with the appropriate rate as set in Circular Standing Instructions issued from time to time.

2.2.17.2. When a support staff is absent from the station or permanent base camp in which he or she is travelling on duty and returns to his or her permanent working place for the night provided the journey involves 16 kilometres or more in one direction by the most direct route and the employee stays away for a period not below 6 hours, he or she will be eligible for a Day Allowance in accordance with the appropriate rate as set out in Circular Standing Instructions issued from time to time.

2.2.17.3. The above allowances will not apply to salary scale SS3 except in exceptional circumstances where it is proved that employees in these groups cannot be recruited at the site. In using of their judgement, Responsible Officers should bear in mind that it is not intended to encourage migration of labour by paying allowances. Unskilled workers shall normally be recruited at or near the site of work.

2.2.17.4. When a support staff other than in scale SS3 is employed on duties which require him or her to be on safari continuously and it cannot be considered that the employee has a station or base camp of any permanency, the staff will be paid a Bush Allowance at the appropriate rate in accordance with E-j of Chapter 1 of Standing Orders, and not the allowances under para. 1 above.

2.2.18. Disturbance Allowance (From GSO II C - f:)

2.2.18.1. Disturbance allowance will be paid to support staff in scale SS2 to SS1 in exceptional circumstances and where the transfer is (or is deemed likely to be at the time of arranging it) for two months or more. Disturbance allowance is not payable to Scale SS3.

2.2.18.2. A disturbance allowance may be approved when the transfer or posting is in the public interest and not as a result of an employee's own initiative; and the distance between one duty station and the other is not less than 32 kilometres by the most direct route.

2.2.18.3. Disturbance allowance if approved will be equal to one-third of a staff's annual salary and will be payable once on each transfer.

2.2.18.4. Recommendations for disturbance allowance will be addressed by Responsible Officers to the Responsible Permanent Secretary for approval and shall state the reasons for posting.

2.2.18.5. Note that recommendations for disturbance allowances shall be sent to the Permanent Secretary (PS). Field Officers should send them to CFF in the first place, giving all necessary information.

2.2.19. Bicycle Allowances: (From GSO II C - g:)

2.2.19.1. A bicycle allowance may be paid to an employee provided that his or her Responsible Officer is satisfied that it is necessary for the employee to use his or her own bicycle regularly on official duty or for house to office running. This allowance will be paid at a rate indicated in CSI and reviewed by the authorising officer at the end of each financial year.

2.2.19.2. The Responsible Officer may authorise the payment of an allowance additional to that provided for in paragraph (a) above, when the employee in receipt of the allowance is required to perform occasional journeys of a length and type not taken into account in fixing the consolidated allowance.

2.2.19.3. Claims under this section need not be supported by detailed logs, but Responsible Officers will issue directions about the records that are to be kept and by whom, of journeys performed on duty on bicycles, and shall ensure that claims are adequately scrutinised before authorisation.

2.2.20. Settling in Allowance: An allowance of 50% of monthly salary may be paid to a newly appointed staff, to enable him/her adjust to the place of work. It is paid by the responsible officer from the non-wage vote.

2.2.21. Discipline: See GSO II D - a. CFF as Head of Department has delegated his disciplinary powers on support staff to DFO's and other charge officers. If Forest Rangers (FRs) or Assistant Forest Officers (AFOs) wish to take disciplinary action against an employee, they must do so through the DFO.

2.2.22. Housing: Provision of Housing allowance as provided for under GSO II E - a was abolished by CSI No. 3 of 1996.

2.2.23. Administration of Workers' Camps: When workers are housed in labour lines built by the FD, a camp caretaker shall be employed to keep the huts, latrines and compounds scrupulously clean. His/her work shall be inspected by the officer in charge of the station.

2.2.24. Temporary Camps

These are some times built, usually of grass, for workers who are engaged on work which is either temporary or mobile e.g. survey work. Before these are erected, permission shall be obtained from the nearest District Labour Officer (DLO), who can only allow the camps for a maximum period of six months.

2.2.25. Permanent and Semi-permanent Labour Lines.

2.2.25.1. Before labour lines can be built, a plan and particulars of the proposed buildings must be submitted to the nearest Labour Officer. Where the walls of the buildings are to be constructed in temporary materials, the Labour Officer may approve drawings and written particulars forwarded to him in triplicate. If buildings are to be constructed wholly in permanent materials, the Labour Officer will forward the plans to the Labour Commissioner for approval.

2.2.25.2. Before any labour camp can be erected the local Labour Officer in consultation with the Medical Officer shall approve the site and lay-out.

2.2.25.3. Labour lines shall not be erected in or near swamps or on un-drained land. Also there must be space of not less than thirty metres measured in any direction from any building, kept clear of refuse, weed, rank grass and undergrowth.

2.2.26. Sanitation

2.2.26.1. There shall be an adequate supply of good drinking water and facilities for bathing and washing of clothes. A site shall be erected for refuse disposal, this should be approved by the Local Labour Officer.

2.2.26.2. Latrines shall be constructed and there must be separate latrine accommodation for each sex so screened as to ensure privacy. Pit latrines shall not be constructed within 30 m. of any other building and they must be sited far away from any well, spring, stream or other source of drinking water to prevent contamination. As a general rule, the distance of a pit latrine from such a source of water will not be less than 30 m.

2.2.27. Health and Safety

2.2.27.1. The FD shall provide for the medical care of sick or injured employees and

also for their families, if the families are living in FD quarters.

2.2.27.2 A responsible person shall be in charge of the drugs and medical equipment listed in Appendix II.2.

2.2.27.3. Medical stores shall be kept separate from other stores in their own box or cupboard.

2.2.27.4. The supply of drugs and equipment listed are only for the treatment of minor injuries and complaints. Any serious cases shall be sent to Government hospital or the nearest dispensary as soon as possible. Infectious diseases shall be reported to a medical officer.

2.2.27.5. The quantities of drugs and equipment to be kept depends upon the number of employees; the legal requirements are in Appendix II.2. Note that it is not obligatory to stock them if the number of employees is less than 40, unless a Labour Department Officer orders it. However, these items are usually held at FD stations employing more than 10 men.

2.2.27.6. Drugs shall be ordered from the Medical Department through CFF every six months, if necessary.

2.2.27.7. All tasks are to be performed in accordance with health and safety standards set out in the Factories Act. Ergonomic methods of doing work shall be applied in all tasks.

2.2.27.8. In addition to the drugs listed in Appendix II.2 the snake bite kits shall be procured and stored in refrigerators.

2.2.28 Death or Illness of an Employee

2.2.28.1 On the death of an employee, the employing officer shall notify the executive head of the district and send him/her a copy of the medical certificate of the cause of death, if available. He/she shall also inform him/her of the wages due to the employee, and shall dispose of them and the personal effects of the employee as directed by the district head (see UER Sec 36).

2.2.28.2. Regulations covering the illness of employees are in para 2.2.14 of this Section.

2.2.28.3. If an employee is prevented by injury from working for more than 3 days, the employing officer shall send a report to the executive head of the districts, CFF and Labour Officer in duplicate on the circumstances. (UER Act Sec. 36 (4) and Workmen's compensation Act Cap.1971 Sec 14). The form to use is LD Form II.

2.2.29. Imprisonment

Under Sec. 66 of the UER no fine or period of imprisonment shall cancel the contract between employer and employee unless so ordered by the magistrate. No wages shall be payable to an employee during a period of imprisonment.

2.2.30. Retirement Benefits : All support staff are pensionable public officers and have a legal right to a pension. (See GSO I L-a)

2.2.31. Personnel Relations

2.2.31.1. Every effort shall be made to build a stable and well trained labour force. Workers shall be aware of their conditions of service and changes in them shall be notified well in advance. Employing

Officers shall not only be scrupulously honest, but shall ensure that none of their actions are liable to misinterpretation i.e. justice shall be done and seen to be done.

2.2.31.2. Where tasks are worked, the full task shall be enforced, and it is up to officers to check not only the quality of work but its duration as well.

2.2.31.3. Headmen will normally be expected to work and not only to supervise.

2.2.31.4. Works Committees have lapsed at most stations, due to decrease in labour. Also due to the decrease in the amount of time that senior staff spend in the field, there is a possibility of increased lack of communication between employers and employees. Works Committees are the best way to bridge this gap and shall be revised.

2.2.31.5. Representatives shall be elected by the workers at the rate of one per 10 men employed. Generally, Works Committees are only appointed where there are more than 30 men employed.

2.2.31.6. Works Committees shall meet regularly and no less frequently than once in 6 months.

2.2.31.7. The DFO or his representative should act as chairman, and secretary also if no one else is capable of doing the job.

2.2.31.8. Regulations for each Works Committee shall be drawn up, including a definition of the rate of representation, the frequency of meetings, the notice to be given of meetings etc. The DLO may advise on this.

2.2.31.9. The DLO may be invited to attend meetings and should be sent the minutes of each.

2.2.31.10. Forest Guards will attend Staff Consultative Councils, not Works Committees (see para 2.8).

2.2.31.11. Any dispute that threatens to turn into a strike shall be dealt with at the Works Committee meetings. If a strike does occur GSO II A - a para 5 (this Section para 2.2.6.2) should be noted. The DLO and CFF shall be informed of an impending strike.

2.3 FOREST GUARDS

2.3.1. Forest Guards (FG) were formerly Support staff, and as such received a wage and movement between groups upon recommendation of the responsible supervisors. However, the 1994 Public Service Review and Reorganisation recommended that the post of FG be upgraded from support to established staff. The FD has always placed great trust and responsibility upon the FGs, and so has always treated them as staff.

2.3.2. The FD has an establishment of 283 FGs (January 1997) which may not be exceeded without the approval of the Ministry of Public Service. Appointments and dismissals will be made by the PSC, on recommendation of the Responsible Permanent Secretary. The CFF allocates FGs to districts depending on the scale of forest operations.

2.3.3. The stipulated qualifications for appointment to the post of FG is a Uganda Certificate of Education. Initially, candidates shall have worked for the FD for at least a year and have a good report from their superior officer. They shall have credits in English, mathematics and general sciences.

2.3.4. Confidential personal files will be maintained on FGs by DFOs.

2.4 FOREST RANGERS

2.4.1. Qualifications. Entry to Nyabyeya Forestry College (NFC) is open to Uganda Certificate of Education holders as minimum qualification with credits in English, Maths and either Biology, Physics with Chemistry or Geography.

2.4.2. Recruitment: Candidates shall obtain application forms for Public Service posts from their headmasters and send the completed forms to the Ministry of Education and to the Principal, NFC. A Joint admissions board organised by the Ministry of Education then decides the institution to which the applicant is admitted.

2.4.3. After the School Certificate exams in December and before the PSC interviews, and subject to funds being available, DFOs may employ school leavers likely to have the requisite qualifications and who have applied to join the FD as their first or second choice of career. Pay shall not be higher than Salary Scale SS1 and the students should do field work rather than office work.

2.4.4. Formerly, in very exceptional cases an outstanding FG might be promoted to Ranger, provided he had a period of training. This is no longer possible because the salary scale (U6) of the Rangers is open to holders of the Uganda Certificate in Forestry.

2.4.5. Training: Instruction and training are done at the Forestry College and on tour in Uganda. At the end of the second year course the examination for the Certificate of the Uganda Forestry College is taken, which is graded into 1st Class, 2nd Class and Pass.

2.4.6. Appointment: After successful completion of the final examination, a FR will be interviewed by the PSC and may be appointed on probation in the Public Service of Uganda. A Public officer must remain on probation for a minimum period of 2 years, during which 4 staff performance appraisal reports, on 30th June and 31st December every year will be submitted by his DFO, or other charge officer. See GSO I A - d.

2.4.7. Salary Scales: Forest Rangers are appointed to the U6 salary scale. Increments beyond U6 depend on seniority and promotion to Forest Ranger Grade I which starts at U5 - c scale.

2.4.8. Promotion: Promotions depend on seniority, merit and availability of vacancies.

2.4.9. Uniforms: See Appendix II.3.

2.5 ASSISTANT FOREST OFFICERS

2.5.1. Qualifications. Entry to the diploma course (for AFOs) is mainly through direct entrance and a few candidates may be selected by the Forest Department. Uganda Advanced Certificate holders shall possess at least a principle in Biology and two passes in Physics, Chemistry and Geography. FD nominations shall come from practising FRs of outstanding performance.

2.5.2. Recruitment: The A-level direct entrants will obtain application forms from their headmasters and submit the completed forms to the Ministry of Education and Principal NFC. Selections are carried out through the Joint Admissions Board for all tertiary institutions. Five places are reserved for FD to select outstanding FRs from the field.

2.5.3. Training: AFO trainees spend three years at Nyabyeya Forestry College where they receive both theoretical and practical training. During the training, the five FRs selected by FD retain their Ranger salary scale.

2.5.4. Appointment: After successful completion of the final examination and subject to availability of positions, the AFO trainees will be interviewed by the PSC and may be appointed on probation in the Public Service of Uganda. They then remain on probation for a period of at least 2 years (see 2.4.6 above).

2.5.5. Salary Scales: AFOs are appointed to the U5c scale.

2.5.6. Promotions: There is only one AFO salary grade - U5c. The only promotional opening is through sitting for mature entrance examinations for the 4 year BSc. Forestry course at Makerere. Once admitted, study leave may be offered by GoU on CFF's recommendation.

2.6 FOREST OFFICERS

2.6.1. Salary Scale: Forest Officers are recruited from university graduates in forestry. They are appointed at the U5a - 3 scale.

2.6.2. Promotions: Promotions include all senior positions to CFF. Promotions depend on seniority, merit and vacancies being available. FD initiates the promotion process by requesting Public Service Commissioner (PSC) to fill available vacancies. Candidates nominated by FD have to be interviewed and appointed by PSC.

2.6.3. In-Service Training

2.6.3.1. The department encourages the acquisition of new knowledge and skills geared to increasing the performance of staff. FD will from time to time, carry out Training Needs Assessment in order to establish the levels of staff development with a view to filling gaps that may exist.

2.6.3.2. Local training programmes are from time to time organised to equip all cadres of staff with specialised skills.

2.6.3.3. The department is often offered places at overseas institutions for specialised training programmes. Subject to availability of funds, FD will nominate those staff that are likely to benefit most from such programmes, and also depending on an individual's line of work.

2.7 POSTINGS AND TRANSFER

2.7.1. Every officer in the FD is expected to serve in any part of Uganda to which he is posted.

2.7.2. Disturbance Allowance: is an allowance which an officer may claim to offset additional household expenses incurred when such an officer is transferred from one station to another, and as a direct result has to move his or her living quarters. It is generally payable when the transfer is not at the officer's own request and when the distance is over 32 km by road. For the conditions of payment of this allowance see GSO I E - n. The rate is 1/3rd of an officers annual basic salary. Disturbance allowance is payable from the relevant vote items on the non-wage component of the receiving officer.

2.7.3. At least one month's notice of posting shall be given if possible. The Staff Posting Order form is shown in Appendix II.7. Charge Officers shall check that the following are done.

- * Arrange transport.
- * Send open and confidential personal files to receiving charge officer.
- * Inform Storekeeper of transfer (see IV.2.6.3) if the posting is to another District.

- * Inform CFF.
- * Inform Ministry Salary Section by means of a Pay Change Report (see App. II.6).
- * Ensure that a handing over report and other procedures are followed (see Section IV).

2.8 LEAVE

2.8.1. Regulations governing leave are in GSO I C. The following points from GSO must be noted.

- * Leave is a privilege, not a right and is granted subject to the exigencies of the service, and unless otherwise stated in the standing orders, will be at the discretion of the government.
- * The object of leave is diversion, recreation, relaxation and recuperation, with a view to increasing an officer's efficiency, output and enthusiasm on the job. Leave is not, therefore, normally convertible in terms of cash as this would defeat the object of leave.
- * Leave will include Sundays and Public Holidays which fall in the leave period.
- * The full annual entitlement of leave shall be taken in the calendar year otherwise it is forfeited. Provided an officer expects to be employed for the whole year the full entitlement may be taken at any time during the year. If an officer does not expect to be employed for the full year he will take only the leave which he has earned.
- * Charge officers will compile a leave roster on the standard Leave Roster Form as closely as possible to the wishes of their staff in November of each year for the next leave year and must copy it to CFF. Should an officer refuse to take his leave according to the roster he will forfeit it if a charge officer can not release him later in the year.

2.8.2. Leave earning rates are:

Basic Salary	Annual Entitlement	Monthly Entitlement
U2 & above	36 days	3 days
U8 to U3	30 days	2 ½ days
Below U8	24 days	2 days
USS	18 days	1 ½ days

2.8.3. Public Holidays are listed in 2.2.13.4.

2.8.4. The Application for Leave form is in Appendix II.2.

2.9 ALLOWANCES

2.9.1. Allowances are dealt with in GSO I Section E. Disturbance allowance has been covered in 2.2.18 and 2.7.2.

2.9.2. Motor Kilometrage Allowances: Full details are in GSO I E - o. U 8 to U5 Scale officers should note that Government does not encourage them to buy cars unless they are essential for the

proper performance of their duties. All officers are warned that the payment of mileage claims depends upon adequate funds being available; any officer considering purchasing a car should check this with his charge officer responsible for payment.

2.9.3. Night Allowance: Night allowances within Uganda vary according to salary scales. The rates are contained in Circular Standing Instructions issued from time to time by the Head of the Civil Service. These rates are payable for 15 consecutive nights in one place per month only; thereafter half rate is claimed.

2.9.4. Bush Allowance: Bush allowance is an allowance which an officer may claim when the nature of his or her duties requires him or her to live outside his or her normal station in a temporary rest house, caravan or tent regardless of whether or not he or she has been allocated Government Quarters either temporarily or permanently in his or her duty station. Rates for Bush Allowance can be found in GSO I E - j

2.10 CONSULTATIVE COUNCIL

2.10.1. Every year, Districts, NFC and HQ will hold their Consultative Council meetings of all staff, including Forest Guards and clerks. A representative should be elected at these meetings to attend the main FD meeting. Minutes of this meeting are sent to the Permanent Secretary (PS) and to the PSC. Specialist section staff stationed in districts or at NFC will attend the meetings there.

2.10.2. Topics for discussion at both the lower and at HQ level are usually concerned mainly with conditions of service. It must be remembered that conditions of service affect the whole of the Public Service and specific requests for higher pay or allowances are unlikely to make much impact, and are often better made through such bodies as the Uganda Civil Servants Association.

2.10.3. Technical subjects are often ignored at these meetings, but if good suggestions are made on technical items they stand a better chance of being acted upon than items concerned with conditions of service. It is important that chairmen and senior staff at these meetings should insist on discussing technical and productivity matters.

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STORES AND VEHICLES
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Section III

Stores and Vehicles

3.1 GENERAL

3.1.1. Detailed instructions covering stores and vehicles are in TAI Part II. Particular attention is drawn to para 1: "Every Government officer is personally and pecuniarily responsible for Government property under his control or in his custody".

3.1.2. The list of general stores in App.III.1 may not be in use at the moment. But they are listed just in case they will be used in the future.

3.2 STORES

3.2.1. Stores buildings shall be weatherproof and secure. Petrol and other highly inflammable materials shall be stored separately and well away from other buildings. Explosives stores shall be built on the advice and to designs supplied by the Department of Geological Surveys and Mining.

3.2.2. Adequate shelving shall be provided to enable items to be stored tidily. Items liable to damage if stored directly on the floor (cement, fertilisers etc.) shall be raised off it slightly.

3.3 MARKING OF STORES

Under subsidiary legislation of Section 300 (1) of the Penal Code (Cap.106) the Forest Department may use the letters "FD" on stores and equipment for identification. All Forest Department stores shall, therefore, be marked FD unless "U.G." has been stamped on them already.

3.4 CLASSIFICATION

Appendix III.1 contains a fairly complete list of stores used and arranged according to the FD classification. For completeness several items that are no longer available, but which may still be found in stores, are included. Several items e.g. fire pumps, have been standardised throughout the Department, because they have proved on testing to be the best available and to simplify the ordering of spare parts. With standardised items no other make but that recommended shall be bought without written permission of CFF.

3.5 STOCKS

The main store at Nakawa handles all stores purchased locally and from overseas. Storekeeper/ Nakawa has, as his main job, the distribution of Stores rather than purchases, and holds stocks prior to allocation and issue to Charge officers.

3.6 REQUISITIONS FOR STORES

Charge Officers should include a detailed list of stores likely to be required in the following year with their Annual Estimates. CFF will amend or approve this list.

3.7 UNIFORMS

3.7.1. Uniform entitlement is shown in App. II.3.

3.7.2. Estimates for uniforms need no longer be submitted by Charge Officers. Instead measurements will from time to time be submitted to the CFF for consolidation prior to placement of orders.

3.7.3. All uniformed staff will have 2 sets of uniform cards, one held by storekeeper and the other by charge officer.

3.7.4. The issue of uniform will be made as early in the financial year as possible. If mistakes have been made the uniform must be returned to Storekeeper immediately with an explanation. Surplus items of uniform must not be retained by charge officers.

3.7.5. When Storekeeper sends the uniform he will mark it as supplied on the officer's uniform card and on receipt of the uniform, the charge officer will mark it as received on the same officer's card.

3.7.6. The success of the scheme depends on the accurate maintenance of uniform cards. Charge officers and Storekeeper must co-operate fully to ensure that the cards are always up to date.

3.8 LOCAL PURCHASES

3.8.1. Local purchases shall be confined to stores that cannot be obtained from HQ Store for which an unexpected and urgent need has arisen. The charge officer shall record briefly on the quadruplicate copy of the LPO the reason for the purchase to be able to answer queries whenever they arise.

3.8.2. A purchase of more than Shs.1,000,000/= requires the approval of the Central Tender Board (CTB). Purchases of less than this sum may be made without CTB's approval, but quotations shall be called for. However, if the purchase is less than Shs.500,000/= quotations are not regarded as essential, but the items should be bought at what appears to be the cheapest price.

3.8.3. LPO's are made according to the instructions on the back of the original copy. Ensure that the Vote and Item are shown on the duplicate and copies below; this is required for accounting and costings. If LPOs (or requisition forms) are held by officers other than the accounting officer, the accounting officer shall ensure that a return is made monthly of the value of items ordered for the control of expenditure (see 4.6.2).

3.9 TENDER BOARDS

3.9.1. CTB deals with most FD purchases of more than Shs.1,000,000/= or from overseas. Local Tender Boards in each District deal with local supplies of foodstuffs, hire of transport etc. and do not usually affect FD.

3.10 PURCHASE FROM OVERSEAS

Stores required from outside East Africa shall be ordered at least 6 months before they are required because the procedure outlined below is often lengthy.

- * Make enquiries for the stores locally, including advertising in regional newspapers, through CFF.
- * At the same time, obtain estimates of the cost through CFF from overseas suppliers, or ask the Government Central Purchasing Corporation to make enquiries about suppliers and costs.
- * If the stores are not obtainable locally and an estimate of cost has been obtained from overseas, then CFF is informed of the full details of the stores required, including any catalogue number or supplier letter reference.
- * If CFF approves he will then obtain CTB permission to order the stores and will place an order, usually through Central Government Purchasing Corporation.

3.11 LEDGERS AND INVENTORIES

3.11.1. Charge officers must maintain Ledgers and Inventories and the recording of transfer of stores by Issue Vouchers. The following should be noted :-

- * All transactions shall be covered by Issue Vouchers.
- * All transactions shall go through the central (DFO's) store ledger. Sub-stores may not transfer stores directly between themselves.
- * All non-consumable stores shall have a ledger entry. Bulk items of consumable stores shall be entered in the consumable stores ledger.
- * A separate Furniture Inventory will be maintained for office furniture and equipment.
- * Loan Books at central stores shall only be maintained for items that are required for a very short time e.g. camp equipment on safari. At the end of this time the stores shall be returned; if not returned they should be issued.

3.11.2. Stores rapidly degenerate into disorganised chaos unless vouchers are accurately made and ledgers promptly entered.

3.12 WRITING OFF

3.12.1. Useless stores shall not be allowed to accumulate in any store. After checking each year, arrangements shall be made for writing off.

3.12.2. Writing off may be done by CFF or his designee, or the executive head of the district. The new value of stores written off at any one time shall not exceed Shs.1,000,001=; if it does a Board of Survey shall be convened. Alternatively, arrangements may be made to send the stores to Nakawa for Storekeeper to write off by a Board of Survey.

3.12.3. FD Form 25 is used for writing off stores and is the authority quoted in the Ledger.

3.12.4 With stores which have been lost and the value recovered, the General Receipt reference is sufficient authority for writing off.

3.13 CHECKING

3.13.1. DFOs shall check stocks and inventories at all sub-stores in their charge against their own inventories at least once a year (see 3.13.3).

3.13.2. Office Superintendent will arrange to have HQ and Specialist Charge stores checked annually.

3.13.3. Every charge officer shall in October each year submit to CFF a certificate that he/she has during the previous 3 months checked and verified all stores on issue to him. This list shall be accompanied by a list of any surplus stores which are available for use elsewhere.

3.14 VEHICLES

3.14.1. Responsibility

3.14.1.1. Officers in charge of vehicles are responsible for their safe custody and also for safe custody and deposit of keys outside office hours. All staff concerned must be warned that journeys will only be undertaken on the authority of a responsible officer particularly outside office hours.

3.14.2.1. Only the appointed driver of a vehicle may drive it, except in case of an emergency. Permission may be granted to drive vehicles by people other than the driver by the Permanent Secretary. Because the appointed driver is directly responsible for the vehicle it is his decision as to the suitability of roads, the safety of bridges etc., on which the vehicle may be at risk.

3.14.2. Allocation

3.14.2.1 Vehicles are allocated to charge officers or to Nakawa pool. The allocation of all FD vehicles shall be shown in TO's Annual Report; that for 1996/97 is reproduced in Appendix III.2, and should be updated whenever there is a change.

3.14.3. Maintenance

3.14.3.1. Each driver must be able to carry out simple maintenance tasks on his vehicle of the daily and weekly maintenance schedules (Appendix III.4). In addition, he should keep the vehicle clean at all times, change the engine oil at about 3,000 km, check gear box and differential oil, etc. Other services as recommended in the Handbook for the vehicle should be done by a qualified mechanic, or by the driver under the supervision of a qualified mechanic. Charge officers must ensure that the maintenance schedules are adhered to and that vehicles are kept in good mechanical condition. If this is not possible, then the vehicles must be put off the road.

3.14.3.2. Each driver must carry the following tools in a locked box :

- 1 Wheel Brace. 1 Jack. 2 Tyre Levers. 1 Clamp for hot patches.
- 6 Hot Patches.
- 1 Adjustable Spanner. 1 Set of Open Ended Spanners.
- 1 Screwdriver.
- 1 Grease Gun.
- 1 Foot Pump.
- Handbook for the Vehicle.
- 1 Panga.
- 1 Spade.
- 1 Bow Saw.

3.14.4. Safety

3.14.4.1. Fire extinguishers shall be carried on all petrol-engine vehicles, and also on any vehicle likely to be used for fire fighting. Vehicles engaged on fire protection shall not carry containers of extra petrol as this is dangerous.

3.14.4.2. Petrol tanks shall have a locked cap and spare wheels should be attached by padlock and chain.

3.14.5. Estimates of Running Cost

3.14.5.1. At the end of each year the ACTUAL cost of running each vehicle shall be calculated from Vote Book expenditure for estimates purposes (see 4.7.29 and Appendix V.4.2.& 3). This should include fuel, lubricants, wages, overtime and allowances, servicing, spares etc, but not depreciation. Running costs shall be included in DFO's quarterly reports as shown below:

Vehicle	Reg. No.	Km/hrs. run	Cost				Unit Cost (Shs/km)
			Fuel, Oil	Spares Repairs	Salaries, etc.	Total	

3.14.5.2. There is limited storage space for cars at Nakawa, which is an approved store. Advance notice should be given if space is required.

3.14.5.3. All storage of private vehicles is at owner's risk and cars must be insured against fire, theft and accidental damage and a cover note produced at the time of storage. The ignition key should be left with the TO so that the vehicle may be moved if necessary.

3.14.6. Requisition: Requisition for a vehicle from the TO should be done using the form in App. III.3.

3.14.7. Hiring of Vehicles of Other Departments: In some cases it is cheaper to hire lorries locally from MOW or tractors from Department of Agriculture rather than hiring from Nakawa. Local vehicle hire rates should be obtained and kept up to date by DFO's.

3.14.8. Records: The following records must be kept for all vehicles:

- * *Log Sheet.* This must be kept in duplicate on MOW Form 488 for every FD vehicle and must always be kept with the vehicle. At the end of every month the original is sent to TO through the charge officer, for the calculation of standard rates after the addition of costs of fuel, oil, spares, repair etc. The duplicate is retained by the officer responsible for the costings of the Management Plan Area (MPA) to which the vehicle is attached and is used for allocating the distances run to costings head.
- * *Daily Maintenance Sheet* } examples of these forms are in Appendix III.4,
} but they may be adapted for other vehicles.
- * *Weekly Maintenance Sheet* } They must be submitted monthly to the } charge officer. The daily maintenance sheet
- * *Servicing Record Sheet* } should periodically be checked and signed } by a senior officer.
- * *Inspection Report* (App. III.4D). For use at Nakawa, but it forms a useful basis for MOW servicing or periodic checks by the driver or a senior officer.

SECTION IV

FORESTRY ADMINISTRATION

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Section IV

Forestry Administration

4.1 GENERAL

4.1.1. Tidiness in Offices and Courtesy

4.1.1.1 Importance shall be attached to maintaining offices in a thoroughly tidy and clean condition: an untidy office not only creates an unfavourable impression on others but is bad training for staff and can only lead to inefficiency.

4.1.1.2. Proper accommodation must be provided for all files, records, maps, stationery, books etc.

4.1.1.3. All maps, papers etc. not in immediate use shall be in their appropriate places and the office shall not be cluttered up with odd boxes, obsolete specimens etc.

4.1.1.4. There is no excuse for discourteous or offensive statements in correspondence. Never commit yourself to writing while your temper is (however justifiably) ruffled. Officers shall ensure that clerks never allow letters to go out to members of the public without beginning “Dear Sir/Madam or “Dear Mr/Ms.” and ending “Your obedient servant”. Be brief but clear. Correct forms of address are given in GSO I R-b.

4.1.1.5. There are few things more irritating than discourtesy on the telephone: incoming calls shall be answered promptly saying “Forestry Department, so and so speaking”. If the officer asked for is not available, say when he is likely to be back, ask if the caller would like to speak to somebody else or if he/she would like to leave a message.

4.2 CORRESPONDENCE

4.2.1. Distinction between Correspondence and Permanent Records: The normal correspondence files of each office shall not contain records of permanent value, or which are necessary for constant reference. The correct place for these is normally Management Plan Records (MPR), where they are of forestry interest, and correctly indexed in Libraries or Archives where they are of other interest.

4.2.2. Acknowledgement of Communications: All communications shall be dealt with promptly. If it is not possible to reply immediately, then an acknowledgement of receipt should be sent. If a matter is to be brought up by a certain date, then a note shall be made on the desk calendar or diary.

4.2.3. Clarity and Brevity: All officers shall always be on their guard against verbosity and obscurity. In correspondence within the FD and in FD reports and records it is not necessary to write in full words which are commonly understood in abbreviated form; clerical staff should be instructed that the abbreviations in page (v) and in App. IV.1 are acceptable. Also hand written letters on memo pads are acceptable for brief notes and acknowledgement within the FD, provided a copy is kept. The standard district abbreviated prefixes shall be used in the numbering of maps, research records, files etc. (App. IV.1).

4.2.4. Correspondence with Heads of other Departments and Ministries

4.2.4.1. Correspondence with Heads of other Departments and with Ministries including our Ministry will normally be conducted by CFF.

4.2.4.2. Correspondence with our PS, the Director of Audit, Treasury Officer of Accounts, Chief Supplies Officer etc., will be sent through CFF but correspondence with our Ministry Accounts or Establishment Sections may be sent direct, but copied to CFF.

4.2.4.3. DFO's may of course correspond direct with the district officers of other departments and with Local Government Officials.

4.2.4.4. DFO's are not permitted to send official letters outside Uganda. If such occasion arises then the matter should be referred to CFF.

4.2.4.5. It is mandatory that Correspondence Registers shall be maintained (see 4.6.1).

4.2.5. Security of Official Correspondence

4.2.5.1. Secret and Top Secret correspondence will be opened and dealt with solely by the addressee who is personally responsible for its security. It will be kept in sealed cover under lock and key available only to the addressee.

4.2.5.2. Confidential correspondence will be opened by the addressee only and will be dealt with by him only. At the discretion of the Responsible Officer, a secretary may assist in dealing with confidential correspondence.

4.2.5.3. A confidential file register shall be maintained and this together with all confidential files should be kept under lock and key by the Charge Officers (CO) (or by secretaries at the discretion of the Responsible officer).

4.3 POSTAL SERVICES

4.3.1. The postal services are dealt with in GSO I R-e, and particular attention is drawn to paras. 7, 8,10 and 12 which deal with economical use of the Postal service

4.3.2. Information on the Telegraphic Service is contained in GSO I R-e

4.3.3. The use of telephones shall be strictly controlled. A register of all calls made shall be maintained, to assist in checking the telephone accounts. No private calls shall be permitted.

4.4 FILING

4.4.1. The subject matter on all files shall be restricted as much as possible and every opportunity shall be taken to open a new file rather than expand the subject of an existing file. When correspondence affects more than one file, copies shall be placed in each.

4.4.2. The opening and closing date spaces on the file front shall be completed when files are opened or volumes closed. New volumes shall be opened as soon as the file becomes unwieldy (normally when more than 5 cm. thick) or when they include, in addition to current correspondence etc., matter which is more than 10 years old. Files with no recent matter and which are not expected to come into current use shall be sent to archive (see 4.4.9). Files shall be marked with volume numbers (Roman) when extra volumes are opened.

4.4.3. Cross reference on file fronts shall be entered only when they are necessary or advisable to indicate a connected file which may not be obviously relevant; normally the subject index provides this information.

4.4.4. Prefixes and Abbreviations: Abbreviated prefixes and other abbreviations will be used in addition to the file No. etc. All individual personal files will bear the prefix PF for open files and C/PF for confidential personal files.

4.4.5. File Register and Index

4.4.5.1. A foolscap book, indexed alphabetically, will be maintained in which details of all files will be entered. A serial list of files will be given at the front, with a note made when a file number is permanently closed and the file sent to archives e.g. a file dealing with local government forestry matters should be closed and put in archives. Where a file number has been closed that number will not be used again for a new file with a different subject.

4.4.5.2. The alphabetical index should enable any officer to file or to find correspondence on any subject. The efficiency of the filing system should not have to rely on the memory of the filing officer, For example, a file entitled "Fuel Plantation Yields" should be indexed under "Fuel", "Plantation" and "Yield". If a letter is then written concerning "Yield of Eucalyptus Fuel at Namanve" then entries in the index should also be made under "Eucalyptus" and "Namanve". The first word of the index entries shall be noted on the space provided on the front of the file cover.

4.4.5.3. It is up to charge officers to ensure that adequate indexing is done and further entries shall be made whenever they appear necessary. It is better to have too many entries than too few.

4.4.6. Archives: Closed files which may not be used again should be marked with a large red 'A' on the front cover and sent to Archives. Closed files may not be destroyed without permission from the CFF. An index of files in the Archives shall also be maintained. Before a file is put in Archives it shall be read through so that it may be indexed properly and any records of importance copied and put in Records etc. Further information on Archives, is in GSO I R-d 4; see also 4.4.2 above. The destruction of financial records is dealt with in TAI 1185 - 9.

4.4.7. Personal Files: Every charge officer shall hold an open and a confidential personal file for each officer in his charge; these files should be sent to the appropriate charge officer on the transfer of an officer. On the termination of the appointment of any officer, his open and confidential PF's shall be sent to HQ. No charge officer shall, therefore, hold any PF's other than those of the staff actually in his charge at the time. Copies of Staff Performance Appraisal Reports will not be held at District level. See also GSO I R-d 4.

4.5 PRINTING AND STATIONERY (See GSO I P and note in particular the instructions for indenting (Appendix F-a 1).

4.5.1. Standard Departmental Forms (FD Forms)

4.5.1.1. All printed forms shall satisfy the following criteria - that they are used to record information essential to the efficiency of the Department and that their use saves time and trouble. All such departmental forms have been allocated numbers and are listed in Appendix IV.2. In order to reduce printing expenses, the FD forms have been divided into two groups, namely one group to be printed and must be obtained from HQ, the second group will not be printed but COs should prepare them strictly following the format in the DSO appendices. CFF may approve new FD Forms.

4.5.1.2. As these forms have to be printed specially for the Department, it is essential for Head office to place a consolidated order for the whole department in January and July. Charge officers shall, therefore, submit their requirements of Departmental Forms to Head office by December and June, separately from their normal "Half yearly Indent for Printing" to the Uganda Printing and Publishing Corporation (which prints Government forms).

4.5.1.3. The following stationery comes within this Category :-

- Some FD Forms (Appendix IV.2)
- Ruled duplicated books (all sheets perforated)
- "Plic" Books (alternate sheets duplicated)
- Survey note books
- Timber harvesting/volume measurement books
- File covers
- Headed letter forms (3 sizes)
- Timber Movement Permit Books
- Forest Produce Declaration Books
- Inventory and Sample Plot Forms, etc.

4.6 RECORDS AND RETURNS

4.6.1. The records listed in App. IV.18 must be kept in all district offices either in bound form or in stiff binders, separate from the correspondence files and they must be kept constantly up to date. Similar records will be kept by Special charge officers where appropriate.

4.6.2. Vote Book (VB) and Commitment Register (CR)

4.6.2.1. The VB records authorise expenditure against a particular vote and enables an officer to see at any time the balance of funds available. It is therefore important not only that items in the VB are accurately and promptly entered but also that expenditure that has been authorised but not paid is recorded. This is best done by a CR in which all authorised expenditure e.g. Requisitions, LPO's etc. are entered at the time they are made. When this expenditure has been entered in the VB then the entry in the CR is cancelled. The use of the Commitments Register is especially important in the case of MOW Requisitions, because these are passed directly to the Ministry for payment and then, often after a delay of several months, to the officer who authorised the payment for entry in his VB. Unless these commitments are known, it is very easy to overspend a vote. Likewise an officer should make sure that he knows all expenditure authorised on his behalf. More detailed instructions for the accounting of votes are in Treasury Accounting Instructions (TAI) particularly paras. 110 - 124 and 1100 - 1104.

4.6.2.2. VB entries shall be sufficiently detailed to enable the voucher or other source to be traced. Expenditure shall be allocated to other heads such as Transport or Overheads for costing purposes. VB entries shall be checked and initialled by the responsible officer, at the time of certifying any expenditure voucher.

4.6.3. Expenditure Returns

4.6.3.1. At the end of each month the Vote Book entries are totalled to enable the expenditure return to be drawn up.

4.6.3.2. Specialist Officers, including P/NFC and DFOs will submit quarterly returns to CFF of expenditure that they control directly for the first three quarters of the year and monthly for the last quarter. The return should be as in App. IV.16 Table 17.

4.6.4. Revenue Collections and Returns

4.6.4.1. Revenue may only be collected by a properly authorised Receiver (Collector) of Revenue. Authority is granted by the Permanent Secretary to the Ministry on recommendation of the CFF. When applying for authority the details required in TAI para. 16 must be supplied.

4.6.4.2. All revenue will be paid through district offices by the authorised receivers of revenue in a District to ensure that it is recorded in the Revenue Abstract and thus shown in the Return. Credits that are not received in cash (e.g. interdepartmental adjustments) shall be appropriately recorded in the revenue abstract. The classification of revenue in the abstract will be as shown below.

Month..... Year.....

MPA or Public Land	Timber Fees		Bush Fuel and Poles	Plantation Fuel & Poles	Other	Total
	Sawmills	Casuals				

4.6.4.3. Revenue returns will be submitted quarterly by all officers responsible for the collection of revenue. The return shall be on the form in App. IV.16 Table 16. This differs only slightly from Revenue Abstract which is required by auditors.

4.6.4.4. A Register of Bills will be kept to enable the progress of payments of invoices to be noted.

4.6.5. Production and Records

4.6.5.1. Categories of Production - will be as in App. IV.16 Tables 8, 9 and 10.

4.6.5.2. Monthly Produce Return. Field staff will submit returns of produce to DFO. On the form constructed as in App. IV.16 Tables 8, 9 and 10. If no produce is cut a Nil return is still required.

4.6.5.3. Production Records. For each compartment or forest in which harvesting is taking place a production record sheet based on App. IV.16, Tables 9 and 10 will be maintained, heading each column of the sheet with the appropriate category of produce and entering monthly the figures supplied under the Monthly Produce Returns. The Forest Produce Declaration, Timber Movement Permit and Timber Harvesting/Volume Measurement Forms shall be filled and circulated as appropriate. Summaries of these shall be included in reports at the respective levels.

4.6.5.4. Monthly Out-turn Return - This return will be compiled from the production record. Three copies on App. IV.16 Tables 8, 9 and 10 form shall be submitted by DFOs to CFF with a copy to ACF (IMS).

4.6.5.5. Sawmill Production Return. All sawmills are required by the terms of their licences to submit production returns to ACF (IMS). This will be done through DFO and shall tally with App. IV 16 Tables 8 and 11.

4.6.5.6. Range Inspection Books: At each Range Headquarters, Forest Station or other suitable place, a foolscap Range Inspection Book shall be kept. In this, visiting or inspecting officers shall record any contents on progress of the work, any instructions for the officer in charge or any other matter of interest. Instructions shall be repeated in a letter, and other comments in a Tour Report (4.8.14). Range officers shall present this book to visiting officers, and the latter must ask for it if it is not presented.

4.7 COSTINGS

4.7.1. Costings records must be maintained for all MPAs whether or not they are under formal MP.

4.7.2. The objects of these costings are:

- * at lower levels - to control labour efficiency.
- * at middle levels - to control expenditure and provide data for annual estimates
- * at top levels - to keep a close check on expenditure and revenue and to provide data for calculating financial yields.

4.7.3. Costings will be built up from the daily field records by a series of steps detailed below to the Annual Summary of Expenditure in which are recorded not only labour costs but also all purchases, transport costs, capital costs and overheads.

4.7.4. The steps in the build up are:

- * Standard Costings Heads, Items and Operations
- * Labour Distribution and Work Done Book
- * Monthly Work and Costings Return - FD 3
- * Monthly Summary of Costings
- * Monthly Reconciliation of Costings with Expenditure
- * Equipment Inventory
- * Annual Management Plan Summary
- * Annual Summary of Overheads
- * Annual Summary of Revenue and Expenditure.

4.7.5. There are five main Sections:

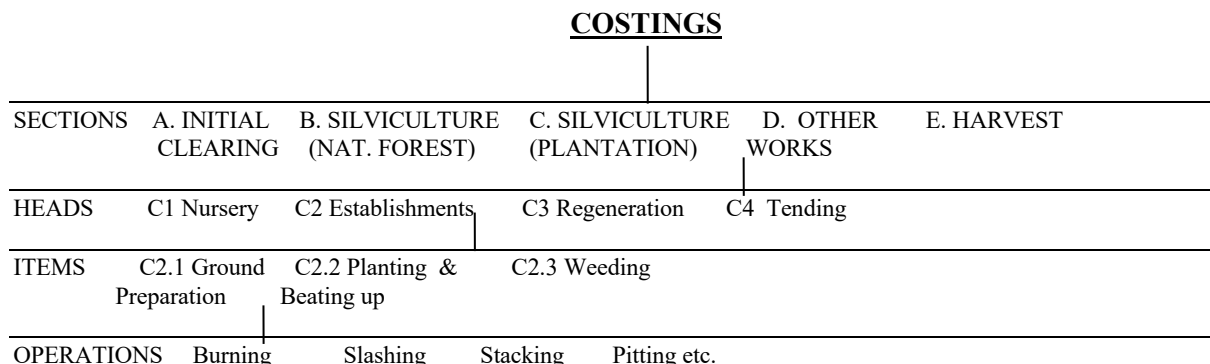
- A. INITIAL CLEARING
- B. SILVICULTURE' (Natural Forest)
- C SILVICULTURE (Plantations)
- D. OTHER WORKS
- E. HARVESTING
- F. EXTENSION SERVICES

4.7.6. The reasons for this division are to facilitate the calculation of economic return and to allow more or less direct extraction from the Sections to the various Annual Records and in particular to the Annual Management Plan Summary. Economic returns shall be worked out for each MPA at HQ.

4.7.7. Each Section shall be subdivided into a number of Heads - e.g. B.1 - Nursery and Seed, B.2 - Establishment etc. and these Heads will be further subdivided into items e.g, C.2.1 Ground Preparation, C.2.2 Planting and Beating Up, etc.

4.7.8. Costing down to Items shall be recorded at ALL levels up to and including the Monthly Summary and Costings.

4.7.9. The Costings of Items will be further broken down to operations whose costs shall be recorded up to the Monthly Work and Costings (App. IV.9A.; FD3) level for control of efficiency. They will NOT, however, be required to be recorded at or above Monthly Summary of Costings level. Costing Sections, Heads, Items and Operations are shown in the chart below:



4.7.10. Appendix IV.5 lists and in most cases adequately defines all standard Costing Sections, Heads, Items and Operations; fuller definitions are explained in paras 4.7.11 - 4.7.14. The list of Heads and Items shall be used in Estimates, Annual Works Programmes and Annual Reports. They shall not be varied without the consent of the CFF.

4.7.11. Particular note should be taken of the following definitions of some heads: (see also 4.8.8)

4.7.11.1. **Initial Clearing** - refers ONLY to the clearing done for the very first time for entirely new planting. Clearing for second or subsequent rotations is NOT to be included here.

4.7.11.2. **Silviculture** - (Natural Forest)

- * B.2 *Regeneration Inducement*. This is pre-exploitation refining which is not generally done nowadays.

- * B.3 *Extensive*. In general, *Extensive* planting covers enrichment (e.g. after charcoal burning) where there are relatively few planted trees per hectare. *Intensive* planting is costed under C head and refers to such operations as line planting where the final crop will be mainly arising from planted stock rather than natural regeneration, i.e. the final crop will be a plantation.
- * Where there is any doubt, an explanatory note shall be added to the costing operation e.g. B.3.3 Enrichment, approx. 20 spots per ha. two trees per spot under gaps. This shall, however, not be taken to extremes.
- * B.4.1 Costs will only be included under this head when repair to felling damage is done as a complete separate operation to any of the operations under B.4.3.
- * B.4.2 This operation refers to the liberation of selected trees.
- * B.4.4 and 5. Tending and thinning of planted trees. Two new items, which include Weeding, Climber cutting etc. and Thinning as operations. Note that it refers only to the planted trees, but costs will be per ha. enriched of the same age class.

4.7.11.3. Silviculture(Plantation)

- * C1 Nursery/Seed - hedge and ornamental species shall be recorded separately from species for production of timber, poles and fuelwood. Nursery pest control will be included here.
- * C.2 Establishment - all silviculture operations required for development of a new crop to the stage when it is considered to be established i.e. when it will survive and grow at adequate stocking without further assistance by weeding or beating up. Nursery/Seed and Fire Protection are included.
- * Under Items C2.2 Planting and C2.3 Weeding the entries are to be made by years; the years shall coincide with the financial year and end on 30th June. All areas in the same financial year shall always be in step with each other and for record purposes shall be treated as a single unit which moves EN BLOC from recording year to year of “Planting” or “Weeding”. Similarly all areas planted in the same financial year shall move EN BLOC, but NEVER individually, from C2, Establishment to C4 Tending. e.g. even if planting is done in April, the 1st year ends on 30th June of the same year.
- * The decision to move the area of one planting year from Establishment to Tending shall be made IN THE FIELD by the DFO bearing in mind the definition of “Establishment” given above.
- * All the above will apply equally to Item C3.1. Beating up (Regeneration) and C3.2 Weeding (Regeneration).
- * DFOs shall define “adequate stocking” in each MPA. Generally stocking shall be 75% and gaps not greater than 6 adjacent blanks. But on difficult sites or in regenerated eucalyptus where demand is low, a lower stocking may be acceptable.
- * Items and Operations shall both be recorded by the financial year.

- * Within a planting year, costs of operations done in different species shall be separated e.g. Weeding Cypress which will probably be a spot hoeing, shall be costed separately from Weeding Pines, which will be slashing.
- * C.3 Regeneration - all silvicultural operations required to renew (re-establish) a crop by coppice whether or not it is assisted by beating up. Nursery/Seed costs is excluded. Complete replanting shall be classed as establishment.
- * C4 Tending - all silvicultural operations in an established or regenerated crop.

4.7.12. Other Works

- * D.1.2 Includes dealing with encroachers. The planting of encroachments will come under B or C heads however, depending on the size and object. Planting of live boundary markers will be covered here.
- * D.3 Fire - all fire protection including establishment of planted fire lines and controlled burning; exclude any costs entered under Item "Nursery/Seed".
- * D.4 Pests - include all pest control, separately for each type of pest but excluding pest control costed to item "Nursery/Seed".
- * D.6 Buildings - includes maintenance of forest stations and grounds, major jobs individually.
- * D.7 Research - all research paid for from funds held by DFO whether the funds came from FORI or DFO's own funds.
- * D.8 Transport - includes ONLY that portion of the Costings of Departmental Vehicles (at standard Rates) which CAN be allocated to a MPA, but which can NOT be allocated to any other Item within the MPA.
- * Transport Analysis Sheet (Appendix IV.6) must be maintained. Entries be made monthly on this Analysis to show by "MPAs" or "Un-allocable" the distances from the Vehicle Log Sheet (excluding those directly allocable to any other costing Item), and their cost at Standard Rates. The total under each must then be transferred monthly to Item D.8 on the appropriate Monthly Summary of Costing while the Un-allocable costing is treated as an Overhead and must be entered Annually on FD.7.

4.7.13 Explanatory Note on the Costing of Transport by Departmental Vehicles.

4.7.13.1. The running of Departmental Vehicles is to be included in Costings. Standard rates per km. or per hour for each type of vehicle will be notified by the TO and they, not actual expenditure, shall be used in calculating costs.

4.7.13.2. Within a District/Charge the running of Departmental Vehicles should fall into one or other of the following categories:

- * Directly allocable to a costing Item in a particular MPA e.g. a lorry used to transport sand for the nursery will be costed to the "Nursery and Seed" item, etc. Most running should come in this category and can be extracted directly from the Vehicle Log Sheet.

- * Allocable to a MPA but NOT allocable to any Item other than “D.8 MPA Transport” - e.g. transport used on leave, transfer, pay safari, stores delivery, repair trips etc.
- * Un-allocable transport which is not allocable to a MPA - e.g. may include any of the uses mentioned in 2 above - leave, transfer, pay safari, stores delivery, repair trips etc.
- * Running Allocable to Items (category b.1) can be obtained direct from Vehicle Log Sheets and their entry onto the monthly Summary of Costings (after costing at Standard Rates) should present no difficulties.

4.7.13.3. In order to separate categories b.2 and b.3 however, it will be necessary to transfer from the Vehicle Log Sheet all distances NOT costed to Items as above onto a Transport Analysis Sheet where all allocations can be made to MPAs and to Un-allocable. The costings from the MPA Columns are transferred monthly to Item D.8 on the Monthly Summary of Costings for each MPA (or Management Circle) while the Un-allocable costings are transferred annually to the Indirect District Overheads on FD.10. The suggested Form of the Transport Analysis Sheet is given as Appendix IV.6.

4.7.14. Harvesting and Processing: Harvesting/Processing - includes departmental harvesting - (felling, carrying, measuring, sawing, etc. as well as supervision of licences).

4.7.15. Extension Services: Costings of extension services will be done overall for the District. The main cost will be transport, but some direct labour and materials cost may be incurred e.g. at shows, cost of nursery plants, etc. Salaries of staff, including FGs, will be treated as Overheads (see 4.7.36).

4.7.16. Miscellaneous is NOT a Standard Costing Item. Store-men, runners etc. are Labour Overheads on FD3; other expenditure MUST be allocated to the appropriate Item.

4.7.17. Labour Distribution Book: Each Ranger or officer in charge of field work must maintain a Labour Distribution Book. Entries must be made daily showing number of men employed by Operation under each Standard Costing Item. The headings of the first few columns preceding the operations being done must always be:

Date	Total No. on M/Roll	Absent	Labour Overheads						Task days worked
			Headmen	Storemen	Runners	Sick	Leave	Holidays	

4.7.18. An example of a page in a labour Distribution Book is given in Appendix IV.7.

4.7.19. A Work Done Book is to be used to record the amount of work done, again under each Standard Costing Item, and entries should be made either daily whenever possible (as in nursery), or at the end of the month or when the job is completed, whichever comes sooner. This shall be the only record of

work done and scraps of paper or the like must not be used. An example of a Work Done page is given in Appendix IV.8.

4.7.20. Monthly Work and Costing returns (FD.3, App. IV.9A)

4.7.20.1. Each Ranger or officer in charge of field work shall submit in support of the muster roll a Monthly work and Costings Return on FD.3, (Appendix IV.9A).

4.7.20.2. This return summarises the task days worked and the work done by Operations under each Standard Costing Item - i.e. the two pages of the Labour Distribution Books and costs Items but not Operations at the appropriate rate per task day.

4.7.20.3. Labour Overheads - see table in para 4.7.16 above - are not counted as task days, but their cost is included in calculating the cost per task day.

4.7.20.4. The cost per task day and the cost of Items shall be worked out to the nearest shilling. Any adjustment necessary as a result of this rounding off may be made to the largest item on that month's return.

4.7.20.5. Rangers and Officers in charge of field work shall work to a definite budget i.e. to the allocation of the Annual Works Programme. To do this the expenditure return shall be entered monthly by them on the reverse of FD.3. Rangers shall, therefore, be told monthly of any Non-labour Costs charged to their allocation.

The return should consist of:

Current expenditure from FD.3	=
Plus - current Transport actual costs	=
“ Purchases	=
Consumable Stores actual costs	=
Total expenditure for the month	_____
Previous total expenditure brought forward	=
TOTAL EXPENDITURE TO DATE	=
BALANCE OF ALLOCATION	=
TOTAL ALLOCATION BY AWP	=

4.7.20.6. Rangers and officers in charge of field work will also make a return of “consumable” stores each month on the form shown in Appendix IV.9B. The purpose of this is to assist field staff to work within their allocation and to act as a check on the balance of consumable stores available so that they may be ordered in good time - field staff should indicate which items they want replenished.

4.7.21. Monthly Costings Summary

4.7.21.1. Monthly Costings Summaries shall be prepared for each Management Circle, (or in some cases for each block within MPA e.g. if the conditions in different blocks are so different as to have a significant effect on the relative costs).

4.7.21.2. The standard form is in Appendix IV.10A and will be used for the costings summary. The summaries must contain for each Standard Costing Item all the following on specific lines with monthly totals on the next line:-

- * labour Costs;
- * actual cost of non departmental transport (NDT);
- * standard Rate costs of departmental transport (DT); and
- * cost of BULK materials (M) actually used during the month (e.g. pesticides) which may of course not agree with actual expenditure.

4.7.21.3. In addition to totalling costs by columns i.e. by Items, it is necessary, in order to carry out the reconciliation of costings with actual expenditure (see 4.7.32) to sum these column totals to get the grand total of all costings not merely the figures from FD.3.

- * Labour Costs - Prefixed by (L) in the left hand Column. They shall be taken direct from FD.3 and are recorded by Items (not Operations) a line to each Compartment - see Appendix IV.10A.
- * Discretion is needed in the entry and interpretation of quantities, for instance where two operations in the same Item cover the same piece of ground - e.g. staking and pitting. Usually each item will have one KEY operation whose quantities should be entered monthly, other quantities being ignored. Key Operations are indicated in Appendix IV.5.
- * As an example of the use of “Key” operations, in the first year of establishment all the operations for ground preparation (Item C2.1) in a compartment may have been done and hoeing may even have been done twice over the whole area. To cost the latter over twice the area of the compartment would obviously be wrong. Hence only the area covered by

the KEY operation i.e. pitting shall be entered. Equally, if hoeing has been done over less than the area pitted, nevertheless the area covered by the KEY operation i.e. that pitted shall be entered for costing.

- * At the end of the financial year the Summary will be totalled and main costs per unit area etc., calculated. Even greater care is necessary here in the entry of quantities.
- * In the entry and interpretation of these Annual quantities the following MUST be observed:
 - For items completed on 30th June - costs shall be over the area of the whole compartment AND over any other untreated compartments OF THE SAME AGE. (N.B. Work done under those Items which are to be recorded by years - 1st, 2nd, etc. as for example in Item C2.2 Planting -shall be treated as if it were “complete” on 30th June and dealt with as described above.
 - For Items incomplete on 30th June - costs shall be spread over the ACTUAL area treated under the KEY operation.
 - These total and unit costs grouped by costing Heads will be entered on FD.9 (App. IV.13) (i.e. the annual silvicultural and other works record) and will be used for Estimates, Annual Works Programmes and Annual Reports.

4.7.22 Transport Costs.

- * Actual cost of non departmental vehicles shall appear on the Ranger’s FD.3 in his expenditure return and again in the VB. Such costs shall be prefixed by NDT and entered under the appropriate Item.
- * Costs of running departmental vehicles will be entered separately in the Costings Summary opposite the prefix DT. Such costs will be calculated at the Standard Rate per km or per hour which will be notified from time to time by the TO.
- * For allocated vehicles the Log Sheet shall record kilometres or hours run against the appropriate Costing.
- * The TO will notify Charge Officers of the distance run on their behalf by pool vehicles and costs shall then be calculated at Standard Rates.
- * Where the running of Departmental Vehicles is allocable to several Items or -more than one MPA, time should not be spent unduly on working out accurate division of the cost - approximate proportioning will suffice (refer also to Item D.8 MPA Transport in 4.7.12).
- * Actual costs of running Departmental Vehicles (viz. Vote Book expenditure on drivers’ wages, fuel, lubricants, tyres, repairs etc.) shall NOT be entered because the Standard Rates allow for these as well as depreciation, etc.

4.7.23. The cost of materials (M) shall be entered under the appropriate Item(s) from the Rangers’ return of stores used - 4.7.20.6. The cost of special Equipment (e.g. McConnel saw, Grass Mower, etc. but not vehicles or tractors) shall not be entered on the Monthly Summary of Costings but shall be entered on the New Works and Equipment Inventory at the time of receipt. The form of the New Works and Equipment Inventory is given in Appendix IV.12, FD.5 and 4.7.24.

4.7.24. Monthly Reconciliation of Costings with Expenditure

4.7.24.1. In order to ensure that the costings are reasonably accurate, the grand total of costings from the monthly Summaries of Costings shall be reconciled with Vote Book expenditure each month. This may be done by MPAs or by Districts/Charges. The latter may be easier particularly when “transport” is a big or difficult item. The reconciliation cannot be done by management circle because the Vote Book break down is only to MPAs

4.7.24.2 The Form to be used for the Monthly Reconciliation is given as Appendix V.11A. Completed form (s) shall be retained at District Offices but are not required elsewhere. The form(s) must be completed in the following way:

- Column 1.** - Enter the names of the MPA.
- Column 2.** - Enter the total Monthly Expenditure recorded in the Vote Book under all Heads dealing with field work (i.e. FFW, New Plantations, Housing etc.) add the value of stocks held at the end of the previous month.
- Column 3.** - Enter the grand total of Costings from the Monthly Summaries of Costings and the un-allocable transport from the Transport Analysis sheet. If equipment is bought from District Votes the cost must be entered here also.
- Column 4.** - Deduct column 3 from column 2. (Where column 3 is smaller than column 2, the answer is a positive figure; where however column 3 is bigger than 2 the answer is a negative figure).
- Column 5.** - Deduct the actual expenditure on departmental transport from the cost at Standard Rates and, enter the result (When actual expenditure is greater than the standard rate costs the entry is a minus amount; where standard rate costs are greater than actual expenditure the entry is a plus amount. This difference should be briefly explained, see example in App. IV.11B.
- Column 6.** - Enter the value of stocks of insecticides, fuel, etc. held at the end of the month whether the stocks are held in the store or are unused in the field.
- Column 7.** - Enter the arithmetical sum of columns 5 and 6. This figure must be the same as that entered in column 4. If columns 4 and 7 do not agree the error must be found. Small differences are allowable due to the error introduced by rounding to the nearest shilling.

4.7.25. Annual Equipment Inventory: Form FD. 8 (Appendix IV.12) describes and values equipment for a MPA during the year. Items of small value bought on the stores vote are not included here but are put in Column 14 of FD.10 by Head Office (4.7.36). Items that are put on FD.8 are those of high value, generally bought on an Equipment vote e.g. chain saws, drills etc. Vehicles are excluded because depreciation is included in the annual rates calculated by TO and used for costings, but equipment attached to the vehicles (ancillary equipment) e.g. grade blades, trailers, fire engines etc. are included. Cost of houses is excluded and is entered on F.D.6 (4.7.35). A consolidated FD.5 shall be submitted annually to support the entries on FD.6 and 7.

4.7.26. Annual MP Summary - Direct Charges (FD.6)

4.7.26.1. A copy of the form is given as Appendix IV.13. This form summarises the sections and heads (i.e. Standard Costings) from the Monthly Summary of Costings and in addition records out-turn and revenue. New forms shall be completed each year for each master copy of a MP. Sections A to D of the Form come direct from the Monthly Summary of Costings totalled by Heads at the end of the year.

4.7.26.2. In Section E, the Harvesting Cost also comes direct from the Monthly Summary of Costings. Entries under Types of Produce must be single line by the following categories:

Plantation and Bush Poles	Separately by classes, class I number only, other classes number and length in metres.
Plantation and Bush Fuel-wood	Stacked m ³ and head-loads separately.
Timber	True m ³ . (N.B. on the reverse of FD.6 or on FD.6 filed immediately after FD.6, the Timber Out-turn should be recorded BY SPECIES

4.7.26.3. Completed FD.6 forms shall be kept with the MP records in a peg-board system so that the top line only of the previous years' forms are visible. Costs are given in shillings to the nearest ten.

4.7.27 Annual Summary of Overheads (FD.7, App. IV.14)

4.7.27.1. The object of this form is to give a more realistic figure for the expenditure in a MPA by including Overheads. Each MPA and extension services will be shown separately on the form.

4.7.27.2. Overheads include: district, labour - costed on FD.3; direct - staff salaries, allowances, etc. which are directly allocable to a MPA or to extension services. Where staff are shared between MPAs or between a MPA and extension, then an estimate shall be made (from monthly reports) of the time spent in each and costs distributed proportionately.

4.7.27.3. Indirect - staff salaries etc. as in 3 above, but which cannot be allocated to a MPA directly. They shall be allocated to each MPA or to extension in proportion to the totals of the direct expenditure (FD.6) and to Direct Overheads (3 above).

4.7.27.4. Departmental (HQ) - These consist of all salaries, allowances, travelling costs etc. not included at lower level and all Departmental expenditure under the heads: P.O. services, water and electricity, incidentals and stores. These Overheads will be allocated to Districts and MPAs. Expenditure on the training divisions is not included.

4.7.27.5. In order to simplify as far as possible the completion of form FD.7 at the various stages (i.e. District and HQ) it shall be used temporarily to record the calculation of proportion at each stage and permanently for MPA records.

4.7.28. Temporary Forms

4.7.28.1. The DFO shall construct and complete a temporary form entering up Columns 1 to 8 as follows:

- Col. 1** - enter names of ALL MPAs and put TOTAL at the foot.
- Col. 2** - enter totals of all FD.9s referring to each MPA.
- Col. 3** - enter Personal Emoluments from vote book and include salaries paid through banks for full time staff in each MPA (or a proportion for part-time staff).
- Col. 4** - enter T&T of staff from Vote Book for all full time staff for each MPA (or a proportion for part-time staff).
- Col. 5** - enter total of columns 2, 3 and 4 for each MPA.
- Col. 6** - enter percentage which each MPA entry in Col.5 bears to the total at the foot of Col.5.
- Col. 7** - at the foot of this column enter the total of all Un-allocable Personal Emoluments (Vote Book and bank payment). Then opposite each MPA enter a proportion of this total calculated using the percentage given to the MPA in column 6.
- Col. 8** - at the foot of the column enter all Un-allocable Transport-(a)..from T&T Vote in the Vote Book and (b)from the un-allocable column of the Transport Analysis Sheet.

Sum these two entries. Opposite each MPA enter a portion of this summed total calculated using the percentage given to the MPA in Column 6. N.B. to facilitate the extraction of figures required for the above entries, it is ESSENTIAL that votes are analysed in the Vote Book into one column per WPA with an extra column for "un-allocable". An EXTRA column for Departmental Transport is also required in the Vote Book in the analysis of ANY vote(s) dealing with field work. Staff salaries may be found from computer pay rolls or from HQ. HQ must complete the remainder of this form.

4.7.29. Permanent MPA Record Forms: Separate permanent FD.7's (App. IV.14) shall be made out for each MPA as MP records. The entries are merely single line transcriptions from the temporary forms. HQ shall complete columns 9-13 on the permanent forms of each flying copy of the MP records before returning them to the DFO. The DFOs shall then transcribe HQ overhead entries onto their MP record copies of the FD.10 and complete the Annual Expenditure and Revenue Summary (App. V.15, FD.8) which must be a MP record. It will not be possible to apportion HQ overheads to MPAs unless the annual records for all areas have been submitted to CFF. COs shall ensure that submission is done as soon as possible after the end of the financial year and before 31 October. MP records, entries, maps and forms must be submitted to HQ by 31 October.

4.8 REPORTS: (Standard Report Headings for quarterly and annual reports are given in Appendix IV.3).

4.8.1. Quarterly Reports

4.8.1.1. Quarterly reports will be written by field officers who submit an FD.3 to DFOs. These shall reach the DFO by 5th of the month following the quarter. Other field officers may also be required to submit monthly reports or boundary inspection reports.

4.8.1.2. DFOs will submit a quarterly report to CFF. Returns to be submitted with the quarterly reports are detailed in 4.6.5, 4.6.9 and 4.6.14. DFO's reports should reach CFF as soon as possible, in any case not later than the 15th of the month following. Two copies will be submitted, one for the file and one for circulation at HQ. Copies of DFO's quarterly reports will be sent to the CAO, RDC and chairperson of the district Local Council and to the Principal, Nyabyeya Forestry College.

4.8.1.3. Specialist officers will submit quarterly reports to CFF by the 15th of the month following. A copy will be sent to each DFO, P/NFC and circulated at HQ.

4.8.2 Annual Reports

4.8.2.1. The object of annual reports is to give a readable picture of what has happened, and they should not be overburdened with a mass of minor detail which is wearisome to read and tends to obscure the overall picture; the place for such data is MP or RP records. At the same time, as an annual report is a record of stewardship for the years, it should include sufficient statistics as are necessary to give a clear and comprehensive picture of departmental activities; for example, the total area of pole and fuel plantations regenerated in a charge should be given in the report, leaving details of the individual plantations or areas in the tables or records. Annual reports will be prepared for the financial year in the standard form (Appendix IV/3) by all COs responsible for sections including P/NFC and DFOs. The report shall be submitted to CFF not later than 31st July.

4.8.2.2. The reports will be accompanied by 17 Tables (see App.IV.16). The tables contain concise data recording achievements and failures of forestry development effort. This information is extremely important in planning future activities and in soliciting funding from both the Uganda Government and the International Aid Agencies. Hence every effort shall be made to complete the tables accurately. The following notes will assist in completing the tables:

- * Tables 1, 2 and 3 make a good estimate of the ownership and area of various vegetation types. The Biomass Section has some of the information required.
- * Tables 4, 5 and 6 - MP Records, Maps and Inventory Records should be available.
- * Table 7 - You may have records or make a good estimate.
- * Tables 8, 9 and 10 - Records should be available.
- * Table 11 - Records should be available for at least 1996/97.
- * Table 12 - Owners of the Industries have the information.
- * Table 13 - URA should have information for at least 1996/97.
- * Tables 14, 15, 16 and 17 - Information should be available at office.

4.8.3 Handing Over

4.8.3.1. Financial etc. Governed by TAI Part 1, paragraphs 1160-1164.

4.8.3.2. Stores. The incoming officer shall sign either the ledger or inventory concerned or a certificate acknowledging receipt of all the stores on charge. This applies to all posts from Forest Guard upwards. (see also TAI's Part 11, paras 58 and 143).

4.8.3.3 Confidential Personal Files. The outgoing charge officer, if his leave or posting will not permit him to complete the next Staff Performance Appraisal reports shall record confidentially in writing such comments on each officer in his charge as will be of assistance to his successor. In practice, a DFO is allowed a maximum of six months to know his officer well enough and fill out his/her performance appraisal reports.

4.8.3.4. Report. Any officer handing over his charge will compile a handing over report which shall be completed at least two weeks BEFORE the incoming officer arrives. A copy will be sent to his superior officer and DFO's and specialist officers will also send a copy to CFF through the next senior officer where appropriate. The report will follow the standard report heads (Appendix IV.3) with sections on each MPA. The length of the handing over report will depend upon whether it is a temporary or permanent handing over and the degree of familiarity of the incoming officer with local conditions, but it is essential that it be sufficiently complete to ensure continuity of policy and action. Reference to files and minutes giving greater detail on important matters shall be included. All reports shall contain a certificate by the incoming officer that he has checked all stores and that they are correct or not correct as the case may be.

4.8.4. Back to Office Reports (BOR): Head Office and Specialist staff will write reports after visiting a district. These will be addressed to the CFF and copied to DFO and other HQ staff as appropriate.

4.9 ANNUAL ESTIMATES

4.9.1. Annual estimates of expenditure and revenue will be submitted as instructed by CFF. Estimates will be made in shillings, rounded off to the nearest Shs.1,000/=.

4.9.2. Estimates of Expenditure: Estimates shall be made in detail by votes and the reason for any large increases or cuts in normal expenditure shall be explained in a covering letter. Notes on the preparation of estimates by charge officers are set out below:

4.9.3. Recurrent Expenditure

4.9.3.1. Staff Salaries. Salaried staff estimates will be prepared by HQ. FGs and other support staff to be shown under FFW (4.9.3.11). Also support staff will be shown under Personal Emoluments but DFOs and other COs show salaries of support staff under MPA or office

4.9.3.2. Travelling and Transport of Staff. Give details as under:-

- * Mileage allowances showing total mileage for each officer, rates and an estimate of minor roads, rough track and upcountry allowances (the previous years claim shall be used for this). Include also bicycle allowances.
- * Subsistence Allowances - state the function of the officer, number of nights and rate.
- * Cost of transfer, leave transport, disturbance allowances, etc.
- * Travel expenses abroad to be prepared at HQ.

4.9.3.3. P.O. Services, Water and Electricity. List each separately and break down the P.O. service into (1) telephone; (2) P.O. Box rent; (3) facsimile and other charges.

4.9.3.4. Other Office Expenses - Give details. Intended for items not supplied by Government Printer, repair and servicing of typewriters etc.

4.9.3.5. Training - Give details including public relations, newspapers, etc.

4.9.3.6. Materials and Supplies - Give details, see App. III.1.

4.9.3.7. Staff Quarters and Rest House Maintenance. Provision for the normal maintenance of Departmental buildings should be included in FFW or Softwood Plantations. This vote will be allocated by CFF for upgrading rest houses etc.

4.9.3.8. Maintenance of Roads, Tracks, Bridges - Included in AWP App. IV.4.

4.9.3.9. Operation and Maintenance of DFO's Vehicle - Give details, km, fuel, repair, etc.

4.9.3.10. Operation and Maintenance of Field Vehicles - Details from AWP, App. IV.4.

4.9.3.11 Participation in national activities e.g. National Tree Planting, environment activities, etc.

4.9.3.12. Publicity. This vote shall be used only by the Publicity Section. If DFOs want items included on it, for district shows or picnic sites etc. then they shall include the expenditure in their estimates.

4.9.3.13. Forest Field Work (FFW). A breakdown of the estimate for this vote shall be made by operations for each MPA. See example in Appendix IV.4. This will then form the basis of the final AWP when the allocation is made. All FG's wages will be included on this vote and shall be shown separately for each MPA. The ACTUAL cost of running and hiring departmental vehicles shall also be included. Wages of FGs will be shown in the respective MPA. Wages of other support staff will be included in unit costs for each operation and shall be deduced from there.

4.9.3.14. Replacement of Vehicles. Give details of the original vehicle, including the age and km/hrs run. Show MPA where vehicle is operated.

4.9.3.15. Replacement of Equipment. Give details and show MPA where required.

4.9.4. Estimates of Development Expenditure

4.9.4.1. New Roads, Tracks and Bridges. Show by MPA in AWP (App. IV.4)

4.9.4.2. Softwood Plantations. This includes maintenance and shall be broken down into operations by MPA in the same way as the FFW. FG's wages and actual cost of running vehicles shall be included as in FFW (App. IV.4C).

4.9.4.3. Additional Vehicles & Equipment. Give details of the vehicle or equipment required showing MPA where vehicle is to be operated. Cost will be added by HQ.

4.9.4.4. New Staff Houses. Give details of location, rank of proposed occupant, method of construction and cost e.g. direct labour or by contract.

4.9.4.5. Nyabyeya Forestry College. Details will be provided by HQ.

4.9.4.6. The Vote Head and sub-heads will be advised by HQ.

4.9.5. Estimates of Revenue

4.9.5.1. Revenue is received from goods (e.g. timber) and services (e.g. tourism) rendered by the Department. Payments shall be collected and accounted for in the usual way, but quoting the appropriate item. This money will then be supposed to be available for continuing the service, rather than being credited to a general revenue item.

4.9.5.2. Estimates of revenue shall be shown by the usual production heads and by MPA or Public Land under the following categories (see also App.IV.16, Table 16):

- * Sawmills (Timber)
- * Pitsawying }
- * Bush Fuel, Poles & Charcoal } List each source of revenue
- * Plantation Fuel, Poles & Charcoal } separately within these heads
- * Eco-tourism and recreation fees }
- * Others (include non-wood products)

4.9.5.3. Nyabyeya Forestry College will show appropriations-in-aid items which at present (1996/97) are Z3 Rest House fees; Z11, Forestry College fees.

4.9.5.4. A Summary of estimates is to be produced by COs as shown in App. IV.4A including items which are applicable to them. Note the three columns for (a) estimate for the coming year; (b) allocation for the current year, and (c) actual expenditure for the last year. The form must be put as page 1 of the estimates.

4.10 ANNUAL WORKS PROGRAMME

4.10.1. When the allocation of funds is known, DFO's and P/NFC should revise the estimates made for that year and issue new AWP's to all staff responsible for the supervision and costing of operations in each MPA. Copies should be kept in the field and in DFO's MP records. At the end of the year, the work achieved should be noted, so that backlogs can be carried on to the next AWP.

4.11 LIBRARIES AND PUBLICATIONS

4.11.1. Classification. All material in HQ library is classified on the Oxford System of Decimal Classification for Forestry (ODC). This applies not only to bound books but also to pamphlets and unpublished material which are housed in the filing cabinets of the Information Filing System (IFS).

4.11.2. Catalogues and Indexes. All bound material for retention in the library shelves will be card-indexed by author and subject. The **Library Catalogue** shall be updated and circulated to all COs. Accession list shall be circulated quarterly or send "nil accession" quarterly.

4.11.3. IFS. This is organised either as species files (classified by families, genera and species) or as ODC files (forestry material by subject, not classifiable by species).

4.11.4. The object of this system is to ensure that all departmental material of value shall not be buried in inaccessible correspondence files. The IFS is always ready to receive dated and initiated notes (not necessarily typed) about any technical matter (flowering or fruiting, unusual distribution of trees, notes on rate of growth, timber uses etc.). In general, information of value shall not be included in the body of a letter but as a report attached to a letter.

4.11.5. Industry and Marketing Section and NFC Libraries: These shall be organised on similar lines to HQ Library. IMS will maintain an IFS for the Section. IMS and P/NFC are responsible for ordering from his own allocations the books and periodicals required for retention; ordering shall be done through the HQ Librarian, to avoid duplication.

4.11.6. District libraries

4.11.6.1 These will be maintained at all District Headquarters and library lists will also be kept.

4.11.6.2. Copies of standard forestry reference books will be supplied to all district libraries and officers should keep the HQ Librarian informed of their requirements. Copies of monthly, quarterly and annual departmental reports will be collected and bound or filed together.

4.11.6.3. All libraries will maintain a Library Index or Catalogue in which all new accessions are entered: books must be checked when a Charge Officer hands over to another. A temporary loan book (FD.35) shall be maintained for all publications leaving the office.

4.11.7. Photographic Collections

4.11.7.1. There is at present one photographic collection, the larger being at HQ of black and white negatives and prints which have been indexed according to subject.

4.11.7.2. The slides in particular are very useful for publicity talks etc. and are available for loan to officers for that purpose. Interesting photographs, either black and white or coloured slides will be bought by the Publicity section. Details to be included with the photograph include a full description of the subject, locality, date and name of photographer.

4.11.8. Periodicals

4.11.8.1. Each periodical received at HQ will be entered in the periodicals accessions register (FD 36) and will be circulated to charge officers, when appropriate, with a periodicals circulation slip. Officers shall pass these on with minimum delay and to ensure that the circulation instructions on each slip are carefully observed. They shall also note on the slip items of particular interest in the paper concerned.

4.11.8.2. A limited number of periodicals will be retained permanently in the library and bound. Others will be destroyed after extraction to IFS of any articles of interest.

4.11.9. Forestry Abstracts: Copies will be received and circulated to HQ and to FORI, then returned to library. No special markings of items of interest is now done, except in the IFS copy.

4.11.10. Departmental Publications: The following list of publications etc. is issued for information and guidance:

- * Indigenous Tree of Uganda (ITU)
- * Introduced Trees of Uganda. (Int. TU)
- * Annotated Check List of the Forest Insects of Uganda.
- * Uganda Timbers. Includes in book form the technical data that was formerly published as Timber Leaflets.

- * Technical Notes. Issued from time to time in mimeographed mainly for FD use, but with a limited distribution outside Uganda e.g. OFI. Material (of mainly local importance) is welcomed and encouraged from all officers of the Department.
- * Forest Department Bulletins. This series will continue to provide for the publication of special material of not only local but of general interest also.
- * Management Plans. Normally mimeographed for departmental use and limited extra-territorial distribution.
- * Conference Papers. Sufficient copies of papers forming part of the proceedings of conferences are normally printed for limited Departmental distribution e.g. Commonwealth Forestry Conference.
- * Contribution to Technical Journals. Officers wishing to contribute technical material to technical journals will probably find that the East African Agricultural and Forestry Journals and the Commonwealth Forestry Review are the most appropriate media for forestry articles of regional and general interest respectively - the Uganda Journal for matters of general local interest. All such contributions should be submitted through CFF.
- * Annual Report of the Forestry Department.
- * Departmental Standing Orders (DSO). To be maintained up to date by all officers of the rank of Ranger and above. An index of amendments must be kept. DSOs are personal to Assistant Forest Officers and Ranger grades.
- * Uganda Forest Manual. This is complementary in many respects to DSO (e.g. technical matters) but does not have the force of orders.
- * Forest Guards' Handbook. Prepared now only in English. To be held by all ranks from FG upwards.
- * Forestry Legislation Handbook. To include the Forests Act, Rules and Gazettings also the Timber (Export) Act and Rules etc. These must be maintained up to date and an index of amendments maintained.
- * "The Woodsman". This is produced quarterly, so charge officers should endeavour to get copies of their reports to the Publicity Officer as early as possible so that interesting material can be extracted.
- * Biodiversity Reports: 33 reports representing results of the first systematic work to document biological diversity represented in Uganda's major reserved forests. (Field work carried out in 1991 to 1995).
- * Useful Trees and Shrubs of Uganda.

SECTION V
TECHNICAL

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Section V

Technical

5.1 RESERVATION

5.1.1. Reserve Registers shall be maintained at District Headquarters and at HQ; these will be on standard printed forms (FD.19) and must be kept up to date.

5.1.2. Reserve Maps For each reserve a boundary plan shall be compiled. This shall be in the standard form (see 5.2.15). In the case of un-demarcated reserves a sketch map must be prepared.

5.1.3 Gazetting

5.1.3.1. When a new reserve is to be gazetted, DFO should submit as soon as completed the reserve map and a list of households, crops, etc. within the area, for compensation purposes.

5.1.3.2. In the case of amendments to a previously gazetted reserve, a revised draft gazette notice will be prepared by HQ. If the amendment involves a change of boundaries, a revised map and boundary description will have to be submitted. See also Public Lands Act, Section I.

5.1.4. Selection of Reserve Boundaries: Whenever possible natural boundaries shall be chosen; rivers, streams or other natural features; permanent roads or tracks are also suitable. Where artificial lines are necessary, the number of corners between straight lines shall be reduced to the minimum consistent with securing the objects of reservation. Where practicable, corners in savannah reserves shall be inter-visible.

5.1.5. Demarcation and Maintenance of lines

5.1.5.1 Wherever constant patrol is required it is essential to maintain a slashed path, regardless of the type of vegetative cover. In the forest, lines shall be cleared to 2m width and all trees with foliage below 3m and under 20 cm. diameter felled and removed from the line, provided that the minimum of interference with the canopy is caused owing to the need to limit regrowth. In areas where there is little danger from encroachment or theft, such a line can be easily picked up many years after clearing. Where intensive patrol is necessary a narrow path should be maintained - a cycling track may even be possible.

5.1.5.2. In Scrub Forest and Young Secondary Bush, unless constant patrol is required necessitating a permanently open patrol path, this is a difficult type of vegetation. If there are sufficient trees to permit a more or less uninterrupted line of blazes, proceed as for forest, if not, where there is little or no danger of fire, a 10 m. strip of a suitable species may well prove a permanent solution. Five lines at 2 m. spacing shall be planted. Where funds are not sufficient, groups of 4-5 trees shall be at corners and at intermediate points, provided they are inter-visible or can be planted in a line at close spacing. If this is impossible due to fire, then the only solution is to increase the number of intermediate cairns.

5.1.5.3. In Savannah Woodland, much will depend on the density of tree cover. If this is relatively high, a cut line 2m wide gives sufficient interruption of the canopy to be readily visible. If the tree cover is

sparse, treat as grassland. Uninhabited grassland areas or where there is no danger of immediate encroachment inter-visible beacons (i.e. in hilly areas) shall suffice and there is no necessity to maintain inter-beacon lines at all. Areas where it is necessary for the line to be constantly patrolled shall have a slashed path.

5.1.5.4. Beacons

5.1.5.4.1. There is much difference of opinion on this point. Although they have their limitations, stone or earth cairns are generally the simplest methods. All corner beacons should be supplemented by numbered concrete markers where cairns are also used the marker should be sunk into the top of the cairn.

5.1.5.4.2. Concrete markers shall be 60cms long, of square section tapering from 10 cm. at base to 7cm. at top and shall be reinforced with four twisted iron rods, one in each corner and well welded (or tied with wire) together with small cross bars so as to form a tapering down the centre (iron rod is suitable). They shall be buried 45 cm. and strongly stamped in, numbering shall be on top of the marker end. It may be more convenient to do this at site by carrying in a little concrete. All concrete markers shall also bear the letters reserve and district codes, to avoid confusion with Survey Department marks. Numbering shall be serially in Arabic numerals round each reserve and shall be recorded on the reserve maps. At all corners, direction trenches are compulsory. These shall be 30x30 cm , at least 3m long and shall be correctly orientated. Where rocky outcrops occur, chiselled arrows shall be made on the stone and picked out with paint. Intermediate beacons on straight lines are not prescribed and shall normally be confined to the crests of distinct ridges, on the edges of streams or swamps and at the side of paths and tracks. They shall also have direction trenches.

5.1.5.5. Live Markers

5.1.5.5.1. Continuous lines of live markers are useful for finding a boundary that has been long neglected or for spotting a boundary from a distance or from the air. Species used shall be fast growing and distinctively different from the surrounding vegetation. In grassland they shall be non-flammable after establishment, and where constant patrolling is necessary they should cast a heavy shade to suppress ground vegetation. Cypress and Cassia were the most commonly used species up to the 1970s, and Eucalyptus, *Markhamia*, *Spathodea*, *Terminalia*, etc. in the recent past. Although the advantages of continuous lines of live markers are admitted, the cost of establishment can be high unless they can be planted and maintained by patrolmen in the course of their normal duties. For this reason continuous lines of live markers shall only be planted with the approval of the CFF. Care shall always be taken in selecting species for boundary planting and the advice of FORI be sought. Species like *Mangifera indica* may also be used.

5.1.5.5.2. Live markers may also be used on cairns or in groups at intermediate points. The following species may be used: *Dracaena*, *Gravellea*, *Terminalia*, *Ficus*, *Erythrina*, Teak, *Eucalyptus*, *Spathodea* and Mango. Species of economic value shall be preferred. Species which will spread into the NHF (invasive spp) shall be avoided. Where possible, local people shall be requested to plant the trees.

5.1.5.6. Sign Plates

5.1.5.6.1. The standard sign plate is the steel 45 cm. x 15 cm “Forest Reserve” plate. These shall be erected wherever reserves cross roads, tracks, paths etc. They can also be used along boundaries that run through closed forests to avoid making large clearings that otherwise would mean felling a lot of trees. If steel plates are not available they can be made from wood.

5.1.5.6.2. It shall always be placed so that it is parallel to the boundary and facing outwards from the reserve. Where possible it shall be nailed to a tree on the boundary not less than 2 ½m from the ground. If this is not possible it shall be erected on a stout hardwood post (treated if possible), at least 10 x 10 cm. x 2 ½ m. Whenever a boundary crosses a main road, a sign plate shall be erected on both sides of the road, indicating that the reserve is not on one side only.

5.1.5.7. Patrolling: Regular patrolling is essential, particularly sections bordering heavily populated areas. Rangers and guards engaged on protection work shall submit boundary inspection reports monthly, stating which section of the boundary they patrolled, the state it was in, any offences discovered and action taken. Like wise, AFO's and DFO's shall inspect boundaries regularly. As a general rule, boundaries that are regularly patrolled shall be inspected by a senior officer at least once a year. Aerial inspection is a quick method of checking the boundaries in a District, but can only be useful after the boundaries are known on the ground. HQ will arrange for aerial inspections from time to time, and DFOs will be involved.

5.2 SURVEYING AND MAPPING

5.2.1 Aerial Photography: The use of air photographs either as a means or as an aid in surveying forest areas should always be considered.

5.2.2. Checking of Survey Instruments

5.2.2.1. Chains. Measuring chains will be checked against a standard measured length before and after any survey. The accuracy or inaccuracy of the chain used will be recorded in the field book, to the nearest cm. Standard and 30 m. marks will be set up at District and other centres where necessary. They will consist of 4 concrete flagstones (the ubiquitous latrine stance was designed perfectly for this function) with a central hole which can be filled with fresh cement and marked when the exact measurement is made. A standard steel band from the local Survey Office should be used for measurement (any instructions from that office about the method to be used should be followed).

5.2.2.2. Compasses. These shall always be checked for "sticking" and for prism or sight for mis-alignment.

5.2.2.3. Haga and Blume-Leiss Altimeters. These shall be checked for "sticking".

5.2.2.4. Abney Levels. These shall be checked for zero reading on a levelled surface and adjusted if necessary.

5.2.3. Field Books: All field books on completion of a survey will be registered by the Map Section and filed there. Field book pages shall be numbered. All field books shall have Map Section Note 1/58 inserted on the first page.

5.2.4. Measurement of Slopes: Owing to the inaccuracies often caused by this method, step chaining on slopes will not be done except in emergency. All slopes of over 5 degrees will be measured following either of the methods described in paras 3.63 (b) and (c) of the Forest Manual. If surveys are frequently inaccurate because of the slope, then the use of the plane table shall be considered.

5.2.5. Tying in of Traverses: No traverse will proceed for more than 3 km without either having an offset or intersecting bearings to a point which is known to be mapped by the Survey Department or having a tie line or offset to another section of the traverse, or a feature which will be, or has been, tied to another section of the traverse. At least one tie line to a mapped point is essential. All available offset details will always be recorded on traverses.

5.2.6. Plotting of Traverses: On completion of survey the field book will be submitted to Map Section without doing a preliminary plot, unless the survey is very urgent. Forward and back bearings shall, however, be checked before submission. Until the Map Section notifies the responsible Charge Officer that the survey is acceptable, the pegs at each station in the field shall remain in place so that any check on the survey can be done readily and quickly.

5.2.7. Closing Error: Surveys carried out for all external boundary demarcation shall not have closing errors of more than the following magnitude to be acceptable. Internal surveys shall normally be within those limits except in special circumstances:

Type of Reserve	Minimum closing error
All plantations	1 : 200
All other reserves	1 : 100

Surveys with closing errors greater than these will be field checked.

5.2.8. Maps

5.2.8.1. The maps most generally used in the department are:

- * District Locality Map, scale 1:250,000, to show all reserves in district and can also have pins to show location of staff, sawmills etc.;
- * MPA Locality Map, generally at scale 1:250,000 should be included in a MP;
- * Boundary Plan at scale 1:50,000 or 1:10,000, to show the location of cairns and forest boundary. This is the same as the gazetting map. All staff engaged on boundary patrol shall have one, preferably mounted on canvas backing;
- * Management Maps are used to show the progress of management operations in a reserve e.g. planting, felling, etc. These shall be brought up to date as soon as possible after the operation has been completed, or at the end of the financial year in the case of continuing operations. In particular new areas of plantation shall be surveyed immediately after planting. All Management maps shall have a tabular statement attached to show the work that has been done by Cpt., species and area for plantations, by Cpt. and area for felling, etc.; and
- * Site or aspect type maps prepared from aerial photographs to show different site types recognisable on the photos and interpreted by ground survey.

5.2.8.2. Scale: Map sheets should be of the minimum size consistent with clarity and not normally be larger than 100 by 60 cms. Choice of scale will depend on the purpose of the map, the intensity and form of management and the sheet size. The scale of plotting should be such that checking of errors is readily done by the co-ordinate method. Final scale should be one of the following, 1:2,500, 1:5,000, 1:10,000, 1:25,000, 1:50,000 or 1:250,000.

5.2.8.3. Plotting: Generally the plotting of surveys will be done by the Management Plans Section (MPS). In that case, preliminary plots need not be done but the surveying posts shall be left in position in the field in case checking is needed. MPS can generally check, plot and return the results to a CO within a fortnight, which is quicker than a Ranger with other duties can do it. If, however, it is a very small survey, or the CO wants the results very quickly, then it can be plotted in the field and checked by the Map Section later. Charge officers shall inform the MPS of the purpose of the survey they want plotted, the proposed scale and other details.

5.2.8.4. Classification of Maps: All maps held in the department, other than the standard 1/50,000 and 1/10,000 will be allocated a serial number and group prefix (see below). For each map, a Map Record Card (FD.55) will be prepared by the MPS in duplicate one to each district. In the absence of more suitable binders, bulldog clips may be used for keeping the cards. The series of cards will form the map register of any office; all issues and receipts shall be entered on the reverse side of the card, any amendments made on a card shall be notified to the other holder. Group prefixes for all maps will be the normal district prefixes (Appendix IV.1). MPs may introduce other prefixes if necessary. Numbering of maps within any group will be serial and not with annual serials. Numbers will be allocated by the MPS.

5.2.8.5. Custody and Distribution of Maps: Draft maps for final drawing, originals and tracings of completed maps and all acquisitions of maps from any source shall be passed to the MPS for indexing. All final tracings and originals will be retained permanently by the MPS. Copies of these or other maps may be obtained on indent. Each charge officer shall have up to date copies of all relevant maps for his charge as shall each field officer subordinate to him. The original distribution of new maps prepared by the Map Section will be one print to each District.

5.2.8.6. Storage and Care of Maps: Maps shall be stored flat in wide drawers and not rolled. Maps which are of value (or are to be used in the field) shall be preserved by lamination with transparent plastic foil. As ammonia prints are relatively cheap, requests for copies as old ones fade shall be made as soon as necessary. In the case of maps which have special data added, the existing copy shall be sent with the indent in order that the data may be copied by the MPS on to the new print and that selected information shall be added to the tracing to keep it up to date.

5.2.9. Aerial Photographs (APs)

5.2.9.1. Aerial photographs will be made available from MPs on request.

5.2.9.2 Cover Diagrams: Air cover diagrams are prepared by all contract firms. For the older covers, they are available at the Survey Department where copies of diagrams for all contract cover may also be obtained on request. Print laydowns which can be used as cover diagrams are available for most of the pre- 1956 cover and copies can be borrowed from the Map Section. Reference to some form of air cover diagrams shall always be made before indenting to check that the correct AP are being ordered. Many Management Plans include reference to the cover available and some contain special diagrams for the reserve in question.

5.2.9.3. Requisitions for APs and Cover Diagrams shall be made to MPS.

5.2.9.4. All indents for prints shall be made direct to the MPS. AP will normally be issued by the Survey Department on loan for 3 months. Prompt return of AP as soon as the work is completed assists in record keeping at that office. Map section shall develop contract procedures for acquisition of APs.

5.2.9.4. Storage and Care of AP: Boxes for AP have been issued to most districts. Where not available the special green folders can be used and these are also usually sufficient protection in the field. AP shall not be folded or bent nor written on with indelible ink or pencil. The pricking of points with a pen or pricker is standard procedure and the prick located with a chinagraph circle on the face and ink or ballpoint circle on the back with a brief description (e.g. trig. point Muhangogima, 1337 m.). Any information marked up on AP in chinagraph on the face shall be transferred to the job intended or to a tracing paper overlay and then erased before the photo is returned to the FD.

5.2.9.5. Use of AP: Officers shall make themselves familiar with the every day use of aerial photographs. A simple test of personal stereoscopic perception is available at the MPS. It is essential that a pocket or mirror stereoscope shall always be used to view AP and Junior officers shall be encouraged to pick up a working knowledge of AP for field use. The following are some of the uses:

- * **Map Making:** AP can be used for the construction of accurate maps using the Arundel Plot Method (see TN No. 1/1957). The location of boundary corners is often possible with good accuracy on AP and more use of AP shall be made in the preparation and revision of boundary plans thus avoiding the time and staff needed for the usual compass and chain survey.
- * **Ground Survey Supplement:** Whenever survey work is being done in the field, AP shall be taken along and marked up with points identified on the ground and photograph. These local "fixes" enable additional detail on the AP to be transferred to the subsequent map.
- * **Mosaic:** When time is insufficient to construct an Arundel plot, a simple mosaic laydown controlled by any ground "fixes" available, can be rapidly made and either traced at photo-scale or reduced by photography.
- * **Field Use:** These are numerous, from road and coupe layout to planning a tour. A photo-pair at scale 1/30,000 covers 2590 ha. in 3-D and at 1/40,000 about 4660 ha. So, large numbers are seldom needed. Marking up in the office prior to field use is of great assistance.
- * **Vegetation Types:** Whenever a distinctive vegetation type is recognisable on the AP it shall be demarcated in chinagraph or removable red ink and a note made on the reverse. This photo shall then be returned to the MPS for preparation of a stereogram and another copy obtained in exchange.

5.3 FOREST MANAGEMENT PLANS (FMP)

5.3.1. The objectives of a Forest Management Plan are to:

- * plan for the efficient management of an MPA in the light of the information available.
- * act as a repository for all information relating to that MPA so that future revisions are based on recorded information.

5.3.2. The standard arrangement of FMPs is shown in App. V.1. As the FMP represents the best information and advice that is available at any one time, no deviations from its prescriptions are permitted without the permission of CFF. However, the prescriptions shall be kept under constant review by DFOs and other interested COs so that they are amended in the light of new information or new objects of management. The amendments shall be recorded in the MP Records and when they become too many, the MP shall be rewritten to incorporate all amendments.

5.3.3. **Management Plan Area (MPA):** The area to be covered by a FMP will be based partly on the type and intensity of management and partly on administrative and geographical considerations. In many cases a series of reserves can conveniently be grouped for FMP purposes. DFOs are responsible for initiating the writing up and revisions of FMPs in their districts. HQ will keep a roster of FMP revisions and will remind DFOs accordingly. Also Annual Reports will clearly show the status of FMPs.

5.3.4. **Preliminary Management Plan Report:** Before any officer undertakes the final preparation of a FMP or its revision, he/she must submit for approval of CFF a preliminary FMP report (normally not exceeding a page), indicating the area to be covered by the FMP and a summary of his main proposals for management including division of the area into working circles, etc., and accompanied by a simple sketch map.

5.3.5. Draft Plans

5.3.5.1. An officer preparing a plan will submit a draft to the Management Plan Section for comments and for forwarding to CFF, who will pass the draft to such officers of the FD as he considers can add information or opinions of value. CFF will give final approval to the draft before printing and circulation.

5.3.5.2. It is not necessary to postpone preparation of a FMP until all the information theoretically is collected. In its initial stages the function of a plan is to provide a suitable repository for records. A plan may be of the simplest possible type, consisting of a page or so of description and providing simply for periodical inspecting, the collection of further information, early burning and what work shall be undertaken or, the basis of an Annual Works Programme (AWP). Normally, FMPs shall not deviate substantially from the Standard Arrangement of FMP in Appendix V.1. All paragraphs must be numbered serially throughout the plan.

5.3.6. **Records:** For each MPA, the following minimum records are to be maintained, whether formal FMPs have been approved or not:

- * **Current Records**, to be kept by DFOs on any new or additional information occurring during the year.
- * **Costing Sheets**, to be maintained for each standard costing heading or compartment and entered up monthly.

- * **Compartment Record Sheets** (FD.IA) to be maintained for each compartment being harvested.
- * **Rainfall Record** (FD.9)
- * **Annual Records:**
 - Equipment Inventory (FD.5)
 - Annual Summary - Direct Charges (FD.6)
 - Annual Summary of Overheads (F.D.7)
 - Annual Summary of Revenue and Expenditure with Overheads (FD.8)
 - Record of deviations from the plan.
 - New Information.
 - Compartment Records (from DFO's current records)

5.3.7. Maps: All FMPs shall have a locality map to indicate the position of the areas under plan. This shall, where possible, be of A4 size and never more than A3 size to permit binding with the FMP. Management maps shall be on a larger scale suitable for the purpose.

5.3.8. Format and Reproduction: All FMPs are to be produced on A4 size and will be reproduced for local and limited external distribution; selected plans may be printed. Compartment descriptions shall be required for record copies only.

5.3.9. Record Copies of Plans

5.3.9.1. The following copies of plans will be maintained as record (master) copies:

- Field (or range) copy
- DFO's copy
- CFF (2 copies)
- Library

5.3.9.2. The field copy shall always be available for the entry of notes etc. by visiting officers. Rangers in charge of operations must be familiar with the provisions of the FMP.

5.3.9.3. Each copy will be filed in a stiff binding cover. The annual records, maps, etc. will be filed separately in the appropriate file cover (FD.58) or a ring binder.

5.3.9.4. Copies of forms and comment slips will be sent to CFF before 31st October each year.

5.3.10. Distribution of Plans

5.3.10.1. DFO concerned - 2 copies (1 range copy).
Officer preparing Forest Management Plan 1 personal copy.
Commissioner for Forestry
HQ Library
NFC
FORI

5.3.10.2. In addition to the above local distribution, copies shall be sent by CFF to other forestry institutions in East Africa and throughout the world who are included in the approved circulation list. The total number of copies of each major plan to be produced will be determined by CFF.

5.4 SEEDS AND NURSERIES

5.4.1. Seed Indents

5.4.1.1. Seed Indents shall be based on the annual planting programme in plantations and for enrichment planting. National Tree Seed Centre (NTSC) will annually send out questionnaires to DFOs for them to indicate their requirements. Also include planned sales of trees, hedgings and ornamentals.

5.4.1.2. Seed will be ordered from the NTSC by 31st December for supply the following year. Generally all except very local collections shall go through the NTSC. A Seed Indent (FD.47) will always be used (Appendix V.4A).

5.4.2. Seed Batch Numbers

5.4.2.1. The Seed Centre will allocate serial batch numbers (prefixed S) to all seed received from within and outside Uganda before forwarding to charge officers.

5.4.2.2. Batches of seed originating from the districts will be numbered serially by the charge officer concerned irrespective of year, and prefixed by the district abbreviation.

5.4.3. Seed Records

5.4.3.1. Batch numbers shall be quoted in all seed records, MPR, research records, etc.

5.4.3.2. Seed movements within Uganda will be covered by Seed Issue Advice Notes (FD.13 App.V.4B) sent separate from the seed and by Seed Supply Notes (FD. 11B) sent with the seed in duplicate (1 copy for DFOs files). Receipt of seed must be acknowledged (Appendix V.4B).

5.4.3.3. Form FD.10 (Particulars of Seed or Fruit Supplied) will be used for special purposes only, e.g. provenance trials and by the NTSC for overseas consignments if considered necessary.

5.4.4. Registers

5.4.4.1. Seed and Nursery Registers shall be maintained by DFOs and P/NFC for all nurseries. The Register Form shall be obtained from the NTSC.

5.4.4.2. The seed register shall show all seed used, whether collected locally or received from outside; seed collected locally and sent outside the district shall also be entered.

5.4.4.3. The Nursery Register shall record only those plants actually taken out of the nursery and used for field planting; transplants within the nursery and culls shall not be entered.

5.4.4.4. The NTSC will maintain the following registers:

- * Serial list of batch numbers for all incoming foreign seed;
- * Record of seed orders; and
- * Seed register recording by species all available information on incoming and outgoing seed.

5.4.5. Germination Tests

5.4.5.1. The NTSC is responsible for carrying out routine germination tests on all incoming seed. DFOs shall inform the centre of the germination of each Seed Batch in the nursery so that the cause of poor germination can be pinpointed i.e. either from poor seed which will be apparent from Silvics’ tests, or from poor nursery technique. On pricking out the number of plants per kg of seed will be recorded on Form FD.48, one copy of which will be sent to FORI. (Appendix V.4C).

5.4.5.2. Seed Storage: Seed will be stored at the NTSC in a refrigerated store to maintain viability. Seed Indents will, therefore, not be supplied until they are required for sowing and this date shall be shown on the order. Before sowing, seed shall be stored in a cool dry place, and any extra seed that is not immediately required shall be returned to the NTSC.

5.4.6. Site and Layout: Permanent as against temporary or “flying” nurseries shall be provided for all long-term planting schemes. One of the main considerations for a nursery site is water supply. This shall be available throughout the year and the water delivered to the nursery by means of piping and hoses wherever possible; pumps shall be installed as necessary. The site shall be sunny, slightly sloping, have a fairly light soil, be drained and be adequately sheltered from cold or drying winds. The most economic layout is a square; in the centre are situated stores, potting shed and shade bandas. The surrounding area will be used for plant pots. In providing shelter for the nursery, fast growing exotics should be avoided as far as possible in view of their adverse edge effects. These can be lessened, however, by digging a deep trench along the nursery side of the hedge or shelter belt.

5.4.7. Seed Beds: Construction and Soil Mixture. The function of the seed bed is to provide for the seed to germinate in before transplanting. It shall be freely drained to prevent damping off. Generally the seedling will be transplanted while it is still utilising food reserves in the cotyledons, so the nutrient status of the seed bed mixture is not important. A 10 cm. deep bed, of a mixture of equal parts of sieved forest soil and sand, or even pure sand, over a layer of coarse stone is adequate. No fertiliser is necessary. The size of the sand grains will depend upon the size of the seed. The seed bed mixture shall be firmed and levelled.

5.4.8. Sowing

5.4.8.1. Seed shall on no account be sown thickly. To avoid this fault, mix all fine seed (which includes pines and cypresses) with sand, 2 parts sand to 1 of seed, at the time of sowing. The mixture is then broadcast carefully and evenly onto the surface of the seed-bed. Appropriate sowing densities are:-

<i>E. grandis</i>	0.5kg. to	25 m ² of bed.
<i>P. patula</i>	“ “	5.0 “ “
<i>P. caribaea</i>	“ “	4.5 “ “
<i>C. lusitanica</i>	“ “	4.5 “ “

5.4.8.2. Seed require to be covered to a depth of only twice their actual thickness, which means a very light covering in most cases.

5.4.8.3. Sand or finely sieved soil shall be used for the purpose, being evenly applied and then firmed with a flat board. Vermiculite is also a good covering in low moisture areas, though it keeps the soil too moist and may cause damping off. It is useful where water is scarce. Conditions of light and moisture shall be carefully controlled from the time of sowing until the seedlings are pricked off.

5.4.9. Shade and Watering: Seed beds shall be given full shade and protection from rain. However, shade and mulch shall be provided after germination. Enough water shall be applied to keep the soil moist, but not too much to cause damping off. Water shall be applied through a fine rose or mist spray. Shading of newly pricked out seedlings shall not go beyond 10 days, otherwise the seedlings are likely to suffer damping off.

5.4.10. Hygiene: Seed bed soils shall not be used for too long unless sterilised as damping-off organisms etc. build up in time.

5.4.11. Transplanting

5.4.11.1. Before the advent of polythene, seedlings were transplanted (pricked out) into beds or boxes or pots. The pots could be made out of bamboo stems or banana fibres or soil blocks. The old practices are described in the Forestry Manual. The current practice is to prick out into polythene pots or bags. These are in the form of 5cm lay flat size for eucalyptus and 10cm for conifers. Larger sizes or empty milk pots may be used for hardwoods. The gauge generally used for large pots is 250, but experience may show that a lighter gauge, say 150, is practical length of polythene tubing per kg. The pots shall be filled to within 3 cm. of the top with the standard soil mixture for the nursery. The mixture can vary from nursery to nursery depending on local conditions, availability of materials etc., but once a satisfactory mixture has been found it shall be standardised and laid down as such in the Forest Management Plan, together with the source of supply of each constituent.

5.4.11.2. The complete mixture (including NPK) shall be made up 2 weeks to 1 month in advance of transplanting (pricking out) so as to allow sufficient time for organic material to break down and , nutrients to become fully distributed. During the waiting period, it shall be protected from sun and rain and maintained in a nicely moist condition by occasional watering. To allow adequate time for “settling” the mixture shall be put into the pots at least a fortnight before pricking out. During this time, weed seeds also germinate and shall be removed.

5.4.11.3. In areas where pine is being introduced for the first time, it is wise to include mycorrhiza in the soil mixture to ensure early growth of seedlings. An amount of 0.1-0.2 by volume will be adequate.

5.4.11.4. Fertilisers are added to the soil mixture while it is maturing to provide a source of nutrients for fungi and bacteria that are breaking down the organic matter and to prevent them depleting the nutrients already in the mixture. The rate should be 1500g per m³. The heap of soil shall be stored in a bin of known size so that its volume can be calculated. Fertilisers should be obtained in the following forms:

N.....Sulphate of Ammonia.
P .. Super-phosphate (usually double).
K....Muriate of Potash.
N, P and K should be mixed in the ratios 3N: 3P: 1K.

5.4.11.5. Fertilisers shall be carefully protected from damp when in store and shall only be mixed immediately before applying otherwise rapid deterioration in the nutrient content takes place.

5.4.11.6. It is essential that seedlings are transplanted as soon as they are large enough to handle. This means, in most cases, one week after germination has taken place. To leave seedlings in the seed bed longer than this results in increasing check on the transplant, a setback from which they may never fully recover from.

5.4.11.7. Holes shall be dibbled in the pot ensuring that the holes will take in all the roots. In lifting seedlings, always grasp the plant by its seed leaves, or seed coat, never by the stem as this may cause damage to the tissues which in turn results in checking and the possibility of disease.

5.4.11.8. If the seedling has been left too long in the seed bed, the tap root shall be cut back to prevent it being bent up in the hole.

5.4.11.9. The whole operation must be carried out entirely under shade, and the workers themselves shall be under shade.

5.4.12. Shade and Watering

5.4.12.1 Transplants require full shade for the first two to three weeks, then half shade for one week, after which no shade should be necessary. As the shade is decreased the intensity of watering shall be increased; for the first few days after pricking off light watering only is necessary, similar to that given to a seed bed. Once the plants are established and fibrous roots are beginning to develop, the rate of watering shall start to increase gradually until, by about the middle of the dry season preceding planting, the twice daily rate has been stepped up. Fine roses shall always be used.

5.4.12.2. Even in a particular nursery it is virtually impossible to lay down definite rules regarding the intensity of watering. The amount of water required by pots can only be judged by the condition of the soil at the time. Nursery men shall be taught how to recognise a “nicely moist” soil by the feel and appearance, and instructed to carry out frequent checks to ensure that this condition is constantly maintained by appropriate watering. This should eliminate the common faults of over-watering young transplants and under-watering old transplants.

5.4.13. Cultivation and Mulching: Once the transplants are well established the soil surface requires cultivation or loosening at regular intervals to prevent it becoming compact hard. Weeding is carried out at the same time. Mulch shall be applied to the soil surface when the shade is fully removed, primarily to conserve soil moisture. A thick mulch is essential during the dry season. A variety of materials can be used for this purpose e.g. chopped leaves, chopped grass, charcoal, rotted coffee husks, wood shavings (not sawdust) forest litter etc. After cultivating the soil, the mulch will be applied liberally to form a complete cover 1 - 2 cm. thick. If termites are likely to attack the mulch material it can be treated with a light dusting or before applying, alternatively use charcoal, which is not affected by termites.

5.4.14. Root Pruning: About two months after pricking off, root pruning shall be commenced using a knife, wire, or scissors or finger nails. Root pruning shall be carried out weekly

5.4.15. Hardening off: To prepare transplants for the change to field conditions, a process of “hardening off” shall begin five or six weeks before planting out time. This involves gradually reducing the amount of watering and increasing the frequency of root pruning so as to bring the nursery stock to a standstill.

5.4.16. Protection of Plants

5.4.16.1. Termites: These treatments are for plants that will be used in areas where losses from termite damage are likely. For this reason, pots must be used. If plants are being attacked, then treatment with an appropriate insecticide according to the manufacturer’s instruction should be done.

5.4.16.2. Pre-treatment of nursery Soil. Marshall Suscon at 8gm per litre of soil or 8kg per cubic metre of soil is thoroughly mixed in the potting soil before placing into pots. Higher concentrations of the insecticide are not recommended as phytotoxicity may develop. Recommended rates shall, therefore, be adhered to.

5.4.16.3. Treatment of Plants Already in Tubes. Once seedlings have been potted, it is unwise to treat them with Marshal suscon as there is likely to be uneven mixture of the soil. Treatment in potted plants is not, therefore, recommended. However, when planting out, Marshal suscon granules at 5 gm per tree should be placed in the planting hole. Then thoroughly mix the Marshal suscon granules with the soil in the planting hole before planting and replace the treated soil around the root zone of the planted seedlings. When pots/tubes have been treated using the method as described, the plants shall not be planted too deep. At least 1 cm of the treated soil shall be above the ground level. This will prevent untreated field soil from covering the treated soil and thus giving the termites a bridge. When planting, the top 3 cm of the pot shall be left intact but the bottom part of the pot shall be split or removed to allow for lateral root development.

5.4.16.4. Field Applications. Mix 10g of Suscon granules with soil around the planted tree. Different species of termites forage at different depths in the soil and so it is important that the granules are mixed evenly round the tap root and underground stem of the young tree. In terms of cost, labour, ease of application and effectiveness, nursery treatments are the best. Applications in the field may make planting rates two or three times slower and are generally 5-10 times more expensive. Insecticide applications can do little to help poor plants or careless planting. There is no substitute for vigorous plants. When clearing ground for planting eucalyptus, termites shall be destroyed by poison or digging out the queen-ant. This shall be done by digging up the anthill and then pouring in poison or keep digging until the queen ant is found and removed.

5.4.16.5. Crickets, Hoppers, Weevils etc. Beds and paths shall be spread with treated soil as described in 5.4.15.

5.4.16.6. Cut -worms, Chafer grubs etc. Treat as in 5.4.16.1.

5.4.16.7. Damping off. A fungicide such as “Tulisan” or “Kaptan” shall be used as routine measure in all nurseries. The fungicide shall be watered onto the seed bed before sowing and at weekly intervals. However, the best protection is thin sowing and avoidance of too much watering. “Perenox” or other copper based fungicides shall NOT be used on acid soil or transplant beds because it inhibits root growth.

5.4.16.8. Safety: Before using insecticides, fungicides or arboricides, please read Appendix V.5 carefully.

5.4.17. Nursery Records: The proper recording of nursery information is absolutely essential and involves the following information:

5.4.17.1. Labels: All forms of nursery stock whether in seed beds, transplant beds, boxes, or pots etc. shall be fully labelled; a scrap of paper in a cleft stick does not count as a label - ivorine or metal labels shall be used, obtainable from the Storekeeper. Labels shall show the following e.g. species, batch No., date sown, quantity sown, date germinated, date transplanted and number transplanted. The relevant dates shall be prefixed 'Sn' for sown, 'G' for germinated and 'T' for transplanted.

Example:

<i>Pinus patula</i>	S.123
Sn. 26/5/96	(100g)
G. 14/6/96	
T. 10/7/96	(2,400)

In case of loss of labels, a nursery plan with these details is useful, see also Seed and Nursery Register, para 5.4.3.1. and 5.4.4.1..

5.4.18. Nursery Planning and Organisation: For all nurseries connected with major planting schemes, the following forms shall be drawn up by the DFO concerned and approved by the CFF prior to implementation:

5.4.18.1. Nursery Calendar (Form FD.34): This lays down for any particular nursery the sequence of operations to be carried out by nursery staff month by month. Once a calendar has been drawn up and proved in practice, it remains in force until amended by the CFF. In addition to the actual timetable of operations, standard instructions for soil mixtures, fertilisers etc. are incorporated as footnotes.

5.4.18.2. Nursery Stock Requirements. (Form FD.35): This form is to be compiled by DFOs for each nursery to show as far in advance as possible the number of plants to be raised in accordance with the annual planting programme. After approval, a copy of the completed form will be sent to the Forest Ranger in charge of the particular nursery, who will then be responsible for organising his nursery work accordingly. Seed requirements shown on this form will of course be incorporated in DFOs annual seed indents, whilst the sowing and planting months quoted will accord with the Nursery Calendar.

5.4.18.3. The primary objectives for these forms are to ensure that sufficient plants are raised for dependent planting schemes; and that the stock produced each year is of optimum size i.e. not less than 25cm high and well proportioned, at the time of planting. Notes on Individual Species are contained in the Forest Manual.

5.4.19. Sale of Nursery Plants

5.4.19.1. If it is certain that there is a good market for nursery plants (for timber/poles/fuelwood/ X-mas trees or ornamentals), then DFO shall plan and budget to meet such a demand. It is not only a commercial venture but also good publicity for FD.

5.4.19.2. Where other agencies already perform this service adequately, there is no need for the FD to do so. These agencies may be the Agricultural Department, Local Authorities, NGOs/CBOs and

individual commercial nurseries. The NTSC (Namanve) will assist in the procurement of seed not available locally.

5.4.20. Seed and Plant Prices: FD has diversified species in nurseries according to demand. Prices are listed in the official gazette made under the Forests Rules. Within the range of prices listed a nursery supplying ornamentals shall seek to cover at least its direct costs. If this is not possible, and a nursery makes a loss over a period of two or more years and it seems unlikely that demand will revive, then the supply of ornamentals shall be discontinued. Free issues of hedging plants can no longer be justified.

5.5 MANAGEMENT OF CYPRESS AND PINE TIMBER PLANTATIONS

5.5.1. Annual Planting Programme: The Annual Planting Programme shall be drawn up 2 years in advance. On this will be based the Seed Indent. The annual planting programs will be derived from the Site Type Map (if available) and a field inspection to determine the areas of each species to be planted. The species to be raised and the sites they are to be planted on shall be prescribed in each Management Plan. If there are no MPs or indication of the species, then DFOs shall get approval from HQ.

5.5.2. Planting

5.5.2.1. Spacing. Planting distance will be 2.7m x 2.7m. Refer to Appendix V.20.

5.5.2.2. Alignment: Accurate horizontal espacement at 2.7m x 2.7m is essential at establishment; without it, subsequent selection and thinning are more difficult and liable to serious error. On easy terrain, where the difference between stocking per ha. obtained by measuring 2.7m along the ground and horizontally is negligible (slopes less than 20 degrees), a wire rope marked in 2.7m lengths shall be used for lining out, taking care to maintain a square pattern. On ground sloping at 20 degrees or over, lining out shall be done using horizontal measures of 2.7m by the following method:

- * Lay out a “base line” through the planting area choosing as long an uninterrupted roughly-horizontal line as possible (in rugged terrain the base-line is best selected nearer to the top of a ridge than the bottom because it is easier to work down hill than uphill from it).
- * Lay a rope along the base line, then, using a light stick exactly 2.7m long, held horizontally, put in pegs every 2.7m along the base line.
- * At or near the end of the base line, using a Cross Staff or Optical Square (never a compass), lay off a “cross line” exactly at right angles to the base line.
- * Lay a rope along the cross line then, using a light 2.7m. stick held horizontally as before, put in pegs every 2.7m along the cross line above and below the base line.
- * Depending on the degree of control desired, cross lines shall be laid down as described above at intervals along the base line - e.g. every 10th stake or every 20th stake. These stages shall be done by trained staff of not lower than a Ranger rank).
- * Now it is possible to start lining out the planting area by the echelon method which can be repeated from each cross line as follows:
 - Lay a rope (Rope 1) from the base line parallel to a cross line at 2.7m measured horizontally from it, then, as before stake every 2.7m measured horizontally along the rope.

- Move Rope 1 to its second position still parallel to 2.7m and from the crossline, repeat the staking process.
- As soon as Rope 1 has moved to its second position, Rope 2 can be introduced starting again from the base line and laid parallel to and horizontally from the first position of Rope 1 while staking this - and all subsequent lines - not only shall the 2.7m espacement be measured horizontally but also the lines of stakes at right angles to the rope shall be maintained by eye.

5.5.2.3. Planting Hole. Planting holes shall be dug well before the rains are due. If the ground is hard, a mattock may be used. Planting holes shall be 30cm deep, 30cm long and as wide as a hoe and be put on a terrace sloping into the slope on hilly ground. When ploughing has been done, the normal method is to plant in the furrow, but this may be varied depending on proven local experience.

5.5.2.4. Soil Moisture (or Rainfall) Build Up. This method is described in Chapter 2 of the Forest Manual. SOIL MOISTURE BUILD UP SHALL ALWAYS BE CALCULATED FOR ANY PLANTING. The following additional rules shall also be observed:

- * If the main rain gauge of the forest station is more than 1km. from the planting site then field rain gauges at the site shall be used.
- * Supplement the build up calculation by field inspection of the top 30cm. of soil.
- * Calculate the earliest date, from previous records, that sustained rainfall occurs, and do not plant before this date even if build up is achieved.
- * Likewise, define the latest date beyond which no planting may be done. Do not plant during breaks in the rain if the soil dries out; wait until build up is achieved before starting planting again.

5.5.2.5. Planting. When moisture build up is achieved all the planting shall be done as quickly as possible; therefore pitting shall be done before the rains start. If possible the plants shall be taken out to the planting site and kept watered and in the shade there. When planting has been completed, a Stock Checking shall be done (para 5.5.9) to check that the stocking is correct, and to see if beating up is necessary. Results shall be recorded in Cpt. records.

5.5.3. Beating Up: In order to eliminate unnecessary cost of beating up and at the same time to ensure adequate stocking of the crop, the following method shall be adopted:

5.5.3.1. Beating up will normally be done during the major planting season i.e. one year after initial planting. If, however, there is surplus of **good** plants after the major planting, then surplus plants may be used for beating up in the next rains.

5.5.3.2. A 10% assessment of survival will be carried out two months before new planting is expected to begin (see Appendix V.21 for a description of the method).

5.5.3.3. Assessments shall be carried out in blocks of up to 30 ha in size with either artificial or natural convenient boundaries.

5.5.3.4. Survival of 75% or more for any block will be considered adequate under all circumstances and will not be beaten up.

5.5.3.5. Where survival is less than 75%, beating up will be done according to the method described in Appendix V.21.

5.5.3.6. Beating up will be done **first** before any major planting is carried out and with the best plants.

5.5.4. Stock Checking

5.5.4.1. The stock checking method using 0.01 ha. un-demarcated circular plots SHALL be used for treatments and checks affecting stocking up to and including the first thinning, but SHALL NOT be used thereafter. The 0.01 ha. circular plots will be located in blocks of relatively uniform crop (in terms of species and height/age) using the Grid for Checks of Stocking in Softwood Plantations. These are available printed on clear film from Management Planning Section on request. Centres of plots shall be chosen at random by tossing the measuring pole into the located plot and taking the point where it lands as the plot centre, but shall never be a tree.

5.5.4.2. All trees and blanks within 5.65 m of the plot centre measured horizontally with a light pole of exactly that length are counted separately. The heights of the three trees of greatest dbh. are required prior to the FIRST thinning ONLY. This will estimate the pruning height and, although not strictly “dominant height”, will indicate the probable Yield Class.

5.5.4.3. For the THIRD thinning, the method employed will depend upon the topography in the block. The following alternatives may be used on relatively flat land, where a continuous series of adjoining 0.02ha. plots can be laid out accurately with the minimum of slope correction:

- * Plot corners are staked or otherwise marked. The plots will be 14m square.
- * The correct number of trees to be LEFT are marked for thinning. The number of trees to be left per plot is simply calculated from the number to be left per ha. e.g.

T.2 s.p.ha. to be left = 640; therefore 13 per 0.02 ha.

T.3 “ “ = 350; “ 7 per 0.02 ha.

No actual stock check is prescribed in this method but a record of numbers of trees left and marked for thinning can give this information.

5.5.4.3. On steep land, using the appropriate grid (Appendix V.6) and 0.04 ha. undemarcated circular plots to determine number of trees only, calculate s.p.ha. Plots will be 11 m. radius corrected for slope using table (Appendix V.14). Reduce “Trees to be left per ha/Trees standing/ha” to a simpler convenient fraction and adjust to the most suitable denominator for use when marking thinning. e.g. 600/1000 = 6/10, giving the prescription. Leave 6 trees standing in a 10 TREE (not Spot) plot.

5.5.4.4. Figures for stock checks must be recorded on the Thinning Control Form (Appendix V.9) in the Compartment Records.

5.5.5. Weeding: The objectives of weeding are to reduce competition from other vegetation, to prevent mechanical damage or smothering by vegetation and to prevent rodent damage by exposing the stem of the tree. Cypress cannot cope with competition so all three reasons above apply, but with pines only 2 and 3 are usually applicable, except in dry conditions. Weeding of pines should, therefore, only be done with good reason and should consist of slashing or trampling only.

5.5.6. Thinning and Pruning

5.5.6.1. The objects of pruning are to produce clear timber, to upgrade timber just outside the knotty core and in some cases, to prevent the spread of ground fires into the crowns. All trees in a crop, except obvious runts, should be pruned twice - see Schedule in Appendix V.7. From the third pruning however, only 300 - 345 selected trees per hectare shall be pruned. Pruning shall not exceed half height unless authorised by CFF.

5.5.6.2. Each MPA must have its own thinning and pruning schedule based on the guide in Appendix V.7 related to species, local growth rates and markets and approval by CFF (refer also to P. Karani, Commonwealth Forestry Review 1976, 1978). In the first thinning the trees that are well formed and of reasonable growth rate shall be favoured. Thinning shall not be based on size alone. In subsequent thinnings, when trees have been selected for high pruning, thinning shall favour them. Good distribution of the trees remaining is important, so trees adjacent to the thinning selection plot shall be considered too.

5.5.6.3. Normally selection of trees to be pruned beyond 5 metres takes place two years prior to the third pruning, i.e. in about years 11 to 13. Marking of thinnings and of selects up to the pruning at age 13 - 15 shall be done by the SPOT PLOT method outlined in Appendix V.8. Pruning beyond 5m was suspended in early 1970s pending a decision on introducing higher fees for pruned logs. Pruning above 5m must, therefore, be approved by CFF.

5.5.6.4. To encourage rapid occlusion in the case of cypress pruning, it is important to confine operations as far as possible to rainy periods. This does not necessarily imply that pruning can only be done during the rains (when labour is generally fully-occupied on planting); a heavy fall of rain at any time justifies resumption of pruning up to 3 weeks from the time of rainfall. Pines can be pruned at any season. Selection marking and thinning will normally be confined to the dry season, say December to February. The simple proportion method using spot or tree plots for choosing thinnings and selects is described in Appendix V.8. This method and no other will be used.

5.5.6.5. From the simple proportion method the thinning and pruning prescriptions can be drawn up and recorded on the Thinning Control Form (Appendix V.9). In FMP records the date the thinning or pruning was done, the stems remaining and the number of selects per ha. and whether the prescription was adhered to shall be recorded. Also an estimate of the height to which pruning was done, for the most efficient exploitation in the future is indicated.

5.5.6.6. Where the thinnings are being harvested by a licensee, diameter measurements shall be made at the time of thinning selection on a proportion (say 1 in 10) of the marked thinnings to give the licensee an estimate of standing volume. When tariff tables are available these will be used instead.

5.6 MANAGEMENT OF EUCALYPTUS PLANTATIONS

5.6.1. Spacing: Normal spacing for Eucalypt plantations is 2.4 x 2.4m for fuel crops on 7 - 10 year rotations and 1.8 x 1.8m for pole crops.

5.6.2. Protection against Termites: If termite attack is likely, the young plants shall be protected as explained under nursery practice in para. 5.4.36. Also, terminaria shall be dug out or poisoned.

5.6.3. Size of Plants: Spindly or oversized plants must be avoided. If plants have to be held over in the nursery for the next rains they shall be cut back short. In dry areas, cutting back (clipping) is recommended and was used as standard practice in eastern Uganda.

5.6.4. Weeding: Clean hoeing in grassland areas is essential for the establishment of new plantations until canopy closure. Coppice crops do not always require hoeing, but slashing back of competing

climbers, grass etc. is necessary, and where the coppice has been beaten up, clean hoeing may have to be done.

5.6.5. Coppice Regeneration: Reduction to 2 - 4 stems per stool shall be done when the plants are 3 - 5 m high. The number of stems will depend on the purposes for which the crop is being raised. If possible, the thinnings shall be sold; if it is not possible to sell the thinnings, and the objects of management permit, then coppice reduction shall not be done.

5.6.6. Felling: Felling shall be done as low as possible and stumps shall be tripod sloping and smooth. (see Forest Manual Chapter 7, Section III, para. 57). If felling is done by contractor or casual licensees then this shall be one of the conditions of the Licence. Felling shall be done by blocks of no bigger than 1 ha., shall be completed as quickly as possible and shall remove every stem before another block is started. Coppice regeneration after haphazard or "selection" felling is always poor. The use of saws (including power saws) shall be encouraged to reduce waste. To reduce waste, all departmental cross-cutting shall be done by saws and all other people should be encouraged to do the same.

5.6.7. Beating up will be as described in Appendix V.21.

5.7 MANAGEMENT OF NATURAL HIGH FOREST (NHF)

5.7.1. Introduction

5.7.1.1. These are purely practical instructions for NHF management. The policy, theory and practice on which they are based and success thereof are described in publications listed in App.V.6. The FD carries out ten different operations in the NHF. They are given here in the order in which they would occur, but not all are current silvicultural practices.

- * Before Felling.
 - i) Exploratory sampling
 - ii) Protective climber-cutting
 - iii) Regeneration inducement
 - iv) Stock mapping

- * After Felling:
 - v) Log measurement
 - vi) Felling damage repair or charcoal burning
 - vii) Enrichment planting or sowing
 - viii) Diagnostic sampling
 - ix) Tending
 - x) Sample plot establishment and measurement.

5.7.1.2. Not all the above works were required in every forest. The diagram in Appendix V.16 gives the logical relation between the ten operations and none of them should be put into practice until all stages higher in the diagram have been considered, and put into practice if relevant. The actual nature and sequence of operations would be separately decided for each forest and even for each compartment by the DFO, subject to the prescriptions of the Forest Management Plan.

5.7.1.3. Exploratory Sampling (ES) (formerly known as enumeration) seeks to find out the composition of a forest sufficiently for planning of harvesting and silviculture. It gives information on the distribution of species in diameters, volumes and yields. ES is now antiquated and has been replaced by the generic term of “inventory”.

5.7.1.4. Inventory methods used before 1973 are described by Dawkins. The CIDA (Canada) inventory of 1973 and subsequent inventories (up to that of Tindyebwa *et al* 1991) applied more sophisticated methods both in the field and in processing the results. Inventory shall be carried out every five years in NHF until permanent sample plots (PSP) can be relied upon to supply the required information. It is the responsibility of the DFO to undertake inventory.

5.7.1.5. Protective Climber Cutting: In any forest where felling damage is likely to be seriously increased by woody lianes, climber cutting may be required from three to five years before felling. All climber stems are cut clean through with a panga at about head height. If the upper severed end falls to the ground then another cut is made at head-height to keep the upper end well clear of the ground. If climber cutting is not necessary to reduce felling damage, it will be done at the same time as access cutting for refining or for enrichment planting (including planting at stamp).

5.7.5. Regeneration Inducement: Where natural regeneration is inadequate before felling and is not induced in sufficient quantity by the felling operation, then pre-exploitation inducement may be considered. This may consist of soil working, ground weeding, slashing, canopy manipulation or even fire. However, regeneration inducement has not been found to be a necessary operation in the management of any Uganda forest so far, as felling generally creates suitable conditions for regeneration. The inclusion of this section is, therefore, only for information and completeness.

5.7.6. Stock Mapping

5.7.6.1. Stock Mapping is done before felling for the following reasons:

- * To provide an estimate of the harvestable timber available. This enables clients to gauge future production and marketing. For this reason, stock mapping shall be done two or three years before felling.
- * To determine the best alignments for extraction roads from the stocking of harvestable trees. A map shall be produced to show the distribution of stems in the Compartment. Extraction roads shall be aligned near the resource so as to minimise skidding distance(s).
- * To act as a check on the completeness of felling of harvestable crop. Trees are identified by numbers scribed onto them.

5.7.6.2. There are two methods of doing stock mapping, depending on the way the information is to be used and the accuracy required. The first is the “**Budongo**” method, where besides a summary of harvestable trees an accurate map showing the position of each harvestable tree, topographic details etc. is made. This is most suitable where there are many stems of high value. The second method is the “**Block**” method, where only the approximate location of each tree is known and any map produced is a diagrammatic representation of the stocking of a block rather than the accurate location of each tree. The Block method is more suited to forests stocked with stems of lower value.

5.7.6.3. Budongo Method

- * From the Base Line running North - South, strip lines are cut running East - West at intervals of 200m. The strips are divided into 200m square blocks with block lines. To enable trees to be accurately located, pegs are put in at 20m intervals on the North-South lines of each block and along three guide lines cut North-South at 50m intervals. The terms North-South are used for descriptive convenience only, and the base line may be aligned in any convenient direction (see diagram in Appendix V.17.A).
- * Enumeration is done by 4 forest workers and a Ranger. Depending on the visibility and the stocking, the Ranger may walk up either mid-way between the guide lines (a sweep 50m wide) or else on the guide line (a sweep 100m. wide). Two workers walk level with the Ranger on either side and at a fixed distance i.e. either 8 1/3 m. apart if the Ranger is doing a sweep 50m wide or 16 2/3m apart if he is doing a sweep 100m wide.
- * On spotting a tree to be measured, each worker inserts a ranging pole in the position he/she has reached and goes to measure and number the tree. Meanwhile the Ranger estimates its distance from the line on which he/she is walking and his/her distance up that line, assisted by the pegs previously put in at 20m. intervals and by the workers ranging poles - hence the need for them to maintain line and accurate spacing. The method is shown in the example of a field book in Appendix V.17B. Topographic details can also be added. The field book shall show the species, the number of the block, the direction of travel and from which cut line the measurements are made.
- * From the field book, an accurate map of the location of each tree can be made and streams etc. plotted. The road system can be laid out on the map to pass as close as possible to concentrations of trees and to avoid obstacles.

- * Data shall also be summarised by species and girth classes for the sawmill and for FMP records.

5.7.6.4. Block Method

- * Basically, the block method is the same as the Budongo method in that blocks are cut and enumerated for harvestable trees. The blocks may be the same size and worked through in the same manner as the Budongo method or they may be bigger (e.g. 300m. square as in Mpigi).
- * Tree numbers, species and girth classes are noted in the usual way, but the tree is not exactly located. Data is presented in diagrammatic form by blocks (see Appendix V.17C).

5.7.6.5. General Notes of Stock Mapping

- * Harvestable trees are those are normally felled. These include all compulsory species under the Licence and the most frequently felled optionals. A list of these should be made for use by the Ranger i/c Stock Mapping.
- * The Ranger doing the stock mapping should, if possible, also be in charge of the exploitation so that he knows not only the species but also the form of the trees to be harvested.
- * A summary of the stock mapping results by numbers of stems, species and diameter classes shall be made. Fairly wide classes can be used e.g. 50-70, 70-90 and 90+ cm diameter. The summary shall be made by blocks by the Ranger doing the stock mapping and sent to the DFO who will summarise the data for a sub-compartment and send it with a covering letter (and map, if available) to the licensee. Copies of the summary should also be put in FMP records.
- * Each tree shall be physically numbered by cutting the figures into the wood after removal of a square patch of bark. This is important for checking the completeness of harvesting.
- * Stock mapping can be combined with climber cutting.

5.7.7. Control of Harvesting and Timber Measurement

5.7.7.1 Felling by sawmillers shall be concentrated in one place and over a short period to induce and preserve regeneration. If felling is diffuse suitable light conditions are not created and if spread over a long time regeneration established at the early fellings is likely to be damaged later. For these reasons, felling shall be concentrated in coupes or sub-compartments, and should be as complete as possible even if harvesting is being done by casual licensees. Strict control shall be exercised to ensure that all harvestable trees are felled. Before granting permission for the opening of another coupe, the DFO shall be satisfied that the previous one has been harvested as completely as possible. The allocation of a “wet weather” coupe adjacent to a good road in addition to the current coupe is not encouraged because the regeneration period then becomes prolonged and the conditions of Licences state that roads must be passable in all weather.

5.7.7.2. Pitsawyers and casual licensees shall be controlled no less strictly than sawmillers and it shall be remembered that the contribution of pitsawyers to good silviculture and efficient management is far less than a sawmill because they cut fewer species, of a smaller size and do not build roads etc. It is important to ensure that casual licensees do not cream a forest. If pitsawyers are numerous, their

operations shall be concentrated in coupes and every effort made to increase the number of species that they will cut. Control of felling is simplified too if they are concentrated into coupes. Alternatively, pitsawyers may be encouraged to do felling in the areas which are too difficult for sawmillers and where there are often logs rejected by the mill but capable of producing some timber. All poles cut for building tresles shall be paid for according to the reigning fees of the respective size class to minimise damage to regeneration.

5.7.7.3. Before casual licensees fell a tree, it should be inspected, usually by the field staff i/c of the area, to check that it is above the diameter limits etc. If so, it is marked with the FD hammer and the pitsawyer goes to obtain a Licence to fell (Form B - Cap.246). After felling the tree is measured, including any unnecessarily high stumps, in the same way that a tree is measured for a sawmiller using FD 51 (App.V.22) and sawing shall commence. In order to check that Licences have been obtained for trees, the Felling Licence number shall be hammered onto the stump. Licensees shall always have a copy of their Licence when working in the forest. Removal of produce from the stump to outside the reserve or county (in case of Open Land) shall require prior acquisition of FD 50 from the in-charge.

5.7.7.4. Firewood cutters and charcoal burners must likewise be strictly confined to coupes. Selected trees shall not be felled, damage to them shall be avoided and any such damage shall be paid for. It may be possible to charge a flat rate per person employed per month to save on administrative costs e.g. if firewood is Shs. 3,000/= per cubic metre and a person cuts an average of 20 cubic metres per month then the licence is Shs. 60,000/= per person per month.

5.7.7.5. Timber measurement shall be done in the forest or at the loading site before or after cross cutting. Measurement is done of the total length of useable timber (as defined by the Licence) in the tree. No matter where cross-cutting has been done, any useable timber in the stump or below the fork shall be included in the measurement. One method is to measure the tree in arbitrary log lengths e.g. 5m. lengths plus the final length measured to the completed 20cm., before cross cutting. No attempt shall be made to tell the client where to cross cut. The second method is to measure the tree in log length as marked by the client but before cross-cutting.

5.7.7.6. Each tree shall be given a number which is stamped onto the stump and each log and will be used to identify the tree on FD 51. Each log will also be numbered, the bottom being 1, the next 2 etc.. These numbers should be stamped onto the end of each log, or if that is not possible, onto a square patch cut out of the bark on at least two opposite sides of each log. The "FD" hammer mark will also be stamped on.

5.7.7.7. Timber Harvesting Volume Measurement Book (THVMB): The following information shall be recorded in the THVMB (FD.51, App. V.22):-

At top:	Forest, Cpt. Coupe, Date, Name of Measurer
Column 1:	Tree number (Stockmapping number).
Column 2:	Species.
Column 3:	Deject Allowance.
Column 4:	Log #.
Column 5:	Log mid-diameter.
Column 6:	Length of Log.
Column 7:	Volume.
Column 8:	Value estimation in Shs.

5.7.7.8. Each main species shall be given a separate page in the timber measuring book to simplify royalty and volume calculations. Blocks of numbers need no longer be allocated but the numbers used each day shall be noted on the front cover for easy reference e.g. 22.6.97, 457 - 512. At the end of each day's work, the measurer will calculate the volumes from Log Volume Table No. 7 (Hardwoods). THVMB forms shall be distributed as indicated on the forms. At the same time as calculating the volume, the measurer shall cross off the numbers of trees felled in his stock mapping book as a check on the completeness of harvesting particularly of compulsory species.

5.7.8. Procedures for Timber Movement

5.7.8.1. Timber converted by a registered pitsawyer and sawmiller are first marked with a field hammer near a conversion site in a forest (private/government owned) with a code specifying a county in case of Open Land or Forest Reserve by field staff. After marking, the field staff issues a Forest Produce Declaration Form (App.V.23, FD.50) to the customer to introduce him/her to the DFO. This form specifies the sizes of timbers, estimate of royalty, number of pieces, the species and the origin of the timber. The DFO on receipt of this form proceeds to mark the timbers with a second timber hammer called a district seal which shows the district code. After marking the timbers, the DFO then issues a permit, the Forest Produce Movement Permit (App.V.24, FD.49) which authorises the transportation of the timbers from one place to another. Entries into all these forms should be as accurate and complete as possible as the statistics therefrom shall be used for planning, investment and management interventions.

5.7.8.2. Timbers from sources where royalty is not paid or VAT not collected shall be charged 15% of their value. This shall be paid before a timber movement permit is issued and a general receipt subsequently issued. All non-VAT collectors are required to carry this every time they move timber.

5.7.8.3. Timbers got from outside the country are marked with an "Import Hammer" (IMP) at the point of entry. This is done after the DFO has ascertained the source from customs papers and physical checks.

5.7.9. Conditions of Licences: The following conditions of most Licences shall be constantly checked as experience has shown that they are quickly disregarded:

- * Roads; maintenance and layout.
- * Felling of marketable species; check by stock mapping and/or inventory records.
- * Length of haul on the ground; generally 400m, but may be varied by DFO where there are few exploitable trees.
- * Usable and sound timber; check height of stump, usable branch wood etc.
- * Period for payment; usually 90 days.

It should be noted that the FD is also responsible for the management and control of forest resources on public land. As such, field staff shall use the guidelines given in 5.7.7.1. - 5.7.7.4. above.

5.7.10. Increased Efficiency and Reduction of Waste - In felling, cross-cutting and processing of logs, every effort shall be made to avoid waste of wood and to increase efficiency. FD staff shall constantly give advice to licensees to avoid such acts as destruction of regeneration and unfelled trees, leaving high stump and usable logs in the forests, wasteful practices in cross-cutting and log-conversion.

5.7.11. Soil destruction and soil erosion must be avoided.

5.7.12. Felling Damage Repair

5.7.12.1. Juvenile trees damaged by felling are especially liable to suppression and shall be dealt with quickly, preferably by the Forest Guard (FG) or an assistant who measures the logs. It shall be remembered that young trees near the centre of gaps, if they survive felling damage, have the best chance of rapid development. It is worthwhile taking considerable trouble to repair damage around up to five such juveniles for every tree felled.

5.7.12.2. Saplings or small poles up to 15 cm. in diameter which have severely damaged crowns shall be cut back to about 30cm from the ground, to allow them to coppice. If bent over or weighed down by fallen branches or climbers, they shall be liberated, straightened and if necessary, supported, or cut back if none of this is practicable.

5.7.12.3. It is not considered worthwhile to deal with stems larger than 15cm diameter.

5.7.13. Enrichment Planting

5.7.13.1. Natural regeneration of marketable species arising after harvesting and refining in natural forests of Uganda is generally enough to ensure adequate stocking over the next rotation of 70 years or so. However, in Mabira and Mpigi district forests where charcoal had a good market, charcoal refining was carried out followed by enrichment planting with *Maesopsis eminii* and other selected species. As refining using arboricides or charcoal burning is no longer practiced, artificial planting in gaps or at stump will be done. Large seedlings will be used for this purpose. Diagnostic sampling will precede all enrichment planting/artificial regeneration.

5.7.13.2. A successful species used for enrichment should have the following attributes:

- * fast growth to avoid a long weeding period;
- * easily marketable timber;
- * resistance to pests and diseases; and
- * self pruning.

5.7.13.3. Successful planting conditions include full overhead light to ensure fast growth and absence of destructive animals.

5.7.14. Refining

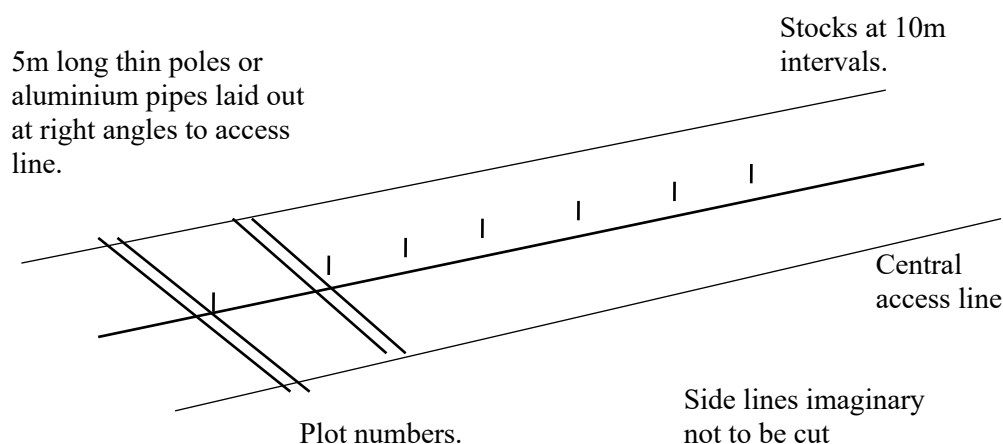
5.7.14.1. This activity has been suspended and the whole concept of trees stand treatment (TST) is thus excluded from the DSOs. It should be noted, however, that the operation used to be successful and cheap in increasing the productivity of NHF. Should the market for charcoal be available, the method could be revived provided its scientific and conservation efficacy can be validated, adequate control is possible and it is approved by CFF. Past experience is described by Earl and is summarised below:

- * In Mpigi District, the conditions of full overhead light was met by complete refining by charcoal burners and firewood cutters. A description of the Mengo technique is given by Earl (1968). By this technique, enrichment planting was done mainly with *Maesopsis eminii* in gaps in pairs at the rate of approximately 100 trees per ha. Trees were only planted if they were not nearer than 10m. from the vertical downward projection of the nearest adolescent's crown. Where possible, the trees were put in the centre of kiln sites because this remains free of weed growth for 3-6 months. A heavy mulching was also done. One tree of each pair was removed when the trees are 3-6m. high at about 2 years of age.
- * The Mengo technique was not directly applicable to other districts because of game and also because charcoal burning was not done, hence refining was done by poisoning. Damage to enriched plants by felling debris from poisoned trees has been found to be fairly severe in some cases. Where full light is not immediately available, tree growth is slow so that the weeding period is prolonged.
- * Complete planting was done in abandoned encroachments and cleared forest areas. As in enrichment, the main species has been *Maesopsis eminii* but spacing is regular 6.4 x 6.4m, 5x5m or 10x3m. Again the secret of success lay in getting the plants beyond the weeding stage as quickly as possible, so planting was done as soon after clearing as possible. Further research shall be done to determine the optimal espacement intervals.
- * Other fast growing species like *Bridelia*, *Markhamia*, and *Prunus africana* were used for encroachment planting in Kibale in the early 1990s. Increasingly, *Terminalia*, *Khaya* and other species are also used (e.g. Mabira)
- * Direct sowing has been tried in several places with mixed success. Further research is needed into direct sowing, particularly as plants arising from this method may be less liable to game damage.

5.7.15. Diagnostic Sampling (App.V.19A)

5.7.15.1. Objective: To discover the silvicultural condition of a compartment of natural forest and to express the condition arithmetically.

5.7.15.2. Layout: A compartment shall be assessed using a 2.5% sample made up of six to ten transects, depending on its size and shape. A convenient layout in large compartments is a grid of transect lines 20 chains apart crossing the principal gradients of topography and forest type. Each transect will consist of a central access line cut sufficiently for temporary use and a series of 0.01 ha (10 x 10m) plots marked by sticks or aluminium pipes laid out across the transect as shown below:



5.7.15.3. Transects will be numbered serially within the compartment and plots serially within the transect.

5.7.15.4. Selection of the Leading High Timber Value Trees (LHTVT)

- * Before measurement starts, the DFO shall state in detail the objectives of the sample and lay down the species and size classes to be measured. Within each plot, the individual priority species which is likely to have the greatest volume at the next felling is selected and measured. This is known as the “Leading High Timber Value Tree (LHTVT)”. LHTVT is defined as the **largest sound tree of highest value that will survive the rotation** and exceptions to this rule shall not be made without very careful consideration and clear written instructions from senior staff. As a general rule, an LHTVT must be capable of producing at least one sound log of 5m in length.
- * A second LHTVTs can be recorded in the appropriate column of the form in Appendix 19A to enable the analyst to obtain some information of the size and specific make up of the recruits likely to be available after a light harvesting of up to 12 stems per ha. If the harvesting is to be more intense than this, then the felling damage is likely to harm a high proportion of the recorded second LHTVTs, invalidating any conclusions previously made. Where felling is heavy, one cannot assess the advance growth available for the next rotation until some years after, when the lop and top have rotted, a sticket has formed and access is relatively easy. A new diagnostic sampling programme shall be designed and executed.
- * Where the commonest LHTVTs are of problematical or low value, it may be necessary to ascertain the state of the regeneration and stocking of a smaller number of less common and more valuable species. This can best be achieved by doing a second examination of each plot using the more restricted list and recording in the second part of Appendix 19B. Obviously, there is no need to repeat the details of the basal area.

5.7.15.5. Measurement of Diameter: The diameter at breast height (d.b.h) of the LHTVT or diameter above buttress (d.a.b) in the case of trees buttressed or fluted higher than 3m, shall then be measured and recorded as follows:

- * if over 10cm then record to the completed 10cm;
- * if between 5 and 10 cm d.b.h. then record as “P” for pole;
- * if less than 5cm d.b.h. but above 2m high then record as “S” for sapling; and

- * if less than 2m high record as “Sd” for Seedling.

5.7.15.6. Diameter records shall be separated into three or four columns to assist interpretation of the sample as shown in Appendix 19A. The columns shall be arranged by the DFO according to the compartment’s status in the cycle of management. For buttresses or fluted trees, the diameter at 3m shall be measured by standing two long poles and holding them against the tree so that they are parallel and their far ends touch diametrically opposed portions of the bole at the point of measurement.

5.7.15.7. Crown Position: The crown of the LHTVT shall be inspected to decide its position relative to shading by other crowns. The following crown scores will be allocated:

- | | | |
|---|--|---|
| * | the crown is emergent with at least 45° exposure all round from the base of the crown; | 5 |
| * | the crown is not shaded from above but the sides are close to or in contact with other crowns or it lies at the bottom of a narrow funnel; | 4 |
| * | part of the crown is vertically shaded and part is fully exposed to vertical light; | 3 |
| * | the whole of the crown is vertically shaded from above though it receives some direct light from the side; and | 2 |
| * | the crown is shaded from above and from all sides; | 1 |

The crown scores are entered as numbers into the appropriate column (see Appendix 19A).

5.7.15.8. Impeders. All LHTVT crowns with scores of less than 4 are being impeded in their need for light by other crowns, and even a 4 may be impeded for light if closely pressed by others. The impeders shall be recorded as follows:

- * if low value trees, record by name (abbreviated). If the name is not known, the letter LV may be used;
- * if LHTVT, record as LH if sound and as H if defective. It is most important to establish whether the impeder is defective or not;
- * if shrubs, record as “Shrubs”. (Column U), but only if they impede the crown; and
- * if climbers record as “C” (Column C).

5.7.15.9. It is not normally necessary to record the names of more than two impeders. Record the worst offenders always starting with the climbers if they are present, and then follow the climbers with impeders in the canopy before those of the understorey and those of the understorey before those of the shrub layer. The analyst will then be able to decide if climber cutting only is a feasible treatment or what layers of the forest need treatment.

5.7.15.10. Crowding: This is measured by recording the basal area of all stems in the plot over 10cm diameter above buttresses. In order to get a reasonable estimate of the basal area in a plot, the diameter of all trees shall be measured to the completed 10cm. above buttress or at b.h. whichever is the higher from the ground. Stems are recorded individually on the form using the gate method of counting up to 5 or in multiples of 5 for the diameters allocated individual columns on the form, or the actual girth recorded to the completed 10cm followed by a full stop for each stem 50 cm and over. All trees will be recorded in a similar manner. Great care shall be taken to ensure that this count is accurate and the

position of trees near the margin of the plot shall be carefully checked by two workers standing at the end of the poles marking the corners of the plot. Trees whose centres are on the boundary line will be counted if the plot is an even number e.g. 4, 18, 126, but ignored if the plot is an odd number e.g. 3, 57, 111 etc. This ensures that half of such margin trees are included and half excluded.

5.7.15.11. Interpretation. It is not possible to describe all the methods of interpreting a diagnostic sample in a DSO. The results will be studied by the DFO in the light of the management plan, the species concerned, and the suggestions made in Technical Paper No. 34. The procedure suggested in the following paras may be followed but are not obligatory:

- * The field sheets shall be made up using 50 plots per page so that the summaries of sets of 100 plots give figures applicable to 1 ha. Residues may be lumped into 100 plot samples or may be dealt with *pro rata*.
- * Inspect the data of each plot and score in red pencil, the silvicultural condition, with symbols such as the following:
 - N = an unstocked or seedling plot;
 - T = a plot whose LHTVT is impeded by priority trees;
 - TT = for an impeded tree 30 to 50 cm dia. i.e. exploitable in 10-20 years time;
 - T = for an impeded tree 10 to 30 cm dia. i.e. exploitable in 30-40 years time;
 - t = for saplings and poles; i.e. exploitable in some 50 years time; seedlings should not be counted as established regeneration, but are recorded as a guide to the analyser;
 - C = where the LHTVT is impeded by climbers;
 - S = where LHTVT is impeded by shrubs, and therefore could be liberated only by slashing; and
 - F = where the LHTVT is either free from impedance, or is over 50 cm dia. and, therefore probably not worth liberating, or is impeded by a superior (i.e. larger) LHTVT and, therefore, could not be liberated.

Plots or cants are serially numbered in each strip. Line cutting should be kept to a minimum.

- * Total plots of each silvicultural category and their basal areas in each 100 plots sample and summarise the results in a table such as that shown in Appendix 19D. Then plot whichever part of the results are relevant on the 3 cornered graph in Appendix 19C. When this is done, the scatter of points relative to the treatment zones on the graph will very soon indicate whether the sample was adequate and what treatments are likely to be justified. The summaries of the basal areas of each diameter class illustrate the structure of the crop, the intensity and effect of a proposed treatment, and the basal area likely to remain after the treatment. (N.B. The basal area of the LHTVT is included and must be allowed for in the interpretation. A basal area table is in Appendix 19E).
- * For example, part of the results shown in Appendix 19D may be plotted as shown in the three points drawn on Appendix 19C. If interest is in all the LHTVT including saplings, then point 1 shows a total stocking of 96 and a total of $18 + 24 + 28 = 70$ LHTVT impeded by less commercially valuable trees. Similarly, point 2 has a total stocking of 100 but $6 + 18 + 42 = 66$ LHTVT impeded by low value tree.

- * Similarly, if the size columns in Table 2 indicated a reasonable stocking of poles and larger stems - ignoring the saplings - it would be possible to plot the condition of those larger sizes only, to discover whether tending could be confined to them and still assure a sufficient final crop.
- * In any case, the degree of scatter indicates the sufficiency of the sample, and the proximity to the lower right hand corner indicates the degree of freedom of the LHTVT crop. It is usually worthwhile to plot several scores of points to permit analysis of silvicultural condition of several size classes separately. Similarly, a study of the basal area summaries shows that the area is carrying a basal area of approximately 11m² /ha. and in order to reduce this substantially and allow relatively free growing conditions to the LHTVT of pole size and above, all low value trees over 10 cm diameter must be eliminated, leaving a residual basal area of the order of 2.40 m²/ha.
- * It must be emphasized that the design and interpretation of diagnostic sampling reach the highest levels of the “natural” forester’s science, and cannot lightly be left in unskilled hands.

5.7.15.12. Prescriptions: From the interpretation, management prescriptions shall be issued to field staff well before work starts. The prescriptions must specify precisely what needs to be done, e.g. enrichment planting, the need and timing of climber cutting as well as any departures from the standard instructions for each MPA. The field sheets and a copy of the prescriptions shall be sent to HQ for storage and for placing into FMP records.

5.7.16. Selection of Mother (Seed) Trees in THF

5.7.16.1. Since harvesting of trees for industrial timber started in the natural forests of Uganda, it has always been the policy of the FD to manage all natural forests on sustained yield basis. Sustainable management of forests entails harvesting of the mature trees into logs or other products and regeneration so that the forests continue to exist and produce more products. Two methods of regenerating natural forests have so far been attempted, namely, artificial regeneration, involving group and line planting and complete reliance on natural regeneration (Dawkins, 1958; Philip, 1968 and Karani, 1994).

5.7.16.2. Artificial regeneration was the first to be applied after realising that the natural forests of the country did not contain the tree species that were marketable. This method was abandoned on the account of high costs and what was then considered inadequate results of seedling survival and growth rates of saplings resulting from such planting.

5.7.16.3. Later on studies carried out in Budongo and Mpanga Forest Reserves revealed that natural forests contained seedlings of all the species including those in high demand. What was needed was to manipulate the forest canopy so as to allow sufficient light to reach the naturally regenerated seedlings that were growing very slowly or not at all because of the heavy shading from above, by the older and mature trees.

5.7.16.4. Causes of Inadequate Regeneration in Treated THF: Three factors are considered to be responsible for inadequate regeneration and tree growth in the natural forests:

- * lack of regular tending especially as no climber cutting has been carried out on regular basis, as prescribed by the management plans and DSOs;
- * harvesting of all marketable timber species without leaving some to continue bearing seeds for the continuation of regeneration; and

- * abandoning artificial regenerations method to supplement natural regeneration.

5.7.16.5. Due to creaming in most forests, a phenomenon that has characterised forest harvesting in the past three decades, many timber species do not occur as they normally did before this scourge. In many forests, valuable timber species occur in lower diameter classes and as seedlings and saplings below 10 cm dbh. They are in immature stages and unable to bear a lot of seeds. **To avoid eventual loss of any species, especially those classified as endangered or vulnerable and ensure the forests are managed sustainably, it is essential to begin applying silvicultural and management practices that allow the regeneration of all the species.** Therefore, there shall be deliberate selection of **SEED BEARERS** after every stockmapping as an essential silvicultural practice which must take place before allowing any form of felling activity.

5.7.16.6. Criteria for Seedbearer - Selection: The following criteria shall guide personnel engaged in seedbearer (mother trees) selection in the natural high forests of Uganda.

- * all species named by IUCN as endangered such as *Entandrophragma utile* (as well as other named tree, shrub or any other plant species listed as occurring in the natural forests and whose existence depends on the forest environment);
- * all tree species which have been listed as vulnerable, namely *Entandrophragma angolense*, *E. cylindricum*, *Khaya authothea*, *K. grandifoliola*, *Parkia filicoides*, *Phoenix reclinata* and *Raphia farinifera*;
- * tree species which are becoming rare and whose competitiveness is being reduced through over exploitation e.g *Mildraediodendron excelsum* and *Etythrophleum suaveolens*;
- * species which take a long time (many years) to mature and start bearing viable seeds e.g. *Entandrophragma*, *Milicia excelsa* and *Mildraediodendron excelsum*;
- * tree species with a high demand for a particular or special and use such as *Cordia millenii* (mukebu), whose timber is much sought after by canoe and boat builders because a canoe or boat made out of its timber floats;

- * tree species which have been shown to be of great value to avian and mammalian populations of the forests, especially various species of *Ficus* and other Keystones species which play a vital role in food supply to forest animals; and
- * any other species which may predominantly be found in the production zone, but rare or absent in the strict nature reserves, buffer zones or site of special scientific interest.

5.7.16.7. Desirable Attributes of Seedbears for Timber Production: The qualities normally considered when selecting mother trees are:

- * large size - shall be larger than its neighbours of the same species and apparent same age. Large size indicates vigour and a high degree of competitiveness in trees of the same species and provenance and of course same age. The tree shall be tall with large crowns and spreading branches and free from forks;
- * a straight bole as straightness of the bole is a heritable trait (Hughes and Robbins, 1982);
- * the bole shall be free of spiral grain as this is an undesirable character in timber utilisation. Spiral grain can sometimes be detected externally;
- * mother trees shall be healthy and strong enough to withstand wind throw especially after the neighbours have been removed during logging operation; and
- * all seedbearers shall ideally, be free from defects such as rot and decay of roots or branches, but circumstances may force seedtree selectors to depart from this guideline.

5.7.16.8. While the above attributes are important in mother tree selection, it is important to know how different attributes in the natural forest arise in relation to their inherent genetic make up or environment in which they grow. Some tree species such as *Entandrophragma cylindricum* produce tall trees with exceptional straight boles with good cylindrical stems whether they are growing singly or in competition with neighbouring trees. In this case straightness is genetically determined.

5.7.16.9. In other species such as *Khaya anthotheca* and *Maesopsis eminii*, straightness of the bole is environmentally determined. Trees that grow free from competition from neighbouring ones, tend to be short, and branch at relatively short heights. Such trees are usually found in large gaps in the canopy and at forest edge in the colonising forest types. While selecting mother trees, consideration should be given to such situation i.e. whether the tree being selected was genetically or environmentally determined.

5.7.16.10. In the natural forests of Uganda, it may not be possible to find trees with desirable attributes as enumerated above for some species, because of the long history of selective logging. Trees with the best attributes are usually the ones which attract selective loggers. Such good trees have over a long time been removed leaving those with less desirable characters. In case of endangered and vulnerable species, it will suffice to identify the best of the trees that happen to be available, provided those so selected have some healthy branches in the crown from which to yield seed.

5.7.16.11. Density of Mother Trees per Unit Area: The convenient unit area is the coupe or felling area, which is also used for stockmapping purposes. During stockmapping operation, candidate seedbearers shall be marked, by a splash of yellow paint. The selectors shall endeavour to mark trees with good attributes as indicated above. The candidate mother trees shall be spaced in such a way that their crowns are free from each other. They shall be identified by their genus and species names and so recorded. It is not enough to list them just as mahogany or even as *Entandrophragma* or *Khaya*. The

selector shall determine whether it is *Khaya anthotheca* or *K. grandifoliola*. The objective of separating species is that, the number of mature trees belonging to each species must be known before selecting some as candidate seed bearers. It is essential also to know how many trees of each species have been selected. All the trees shall be identified by their stock numbers, their generic and specific names. After ascertaining the number of mature trees in a coupe and the species to which they belong, the following shall be carried out.

- * all mature trees belonging to *Entandrophragma cylindricum* *E. utile* shall be marked as seedbearers irrespective of stem form, branch habit and healthy condition. The reason for wholesale selection of these species is that they have been listed by IUCN as ENDANGERED and so require careful protection now. **All *Entandrophragma* trees should be left in the forest to provide seed for natural regeneration.** Furthermore the two species are difficult to regenerate by artificial means especially *E. cylindricum*.
- * One quarter (25%) of all species of economic Group 1, shall be marked as seedbearers. In addition to trees of Group 1, *Cordia millenii* shall also have its 25% of all its stems marked as seedbearers, because of its high demand and specialised use as alluded to already. The FD shall consider the promotion of this species to Group 1. Many trees of this species have been selectively logged for a long time and what is left needs protection. The reason for a 25% retention of Group 1, is that all the species which make up this group have provided the bulk of the volume taken out of the natural forests, especially from Budongo Forest Reserve. This reduced their competitive ability to the point today where they have the least both in regeneration and at later stages of growth i.e. in the 10 - 49 cm. dbh size classes. The group needs special attention if it is to be sustainably managed. It is also vital to bear in mind that *Entandrophragma* and *Khaya spp.* take many years to mature and start producing viable seeds. Scientific investigations of the mahoganies within Budongo suggest seed production is not significant until trees are over 50 cm dbh (Plumptre *et al.* 1997) whilst the *Entandrophragma spp.* may not produce substantial quantities of fruit until the dbh reaches 80cm (Plumptre 1995).
- * For all species in Groups II and III, and keystone species, TWO TREES PER HECTARE, of each species shall be selected and marked as seedbearers. The reason is that these species are regenerating very well throughout all forest types, including swamp forests. They have abundant regeneration on the forest floor and dominate the crop in the 10 - 49 cm dbh size classes. The two genera are close associates of the *Cynometra* dominated forest type with ability to take over and dominate other forest types. They have the ability to out compete all other genera in the top storey. Two trees per hectare in case of every species in the second and third economic groups, may suggest that there will be too many trees. This is most unlikely in the natural forest of Uganda, where the usual number of trees of 50 cm dbh and above, are between 2 and 5 per ha. The high number of 4 - 5 trees per ha only occurs in unexploited pure *Cynometra* forest type.
- * Species which have been common in the natural forests of Uganda in the past but were heavily exploited have become rare and need special protection. Such species include *Mildraediodendron excelsum* and *Erythrophleum suaveolens*. Both have been over exploited and are not regenerating well. All trees of these two species shall be retained as seed bearers due to their scarcity. Without special protection they too may disappear from the natural forest. However, *Erythrophleum suaveolens* can be artificially propagated and it can be grown in plantations as shown in Nyakafunjo trial plots. After selection all seed bearers shall be painted with two rings round the stems at 1.3 and at 1.5 m above ground level.

5.8 FOREST RESOURCE ASSESSMENTS

5.8.1. General: This section covers methodologies for various aspects of resource assessments. It deals with objectives, planning, design, measurement and data recording of sample plots in the 6 fields listed below:

- * Temporary Sample Plots (TSP) for NHF;
- * Permanent Sample Plot (PSP) Field Techniques for Natural High Forests;
- * Plantation Inventory Using Point Sampling (POS);
- * Permanent Sample Plot Field Techniques for Plantations;
- * Biomass Field Techniques; and
- * Biodiversity Inventory.

5.8.2. Inventory of NHF Using Temporary Sample Plots: The objectives of undertaking this include:

- * to carry out a field assessment of natural high forest reserves;
- * to estimate the volume of standing timber;
- * to construct volume tables for species or group of species; and
- * to assess the condition of natural regeneration.

5.8.3. Mapping: Maps of various scales exist for most FRs. A forest type map of a scale of 1:30,000 is updated using photo-interpretation of new photography. The interpreted details are checked and the final map prepared based on ground thruthing (field checks).

5.8.4. Field Organisation

5.8.4.1. Field Team - Each field team consists of a line cutting team and an enumerating team. A team leader is in overall charge of both the teams. A line cutting crew consists of a team leader, an assistant (compass person) and 3 casual workers while the enumeration team consists of a booker, relascope person, 2 tree spotters and 4 casual workers.

5.8.4.2. The functions of team members are as follows:

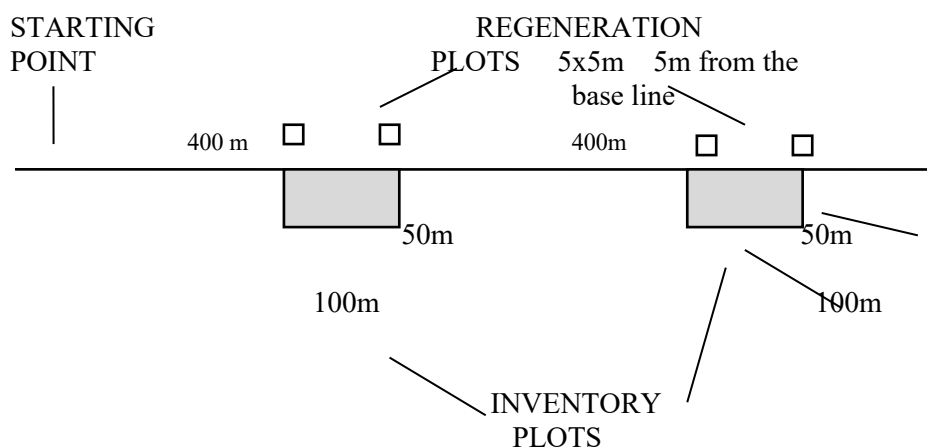
- Team Leader** - supervises and checks booking, relascope measurements, height measurements and tree counts as well as establishment of the inventory plots. He/she is responsible for the equipment.
- Booker** - the main responsibility of the booker is to record the measurements of diameters, heights and quality assessment.
- Relascope person-** using a wide scale relascope, he/she will measure the diameters and heights.
- Tree spotters** - will look for and identify tree species and help with diameter measurements.
- Workers** - will cut lines, establish sample plots and be of general assistance to the enumerating crew.

5.8.4.3. Field Equipment - Same as for plantation TSP but include wide scale relascope.

5.8.5 Sampling Method

5.8.5.1. A stratified random sample is to be used for inventory. The survey is based on a photo stratification into various forest types. The forest types are based on ecological classification. From the established access points on the edge of the forest, base lines are set up using randomly selected bearings within a desired range. Plots are located along these lines systematically at a predetermined distances. The number of plots in each forest type will be allocated by keeping in mind the area of the type, the expected quality of the type and its accessibility. In order to achieve a sampling error of about $\pm 20\%$, the number of sample plots in the more important types should be about 25.

5.8.5.2. Two different types of sample plots will be established, namely the inventory sample plots and the regeneration survey plots (see diagram below). The distance between the inventory plots will be 400 metres while the regeneration plots are nested at the corners of the inventory plots as shown on the diagram. The maximum distance of a line is 3km (6 plots). Long distances to plots are time consuming.



5.8.6. Line Cutting and Starting Point

5.8.6.1. Line bearing and the starting point of each line shall be established by the team leader. The starting point will be marked on the field map and on the photograph. In the field, the starting point shall be marked by blazing a tree and tying a coloured flagging tape around the tree. The line number, bearing and the date shall be written on the blaze and on the flagging tape. The lines shall be numbered consecutively. Given a starting point and a predetermined bearing the crew shall then cut a line through the forest.

5.8.6.2. The leader of the line cutting crew has to check that a bearing given by the team leader is followed and that a proper declination is on the compass. The compassman has to check frequently his back bearing to eliminate the possibility of error due to human error or magnetic disturbances. Using a nylon chain (or steel surveyors chain) a distance along the line will be measured from the starting point. Each 50m interval will be marked by a stake put solidly into the ground. The distance of each stake from the starting point will be marked on the stake by a marker.

5.8.6.3. Normally, a line cutting crew will be able to cut about 1000m of line per day. The lines will be cleared well enough to be easily walked. Provision for slope correction will be made where the terrain is not flat (see the table below). The slope correction table shall be checked for distances.

Slope Correction Table

Slope

Distance Adjustment
(Add to each 100 m)

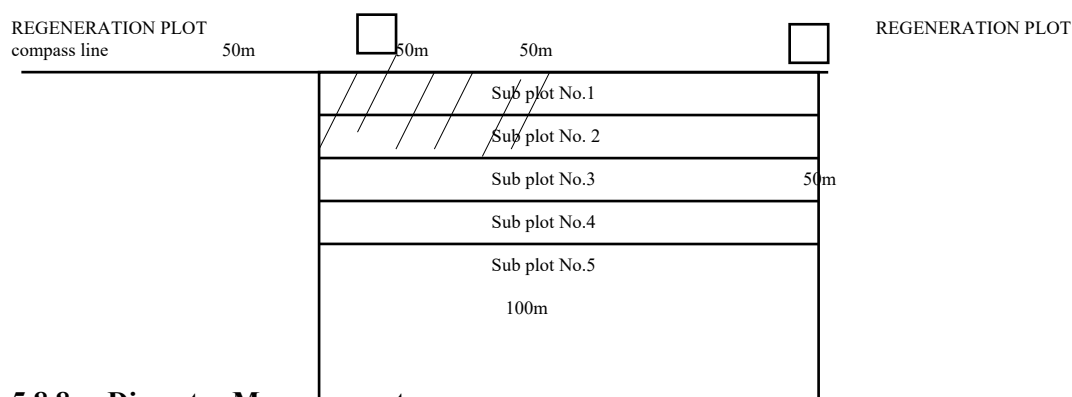
Departmental Standing Orders

10%	0.5 m
15%	1.1 m
20%	1.9 m
25%	3.1 m
30%	4.4 m
35%	5.9 m
40%	7.7 m
45%	9.6 m
50%	11.8 m
55%	14.1 m
60%	16.6 m

5.8.7. Sample Plot Procedure

5.8.7.1. Inventory Plots: At the predetermined interval, the enumeration plots shall be established. The plots shall be 100x50m rectangle, 0.5 hectare in area. Plots of 1 ha are being considered for compatibility with PSP. These shall be sub-divided into five, 100x10m or one-tenth hectares sub-plots. The sub-division of the plots into sub-plots facilitates easy recording and control of the measured data. The sub-plots shall be numbered standing with No.1 from the sub-plot nearest to the baseline to No.5. In sub-plot No.1, two regeneration plots will be nested in corners at the both ends of the sub-plot.

5.8.7.2. The first sub-plot shall be divided into two halves in order to record trees of different diameters. The compass line will be used as the base line and then the plot demarcated as shown in the diagram. The plots and sub-plots will be demarcated by means of rectangular prisms.



5.8.8 Diameter Measurement.

5.8.8.1. Three diameter measurements shall be taken on each tree at the breast height, at the crown point (CP) and at mind point between ground and CP. The three measurements are required for the construction of volume equations for the various species. The next inventory will necessitate only measurement of dbh. CP will be defined as the point just below the lowest branch forming the crown. Within the entire half hectare plot, all trees 50.0cm dbh and over shall be tallied by species, dbh, merchantable height and top and mid diameters. Within the sub-plot No.1 (0.1 ha) all trees between 20-49cm dbh shall be measured for dbh, merchantable height (MH) and top and mid diameters.

5.8.8.2. In the second half of the first sub-plot, all trees between 10-19cm dbh shall be measured as above. Dbh shall be measured using a diameter tape. Trees with buttresses or malformation at the breast height level shall be measured just above the buttress or the malformation (swelling etc). The diameters that are beyond the reach of direct measurement shall be measured using a relascope or, if available, a ladder shall be used to reach the point of measurement.

5.8.8.3. For trees with very large diameters (above 2 metres), an ordinary measuring tape shall be used, recording the circumference (girth) of a tree which will then be recalculated into a diameter by dividing the girth by Pie 3.14. Caution is needed to stretch the diameter measuring tape in a horizontal plane along the tree bole at breast height level.

5.8.8.4. The top diameter shall be measured at the crown point while the mid diameter shall be taken midway between the ground and crown point or in a case of buttressed trees halfway between the crown point and the top of the buttress. The relascope shall be used to measure the top and mid diameters. Instructions on the use of relascopes are available in separate manuals to be obtained from HQ. Diameters shall be measured to the nearest centimetre.

5.8.9. Heights: The merchantable height shall be taken using a Bitterlich relascope or a clinometer. The merchantable height shall be measured from the ground to crown point or the first substantial live branch. The buttress height shall be measured using the same instruments or, in the case of short buttresses by a measuring stick.

5.8.10. Defect and Damage Assessment: Codes for defects and damage shall be devised which will describe visible defects in any one tree. These shall include defects of form, visible rot and damage caused by wildlife and felling. Details shall be presented on the tally sheets and coding.

5.8.11. Description of the Sample Plot: Each plot shall be described on a tally sheet according to slope, drainage, regeneration, climber tangle, indication of pitsawing and history of past harvesting and treatment. Various classifications shall be used as indicated in the sample plot form (App. V.26A) All tree species within the plot shall be identified by their vernacular and/ or scientific name. If the tree

cannot be identified, it shall be classed as “unknown”, but samples of bud, leaves, fruits, etc. shall be collected and used by HQ staff to get species identification.

5.8.12. Regeneration Plots: In order to assess the regeneration in each forest type, regeneration plots shall be established along the lines. Within the inventory plots, two regeneration plots shall be established at opposing corners of the plot 5 metres off the base line. The reason for this is that some saplings may be destroyed while cutting the base line. All seedlings and saplings up to a dbh of 9 cm shall be recorded on the regeneration survey sample plot form. Only tree count shall be taken and no other measurement shall be made. These shall be recorded in the regeneration survey form (see Appendix V.28).

5.8.13. Inventory Sample Plot Form: The inventory sample plot forms shall be used by the booker to record the measurements on the sample plot. The form is designed in such a way that the information from the plot can be easily typed into the computer compilation programme (see V.26A). The form contains two groups of information shown in Appendix V.26B. Plot information shall be recorded in column 1-25 while individual tree information shall be recorded in columns 26-76.

5.8.14. Permanent Sample Plots (PSPs) in Natural High Forests

5.8.14.1. Present policy in Uganda is not to do anything in strict nature reserves (SNRs). However, the views given by Alder and Synnott should be considered. These are quoted below:¹

“When NHF is located in conservation areas and not subject to harvesting, there is still a need for PSPs, *albeit* at a lower intensity than in managed forest. PSPs in this case serve three functions:

- * they provide very valuable control information relative to PSPs in exploited forest. Dawkins (1958) stressed the need for PSPs in conservation forest for this purpose;
- * they monitor the dynamics of the unexploited forest, and assist in its management. It is a misconception to believe that conservation areas require no management. Most such reserves are fragments of previously much larger areas that are now subject to a variety of influences at the edges, including fire, gathering of non-timber products and possibly encroachment by shifting cultivators. They are not always in a state of equilibrium but require to be actively maintained (Whitmore, 1990); and
- * where large animal populations exist in the forest, a long-term fluctuating dynamic equilibrium may exist between the forest and the animal population. This requires to be understood for the management of the wildlife population and will require PSPs to examine the forest component of this ecosystem.”

5.8.14.2. PSPs are a means of measuring tree growth, mortality and regeneration in relation to stand density. Data for growth and yield models which is necessary for forest management is provided. PSPs are laid down as a network of sampling plots, passively sampling existing forest management (or as measurement plots within an experimental design). The plots are not intended to estimate directly the stocking or yield of individual compartments but their growth data may be applied to an individual compartment by taking additional TSPs to ascertain the actual stocking of that compartment. They shall be samples in the true sense of the word i.e. they are small representative parts of a larger whole and shall be given the same treatment as the rest of the forest. A knowledge of the standard error of estimate shall be needed and so, a layout of stratified random pairs of plots has to be chosen.

¹ D. Alder and T.J. Synnott: Permanent Sample Plot Techniques for Mixed Tropical Forest, Oxford Forestry Institute, 1992.

5.8.14.3. Plot Size, Shape and Distribution: Plots shall be square and of 1 ha. each, at a sampling intensity of about 0.8%. Two plots must be sited randomly and independently of compartment boundaries, within each approximate 250 ha. of tended productive forest (i.e. excluding mapped areas of vegetation type which would be excluded from any calculation of yield, e.g. Savanna, papyrus). This shall be done by using a grid marked in 256 ha. blocks and in 1 ha. squares and in a series of random numbers. A plot on the map that falls in an unproductive vegetation type or within 200 metres of another plot shall be replaced by taking a new random number. A plot which falls within 20 m. of a road shall be moved away at right angles until no part of the plot is less than 20 m. from the road, so as to allow for clearing and road widening. A plot adjoining the reserve boundary need only be moved sufficiently to avoid overlapping the boundary. Temporary lines used for tending operations shall not be used for siting plots.

5.8.14.4. Plot Location and Demarcation

- * Random positions shall be selected. Two plots each 100m x 100m shall be selected from each block of 1600 x 1600m gridded into squares 100m x 100m. Each block, therefore, contains 16 x 16 plot positions.
- * Two random numbers (one for each co-ordinate) in the series 0-15 shall, therefore, be required for each plot and shall be obtained by taking a pair of numbers drawn from the Random Number table shown in table 1. Successive pairs of numbers shall be used for the next and subsequent plots. If two plots fall in adjacent squares, or are separated from each other by only one empty square, one shall be discarded and replaced by another random plot.
- * The plot locations will be determined initially on maps and the position of plots shall be plotted on all copies of the Management Map.
- * These shall be translated into locations on the ground using base maps and field survey. This task will be relatively simple if there is an established permanent forest infrastructure of roads and compartment boundaries and survey beacons. The plot locations shall be described relative to the nearest fixed base point that can be accurately, reliably and permanently relocated on the ground and whose absolute geographical coordinates are known with certainty. The plot locations shall be described as a bearing and distance from the base point.

Table 1: RANDOM NUMBERS

1	15	6	8	5	2	1	7	4	10	11	9	10	1	6	11
2	15	1	3	13	7	12	3	15	5	0	11	12	9	10	12
11	9	9	3	15	8	5	14	2	0	14	7	4	7	14	5
4	3	6	8	2	7	12	13	4	6	13	2	2	0	3	11
1	6	12	0	0	7	15	4	5	15	6	9	0	12	9	1
11	10	5	8	10	6	4	0	8	7	14	7	4	13	5	14
8	3	13	12	1	11	13	15	3	8	13	10	6	0	14	15
4	9	1	14	2	11	14	15	11	2	15	1	3	13	7	12
3	15	5	0	11	12	9	8	11	9	15	13	4	1	11	6
3	11	3	1	1	12	7	14	5	4	3	6	8	2	7	12
13	4	6	1	2	4	5	14	3	0	2	0	7	4	14	9
10	8	2	10	9	0	12	9	1	11	10	5	8	10	6	4
0	8	7	7	10	12	6	5	6	8	14	1	12	2	8	7
11	4	8	13	10	6	0	14	15	4	9	1	14	2	11	14
15	2	1	13	9	10	12	15	3	15	5	0	13	7	5	15
8	11	9	15	13	4	1	11	6	3	11	3	1	14	12	4
0	1	12	7	12	9	0	5	15	2	5	5	14	11	4	5
14	3	0	2	0	7	4	14	9	10	8	2	10	3	14	5

5.8.15. Survey Instruments and Methods

5.8.15.1. PSPs shall be located by compass traverse (chain and compass survey) from a fixed point. The instruments required for this purpose are:

- * an accurate transit or compass suitable for taking bearings under poor light conditions. The Suunto forestry compass is often used; and
- * a surveyor's chain or rope. Survey tapes may be used but will not withstand the rigours of continuous dragging on the ground. Modern chains are usually made of polyclad rope and should be graduated in metres and decimetres. For access lines, 50-m tapes or chains or ropes are usually most efficient, but on steep topography, 30-m lengths may be easier to use, to measure corrected lengths of 20m. Correction of tapes shall be done as explained in para 5.2.2.

5.8.15.2. A compass staff, survey sticks and poles can be made as required locally.

5.8.15.3. Slope corrections shall be applied to all line surveys where the slope exceeds 5°. This can be done by measuring the slope-corrected distance along the ground or by stepping the tape. The latter procedure is easier for short irregular sections of terrain such as gullies, river banks, etc. The former shall be applied on long sections of steep slope.

5.8.15.4. To establish an accurate base point for relocating the plot, Geographical Positioning Satellite (GPS) instruments are extremely useful. These comprise hand-held electronic units that can be used in forest clearings, in log landings, or under light forest canopies to obtain an absolute fix in geographical coordinates (degrees, minutes and seconds). GPS technology is in the process of rapid evolution and may almost entirely displace conventional survey methods for plot location. They rely on the use of a system of satellites in continuous orbit around the earth that emit highly calibrated time and identification signals. Computer algorithms within the instruments decode signals from several satellites to calculate the positional fix.

5.8.16. The Plot Access Line

5.8.16.1. Having determined a fixed base point from maps, ground features and possibly GPS instruments, an access line on an appropriate bearing shall be cut to locate one corner of the plot. The access line shall be as short as possible. If it exceeds 5km, relocating the plot is likely to be difficult and will depend on a very precise initial survey. It should be noted that errors are likely to accumulate faster on terrain that is steep or dissected by numerous rivers and streams.

5.8.16.2. Where several plots are located from one control point, it is desirable to minimise the number of access line segments and keep the total distance from the original control point to less than 5km. If possible, a single straight baseline shall be cut, with the PSPs being connected to the baseline by short offsets.

5.8.17. Adjustments to the Plot Location: On completion of the access line, it may be found that the plot falls largely within a river, swamp, farm, haulage road, log landing or other feature that makes the plot either very difficult to survey or largely deforested. An approximate preliminary survey shall also be undertaken along the proposed plot boundaries to ensure that no large buttressed trees intersect plot corners. These make the plot difficult to survey accurately. If these conditions arise, the plot shall be moved back or forwards along the access line bearing in fixed multiples of 100m to avoid the anomaly. It shall then be *essential to ensure that the adjusted plot location is recorded clearly* in the plot file and on the forest base maps.

5.8.18. Outer Boundaries of the Plot

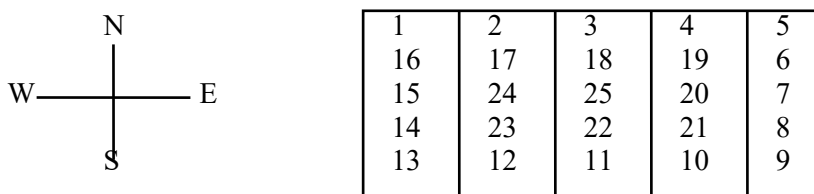
5.8.18.1. The outer boundaries of the plot shall be surveyed using the same instruments as for the access line. The right angles shall be formed by surveying along bearings at 90°, 180° and 270° from the original access line. Alternatively, it may be decided to orient the plot along the cardinal bearings (N, S, E, W) irrespective of the original access line bearing. The latter procedure may help to reestablish the plot at later measurements and is recommended (Synnott [1979a]).² Stakes of durable hardwood species shall be located at each corner and numbered. At 20-m intervals along the access line, smaller stakes shall be located to mark quadrat boundaries.

5.8.18.2. During the process of demarcating the boundaries, trees inside the plot and above or close to the measurement limit shall not be cut or cleared unless already dead. No trees above 5cm diameter shall be cleared or cut from the boundary lines. Where large trees cross the boundaries, offsets shall be constructed around the tree to establish an accurate alignment for the boundary, with stakes placed against the tree bole where it is intersected by the boundary line. Large trees at the corner of the plot create difficulties; it is best to relocate the plot slightly to avoid this situation.

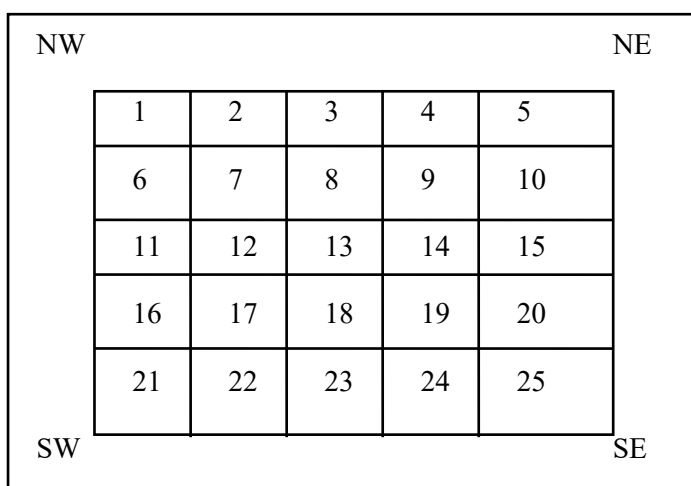
5.8.19. Quadrat Boundaries and Numbering

² Synnott, T.J. (1979a). A manual of permanent plot procedures for tropical rain forests. Tropical Forestry Papers CFI, No. 14.

5.8.19.1. Quadrat boundaries shall be cut across the plot from the end posts placed along the outer boundary. Care shall be needed when deciding if small trees should be cut, especially where the plot is tiered and an inner zone involves measuring trees 5cm diameter or less. Where a quadrat boundary borders such an area, disturbance and line cutting work shall be restricted to outside the boundary of the regeneration sub-plot. The 25 quadrats of 0.04 ha (20m x 20m) shall be numbered serially clockwise starting with the one in the NW corner.



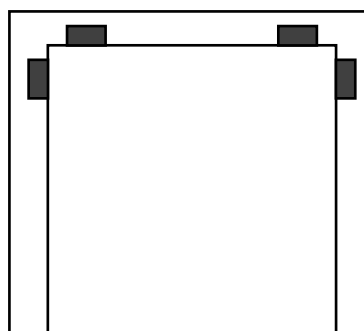
5.8.19.2. The above numbering has been used in the existing PSPs and shall be used during re-opening. However, for new PSPs, a better alternative scheme will be adopted and is as follows:



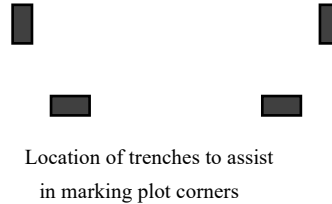
5.8.20. Permanent Demarcation of Plot Corners

5.8.20.1. The corners of the PSP need to be permanently marked so that after an interval of 5 years or more, they may be precisely and unambiguously relocated. The basic method shall involve marking the corners of the plot with concrete beacons or durable wooden posts. These beacons or posts can be placed in cairns of heaped soil. However, in such a position, the post can be readily pushed over by logging equipment. It is usually better to bury the beacon, so that only a small part protrudes, but to indicate its approximate position through the use of trenches. These are dug along the boundary lines, ending 1m from each corner, as shown in figure below. The trenches shall be 30cm deep, 30cm wide and 1.5m along the quadrat or boundary line. Although such trenches will tend to erode and fill in over a 5-year period and may be eradicated by logging equipment, in heavier clay soils they are likely to remain clearly visible.

5.8.20.2. Concrete beacons, marked with the PSP number and the corner positions (SW, NW, NE, SE) shall be placed, largely buried, at each corner. The beacon shall be placed



with only about 5cm above the soil, so that it will be buried rather than dragged by the passage of any logging equipment. The central metal rod, apart from strengthening the pillar against cracking, allows it to be relocated by a metal detector in future. The beacons are relocatable without special equipment if the approximate position of the plot corner is known, even when partially buried, and provide a precise and durable marker.



5.8.21. Tree Numbering and Marking

5.8.21.1. This shall be done serially on the plot so that each tree bears a unique number. There are several methods of marking numbers on trees:

- * writeable tags nailed to trees;
- * pre-numbered tags nailed to the tree;
- * tree numbers scribed into the bark; and
- * numbers painted on the tree.

5.8.21.2. Painted numbers in the longer term offer easier plot remeasurement and maintenance than tags, and cause less interior damage to the wood (nails inevitably become embedded). However, painted numbers are difficult to use on small trees (below 10cm), for which writeable or pre-embossed tags on wire loops are necessary. The numbers given to trees shall not be re-used if the tree subsequently dies or is logged. Such duplicate numbers are a source of considerable confusion to the data analyst. Ingrowth trees that achieve the minimum measurement diameter shall be given a new unique number that has not previously been used by any tree on the plot.

5.8.22. Marking the Point of Measurement (POM)

5.8.22.1. It shall be marked on the tree by a continuous painted band, located so that the top of the band marks the point of measurement (i.e. position of the measuring tape). At the first measurement of the tree, the procedure to be adopted is as follows:

- * mark the point of measurement with a crayon;
- * place the tape around the tree and record its diameter;
- * make additional crayon marks to record the exact position of the tape on the stem; and
- * after completing measurement and removing the tape, paint a circular band around the tree whose top edge coincides exactly with the crayon marks.

5.8.22.2. This procedure ensures that the diameter tape does not come into contact with wet paint. If calipers are used, rather than a diameter or girth tape, then a spot shall be placed on both sides of the tree where the caliper arms make contact. The centre of the spot shall be the exact point of contact. This will normally be done in two directions mutually at right angles. POM is explained further under diameter measurement.

5.8.23. Mapping Tree Locations and Plot Characteristics

5.8.23.1. Uses of the Tree and Plot Map: A map of the tree positions on the plot allows various types of competition index to be calculated. Without a plot map, only position-independent competition

indices such as quadrat basal area can be used. A plot map is also useful in relocating and remeasuring the plot. By showing the numbered trees, with their approximate sizes and species, the work of re-measurement is considerably aided. It is especially helpful when some tags or tree numbers have faded or been lost, and where logging or tree falls have substantially changed the appearance of the plot.

5.8.23.2. Measurement of Tree Coordinates - Direct measurement of tree coordinates is the simplest and most effective method of recording tree position. Coordinates are recorded relative to the SW corner of each quadrat. The method requires the use of two 20-m surveyor's tapes. One tape is laid from the western-most boundary of the quadrat beside the tree and the distance in metres and decimetres read to the tree centre. Another tape is laid from the southern-most boundary and similarly read. The two coordinates are recorded on the plot record form. When the data is processed, a plotter can be used to draw the plot map from this tree position information with different sized circles representing diameter and tree number and species mnemonic shown on the plot. The method is accurate and simple.

5.8.24. Determination of Species

5.8.24.1. A preliminary determination of tree species shall be made at the time of initial demarcation and measurement. Often this may only be possible as a vernacular or trade name that may refer to a group of botanical species of similar appearance. This preliminary identification shall be coded with a note when there is any uncertainty as to the precise botanical identification.

5.8.24.2. It is ultimately necessary that every measured tree on the PSP is identified as fully as possible. This will usually involve the much slower process of gathering botanical material from trees of unknown or uncertain species and shall be conducted after the initial establishment and demarcation of the PSPs. It implies that a botanist and herbarium shall be available to the PSP programme at all times. By the time remeasurement of the PSP is due (3-5 years), this process of confirmatory species identification should be completed. Provided that the tree number has not been lost, there shall be no need for re-identification of species at second and subsequent measurements. PSPs, especially on experimental sites, can, therefore, serve as training areas for foresters in tree identification, once the initial demarcation and confirmatory botanical work has been completed.

5.8.25. Measurements

5.8.25.1. Methods for measuring diameter, height, crown diameter and recording qualitative information in PSPs are explained below. The information is recorded in the Forms in Appendix V.27A (FD.54) and V.27B (FD.55). A description of quadrat records and tree records is given in App.V.27C. The codes for recording qualitative information are shown in the diagram in App. V.27C

5.8.25.2. Reference Diameter

- * The reference diameter of the tree is the diameter of the stem or main bole measured at a point 1.3 m above ground level (breast height), or at a specified distance above the point of convergence of the buttress or other anomaly preventing measurement at breast height.
- * For trees without buttresses, the measurement height is 1.3 m above ground. This shall be measured from the uphill side of the tree on a slope, or on the inside of the lean for a leaning tree. Trees that fork below the point of measurement are treated as two trees and those that fork at the point of measurement are measured as two trees at a point above the fork. For trees with deformations or excrescences at 1.3 m, the measurement shall be made at the first sound point on the stem above the abnormality. A tree condition code will be recorded indicating the presence of such an abnormality (see Appendix V.27E).

- * For buttressed and stilt rooted trees, a POM is selected approximately 1 m above the convergence of the buttress. Ladders will frequently be required to reach this point. For trees with highly fluted stems, or buttresses that converge very gradually, a POM shall be selected arbitrarily above the major deformation of the stem.
- * The POM is permanently marked on the tree. Re-measurements shall be done at the same POM, regardless of whether the ground level has changed in the interim period. The tree shall be marked with a painted band at the POM. The measurement shall be made exactly along the top line of the band. The tape shall be adjusted to lie along this line. All diameter measurements shall be rounded to the nearest complete centimetre.

5.8.25.3. Moving the Point of Measurement

- * As the buttresses or stilt roots develop, they will eventually reach the POM originally adopted. In this case, the POM shall be moved and a new POM established 1.5 metres above the first. Diameter at both the old and new POMs are recorded. The second reference diameter shall be termed the *alternate diameter*. At the subsequent re-measurement of the plot, the old POM shall be discontinued and not measured. Only the new POM shall be measured. A coded note is made that the old POM has been discontinued. The alternate diameter from the previous measurement will then become the new reference diameter.

5.8.25.4. Height Measurement: Three components of tree height are normally significant and these are total height, crown point height, and buttress height. Crown length shall be derived as the difference between total height and crown point height. Total height shall be measured vertically from ground level at the centre of the stem to the highest point of the crown. Crown point height shall be carefully defined for consistency and it will usually be taken as the height to the first major live branch. As the POM is defined as being above the convergence of the buttress, it shall be sufficient to record the height of POM, rather than trying to measure a second rather indefinite point, a short distance below.

5.8.25.5. Crown Diameter: Measurement of crown diameter in tropical mixed forest is often difficult. In closed forest, three people shall be required. One will stand some distance from the tree with a clear view of the edge of the crown tangentially to a given radius. A second will hold a tape at the base of the tree, whilst a third will move out until he is sighted by the first operator as being aligned with the edge of the crown. This person will then measure the radius. This procedure shall be repeated along four axes mutually at right angles. The four measures of radius shall be summed and divided by two in the forest to give mean crown diameter.

5.8.2.6. Redemarcation and Plot Maintenance

5.8.26.1. It is desirable that access lines and plot boundaries are cleared annually and kept open. This greatly facilitates access to the plot, and ensures that it is not lost. During annual maintenance, beacons or marker posts shall be cleared of vegetation and soil, and replaced if necessary.

5.8.26.2. Annual maintenance ensures that any logging in the plot is noted promptly. An assessment shall then be made immediately post-logging to record the numbers of removed trees and to record damage on the residual stand. The position of gaps caused by felling, skid trails, roads, and landings shall be sketched on a plot map form. Similarly, if other periodic events that have occurred, details shall be reported and an assessment made of dead and damaged trees.

5.8.27. Re-assessment

5.8.27.1. The full re-assessment of the plot will normally be made at 5 year intervals, or at shorter periods in some special cases. At this re-assessment, the recurrent measurements described earlier shall be made on trees, and the following maintenance procedures shall be carried out:

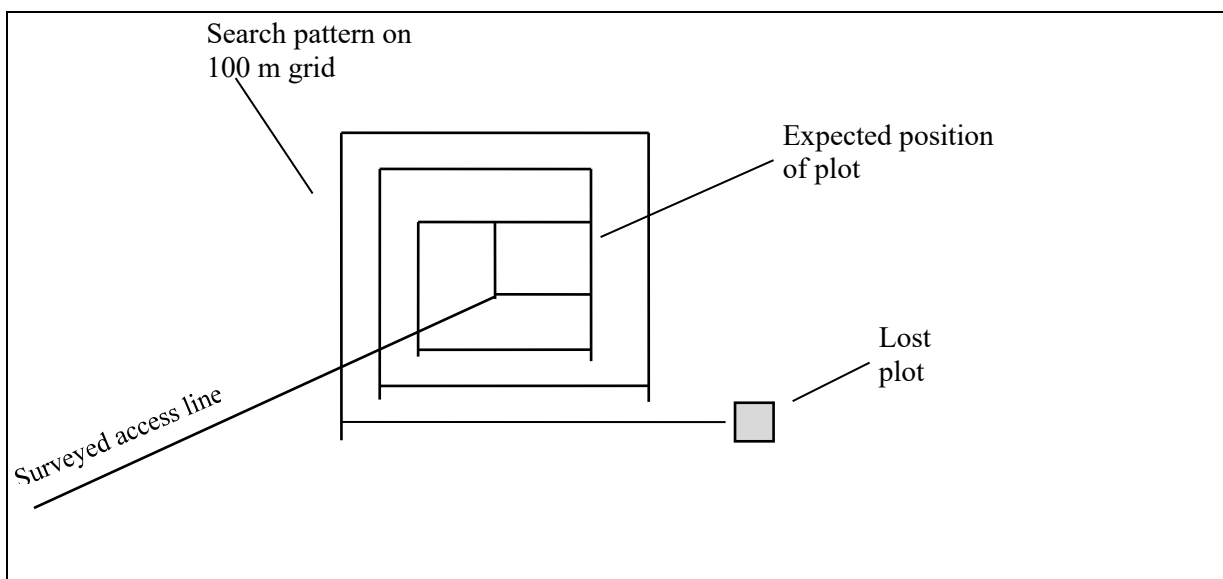
- * plot boundaries shall be renewed, boundary pillars and trenches replaced and cleared of vegetation or soil, as necessary;
- * tree markings shall be renewed, painted numbers repainted, as far as possible, on top of the old numbers;
- * if there are any trees that cannot be found, their expected locations shall be carefully checked for signs of a stump or felled bole. A suitably coded note shall be entered; and
- * trees that bear no markings shall be carefully compared with a list of missing trees to find correspondences of location, size and species. If there are none, the unmarked trees shall be recorded as ingrowth.

5.8.27.2. Ingrowth trees shall be given new unique numbers and marked for point of measurement and tree number. Their positions shall be recorded. Care shall be required to ensure that trees that have lost their markings are not confused with ingrowth. This is relatively simple if tree coordinates have been measured accurately and mapped.

5.8.28. Searching for Lost Plots

5.8.28.1. PSPs occasionally get lost, especially when there is no routine or annual maintenance. Logging can severely disturb the forest, completely obliterating access lines, corner beacons and the like. Only a few marked trees may remain. Plots may also be lost because of inadequate initial survey, inaccurate base maps, or control points that are not invariable (such as curves in rivers, stream junctions and minor forest roads). Sometimes survey beacons are moved or destroyed by local populations as a result of land disputes or similar matters. All these problems can be avoided by using GPS systems to fix the absolute longitude and latitude of control points close to or on the plot.

5.8.28.2. When a plot is lost, an access line shall be laid to the best estimated position and then a search made in the outward spiral pattern as shown in the Figure below. The spiral shall be surveyed approximately and increased by 100m on each leg, with a 100m spacing between spirals. Searchers shall be spaced at intervals of about 10 m inside and outside the search path and up to 50m from it, to look for any marked tree.



5.8.28.3. Once a marked tree has been found, the plot shall be relocated and its boundaries re-constructed. This can only be done completely successfully if tree coordinates were originally recorded. If the original boundaries cannot be precisely re-established, then data on ingrowth and mortality will be unreliable.

5.8.29. Plantation Inventory Using Point Sampling Method

5.8.29.1. The Objectives: The objectives will be to carry out a field assessment of plantations using point sampling so as to produce stock and stand tables. Point sampling is applicable to all plantations.

5.8.29.2. Field Organisation

Field teams should be formed consisting of one team leader/booker, one assistant team leader/compassperson, one chainperson and workers. The functions of the team members are as follows:

Team Leader - In overall charge, books, makes relascope sweeps, measures tree heights, functions as compassperson, measures slope, runs compass traverse, makes slope corrections and checks borderline trees.

Tree measurer - measures diameter of trees at breast height, assist with running traverse to locate sample point.

Workers - cut the line, cut sticks for traversing and plot centres, assists measuring and performs other tasks as required.

5.8.29.3. Methods and Equipment: Field equipment will include a clip board, tally sheets, pencils, relascope, hypsometer, map, aerial photographs, protractor, ruler, table of critical distances, compass, slope correction table, clinometer, 20m measuring tape, diameter tapes, chalk, axe, panga. Sample points shall be located on a grid at a specified spacing determined by the size of the stratum and the number of required sample points. The ‘plots’ are referred to as points. The origin of the grid and the orientation shall be determined randomly, using random numbers generated by the computer -0.000-0.999³.

The sampling method will be point sampling using basal area sweeps with Bitterlich Relascope. The survey shall be based on primary stratification of the plantation according to the species and year of planting and on photo-stratification into density classes.

³ The minimum number of points required is calculated using the following formula:

$$N = \frac{t^2 S^2}{E^2}$$

Where: N = Number of required points
 t = Student's t-2 for 95% confidence limit
 S = standard deviation
 E = expected sampling error.

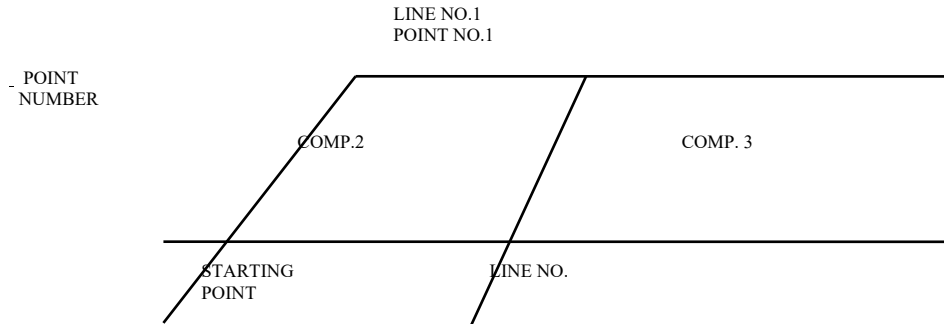
i) Origin of the grid - on the map select at least 30 conspicuous points (compartment corners, road intersections etc) and number them.

Press the “Random No” key. First number indicating 0.01 ... to 0.30 will determine the origin of the grid (example-random number generated is 0.178 - point 17 is the origin of the grid).

ii) Orientation of the grid. 0° - 360° - method as shown above.
 Example: Random number generated 0.053 = 53° or 0.145 = 145° etc.

5.8.29.4. Line Cutting and Starting Point

- * Line grid and the starting point of each line shall be established by the team leader. The starting point shall be marked on the field map and on a photograph. In the field, the starting point shall be marked by blazing a tree and using lumber crayon; the line number and the date shall be written on the blaze. The lines and points shall be numbered consecutively (see chart).



- * Having got a proper compass bearing to run the line, the compassperson shall check that he/she has proper declination on the compass. The compassperson shall frequently check the back bearing to eliminate the possibility of error due to human error or magnetic disturbance. The line having been established and cut, the chainpersons follow the compassperson. By using a nylon chain (or steel surveyors chain), a distance from the starting point to the first point centre shall be measured as well as the distances to the other point centres along the line. Provision for slope correction shall be made where the terrain is not flat. The required addition shall be read from the slope correction table.

5.8.29.5. Sample Plot Procedure: When the compassperson arrives at the sample point location, he/she shall have, as a point centre, a stake cut about 1½m long and shall stick it solidly into the ground at the point centre. On it, he/she shall note the line number, the point number and the distance along the line. When the team leader arrives on the point, the enumeration shall begin with the description of the plot and the determination of the “in” trees.

5.8.29.6. Description of the Plot: Each point shall be described on a tally sheet as to the elevation, slope, aspect, drainage, disturbance, treatment, ground cover, soil etc. Various classifications shall be employed as indicated in the section on the Sample ‘Plot’ Form.

5.8.29.7. Determination of the “in” Trees: All the “in” trees shall be numbered consequentially by marking them with a crayon. The team leader shall stand holding the relascope directly above the point centre, sight the trees in a clockwise direction and indicate the trees to be measured for dbh. Dbh shall be taken at 1.3m from the ground on the uphill side of the tree. He/she shall be able to use both eyes simultaneously, with one eye observing the tree, while another checks the scale. Trees that appear in the relascope as larger (wider) than the appropriate basal areas scale (band) shall be tallied (“in” trees). Trees that appear in the relascope as smaller than the appropriate scale shall not be tallied. Details of use of relascope are provided in separate manuals.

5.8.29.8. Doubtful Trees/Border Line Trees: When it is difficult to decide whether a tree is to be tallied because it is obscured from view, or because it is a borderline tree, the horizontal distance from the centre of the tree to the centre of the point will be measured. The ‘plot’ radius, that is the maximum distance for each diameter shall be given in a table of critical distances. If the distance measured is shorter or equal to that in the table for the corresponding diameter, the tree is “in” and is tallied; if the distance is larger the tree is “out” and is not tallied.

5.8.29.9. Tree Measurement: The tree species of all “in” trees shall be identified, recorded, and their dbh is measured. The conventional principles of diameter measurements will be followed. The team member measuring the diameters shall call out the information to the leader who shall report back as he/she notes it down on the sample plot form. This procedure shall be repeated until all “in” trees on the point are recorded. A careful check shall be made to ensure that no trees are missed on the point. Height shall be measured on largest trees on the point (“Largest” meaning trees with the largest diameter). A total height shall be measured and recorded to the nearest half metre. For the height measurement, a clinometer or a hypsometer shall be used. A clinometer is a very compact, handy instrument that uses a percentage scale. Heights shall be determined by short calculations of instrument reading multiplied by a factor related to the distance from the tree. With the hypsometer, no height calculations are required as the heights are read directly from the instrument. Heights may also be measured using a relascope. No trees with broken tops will be measured for heights.

5.8.29.10. Quality Assessment: On each “in” tree, the following defects will be observed and marked: Foxtail (Fx), Fork (F), Insect damage (In), Rot (R), Animal-Man damage (A/M), Sweep (s), Fire damage (FIR), Broken top (BT). The defects will be marked down as 1 (one) in the appropriate column opposite the diameter measurement. Two observations will be made. The first will be made on the first 4.5m from the ground (Log No.1) and the second observation will be made on the remaining part of the tree. Before the team moves to the next plot, they will have to make certain that all trees are included and that the sample plot form has been filled out completely. On finishing the day’s work and returning to camp, the team leader shall check through the sample plot forms for missing information. This is extremely important. The sample plot forms shall be completely filled out before they are sent for a computer compilation. Also, in the camp, the team leader shall check the work maps to see that the ground information and the map information agree. Necessary changes shall be made to the maps where necessary.

5.8.29.11. Inventory Form: The inventory ‘plot’ forms shall be used by the leader to record the measurements taken on the sample point. The form was designed so that information from the plot form can be easily typed into the computer compilation programme. The form (App. 28A FD.57) contains two groups of information namely point information which will be recorded in columns 1-30 and individual tree information which will be recorded in columns 31-60. The recording of the information is explained in App. V.28B.

5.8.30. Permanent Sample Plots in Plantations

5.8.30.1. All softwood timber plantations over 400ha. shall be sampled using permanent, circular sample plots of 0.04ha. The sites for permanent sample plots will be selected on a stratified random system in each compartment, or other uniform area of management at the rate of 1 pair of plots per 20ha. up to a maximum of 3 pairs (6 plots) in a stratum of 60ha. or more. Sampling will be restricted to pure even-aged crops of the main plantation species, which for the present are defined as: *Cupressus lusitanica*, *Pinus patula*, *P. caribaea* and *P. oocarpa*.

5.8.30.2. Management staff will be responsible for the establishment, inspection and measurement of plots. DFO’s shall include provision in their Annual Estimates for funds and staff to do this. The Biometrician will be responsible for computation, analysis, return of results and advice on the field work. The Biometrician will also check that the sample plot programme is kept up to date in the Districts.

5.8.30.3. First measurements will be done at the time of the first thinning, so plots shall be established before then. A 100% check of the survey and assessments of a new plot shall be done as soon as possible and within a month of its establishment. Thereafter, measurements will be done at 4 yearly intervals or at the time of thinning, whichever is the less. An annual inspection will be made of all plots to check for windfalls or other losses and interference.

5.8.30.4. The object of the sample plots is to collect the continuous data on the performance of plantations without which planned management is impossible. It is, therefore, essential that the plots are treated in exactly the same way as the crops in which they are situated. Sample plots shall be thinned and pruned at the same time as the rest of the crop. It has been decided to use a stratified random, two per block system as this increases the efficiency of the sampling when within-block differences are likely to be large. This is the case in most plantations as it is seldom that site as a factor in selecting uniform blocks is used. The samples are not intended to provide direct estimates of the yield or growing stock of individual compartments. However, their results can be applied at any time by doing a simple but more intensive enumeration of the growing stock of the compartment. The plots will be used for the compilation of general volume tables, tariff tables, assortment tables and local yield tables. As the plots are a vital source of management information they shall be given a high priority in the event of staff or financial shortages.

5.8.30.5. Selection of Random Positions and Numbers

- * To eliminate bias, the plots will be selected at random and marked on the plantation map before they are sited on the ground. Using a 1:10,000 scale transparent grid, they shall be divided into squares of approximately 40m. x 40m placed over the plantation map of the same scale. The centre of each of these squares represents a possible plot centre which shall be numbered on the grid by co-ordinates and selected by taking a pair of random numbers, one for each co-ordinate, until 2 plots have been selected in each stratum (q.v.) of the map. A plot that falls on a road or crop boundary etc. will be rejected and another selected at random to replace it. If the same plot centre is selected twice in a stratum then the second one will be discarded and another made. A table of random numbers from 0 - 27 is given in Appendix V. 11. The numbers shall be crossed off as they are used, although if the table is finished by working along the lines from left to right may be gone through again working from right to left or up and down the columns.
- * The block in which plots are to be sited will have one species planted in one year. If it is possible, the block may be further divided according to site types, but normally this is not easy and it is hoped that by using a stratified system of plots, variations caused by site will be accounted for. Normally the block will be restricted to one compartment or sub-compartment and for the re-measurement of pairs of plots at the same time it is better so, but in theory there is no reason why a block should not include two compartments (or parts of two compartments) if they are planted with the same species in the same year.
- * Two or more separate but uniform blocks, which on their own are too small to sample, may be combined for sampling. Blocks of 10 ha. or less will be ignored unless they can be combined with other blocks of the same species and planting year or there are special reasons for sampling them. However small the block is, the minimum sample shall be 1 pair of plots. For uniform blocks of 10-30 ha. there will be 1 pair of plots, for 30 - 50ha. 2 pairs of plots, and over 50ha 3 pairs of plots. Plots shall always be laid down, measured and re-measured in pairs.
- * Any uniform block larger than 30ha. in which more than one pair of plots have to be placed must be divided up into strata on the map. If the sites are uniform throughout the block, the strata of areas between 30 and 50ha. may be approximately two halves (accurate area measurement is not necessary) and of areas over 50 ha. approximately three thirds. However, if some obvious variations in site type are discernible they shall be separated as strata e.g. in a block of 40 ha. one stratum could be 30ha and the other 10 ha if the areas covered two obvious site differences. No stratum shall be less than 10 ha. or more than 30

ha. except if a uniform block is over 90 ha. in which case one or more of the strata will have to be more than 30 ha.

5.8.30.6. Numbering: Plots will be numbered consecutively as they are established in each project or management plan area. A re-numbering exercise has been carried out since 1965 to take account of the conversion of the old 0.2 acre plots. It is essential that numbering continues to indicate the pairing of the plots and to do this an odd number followed by an even number will always be the pair (e.g. No.17 and 18, 19 and 20 are pairs, but on no account can 18 and 19 be pairs).

5.8.30.7. Conversion of old 0.2 acre rectangular plots to 0.1 acre (0.04ha): Up to 1965, plots were 2 square chains. On revision of the sample plot instructions, one half of these plots was discarded at random, and the remaining half retained. In a few cases both halves were discarded. Where one half was to be retained, both halves were measured first by the former method, then the half that was retained was immediately re-measured by the newly introduced method. Full instructions for the conversion are given in Appendix V.15.

5.8.30.8. Equipment and Personnel

- * To establish a plot the following will be required:
 - Map showing location of sample plot and survey data;
 - Slope correction table, scale and protractor;
 - Compass and 30 m. chain;
 - One tape, preferably fibre glass and not linen, of 30m;
 - 2m fibre glass diameter tape;
 - Hypsometer or height rods. Abney level for slope;
 - Timber crayon, coloured pencil or marker;
 - Clip board, forms, rubber, pencil, carbon paper;
 - Staff with 2m. and 1.3m. clearly and accurately marked;
 - Aluminium nails, hammer and numbered aluminium labels - the last may be made in the field with a Dymo Tape-writer;
 - 0.7m metal strip to measure from nail at 2m. to point of measurement at breast height;
 - Concrete or treated wooden post: to mark plot centre; and
 - Hoes, pangas, etc. for access line. (N.B. Chain and tapes must be checked before and after use against a steel band, which must itself be regularly checked against FD or Survey Dept. Standard).

- * In addition to 1 Forest Ranger and 2 measurers, 2 or 3 labourers equipped with necessary tools will be needed at the time of establishment, and 1 man at re-remeasurement. Experience has shown that a plot can be established in 4-6 hours excluding the digging of access line trenches. Re -measurement takes 2 - 3 hours. Annual inspection can be done by a Forest Ranger or experienced Forest Guard and a porter and takes about half an hour or less. All of these times vary with terrain and undergrowth. Because sample plot methods take a little experience before they are well understood, DFO's and Foresters should endeavour to keep the same Ranger and workers on the work for as long as possible.

5.8.30.9. Location, Survey and Demarcation

- * Bearing(s) and distance(s) to the sample plot centre from an obvious permanent feature (e.g. boundary cairn) shall be taken from the map and corrected in the field for slope on the ground. The starting point shall be clearly marked by a notice or a final crop tree or treated stake and the access line by trenches 1.5m x 0.3m. x 0.3m. at 15m. intervals or, where there is risk of erosion of trenches, by a row of paint marks on trees leading to the

plot. The measurements, with magnetic bearings in and distances corrected for slope, shall be entered on a simple locality map. It is essential that locality maps include sufficient details to allow the plots to be re-located without confusion.

- * The plot shall then be located according to the measurements obtained from the map, irrespective of the appearance or condition of the crop at that point. The only adjustment permitted shall be if, owing to map errors, the predetermined position is over a boundary or obstruction. In such cases the sample plot may be moved so that no part of it overlaps that boundary or obstruction. The survey details shall then be amended on the locality map. The month and year of planting, species etc., shall be copied from the MP compartment records on to FD.40.
- * The actual plot centre will be the end of the access line as surveyed on the ground, with the exception that if it coincides with a tree it must be moved back 1 metre along the line of access. Each sample plot will be a circle of exactly 0.04 ha. Horizontal radii of 11.28m. will be measured from the plot centre to determine the perimeter of the plot - using stepped measurements or the radius correction table in Appendix V.14 on slopes. If the correction table is used, the angle of slope shall be measured from the centre point of the plot separately to each perimeter tree, as the angle will vary round the circle. Normally the ends of 5 or 6 tapes (less in easy areas) will be fixed at the plot centre and run out towards trees standing on the plot margin. Those trees whose centres are determined to be within the circle will be included.
- * The plot centre will be demarcated by 2 trenches, 1.5m x 0.3m x 0.3m forming a cross pointing to N, E, S, & W and with a concrete or treated wooden post bearing the plot number in the centre of the cross or the centre tree may have the plot number painted or embossed on it or both. The perimeter of the plot will not be demarcated but each tree in the plot will be numbered with an aluminium tag.
- * These tags will be nailed on with aluminium nails at 2m height. Two cm. or more of the nail shall be left protruding and the label shall be hung away from the bark to prevent obliteration by resin exudation. The numbering will follow the planting lines, normally starting in the north-west, running eastwards and then back along the adjacent line to the south and so on. The numbering will be clearly indicated on the Plot Plan (FD.40) which will also show the line of access. The numbers will be nailed at 2m. above the ground on the uphill side of the tree and will be 0.7m above the b.h. point of measurement or 0.7 m above the higher if there is a deformity etc. On a leaning tree the 2m. from the ground shall be measured along the tree axis and not vertically. In some plots it has been found that nails are stolen. If this happens persistently in a plot, then it will be necessary to paint numbers and 1.3m. rings on the trees. The upper edge of a painted 1.3m ring will mark the upper edge of the tape, and to paint this ring, webbing shall be put round the tree just above the tape and held tightly. When the plot has been established the locality map description and measurements shall be carefully checked and its position entered on the MP map.

5.8.30.10. Measurement of the Crop: Care shall be taken to avoid any undue disturbance of the growing conditions in or near the plot i.e. slashing and similar operations shall be kept to a minimum. Also, if one plot is measured then its pair will be measured at the same time, which may cause difficulty where plots in a pair are in different compartments. If possible, therefore, both plots in a pair shall be in the same compartment. Nails at 6 feet from the ground level in established plots shall be raised by 0.17m. to 2m. above ground level and the action recorded in the plot files.

5.8.30.11. Diameter Measurement: Diameter measurements will be taken at 1.3m. (dbh). If there is a deformity or branch whorl at this point, then true measurements taken at equal distances above and

below the point and avoiding the deformed portion of the stem will be averaged. Stems will be numbered before measurement as described in 5.8.30.9 above and the point of measurement (p.o.m.) will always be defined in relation to the real and not ground-level. The bh or other marks will not be made on the trees unless absolutely necessary (see 5.8.100). The diameters will be recorded individually, against the tree serial number, to the completed 1mm. expressed as cm. on Form FD. 71. Measurement will be done before thinning and the trees marked for thinning will be recorded with a T in the remarks column opposite the relevant number and measurement. At each re-measurement, the officer taking the measurements will ensure that the total number of trees measured is equal to the number at the previous measurement less any recorded windfalls or thinnings. If not, the reason for the discrepancy will be recorded or that no reason can be found. Doubtful marginal trees shall be checked for signs of a missing label and any stumps or other evidence of an unrecorded felling examined, hence the necessity for showing the numbering clearly on the plot plan.

5.8.30.12. Height Measurement: Ten main crop trees systematically selected will be measured for height (i.e. from the total number of trees in the plot less thinnings). Systematic selection will be done by dividing the total number of main crop trees in the plot by 10 and the answer corrected to the next lower whole number (n). Then the height of every nth. tree shall be measured until 10 have been recorded. Height will be measured to the completed metre. If the trees are less than 10 metres high, the measurements will be made with height measuring rods, but this will only be for the first measurements, if at all. Otherwise a hypsometer, either Blume-Leiss or Haga, will be used, great care being exercised to ensure the use of the correct scale. The range finder device or the Blume-Leiss (or the Relascope) shall be checked at the start of each day of measurements, against measurement by tape and, if found to be out of adjustment, the distance from the observer to the tree will be established using a tape. Several height readings will be taken until a constant reading is obtained and the instrument will be held steadily on each sighting for sufficient time to allow the needle to stop swinging before locking it. Readings will be taken to the top of the tree and to the nail at 2m. - if the reading to the nail is a negative one it will be added to the reading to the top and if positive it will be subtracted. The calculated height will be recorded on the form to the completed metre,, always remembering to add 2m. to the height of the tree measured from the nail. It shall normally be easier to take these height measurements after the thinnings have been felled, but if this is not possible and the tops of the trees cannot be seen clearly from any of the fixed distances used with the instruments, then using an Abney Level from a place where the top of the tree can be seen, the angle to the top and the nail and the horizontal distance to the tree will be recorded in place of a direct height reading. At each measurement the trees to be measured for height will be re-selected. It should be noted that there is no need to measure the same trees on each occasion. When tariff tables are available it will only be necessary to measure the heights of 4 trees with the greatest d.b.h. in each plot. However, until this time, it will be necessary to continue with the measurement of height of 10 trees, elected systematically. To get data for preparing tariff tables the 4 trees of largest d.b.h. (including thinnings) in a plot will also be measured for height. Note that the trees to be measured are the 4 with the greatest d.b.h. in the whole plot and will not necessarily be amongst the 10 selected at random. This height will be recorded on the form after the d.b.h. column opposite the number of the tree concerned.

5.8.30.13. Measurements of Thinnings and other Removals

- * The thinnings shall be felled at the same time and in the same way as the rest of the block. If, however, external labour is doing the felling for a sawmill etc., then experience may show that it is necessary to fell sample plot thinnings with F.D. labour. This has the advantage that all measurements can be done at the same time. It is most important, however, apart from this, that sample plots do not get any special treatment and that thinnings are marked and felled with the rest of the compartment. Care will be taken when marking thinnings.

- * All trees that are removed from a plot will be recorded, whether it be at final felling, at thinning, because of windthrow or death or any other reason. All removals, except those at final felling will be measured for dbh and total height and these will be recorded on form FD.41. At final felling, all trees in the plot will be measured for volume with the following being recorded on form FD.14:
 - * tree number;
 - * total length (measured from breast height so as to include stump height); and
- * diameter OB and UB at breast height. Percentages of 90%, 70%, 50%, 30%, 10% of total height measured from the top.

Reason for felling should be indicated by abbreviation T for thinning, F for final felling, D. for dead, T(W) for windthrow, etc.
- * Thinnings and final fellings will be measured at the time of felling. All trees left standing in the plot will be assessed at the same time as the thinnings. All other thinnings caused by wind throw, death or any other reason will be recorded as soon as possible after the event and not later than the next annual inspection. The copies will be accurately aligned by holding them up to the light and pinning them together before inserting the carbon. Errors will be corrected by crossing out neatly and not by altering figures. If for any reason a fair copy has to be made of a field sheet, then the original and the copy will be forwarded to HQ for checking prior to computing.
- * Notes on completing forms FD. 40 will include:
 - the locality map showing the N point, the distance and bearing of the access line;
 - eights - 10 should be recorded for deriving mean height, and 4 dominants being trees of the greater dbh. Type of hypsometer used should be noted. The horizontal distance and reading to top and to 2m. are for use with the Abney level.

5.8.31. Maximum Basal Area Control Plots (MBACP)

5.8.31.1. There is evidence of the value of maximum basal area as an indication of site potential at a given age and as a standard by which to assess thinning intensity. Unthinned plots will, therefore, be systematically sited and established in association with the permanent sample plots as follows:

- * in plantations with not more than 50 permanent sample plots allocate one MBACP for every 6 PSPs;
- * in plantations with 51-100 PSPs allocate 1 in 8; and
- * in plantations with over 100 PSP allocate 1 in 10

5.8.31.2. In stands which have had their final thinning, no MBACP shall be laid. These plots shall be established midway between the PSPs to which they are meant and as far as possible should be on the same contour.

5.8.31.3. Layout: The MBACP will be a circular plot of 25 m. radius i.e. 0.02 ha. Inside this will be established an assessment plot of 0.04 ha. of radius 11.28 m., thus giving a surround of approximately 13 m. width. In compartments in which new PSPs are being established, MBACP shall be established at the same time before first thinning. The plot centre will be established with a post and cross trenches. This will also be done at the time of each full assessment. Information on missing trees, windfalls, disease etc. will be sent to the Biometrician in the usual way.

5.8.31.4. Computation: After assessment and annual inspection, the original copy of forms only will be sent to the Biometrician by registered post. The carbon copies will be put in field plot files. At the establishment of a new plot the original forms FD.40 and 71 will be sent. Thereafter only FD.41 need be sent. A letter detailing the contents of registered consignment will be sent separately. The Biometrician will acknowledge receipt in detail and the sender must make enquiries if such acknowledgement is not received within two weeks of despatch. Details of the computations will be sent back for entry on form FD.42 in the field files. Every year the Biometrician will prepare a summary of the plots measured during that year for all record copies of the working plans.

5.9 PROTECTION OF FOREST RESERVES FROM FIRE

5.9.1. Controlled Burning in Savanna Reserves

5.9.1.1. General

- * Any fire, no matter how small, will harm young trees. Except in plantations and natural high-forest, complete fire protection is impracticable. Consequently, it used to be the practice of the FD to minimise the damage done by fire in all the savanna woodlands and dry mountain forests by means of “Controlled” or “Early Burning”. When the establishment of exotic plantations on grasslands and woodlands became widespread and because of shortage of funds, early burning was abandoned since the 1950s. However, it shall be applied where the expansion of NHF is desirable (grassland glades surrounded by NHF or adjacent to it, e.g. Budongo-Kitigo) or to prevent fires entering plantations. Experience has shown, however, that the quickest means of getting NHF colonisation is to establish plantations first and NHF species will invade the plantation as soon as the grass has been suppressed. This has been the case in Kibale forest, Mwenge Plantations and Namaganda Hill in Mabira Forest Reserve.
- * The aim of early burning in Savanna is to burn all the grass in the reserve annually using as small a fire or fires as possible. This is achieved by timing the burn as soon as possible after the cessation of the late rains and before the grass has completely dried out. This limits the fierceness of the fires as there can be no widespread accumulation of flammable material from one year to the next and the presence of some grass that is still too green to burn ensures that the fires are slow and incomplete.
- * The date to start burning will be as soon as possible after the second rains of the year, i.e. usually in the months of October, November or December, depending on the locality. Burning shall not normally be done in the short dry season between the early and late rains as the grass will grow up and dry out again after the last rains. It will then become a danger and, if burnt a second time, may be unduly weakened or even killed, leaving the soil without protection.
- * At the onset of the long dry season, the in-charge will try to light fires each day in the reserve. Once a trial fire has run 50 m then widespread operations will begin. The trials will be made on the driest sites in the reserve and especially where small patches of grass remain unburnt from the year before.
- * In a flat savanna reserve much of the area will dry out uniformly, making it essential to complete the burn within a few days. Thus, a large gang will be needed for a short time, perhaps only a week. In mountainous terrain, small areas dry out uniformly and the fire fighters have to move on from the dry site to another returning two or three times to any

one valley until all the grass has been fired. In such a case a small labour force will be needed for several months.

5.9.1.2. Plan for Burning: It is essential that the in-charge knows intimately the area to be burnt, as she/he shall be constantly directing the fire lighters to those areas which are dry enough to burn. The following points shall be born in mind:

- * sites on the windward side of the hill dry out before similar sites on the lee;
- * areas with an accumulation of dead material will burn before entirely green areas;
- * grass growing on shallow soil will dry out before that on a deep soil; and
- * fire moves more easily up-hill than down.

For each reserve, a burning plan will be made based on the experience of previous years' work. Such a plan will guide a new person unfamiliar with the area.

5.9.1.3. Hours of Fire Lighting: While the grass is green is when early burning shall commence. The fires shall be lit at mid-day, when the sun is hottest and the grass is driest. If burning has to continue late into the dry season when the grass is very dry, fires lit at mid-day will become too fierce and spread too rapidly. Lighting shall then be restricted to after 4 p.m. or even after dark.

5.9.1.4. Firing

- * Ideally, in a flat reserve firing shall be done in lines at right angles to the prevailing wind, that is work proceeds up wind, lines of fire being set at intervals of 400 m or less. In mountainous reserves the wind is often deflected by the hills and valleys across its path and is liable to change in direction once the sun is high. Nevertheless, fires shall be set in lines across the direction of the wind as at the time of fire lighting and each side of a valley or spur must be treated separately. At the beginning of the burning season the fires will be lit at the bottom of the slopes in order to encourage them to run, but later in the season, when it is necessary to try to restrict the run of the fire, lighting shall begin at the top of the slopes and continue at intervals to the bottom.
- * Precautions to prevent loss of life or property will be taken. The following points shall be born in mind and observed as the local conditions dictate:
 - local chiefs and people, the district administration and officers of departments such as those in charge of wildlife and tsetse shall be concerned, shall be warned before burning takes place. Normally, at least one month's warning will be given;
 - adequate firebreaks shall be cut or burnt and manned in order to contain the fire within a specific area; and
 - near plantations, homesteads and other sites where particular care is needed, the fire-line guards and burning gangs shall be suitably equipped to prevent uncontrolled spread of the fire. If necessary water supplies and backpack pumps, shall be kept in readiness.

5.9.1.5. Additional Points: NO fire shall run further than 500 m. If it does, then it is not under control. After the operation is complete the reserve shall not be uniformly black. Small patches of un-burnt grass shall have been left beneath large shady trees, the edges of the valley and plateau forests shall be wide, green, and un scorched, and the first burnt area shall be green with a new flush of grass. It may happen that before the fire lighters reach them some parts of a large reserve dry out to such an extent as to make it difficult to early burn them successfully. In such a case the area shall be burnt after dark by lighting a line of fires across the prevailing wind some 200 m upwind from the lee side of the un-burnt area. By

this means a relatively small and safe fire may be achieved. The operation shall be repeated on successive nights until all the area has been burnt. On the basis of experience in Karamoja, the cost of the operation will be between 65 - 130 ha./man day depending on the type of area. This is exclusive of supervision or fire line cutting, i.e. it is the cost of the fire lighting only.

5.9.2. Fire Protection in Plantations

5.9.2.1. General: It is essential that for all plantations in which fire is a hazard, not only shall every possible precaution be taken to ensure that normal fire hazards are foreseen, but also that abnormal conditions are met. The following notes indicate the major points which should be considered.

5.9.2.2. Selection of Plantation Areas: Whenever alternative sites are available, areas shall be chosen where grass-suppression can be secured within 2 - 3 years of planting. Where possible, external boundaries shall be chosen where a minimum external fire hazard exists and narrow belts with a long boundary shall be avoided.

5.9.2.3. Exclusion of Fire: The prevention of fire from entering the plantation from outside may be assisted by early burning outside the boundaries (in the case of uncultivated grasslands). Herbicides may be used to kill a narrow strip of grass around the plantation before the end of the rains, followed by early burning while the rest of the grass is still green.

5.9.2.4. Containment of Fire: Arson is a serious risk in several areas and is especially dangerous because fires are started with no warning within the plantation. As these fires in particular are likely to spread rapidly with little warning, some provision for the containment of fires shall be made. Since planted eucalypts firelines were discontinued and un-forested breaks are either expensive to maintain or a source of danger if not maintained, cleared breaks through the planted area shall be maintained in the early life of the crop. Their width will depend on the hazard, but generally external breaks will be not less than 5 m. and internal breaks not less than 2 m. The breaks shall divide crops of up to 3m. high into 25 ha. blocks or if it is still thought necessary, crops of over 3m. high into 50 ha. blocks. Un-flammable natural forest may also be used as a fire break. A width of no greater than 100m. may be left between compartments and narrower widths within a compartment. Roads may also form useful firebreaks around or within compartments. Supplementary aids to fire containment include differences of species, age class or silvicultural practice between blocks. The best method of preventing arson and the subsequent spread of fire is to remove the opportunities. Avoid piles of cut grass (burn it if possible), heaps of pruned branches, low branches near the forest edge etc.

5.9.2.5. Action to be taken before the fire season. (“Pre-suppression”): Well before the fire season starts the following shall be done:

- * check and service vehicles and equipment;
- * ensure that adequate spare parts are held. Equipment includes telephones, fire pumps, sirens, beaters, hoes, fire extinguishers in vehicles etc.;
- * repair and fill static tanks;
- * revise fire instructions and ensure that all FD employees know them. Detail responsibilities to staff and draw up duty roster;
- * practise fire fighting while early burning;
- * give talks to schools etc.;
- * contact Police or Fire Service where they may be in a position to help; and
- * contact Sawmillers and others working in or near plantations, point out their obligations and discuss their assistance in the event of fire. Ensure that their operations do not constitute a danger to the forest, e.g. dangerous waste piles, cooking fires in the exploitation area etc.

- * Beaters shall be left at convenient places in the plantation for immediate use, but only if made of durable materials such as netting. Leaving piles of branches which quickly dry out as a reserve of beaters not only engenders false security but is an invitation to arson. There shall be 1 beater of durable materials per 5 ha. of plantation.
- * Static tanks shall be sited at convenient places in the plantation, and kept repaired and filled. As a general guide, there shall be 100 litres of water per ha. available in static tanks. One fire pump in good condition shall be held per 20 ha. up to 1,000 ha, then 1 pump per 50 ha.

5.9.2.5. Awareness Creation

- * Although the protection of forests from fire is covered under Section 16 of the Forests Act and the duty of local people to assist in extinguishing fires is explained under Section 17 of the same Act, it is better to convince people of the value of forests and thus win their co-operation than to threaten them with penalties for infringements of the Act. Before the main fire season, local officers shall give talks at convenient centres, including schools, to people living around the reserve and tell them what the system is calling them out for and where to report when they hear the warning.
- * Propaganda posters and notices shall be displayed at this time too, but must be taken down at the end of the dry season or their message will be disregarded the following year because of over-familiarity. Local people should rarely be called out for fire fighting practices as they may then tend to ignore the call for fighting a real fire.

5.9.2.6. Patrols and Communications

- * The first essential of fire suppression is that the fire should be tackled as soon as possible after it occurs. The duty of patrols is therefore **FIRSTLY** to alert the main fire fighting crew and secondly to tackle the fire. If patrols work in pairs carrying a fire pump, beater and whistle or hooter, between them, then while one worker gives the alarm and contacts the fire fighting crew, the other tackles the fire. Only after he/she is sure that the alarm has been heard and acted upon shall the first worker return to fight the fire.
- * Patrols shall be assigned definite beats and checked periodically. The length of the beat will depend upon the fire risk of that portion. A fire danger rating may be used to determine the number of workers who should be put on standby and patrol. The places where other workers are in the plantation shall be known to patrols. If an alarm is given then gangs working in the plantation shall report to a specific point (Fire Rendezvous Point or FRP) where transport will collect them if available.

5.9.2.7. Lookouts: In addition to mobile patrols, static lookouts, linked to the fire fighting crew by radio or telephone or even runner, shall be established in fire towers or other places with a good view to warn of fires. When fire danger is low, patrols shall be stood off and only lookouts employed.

5.9.2.8. Warning Devices: A hand operated siren is the best general alarm, as it has a range of about 4 km. and cannot be mistaken for any other alarm. Whistles or hooters may be used by patrolmen for alerting FD staff.

5.9.2.9. Communications: The telephone is the best method, although the wire is likely to be stolen. Radios are difficult to procure at the present and there are difficulties of reception in hilly areas.

Communication by Morse or other code on a hooter or siren is not advised as it is liable to be misinterpreted in the heat of the moment.

5.9.2.10. Fire Fighting: During times of extreme fire danger the fire fighting crew shall be constantly on full alert. There shall be a duty officer in charge of them with provision made for a substitute if he/she is called away to a fire. The two main tools for ground fires are the beater and the hoe. Water shall generally be used for damping down the fuel after the flames have been beaten out. Water is also required for drinking. After a fire, watchmen shall be left for at least 12 hours to ensure that it does not break out again.

5.9.2.11. Fire Reports: The Fire Report Form is FD.45 (Appendix V.2). It will be completed and forwarded with a map as soon as possible after any fire in a plantation. Every attempt shall be made to complete every heading on the form and if accurate information is not available even an estimate is useful, so long as the fact that it is an estimate is noted. Under "Ground Vegetation", the principal species of grass or herbs shall be listed and a note made on the way they burnt. Under "Remarks" a note shall be made of the approximate allocation of fire fighters to different tasks, e.g. beating, hoeing, spraying water, carrying water, supervision etc. Also details shall be given of the state of the fire and the area burnt on the arrival of the main body of the fire fighters.

5.9.2.12. Instructions: Every plantation shall have fire fighting instructions drawn up. These shall be as simple as possible and list the duties of each person depending on task e.g. patrolman, lookout etc. For supervisory staff there will be a clear line of command and outline of responsibilities. These instructions shall be written in the form of a Fire Plan which shall be produced for all coniferous plantations and large blocks of fuel and pole plantations (see Appendix V.25, FIRE PLAN).

5.9.2.13. Allocation of Funds: Adequate funds shall be estimated for the efficient protection of planted areas. Fire protection has priority over all other operations. In particular, the protection of RP's shall have as high a priority as the rest of the plantation and the instructions for their protection shall be closely followed.

5.9.3. Management of Planted Firelines

5.9.3.1. Eucalyptus firelines were planted to intercept fire sparks or force them high into the air so that they burn out before falling. They also broke the blocks up, formed relatively un-flammable crown and ground barriers and provided a ready means of access. Their effectiveness as spark interceptors was, however, doubted, their establishment and management was expensive, the eucalyptus produce was often unsaleable and they suppressed the adjacent coniferous crop. Planting of eucalyptus firelines was, therefore, discontinued in 1968.

5.9.3.2. There remained, however, several hundred hectares of established eucalyptus firelines. Today, the produce can be sold in various forms e.g. saw logs, utility poles, firewood, etc. They shall be managed like any other eucalyptus plantation by felling and coppice regeneration. As usual, felling shall not be haphazard and stumps must be trimmed. Felling was formerly done over half the width of a line at a time, so that coppice re-growth gave protection from sparks and the crowns of the established trees gave high protection. This shall no longer be followed, although it is still recommended for external lines.

5.9.3.3. If felling of external firelines is done, then all felling debris shall be cleared off them and burnt before the dry season. If eucalyptus firelines can not be sold then they shall be left alone. Removal of debris shall be done in the external lines.

5.10 CONTROL DISEASES AND DAMAGES

5.10.1. Reports: All charge officers are responsible for the prompt reporting of tree diseases and injury whether observed in the course of routine work or in special pathological investigations. Special attention shall be paid at the time of thinning and assessing PSPs. All entomological and mycological reports and specimens shall be sent to:

Forest Entomologist, FORI,
P.O. Box 1752,
Kampala

with copies to FD HQ. Reports shall be on Form FD.46 (Appendix V.3) which shall be obtained from the Entomologist at FORI.

5.10.2. Collection and Packing of Specimens

5.10.2.1. Insects: These shall be handled as follows:

- * beetles - in spirit, pack in specimen tubes with most of the spirit poured off; if possible seal the corks with wax;
- * moths, flies, Hymenoptera - kill by fumigation with cyanide or, in emergency, petrol vapour pack dry in paper envelopes and include some naphthalene (moth balls) crystals;
- * larvae - in Spirit. If possible, gently boil in water -and allow to cool first; and
- * wood samples with living larvae - pack in tin or galvanised iron containers for reference.

5.10.2.2. Fungal: These will include:

- * wood samples with mycelium - allow to dry on the surface before packing in wooden or metal boxes. The samples shall be wedged or enclosed in shavings to prevent movement in transit; and
- * fruit bodies - dry slowly (not in direct sunshine) before packing in soft material enclosed in box. If possible send the fruit body still attached to the host.

If it is not possible to get the chemicals and materials mentioned above, consult FORI.

5.10.3. Wind Damage: Wind damage involving more than one tenth of a ha. shall be reported on the Fire Report Form using such headings as are applicable. Additional information on soil texture and depth, rooting depth, density of crop, pruned height, health and vigour of the crop etc. shall be given.

5.11 NATURE CONSERVATION IN NATURAL FORESTS

5.11.1. General

5.11.1.1. Uganda's forests are a home to a remarkable array of species and ecosystems. They contain a very significant portion of the country's biodiversity particularly with regard to certain taxa e.g. birds, primates, herpetofauna and butterflies. This biodiversity is of local and global importance, as it provides the future genetic feed stock for important products that are derived from natural sources. Currently, the FD manages natural high forests along management principles that attempt to balance provision of an array of forest products and protection of biodiversity through the establishment and maintenance of an extensive network of Nature Reserves (NRs). This network constitutes one of the most important safeguards for the country's biodiversity. Apart from forest products and biodiversity, forests also provide:

- * significant environmental services through local climate control functions which maintain surface water levels and maintain soil stability; and
- * recreational opportunities to both local and international holiday makers, thus increasing financial benefits from forests.

5.11.1.2. The job of maintaining the integrity of Uganda's biodiversity found in forest reserves is the primary responsibility of all cadres of forestry staff. They shall ensure that their management decisions and actions do not in any way impact negatively on the ecosystems and species that they harbour. Thus, currently management of natural forests is to ensure the preservation of biological diversity through the strict protection of some representative samples from extricate use. The strategy shall involve the setting aside of at least 20% of conservation forests area as Strict Nature Reserves (SNR) in order to:

- * ensure the long-term survival of as many as possible of Uganda's forest species;
- * maintain viable representative samples of each of the major forest types in an undisturbed states;
- * provide suitable areas for fundamental scientific research, education and other forms of consumptive and non-consumptive use including recreation and tourism; and
- * help sustain the productive capacity of adjacent production forests, and their role in environmental protection, by serving as a reservoir of plant and animal species able to disperse and recolonise these areas.

5.11.2. Zoning: The FD will designate forests considered most suitable for establishment of SNRs. Based on biological inventories, such forests will be subject to a zoning programme to maximise potential resource utilisation whilst preventing conflict of usage and unacceptable resource degradation. Zones will be designated for specific uses. The main zones shall be:

Strict Nature Reserves	- areas with strictly controlled access.
Recreation Zones	- for low impact recreation and tourism
development	
Resource Utilisation & Community Use Zones	- Sustainable and Controlled resource utilisation.
Buffer Zones	- Areas where only limited logging and resource extraction are permitted, to ensure the integrity of the strict nature reserve.

5.11.3. Establishment and Demarcation of SNRs

5.11.3.1. SNRs are demarcated within Forest Reserves in order to preserve examples of natural vegetation unaffected by forestry operations. Generally all that is necessary is the demarcation of the boundaries (usually by "Nature Reserve" signs similar to "Forest Reserve" ones) and the prohibition of felling therein. It must, however, be remembered that:

- * complete protection may alter the vegetation which it was the purpose of SNR to preserve e.g. complete fire protection in savannah reserve, or a ban on elephant control in a part of high forest. A certain degree of management shall, therefore, be required, such as early burning or the shooting of excessively large herds of elephant within the SNR; and
- * SNRs shall best be established beyond easy walking distance but they shall not be completely inaccessible.

5.11.3.2. A description of the vegetation of the NR shall be placed in Records, and to assist with this a few permanently demarcated sample plots recording growth and succession of all species shall be laid down. The existence of SNRs shall be brought to the attention of both local and international institutions likely to be interested.

5.11.3.3. Whenever FRs adjoin main roads, no felling shall be permitted in natural forest within 50 m of the edge of the road. Wherever permanent forest stations or buildings are maintained by the FD, their surrounds shall be maintained in a neat and tidy condition; hedges and shade, ornamental and fruit trees and shrubs shall be planted. PWD camps, logging camps, camping grounds, etc. in forest reserves shall be sited with a view to minimising loss of amenity value.

5.11.3.4. The establishment of SNRs shall as much as possible be based on the UNESCO's "**Man and Biosphere**" model which is based on the principle that a SNR shall be a totally protected central "core" area surrounded by "zones" of increasing intensive use permitted close to the Forest Reserve boundaries. The selection of SNRs shall be in line with the objectives set-out in the Nature Conservation Master Plan.

5.11.3.5. The procedure for selecting SNR shall follow a sequence of steps designed to ensure selection of the minimum number of sites necessary for protection of the country's biodiversity. These steps shall include satisfaction of the following criteria:

- * identification of biologically important sites;
- * combination of biological and socio-economic considerations to evaluate "Suitability", "Conservation Value" and "Alternative-use Potential";
- * examining options for a diverse national network of complementary protected areas;
- * selecting "prime" sites for establishment, based on their contribution to the national protected areas system;
- * selecting "core" forest sites for SNR establishment, based on the occurrence of "concentrations" of species not found elsewhere;
- * selecting "secondary" forest sites for SNR establishment, based on the occurrence of "significant" species not found elsewhere; and
- * allocating areas for designation as SNRs and BZs.

5.12 RECREATION IN FOREST RESERVES [ECO-TOURISM, (ET)]

5.12.1. Objectives and Tourism Plans

5.12.1.1. The FD shall encourage and promote recreational activities in forest reserves as important non-consumptive uses of forests, in order to optimise economic returns from these resources. Charge officers and their staff shall be familiar with and use official guidelines for development of ecotourism in Forest Reserves as a working tool for staff and a guide to all those involved in forest tourism and recreation. These guidelines are contained in the National Tourism Development Plan (NTDP).

5.12.1.2. The NTDP is the overall plan that identifies forests most suitable for recreational use, based on inventory results and site appraisals of each site. The plan identifies the form of recreation

appropriate for each site, details the potential attractions, outlines plans for future development of the sites and identifies broad opportunities for investment and training/staffing requirements. Each site will be given a budget estimate for planning purposes. For each site, there shall be a Tourism Development Plan (TDP).

5.12.1.3. Each TDP shall consider, *inter alia*:

- * the type and level of recreation appropriate to the site;
- * the current level of tourism and tourism services;
- * all infrastructure and services which are required;
- * what provisions for access are needed;
- * any specific regulations which may apply;
- * which organisations are expected to be involved and what role they will play;
- * what opportunities, if any, exist for investment or local community involvement;
- * design and construction plans for facilities;
- * training and staffing requirements; and
- * any other considerations.

The TDP shall be translated into specific working circles in the FMP of the respective Forest Reserve.

5.12.2. Access

5.12.2.1. Public roads within Forest Reserves shall be constructed and maintained by the ministries responsible for such works. Users of public thoroughfares will not be charged for entry to the forest unless they leave the public thoroughfare. Management and development plans for forests will contain clear instructions on the level of access envisaged. Access will take the form of navigable roads leading to forest reserves and correctly constructed trails within the Forest Reserve. In some instances where navigable roads exist within a forest, these shall be maintained in preference to cutting new trails. As far as possible, all trail and road design shall follow existing routes.

5.12.2.2. The planning of access routes shall be a responsibility of the Forest Officer in charge. Construction and maintenance will be carried out by forest staff, or where appropriate, this activity shall be contracted out, or may form part of a concession condition.

5.12.2.3. Transport to recreation sites will not be the responsibility of the FD. Within the Forest Reserve, transport will normally be by foot (on trails) or by canoe (on watercourses). This may be organised by FD staff or under the terms of a concession. No form of animal or motorized transport within the forest reserve shall be permitted except in exceptional and justifiable cases. Permission for such an activity shall be applied for as a concession and will be subject to a stringent environmental review. The CO in charge shall reserve the right to restrict access within the reserve as conditions warrant.

5.12.3. Regulations

5.12.3.1. A regulatory framework for recreation has been developed for use in all forests. It is:

- * consistent with existing rules and regulations in the Forests Act, Uganda Wildlife Statute and rules that are applicable to other tourism activities in Uganda;
- * able to control recreation without unnecessarily restricting recreational activity;
- * enforceable;

- * easy to understand, but legally tight to ensure that offenders can be subject to the full powers of the court if necessary; and
- * comprehensive enough to cope with present and future demands on forest reserves.

5.12.3.2. The specific circumstances and anticipated activities within each Forest Reserve will be considered with additional regulations drafted and incorporated into TDPs. These will be part of the FMP records. Discretionary powers will be given to FD staff to enable them interpret and apply the regulations efficiently and fairly. Regulations specific to the provision of services and infrastructure will apply both to the FD and to private organisations or NGOs. These regulations will be applied and enforced by the FD staff. Copies will be made available at each Forest Reserve.

5.12.4. Permits

5.12.4.1. Permits shall be issued to persons wishing to enter the Forest Reserve, who do not possess a valid license or concession, except within free access zones and on public thoroughfares. The issuing of permits will enable FD staff to monitor and control activities within the forest, keep accurate records and ensure visitor safety. The FD staff incharge will ensure that permits are easily available to encourage visitors to the forest. The following points shall be followed:

- * forestry entry gates will be constructed to enable forest staff to control access into the forest;
- * permits will be available at the forest entry gate for ease of purchase. No person shall enter without the correct permit; and
- * Permits will be available for the following activities within forests;
 - simple access to recreation zone (access permit);
 - chimp viewing, boat trips and camping (special activity permit);
 - access to restricted areas of the forest (issued at the discretion of the officer in charge; and
 - camping permit.

5.12.4.2. In forests with recreation activities, existing license/concession holders (e.g. licenses for extraction of timber) will not require a permit to enter the forest to carry out the licensed activity but will be required to carry the license at all times within the forest. Authorized employees of a licensee must be issued with identifications which have been stamped by the FD staff. The issuing of permits will be subject to the payment of fees and will have the following conditions:.

- * permits are not transferable;
- * permits are non-refundable;
- * permits are valid for 7 days, unless otherwise stated;
- * every person except license holders/concessionaires and government officials on duty shall obtain an entry permit. No other permits shall be issued unless an entry permit is purchased;
- * proof of identity and residence status shall be provided on purchase;
- * permits shall be shown on request to officials in the Forest Reserve;
- * payment for permits will be in advance of the issue of the permit;
- * a permit will only valid for the specific activity stated. Permits shall be purchased for each and every activity undertaken;
- * visitors will be bound by all the laws and bylaws governing the Forest Reserve;
- * entry into and activities within Forest Reserves shall be undertaken AT THE INDIVIDUAL'S OWN RISK, and visitors agree that they will not hold any officer,

employee or agent of the FD, or the FD itself, liable for any loss or injury whatsoever, which is sustained while in the forest;

- * any contravention of any permit condition will result in forfeiture of the permit; and
- * persons possessing a license or concession to carry out tourism activities (e.g. guides, accommodation staff) will be exempt from the requirement of an entry permit.

5.12.5. Fees: FD will establish fee schedules for recreation activities. These fees will be at a level which encourages rather than deter entry. Fees will be collected at forest entry gates or at the FD/HQ. FD will share benefits with local administrations and a percentage of the levy fee shall go towards community development activities. This levy will be collected separately from the government entry fee, with the issue of a double receipt to clarify the separate charge for visitors and enable simple accounting.

5.12.6. Provision of Services

5.12.6.1. The FD will allow and encourage private operators to provide tourism services within designated recreation zones in selected Forest Reserves. These services may include:

- * accommodation;
- * provisioning (food and drinks, general groceries);
- * guiding and portering; and
- * special activities, e.g. chimp viewing, boat trips or bird watching.

5.12.6.2. Operators of service facilities will be required to achieve high standards in terms of visitor safety and satisfaction and environmentally good practice. FD shall encourage the participation of local communities in the provision of service facilities. FD will also encourage the provision of services adjacent to the Forest Reserve with the intention of spreading the financial benefits and reducing pressure on the forest resource.

5.12.7. Community Participation: FD will encourage conservation at the local community level through education and extension work, to provide a better understanding of the importance of forests to the present and future generations, both locally and globally. It will work with communities to increase benefits from the forests through sustainable means. FD will also increase consultation with local communities in preparing FMPs, TDPs and in making forest management **decisions**.

5.12.8. Guidelines for Developing Trails in Forest Reserves

5.12.8.1. One of the best ways to encourage visitors to experience the forest is through developing interesting walks which will bring them into contact with the major attractions in the forests, including pristine areas of the forests. The following shall be borne in mind while developing nature trails:

- * a forest trail shall be as short as possible;
- * a forest trail will be constructed as a one way loop beginning and ending in the same place;
- * a forest trail shall be information. Along the trail there will be put signs or labels explaining its features. Signs shall contain all the desired information, or simply have numbers referring the visitor to an accompanying pamphlet;
- * a forest trail shall be inviting. It shall have a clear, well marked beginning. It shall be wide and flat enough to walk in comfort. It shall have no steep climbs, muddy places, or physical obstacles; and

- * forest trails shall be clean and well maintained. Litter cans shall be provided at the entrance and at rest stops. Vegetation and debris shall be removed regularly from the trail.

5.12.8.2. Construction of the trails shall observe the following:

- * a thorough survey of the area where the trail is to pass shall be done. A list of all notable natural and historic features (e.g. salt licks, rock outcrops, view points, vegetation fossils, waterfalls) shall be made and these features shall be marked on a sketch map, with the trail route being planned to connect them;
- * walk the route to check its length and access to noted features and to determine the feasibility of trail construction;
- * disturbance and damage to nature shall be avoided;
- * the walking area shall be cleared of all obstacles and overhanging vegetation to a height of 2m shall be cut. Cutting large trees, clearing debris down to bare soil shall be avoided. Depressions will be filled with rock or earth waste;
- * the trail will be built with curves, avoiding straight stretches where possible as a winding trail is more interesting to walk. Designs that "double back", shall be avoided as these may encourage visitors to take short cuts;
- * steep hillsides and water-logged areas shall be avoided. Drainage shall run off, not down, the trail and water bars and drains shall be installed. In some areas the trail shall need to be raised on a wooden walkway or stepping stones;
- * at rest stops simple benches shall be provided. At stream crossings or deep gorges, bridges shall be built. Steps shall be cut in rock or a fallen tree shall be used for passage if it is wide enough for safety; and
- * trail entrance signs with basic information (a map and the trails' length) shall be provided. Directional signs shall be put at junctions.

5.13 ROADS

5.13.1. Layout of Roads

5.13.1.1. Softwood Plantations: The layout of the major road system in all new plantation areas shall be completed before compartments are formed and before planting is started. The road alignments will be marked permanently either by the maintenance of an inspection path, or cairns or other suitable methods. A width of 6 m will be left unplanted along these road traces.

5.13.1.2. Fuel and Pole Plantations: Where large scale extensions are planned for charcoal, tobacco etc. the road system shall be planned in the same way as softwood plantations above. Otherwise, with established township plantations, the layout of roads shall be the responsibility of the DFO.

5.13.1.3. High Forest Areas: The main skeleton of the proposed road system in high forest reserves shall be laid out on paper before exploitation or silvicultural treatment is begun. The steps will be as follows:

- * Map Section will produce a topographical map of the area;
- * DFO will give indication of management requirements;
- * DFO will prepare, an approximate main framework for the area;
- * when any part of this framework is to be constructed either by concessionaires or by the FD, DFO will lay out the alignment; and
- * the building of minor roads within coupes or compartments shall be the concern of the concessionaire on alignments approved by the DFO. These alignments shall be laid down from the topographical and the stock-mapping maps.

5.13.2. Construction of Roads

5.13.2.1. Charge Officers shall be responsible for estimating for new roads and with the advice of the Forest Products Division, for laying out the alignments. The usual method of building roads has been by hand labour, but a road construction unit consisting of D.4 tractor, grader and tipper truck shall be used when available. DFO's will make their requests for this unit to the Forest Products Division before the end of June each year in respect of the forthcoming year. The method of payment of costs will be advised from time to time.

5.13.2.2. Width: The normal width for forest roads will be 5 m. but shall be increased or decreased, depending on purpose.

5.13.2.3. Gradients: The maximum gradient for forest roads will normally be 1/15, but in softwood and fuel plantations gradients of 1/9 with the load and 1/12 against the load shall be used for distances not exceeding 400 m., if cheaper and shorter alignments are thereby secured. In most forest areas, avoiding of soft ground is generally more important than gradient and alignments shall make the best use of well drained ridges and firm murrum outcrops.

5.13.2.4. Bridges and Culverts: Concrete culverts shall always be used in preference to wooden bridges on all except entirely temporary tracks. Bridges and culverts in plantations shall be designed to take a ten tonne static load plus 25% safety margin. The minimum width will be 3.6 m.

5.13.2.5. Curves: Minimum radius is 10m. at the centre line (12 m. is preferable) based on the turning radius of a seven tonne truck.

5.13.2.6. Camber: Proper camber shall be constructed and maintained on all roads, except the most temporary tracks, to expedite drainage.

5.13.2.7. Charge Officers shall be responsible for maintaining roads except where they are being used by a licensee. The road construction unit grader shall be requested for where necessary.

5.14 BUILDINGS

5.14.1 Because funds for buildings have been limited in recent years and this situation may continue, it is important that money is spent to the best advantage on new buildings. For Junior staff houses, rest houses, stores etc., mud and wattle buildings with plaster facing, preservative treated woodwork, concrete floors and CIS roofs, are a far better investment than those of concrete blocks. For more senior staff, prefabricated, preservative treated, wooden houses with linings, ceilings and glazed windows shall be considered, especially near a sawmill.

5.14.2 DFO's shall consider all types of building to obtain the best value. Methods shall be by direct labour or contract. Plans shall be obtained from HQ for standard concrete block houses and houses of local materials.

5.14.3 Since “Remote Areas” houses were transferred to their respective Departments the maintenance of all FD buildings shall be the responsibility of FD although the department of Housing shall do repairs on payment.

5.15 RESEARCH: The bulk of forestry research is expected to be carried out by FORI in consultation with FD and it shall be the responsibility of FD to ensure that appropriate priorities are included in all FORI’s research programmes. The programmes have been prepared and FORI shall collaborate closely with FD staff, some of whom will carry out field activities on behalf of FORI.

5.16 ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

5.16.1. Until recently, forests were treated as an infinite supply of physical resources to be used for human benefit and exploited as required. Forestry operations were assessed purely in silvicultural and financial terms without economic valuation of non-cash benefits and without environmental considerations. It is the policy of the Government of Uganda that environmental impact assessments be conducted for proposed activities that may, are likely to, or will have significant impacts on the environment. EIA is a tool for protecting the environment. The use of EIA ensures that environmental impacts are considered during conception, design and implementation of development activities at the same time that financial, technical and institutional aspects of the project are considered.

5.16.2. EIA is a systematic and interdisciplinary evaluation of the potential positive and negative environmental effects of a proposed action and its practical alternatives on the physical, biological, cultural and socio-economic attributes of a particular geographical area. The developer is responsible for the EIA in accordance with the general guidelines on the conduct of the assessment and in compliance with provisions of the National Environment Statute.

5.16.3. Although the National Environment Management Authority (NEMA) is responsible for the development of guidelines for implementing EIA for activities that may, are likely to, or will have significant impacts on the environment, the FD as a “lead agency” is under legal obligation to develop and implement sector-specific EIA guidelines. The third schedule of the National Environment Statute lists those projects that have to be considered for EIA, including forestry related activities like timber harvesting, clearance of forest areas and reforestation and afforestation.

5.16.4. Other forest management related activities that require EIA include:

- * establishment of wildlife areas;
- * formulation or modification of forest management policies;
- * formulation or modification of water catchment management policies;
- * policies for management of ecosystems, especially by use of fire;
- * commercial exploitation of natural fauna and flora; and
- * introduction of alien species of fauna and flora into ecosystems.

5.16.5. It will be the responsibility of all COs to implement the environmental standards and ensure compliance thereof in all Forest Reserves. The EIA requirement for any activity, project or any development within the Forest Reserves will ensure that the foregoing objectives are considered with reference to each individual proposal.

5.16.6. The FD shall from time to time issue guidelines for EIA specific for forest operations and activities by concessionaires. Such guidelines shall be cleared with the NEMA to ensure their conformity and compatibility to the law. Once they are approved by NEMA, all the concerned officers shall keep copies of and be familiar with the guidelines and requirements.

5.16.7. Apart from the activities listed in Schedule 3 of the National Environment Statute, the following shall be considered for environmental assessment:

- * staff house construction;
- * research units;
- * high usage nature trails;
- * construction of camping facilities;
- * improvement of existing accommodation facilities;
- * road maintenance;
- * construction of visitor centres;
- * construction of hotels and lodges;
- * activities in virgin forests;
- * primate viewing; and
- * new road construction.

5.17 COLLABORATIVE FOREST MANAGEMENT (CFM)

5.17.1. General

5.17.1.1. CFM means that interested parties are genuinely involved in management of the forest resources through a negotiated process in which all share rights, roles, responsibilities and returns for the sustainable management of forest resources. The details of this shared management are arrived at through meaningful negotiation and expressed in written agreements.

5.17.1.2. CFM is an alternative approach to the management of Forest Reserves, an approach that focuses on management through collaboration. It is neither extension nor handing over ownership. It is a process of giving adjacent residents the opportunity to become involved in decision making regarding the management of the forest, receive benefits from that area and in turn take on some appropriate management responsibilities.

5.17.1.3. The future of forestry in Uganda very much hinges on public participation through shared management responsibilities. It is well known that the local people are interested in forests and actually do have ideas and values to add to the decision making process about the future of forests that are located within their midst. A partnership between the FD and the people is essential for the protection and long-term survival of both people and the forest.

5.17.1.4 In line with the new global focus on people centred conservation, FD is committed to addressing the needs and concerns of the locally resident communities. To avoid the old paternalistic command and control approach towards dealing with locally resident people, the FD has decided to begin on CFM initiatives with a genuine commitment from all levels to explore the possibilities of forging viable partnerships with local people. This will entail an institutional commitment at all levels that recognises members of the local community as partners with rights and the capacity to take on responsibilities and making appropriate adjustments to management plans where they already exist through a negotiated process. All Charge Officers shall explore possibilities of involving all interested parties at all times in making decisions that affect them.

5.17.2. The Operational Guidelines

5.17.2.1. The “how-to-do-it” guide, offering broad, but flexible, advice on implementing CFM in the field, involves a number of logical stages, notably:

- * *formalisation of pilot initiative*: whereby a pilot Forest Reserve is chosen to have CFM as a priority approach towards management;
- * *site selection within the pilot area*: to ensure that there is a rational basis to the decision making about which communities CFM will be initiated in;
- * *initial training/sensitisation of FD staff*: to give FD staff some preliminary understanding of CFM and some initial training in useful tools for its implementation;
- * *start-up*: the initial entry point to the communities;
- * *familiarisation*: during which the FD staff make a concerted effort to understand the social, cultural and historical perspective of forest use;
- * *resource assessment*: collection of the specific information upon which management decisions will be based;
- * *negotiation and agreement*: a process of meaningful discussion, compromise and finally agreement will be undertaken by the parties to the process; and
- * *implementation and monitoring*: whereby the terms of the agreement will actually be put into action, coupled with a monitoring programme which will track both social and ecological trends.

5.18 PUBLICITY, EXTENSION SERVICES AND ENVIRONMENTAL EDUCATION

5.18.1. General: Publicity refers to methods of informing the public of the general work of the FD. Extension Services refer to the advisory work on forestry and forest industries done by the officers of the FD for the benefit of the public. In the past, emphasis was laid on tree planting as the main interest in extension. There is now a shift and FD staff will pay equal attention to also wood-based industries, environmental education, forest products utilisation and natural forests management. The main function of the Public Relations and Extension Section (PRES), is to organise, support and/or participate in those activities that help to disseminate knowledge among the general public on various aspects of forestry. The section also gives technical advice to the public regarding forestry operations. The areas where the section will be most involved are:

- * Agroforestry;
- * Biodiversity conservation;
- * Non-timber forest products;
- * Private commercial forestry;
- * Community forestry;
- * Farm forestry;
- * Environmental protection/education;
- * Ecotourism;

It will be the responsibility of every officer to publicise the work of the Department and to provide extension services. The duties of the Public Relations Officer are to backstop and supervise field officers in this work and to organise large public relations exercises at national level.

5.18.2. Publicity: Publicity can take many forms, e.g.:

- * district shows. Some exhibits can be supplied by PRES;
- * radio talks. Press releases arranged by PRO from material sent in by field officers;
- * talks to schools, clubs etc. useful for recruiting. Slides can be arranged by PRES;
- * open days. The objects and the benefits to be obtained shall be clearly thought out, as open days take a lot of time to organise. PRES can advise and supply exhibits;
- * guided tours of forest areas for small parties of VIP's, local leaders, school leavers etc. This can be a most successful method of demonstrating the work of the FD in a particular area;
- * articles for magazines etc. clear with CFF first; and
- * picnic sites - should be established in forest reserves near towns or at suitable points on major roads.

5.18.3. Information Work: A unit to collect, manage and disseminate information is being established at FD/HQ. All FD staff at all levels shall put it to maximum use by gathering accurate information and giving it to the unit.

5.18.4. Extension Services

5.18.4.1. Forest extension at the district level shall be headed by a Forest Officer assigned the responsibility of extension services, assisted (where possible) by Assistant Forest Officers and Forest Rangers. The Extension Officer plans, controls and supervises all forest extension work. AFOs and FRs are usually in direct contact with farmers. Together with field staff, the he will prepare work plans for the district.

5.18.4.2. At the farm level, extension staff will assist farmers with technical issues like nursery work, tree planting, tending and harvesting. Extension workers will also work with private owners of natural forests and advise on sustainable forms of using their forests.

5.18.4.3. Staff shall avoid the risk of wasting a lot of time giving general advice and follow up of vague promises of action on extension services. Field staff shall rather concentrate on a few projects or individuals, community based organisations, religious institutions, farms, schools, progressive farmers, etc. at a time and obtain positive results from them rather than spending their efforts on many uninterested people. FEO or, in his absence, field staff will submit monthly reports to the DFO, who will in turn dedicate a section of the monthly report to extension services.

5.18.4.4. Field staff promoting agroforestry interventions will endeavour to work with their colleagues in other professions, to provide a single field level extension service to farmers following a farming system approach and thorough regular schedule of trainings and visits.

5.18.4.5. Agroforestry: This is a farming system where trees are planted as part and parcel of the farming landscape. Suitable trees are planted to provide shade to agricultural crops like coffee, cocoa, banana plantations, or judiciously interplanted with crops, on the edge or in a mixture to provide essential goods like fuelwood, poles, fruit, food, bark cloth and fodder. They also provide services like shade, essential nutrients like nitrogen and may act as wind breaks. Appropriate species shall also be planted on grazing or degraded land to provide browse, shade, fuelwood and poles and to restore the degraded land. Extension staff will work with farmers to identify their problems and possible solutions. Farmers will be encouraged to identify and use appropriate agroforestry species.

5.18.4.6. Farm Forestry: Farm forestry was adopted in 1989 with the immediate objective of improving the productivity of small farming households through farm and community level adoption of sound agroforestry practices. Farm forestry is geared to increasing the production of wood products for the rural population and to conserve soil fertility through encouraging farmers and community

groups to plant multi-purpose tree species for fuelwood, poles, fodder, fruits and increased soil fertility. All FD staff at grassroot level shall endeavour to promote farm forestry in their areas of jurisdiction.

5.18.4.7. Woodlots: These are small parcels of plantations planted by individuals or organisations principally for income. Field staff will provide technical advice for operations like seed collection, nursery work, spacing, planting, tending, fire protection and harvesting. They will also advise on marketing, to ensure that farmers get the maximum benefits possible out of their investments.

5.18.4.8. Community Forestry: Field staff will endeavour to identify and mobilise communities and individuals for tree planting and the sustainable management of forest/natural resources that are commonly owned. The goal will be to help such communities attain self-sufficiency and to increase community benefits to them. End-user groups will include charcoal burners, brick-makers, fish processors, tobacco farmers and industrial concerns dealing in limestone, sugar, tobacco, tea, etc.

5.18.4.9. Community forestry programmes will particularly be promoted in places where there is need to avert environmental disasters like landslides, soil erosion, bare hills, etc. This will also complement innovative forest management practices such as CFM and Ecotourism (See Section V).

5.18.5. Forest Products Marketing

5.18.5.1. It is the responsibility of every officer to promote the wider use of wood and non wood based materials in the area. Assistance shall be offered by the Industry and Marketing Section and the PRES. In order to do this, officers shall:

- * promote a better understanding of the correct ways of using forest products;
- * promote an increasing participation of Ugandans in the forest industries; for effective participation through extension services. More emphasis shall be put on Community Based Organisations, Wood Users' Associations and religious organisations, rather than Individual operation in order to promote progressive business and make it more convenient for field officers to offer meaningful and effective services, The SPRO will from time to time bring to the attention of DFO's tender calls for forest products for their immediate action with the local firms available. The field officers will always be informed through DFO's;
- * get to know intimately the problem of both wood suppliers and wood users by visiting them listening to them and facilitating the exchange of ideas by means of publications that may be available from the Industry and Marketing, Ecotourism and Public Relations Sections; and
- * publicise information on the use of less known species and non wood products. Such information should be based on research findings.

5.18.5.2. All staff shall educate the timber industry in particular and the public in general about the use of metric system as required by law (see section on legislation).

5.18.5.3. Field staff shall submit in their monthly reports, and DFO's shall, under Timber Trade in Monthly Reports, summarise development on marketing.

5.18.6. Environmental Education

5.18.6.1. Environmental education is any type of education that attempts to enable and motivate people to use their environment wisely so that it can continue to provide for the wants and needs of the people

and other living things. In Uganda today, there is a general lack of awareness of the role that people can play in the sustainable management of forests on the one hand, and the contribution of forests to the protection of the environment. The general public lacks knowledge of forest ecology and the relationship between wildlife and the environment. This situation is worsened by some negative views held by sections of society about the environment as a result of their socio-economic backgrounds.

5.18.6.2. In order for the FD to successfully adopt concepts of sustainable forest management, there is need to create and maintain an environmental education programme. The programme shall be fully integrated in all forest practices and at all levels of forest management. Through this programme, the forest policy and the relevant legislation will be explained to the people, in order for them to appreciate that such policies are in their interests. New policies and laws shall also be made with the participation of all interested parties.

5.18.6.3. The Publicity section will ensure that a sound and adaptive environmental education programme is carefully designed to bring about environmentally significant behavioural change. The programme will be circulated to DFOs and to field staff. The target audiences, content, delivery strategies and criteria for evaluating success shall all be carefully identified.

5.19 GENDER ISSUES

5.19.1. All Forest staff at all levels shall endeavour to implement the Ministry's policy on gender. The PRES shall duplicate and circulate the respective document and shall keep it under constant review to make it both flexible and adaptable to the FD's operational terrain.

APPENDICES

Appendix I

I.1 Forestry Policy

I.2 Forestry Legislation

I.3 Forest Department Organisation

Forestry Policy

The Forestry Policy of the Government of Uganda is:-

1. To maintain and safeguard enough forest land so as to ensure that:
 - i) sufficient supplies of timber, fuel, pulp, paper and poles and other forest products are available in the long-term for the needs of the country, and where feasible for export;
 - ii) water supplies and soils are protected, plants and animals (including endangered ones) are conserved in natural ecosystems, and forests are also available for amenity and recreation.
2. To manage the forest estate so as to optimise economic and environmental benefits to the country by ensuring that:
 - i) the conversion of the forest produce into timber, charcoal, fuelwood, poles, pulp and paper and other products is carried out efficiently;
 - ii) the forest estate is protected against encroachment, illegal tree cutting, pests, diseases and fires;
 - iii) the harvesting of timber, charcoal, fuelwood, poles and other products applies appropriate silvicultural methods which ensures sustainable yields and preserves environmental services and biotic diversity,
 - iv) research is undertaken to improve seed sources for planting stock and the silvicultural and protection methods needed to regenerate the forest and increase its growth and yield. Research is also carried out into new and existing forest products including tourism and education with the object of maximising their utilisation potential. Research is undertaken to monitor and promote the preservation of environmental services and conservation of biotic diversity.
3. To promote an understanding of forests and trees by:
 - i) establishing extension and research services aimed at helping farmers, organisations and individuals to grow and protect their own trees for timber, fuel and poles and to encourage agro-forestry practices;
 - ii) publicising the availability and suitability of various types of timber and wood products for domestic and industrial use, and publicising the importance of environmental services provided by forests;

Departmental Standing Orders

- iii) holding open days at regular intervals in all districts to demonstrate working techniques and raise attention to the positive benefits of forestry; and
- iv) promoting scientific research, environmental tourism, education and related activities inside the forest estate.

Forestry Legislation

1. The Forests Act (Chapter 246, Laws of Uganda 1964)

The Act includes the following:

- Appointment of forest officers;
- Declaration of forest reserves;
- Issue of licences;
- Licences to be produced when required;
- Prohibited acts;
- Domestic use of forest produce;
- Precautions against fire;
- Public to assist in extinguishing fires;
- Damage to forest produce;
- Contraventions;
- Counterfeiting and similar offences;
- Penalties;
- Power of court to confiscate forest produce and order restitution;
- Arrest without warrant;
- Power to search for forest produce;
- Power to seize and detain;
- Power to accept compensation for offences;
- Power of exemption.

2. The Forests Rules

The Rules were issued as Statutory Instrument (SI) No. 246-2 based on the Forests Act and includes the following:

- Forms;
- Licences;
- Issue of licences at prescribed fees;
- Issue of licences by public tender;
- Special licences and permits;
- Closing of areas;
- Permits;
- Cancellation of permits;
- Exemption of certain persons from payment of fees;
- Trade names of timbers for export.

3. **SI No. 151 of 1967** abolished Local Forest Reserves. The terms "Central" and "Local" ceased to exist, all gazetted forests were called Forest Reserves.

4. **SI 1970 No. 119, The Forest Reserves (Declaration) Amendment Order, 1970**

This S.I. substituted the use of imperial measures for metric measures.

5. **S.I. 176 of 1968 (amended by SI 62 of 1969)** gives complete regazetting of all Forest Reserves (FRVs).

6. **The Forests (Pest Control) Rules, SI 246-3, based on Section 30 of the Forests Act.** These Rules provide for the use of preservatives by sawmillers to treat all timber susceptible to attack by beetle borers. A list of species not so susceptible is given in the Schedule to the Rules.

7. **Timber (Export) Act (Cap. 247).** This Act includes:

Power to exclude timber and to control movement, no export except under certificates of export, particular restrictions on export, power to cancel certificate in certain cases, prohibition of false export certificates, Chief Conservator of Forests to authorise graders, inspection of timber by grader, etc., marking of timber, information may be required, penalties, appeal to Chief Conservator and appeal to Minister.

8. **SI 1970 No. 117 The Timber (Export) (Grading and Export) Rules 1970**

These Rules were made under Timber (Export) Act (see 7 above). It provides for timber grading, the marks to be placed upon timber, the method of placing and registration of such marks and the issuing of grading certificates.

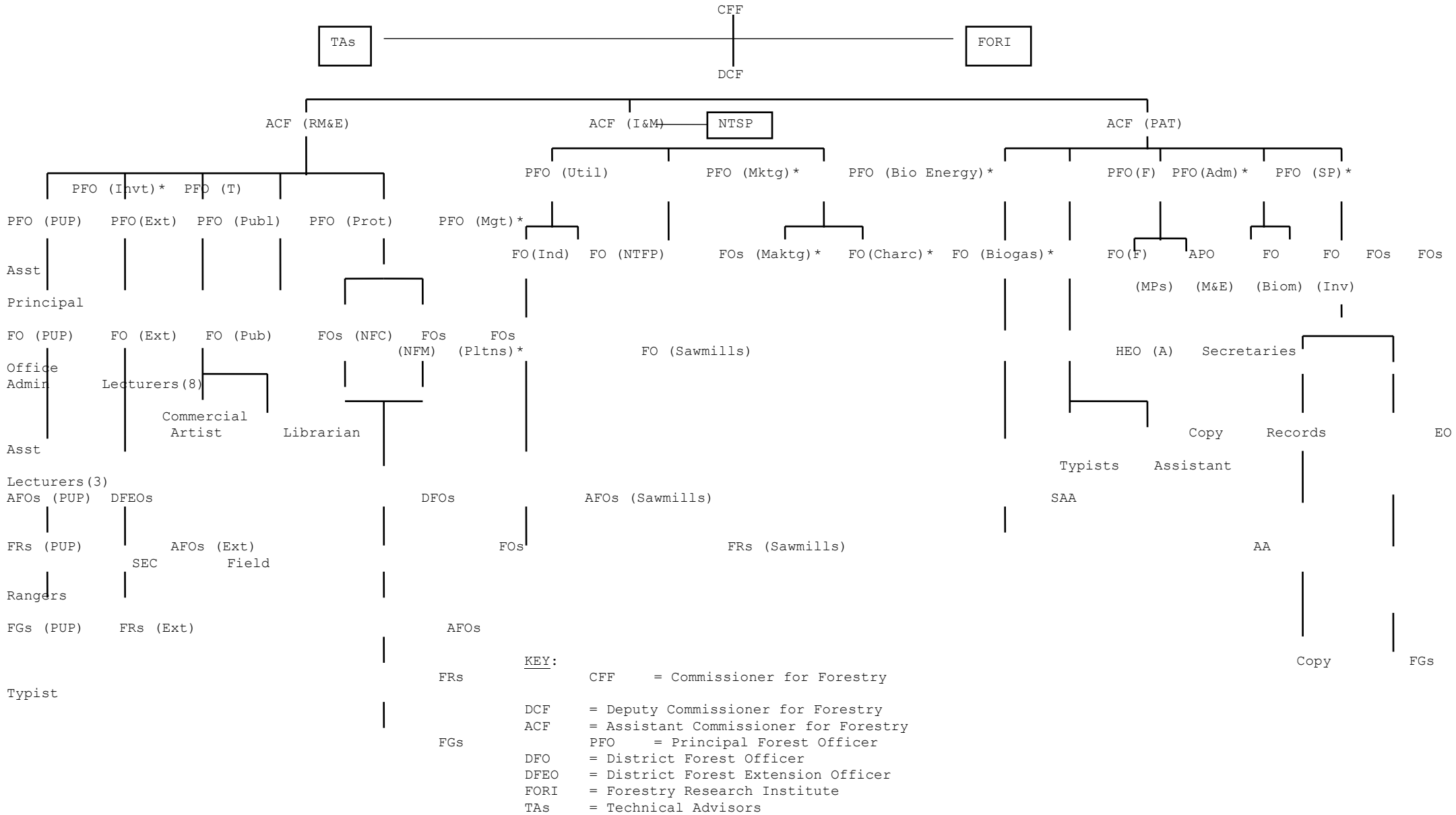
9. **SI 1970 No. 118 The Forests (Amendment) Rules, 1970**

Based on Act 9 (see DSO 1.11.1), these Rules changed diameter at breast height (dbh) from 4ft. 3in. to 1.3m; fees to be charged according to metric measures instead of imperial measures.

10. **SI 1970 No. 121 The Weights and Measures (Prohibition of Derived System) (Forest Industry) Order, 1970**

This SI prohibited the use of imperial system in the recording and sale of forest products. Therefore, the current use of imperial system e.g. timber size 12"x1"x14ft and poles 6" diameter etc. are illegal.

ORGANISATION CHART OF THE FORESTRY DEPARTMENT AS AT 1/1/97



Departmental Standing Orders

AFOs = Assistant Forest Officers
FRs = Forest Rangers
FGs = Forest Guards
APO = Assistant Personnel Officer
* = Vacant positions

Appendix II

- II.1 Wage Rates Payable to Group Employees
- II.2 Drugs and Equipment
- II.3 Application for Leave Form
- II.4 Record Card
- II.5 Staff Posting Order
- II.6 Pay Change Report
- II.7 Uniform Entitlement

SALARY STRUCTURE FOR SUPPORT STAFF - 1996/97

<u>Salary Scale</u> <u>Salary</u>		<u>Annual Salary</u>	<u>Monthly</u>
SS3	531,401		44,283
(Equiv. former	532,970		44,414
Group A-1)	535,602		44,634
	540,528		45,044
	544,512		45,376
 SS2	551,112		45,926
(Equiv. former	558,095		46,508
Group J-K)	564,592		47,049
	573,253		47,771
	578,460		48,205
 SS1	578,479		48,207
(Equiv. former	580,612		48,384
Group L-O)	603,552		50,296
	642,984		53,582

DRUGS AND EQUIPMENT

Where less than 40 men are employed the following items may be kept at Forest Stations:

Consumable Items	No. of Item
Bandages (rolls) 2.5cm	6
Bandages (rolls) 7.5cm	6
Lint (white)	0.5kg.
Cotton wool	0.5kg.
Bandages Triangular	3
Elastoplast or equivalent, 7.5cm wide.	1 roll
Acridflavine (1/1,000)	
Castor Oil (for eye drops)	60g.
Snake Serum (where applicable)	

Non-consumable	
Scissors	1 pair
Safety Pins (large)	6
Lotion Bowl or dish	1
Tumbler or Plug	1
Receptacle for storing clean water (minimum capacity 5 litres)	1

Where between 40 and 500 men are employed the following items must be kept at Forest Station:

Consumable Item (to be repeated for each 100 employees up to 500)	
Aspirin	200 Tabs
Quinine, Chloroquine, mepacrine or paludrine	200 Tabs.
Epsom or salts	2kg.
Cough Mixture (approved by a Government Medical Officer)	
21	
Acridflavine (1/1,000)	0.5l
Caster Oil (for eye drops)	60 g.
Common Salt (for gargles, etc.)	1kg.
Sulphur Ointment	0.5kg.
Lint (white)	0.5kg.
Cotton Wool	0.5kg.
Bandages (rolls) (or equivalent)	30
Bandages (triangular)	6
Elastoplast or equivalent, 7.5cm wide	1 roll
Snake Serum (where applicable)	

Non - Consumable Items	
Safety pins (assorted)	12
Scissors	1 pair
Table Spoon	1
Forceps (dissecting or dressing)	1 pair
Lotion Bowl or Dish	1
Medicine Measure (30g)	1
Tumbler or Mug	1

Receptacle for storing clean water (minimum capacity 20 litres)
1

**FOREST DEPARTMENT
APPLICATION FOR LEAVE**

Appendix II.3
FD. 30
DSO 2.2.13.3 &

2.8

ORIGINAL
DUPLICATE
TRIPLICATE

Leave is granted to:-

Name

Designation

Station

Salary per month/annum. Shs.

Leave is calculated as under:-

Current Year's entitlement = days

Plus balance of leave (if any) = days

Total ... = days

Less leave previously taken = days

Leave now taken = days

Balance of leave to be carried forward = days

Leave starts on

Leave expires on

Due to resume duty on

Leave transport was last received in 19.....

Leave transport is therefore due/not due this year

Signature

Title

Station

Original to the Officer or Employee;

1 copy to the Commissioner for Forestry (for staff only)

1 copy for file.

NOTE.

Leave earning rates and regulations are contained in GSO II. B - a4

RECORD CARD

SERVICE RECORD CARD								
Tax Identification No.	Personal No.....	OTHER REMARKS ON EMPLOYEE	Trade Cert. No.					
	Nationality							
Employment Record No.							
	Sex							
	Date of Birth							
	Country							
	District							
	Country: (Saza) Sub-county (Gombolola).....							
	Village							
	Location.....							
NEXT - OF - KIN		TRADE TESTS AND COURSES	Test Passed					
Name	Name			Date				
	Relationship							
	Address							
							
							
							
							
	Country							
	District							
	Country: (Saza) Sub-county (Gombolola).....							
Father's Name	EDUCATION AND OTHER QUALIFICATIONS		TRANSFER	Date	From	To		
							
							
							
							
							
							
							
							
							

.....

PREVIOUS SERVICE WITH DATES

.....

.....

.....

Appendix II.4

Page 2 of 2

RECORD OF DAYS WORKED

	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
19													
19													
19													
19													
19													
19													
19													
19													
19													
19													
19													

LEAVE GRANTED

FROM	TO	NO. OF DAYS	FROM	TO	NO. OF DAYS	FROM	TO	NO. OF DAYS

Departmental Standing Orders

TRANSFERS

TRANSFERRED FROM TO
..... DATE
.....

 " " TO
..... DATE
.....

 " " TO
..... DATE
.....

STAFF POSTING ORDER

Forest Office
P. O. Box.....
.....

To

Date

Posting

1. You are hereby notified that you are posted to

..... Transport is being arranged and you will soon be informed of the travel date. You will report to

as soon as you arrive at the new post

2. Your successor will arrive on A handing over report must be written

at least 2 weeks before his arrival and copied to your immediate supervisor.

3. Special Instructions:

Signed

.....

Designation

.....

PAY CHANGE REPORT

(Revised October, 1996)

PERSONAL INFORMATION SECTION

Batch No.	Personal number	Alpha Surname	Record Code
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Name

Exemption

<input type="text"/>

Amount

Shillings Cents

Increment: Month, Year	<input type="text"/>	<input type="text"/>
Date of Birth: Month, Year	<input type="text"/>	<input type="text"/>
Date of First Appointment: Month, Year	<input type="text"/>	<input type="text"/>
Date of Last Appointment: Month, Year	<input type="text"/>	<input type="text"/>
Date Joined or Day Left: Days in Month	<input type="text"/>	<input type="text"/>
Term of Employment	<input type="text"/>	<input type="text"/>
Ministry Code	<input type="text"/>	<input type="text"/>
Department/Programme	<input type="text"/>	<input type="text"/>
Section/Subprogramme	<input type="text"/>	<input type="text"/>
Description	<input type="text"/>	<input type="text"/>
Salary Scale	<input type="text"/>	<input type="text"/>
Bank Code	<input type="text"/>	<input type="text"/>
Bank Account No.	<input type="text"/>	<input type="text"/>
Posting Station	<input type="text"/>	<input type="text"/>
Cash Pay Station Code	<input type="text"/>	<input type="text"/>
Graduated Tax Code	<input type="text"/>	<input type="text"/>
Social Security Fund No.	<input type="text"/>	<input type="text"/>
Sex/Nationality	<input type="text"/>	<input type="text"/>
Job Description (ISCO)	<input type="text"/>	<input type="text"/>

- Record Code "1" New Employees
- "2" Change to pers.inf.
- "3" Emoluments
- "4" Delete
- "5" Tax Exemp.
- 0 No Tax Exemption
- 1 P.A.Y.E.
- 2 Graduated Tax
- 3 Surtax
- 4 Total Exemption

PAY CHANGE REPORT
EMOLUMENT SECTION

On "I" Emolument on
Off "I" Emolument off

R E C O R D D	TRANS CODE	DESCRIPTION	AMOUNT		O N	O F F	ADJUSTMENT		M I N U S
			Shillings	Cts			Shillings	Cts	

Entered by: Date: Checked by:
 Date:
 Keyed in by: Date: Verified
 by: Date:
 Ministry

Original to Computer
 Duplicate to Officer's Personal File

Departmental Standing Orders

Triplicate to Payroll Section of The Ministry
Stamp of Authorising Officer

Signature &

LIST OF CHANGES

<u>Item</u>	<u>Remarks</u>
1. New appointments for duty.	Stating date on which the officer reported
2. Promotion to new salary scale.	
3. Award of annual increment.	
4. Award of allowances (Acting, duty, etc.)	
5. Departure of an officer on Overseas leave.	
6. Return from Overseas leave.	
7. Transfer between stations or paying unit.	
8. Imposing of fines, court attachments, etc. order should be original with change report	The court sent in
9. Granting of leave without pay.	
10. Opening or closing of Credit and Savings number of account Bank Account to be	Stating and monthly payment made.
11. Opening or closing of Post Office Savings Account.	
12. Opening of bank account for payment of salary and allowances.	
13. Change of Bank account to a new branch.	
14. Termination of appointment including effective date of dismissal, retirement and resignation. Termination.	Stating
15. Change of Vote allocation.	
16. All other changes affecting the net amount of salary of an officer.	

NOTE:

It is most important that the date of commencement of the change be stated and the appropriate amount in Shillings per month be detailed.

UNIFORM ENTITLEMENT

Assistant Forest Officers and Rangers

2 sets bush shirt/blouse and trousers
Khaki Bush hat
Stockings (grey)
Field Boots
Raincoat
Backpack

Students

Bush shirts/blouses
Trousers
Field Boots
Stockings (Grey)
Raincoat
Bush Hat.

Guards

2 sets bush shirts/blouses and trousers
Khaki bush hat
Stockings (grey)
Field Boots
Raincoat

Drivers

Overalls
Peaked cap.
Black shoes
Raincoat
Field Boots

Office Attendants

2 sets bush shirt and trousers

Night Watchman

2 sets trousers
2 bush shirts

Officers and support staff to whom uniform is issued must wear it when on duty.

Appendix III

- III.1 Stores**
- III.2 Vehicles**
- III.3 Requisition of a Vehicle**
- III.4A Daily Maintenance**
- III.4B Weekly Maintenance**
- III.4C Vehicle Servicing Record Sheet**
- III.4D Vehicle Inspection Report**

STORES

Group A Field Stores

FD
No. Description

A1	Armco Culverts
A2	Axe, 1.36kg felling, oval eye
A3	Axes Elwell
A3a	Axes Elwell handles
(A4	Balance Spring, 50, 100, 150 kg)
A5	Balance Spring Metric. Not yet available
A6	Billhooks 7.5cm handle, 30cm blade (also described as slashers long handle)
A7a	Bolts, barrel or tower, iron 7.5cm
A7b	Bolts, barrel or tower, iron 15cm
A8a	Brushes, Varnish, Flat 2.5cm
A8b	Brushes, Varnish, flat 5cm
A8c	Brushes, Varnish, flat 7.5cm
A8d	Brushes, whitewash, 200gm, 3 knot
A9	Buckets. GI 13.6 litres, 30cm diam.
A10	Cable, PVC, single core, insulated } 3/029 Black (suitable for field } telephones }
A11	Cans watering, 9 l complete with rose
A11a	Cans watering, 9 l with roses for
A12	Cans watering, 7 l (Haws) No.3
A12b	Cans watering, 7 l gal. (Haws) No.4
A13	Cloth, Lession, 2m wide
(A14	Coffee diggers, 1.13kg Creosote. See Preservative.
A15	Crowbars, 12.5cm x 2.5cm, 0.3cm chisel and point
(A16	Dahs, Burmese (long handle)
A17	Fire extinguishers, vehicle, tetra chloride complete with brackets
A17a	Charge for above
(A18	Fire-Pumps. Dron-Wal
(A19	Fire Pumps. Rega
A20	Fire Pumps. Plantector (with plastic tank)
A21	Forks, digging, 5 prong
A22	Grindstones, with stand complete
A22a	Grindstones, stone only, 20cm, 7.5cm
A23	Hammer, claw

- A24a Hasps & staples, iron, black japanned,
Safty pattern: 7.5cm
- A24b 15cm
- A24c 20cm (for other sizes see Cat)
- A25 Hatchets
- A26a Hinges, butt, steel 7.5cm
- A26b Hinges, butt, steel 15cm (for other sizes see Cat)
- A27a Hinges, tee. steel. 25cm
- A27b Hinges, tee, steel. 35cm (for other sizes see Cat)
- A28 Hoes, Dutch, without handles
- A29 Hoes, planting (Jembe) 1.36kg old type
- A30 Hoes, planting Alligator
- A31 Hoes, vine (Lumbugu fork)
- Hooks, bill. See Billhook
- A32 Hooks, reaping (Sickle)
- A33 Hooks, scrub (45cm and handle)
- A34 Irons, soldering axe 340gm
- A35 Labels, plant marking, tin with stakes
- A36 Labels, ivorine, pot, 15cm
- A37 Ladders, aluminium sections
- A38 Lawnmower, Rippe MK.II, 35cm
- A39 Matchets, 45cm with wooden handle
- A40 Mattocks, 1.8kg
- A41 Mortar pans, handled (karai)
- A42 Nails
- A43 Padlocks, iron galvanised, 5cm
- A44 Paints etc.
- A45 Pangas
- A46 Picks, diamond, oval eye, 3.17kg
- A47 Pliers 15cm
- Polythene tubing. See Section H.
- A48 Preservative, wood, creosote in 22.73l containers
- A49 Tanex in 50kg containers
- A50 Rakes, garden (16 teeth without handle)
- A50a Rakes, garden handle
- A51 Saw, bow. Various makes and sizes
 Consult S/K
- A52 Saws, pruning, 45cm curved
- A53 Screws
- A54 Sacateurs, Rollcut
- A55 Sacateurs, Scissors type
- A56 Shears, garden
- A57 Shovels, round mouth, handled
- A57a Shovels, spare handles
- (A58 Sign plates, Forest Reserve, steel
- A59 Slashers, grass
- A60 Solder, tinman's
- A61 Spades

- A61a Spades, spare handles

- A62 Sprayers, Hawk. Spare parts only
- A20 Sprayers, Plantectors
- A63 Sprayers, Policaire
- A64 Stones, scythe, sharpening
- A65 Stones, axe sharpening
- A66 Trowels, gardening
- A67 Trowels, mason's 22.5cm
- A68 Wedges, steel, quarry, 20, 4, 22.5cm
- A69 Wedges, felling 22.5cm
- A70 Wheel barrows, 0.1m³ (See Cat for spares)
- A71 Wire, barbed, galvanised 2 strand, 4 point
barbs, 7.5cm apart, 12.5 gauge. 22.7kg reel
- A72a Wire, plain steel, galvanised (12G per kg)
- A72b Wire, plain steel, galvanised (16G per kg)
- A73 Wire, Piano Gauge 20 per roll
Wire, Telephone See Cable.

Group B **Camp Equipment**

FD
No. Description

- B1 Beds, Camp, X type
- B2 Beds, Camp, Housefield
- B3 Beds, Camp, 17.5cm x 7.5cm with brass rods & valises
- B4 Chairs, arm, flat, folding
- B5 Chairs, camp, verdun pattern
- B6 Cooking utensils
- B7 Crockery
- B8 Cutlery
- B9 Filters, aluminium
- B10 Filters, candles for
- B11 Lamps, Pressure, Tilley, complete
(see Cat for spare parts)
- B12 Lamps, hurricane complete
(see Cat. for spare parts)
- B13 Nets, camp bed
- B14 Tables, camp, solid, folding (102.5cm x 60cm)
Tables, Roll-up, slatted
- B15 Tents, Heavy
- B16 Tents, Light
- B17 Tarpaulins. Various sizes

Group C **Survey and Measuring Equipment**

- C1 Chains measuring 30m
- C2 Compass, prismatic, 10cm in case
- C3 Compass, prismatic, 10cm stand for
- C4 Compass, prismatic, 6.25cm in case
- C5 Compass, prismatic, 6.25cm stand for
- C6 Converter to convert C5 to C3
- C7 Altimeter, Haga
- C8 Altimeter, Blume - Leiss
- C9 Map cases, with hasp & staple
- C10 Plane Table and Stand
- C11 Plane Table Alidade
- C12 Plane Table Trough Compass
- C13 Stanley Road Tracer
- C14 Stereoscope, pocket
- C15 Tapes, diameter, fibran, 2m
- C16 Tapes, diameter, fibran, 10m
- C17 Tapes, diameter, steel 2m
- C18 Tapes, 10m fibran
- C19 Umbrella, survey

Group D **Drawing Office Equipment**

- Cartridge Paper, rolls 62.5cm X 900cm
- Cartridge Paper, sheets
- Drawing Board 105cm x 75cm
- Drawing Instruments, set
- Drawing Instruments, (Ranger trainees)
- Ink, drawing, black and coloured
- Pens, mapping
- Pens, Uno.
- Protractors, celluloid
- Parallel Rulers
- Rulers
- Sectional paper (graph) Rolls
- Sectional paper (graph) sheets per pad
- Scale & Offset (various scales)
- Set square 45° or 60°
- Tracing Paper, rolls
- T-squares, 90cm

Group E Uniforms

The items of uniform in Appendix II will be supplied by Storekeeper/HQ. The items below may be required in addition:

- E1 Brass paste
- E2 Haversacks, green with sling
- E3 Harversacks, khaki, webbing
- E4 Whistle, watchman's
- E5 Chain for whistle
- E6 Overalls, spraying

Group F Chemicals

- F1 Sulphate of Ammonia 50 kilo bag
- F2 Superphosphate (double) 50 kilo bag
- F3 Sulphate of Potash 100 kilo bag
- F5 Perenox
- F6 Tulisan 226.8gm
- F7 Kaptan 340gm
- F9 Barrier Cream
- F10 Paraquat (Gramoxone)
- F11 Dalapon
- F12 Soap, washing, bars

Group G Miscellaneous

- G1 Bicycles, complete
- G2 (for spare parts see Cat)
- G3 Bicycle pump (inflator)
- G4 Box, cash
- G5 Bag, cash
- G6 Hammer, timber numbering (Field)
- G7 Hammer, timber numbering (Field)
- G8 Hammer, timber Marking (FDSeal)
- G9 Specimen Tubes, glass. per gross
- G10 Specimen Tubes, wooden cases per gross
- G11 Vasculum
- G12 Botanical press, wire, pair
- G13 Soil augur
- G14 Pocket knife (Forestry College)
- G15 Hand Lens
- G16 Stencils, interlocking brass (A-Z & 0-9)
 - 1"
 - 1.5"
 - 2"
- G17 Ink Stencil
- G18 Brush Stencil

Items 10 and 12 can be made locally.

Group H Polythene Tubing

Departmental Standing Orders

POLYTHENE TUBING METRES PER KG.

cm	GAUGE								TUBE		
	100	150	200	300	400	500	700	1000	circ.	diam	
										cm	
5.1	419	280	210	140	105	84	60	42	10.2	3.0	
7.6	280	185	140	93	90	56	40	28	15.2	4.8	
10.2	210	140	105	70	52	42	30	21	20.3	6.3	
12.17	167	112	84	56	42	34	24	17	25.4	8.1	
15.2		140	93	70	46	35	28	19	14	30.5	9.6
17.8		120	79	60	40	30	24	17	12	35.6	11.4
20.3		105	70	52		35	26	21	15	10	40.6
12.9											
22.9	93	62	46	31	24	19	13	9	40.7	14.5	
25.4	83	56	42	28	21	17	12	8	50.8	16.3	

DEPARTMENTAL VEHICLE ALLOCATION

Reg. No.	Present Location	Reg. No.	Present Location
UZ 0083	Bed Ford EC.		
UZ 0114	Hqtrs-Eng. Onen	UZ 0326	Peri-Urban
UZ 0112	Garage		
UZ 0235	L/Rover Publicity		
		UZ 0331	to go to Kapchorwa
		UZ 0333	NARO
UZ 0305	Workshop - Hqtrs	UZ 0335	to be picked from
Tororo			
		UZ 0336	to be picked from
Masindi			
UZ 0307	Garage		
UZ 0314	Hqtrs		
UZ 0315	Hqtrs		
		UZ 0347	Utilisation
UZ 0317	Budongo Project	UZ 0348	Mpigi on loan
		UZ 0349	?

Appendix III. 3.

Ref....

Forest Department
P.O. Box

.....
.....

To CFF
Nakawa

REQUISITION FOR A VEHICLE

Please reserve a Vehicle/Lorry

from..... (date) (date)

tofor

.....

.....

.....

.....

.....

.....

from (place)

to

.....

Special Instructions

.....

.....

.....
Requisitioning

Officer

Payment to be made according to D.S.O.

.....

.....

.....

To

.....

.....

.....

.....

.....

.....

1.* I confirm that the arrangement you request has been made.

2.* I cannot supply the transport you request but alternatively
can provide

from to

..... for

.....

.....
Forestry Commissioner for

* Delete whichever does not apply.

DAILY MAINTENANCE SHEET

VEHICLE NO.

MONTH

Date	CHECK					Wash	Remarks
	Water	Oil	Battery	Fuel	Tyres	Vehicle	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

Driver to initial each task if completed.

INSPECTION BY SENIOR OFFICERS

Date	Comment	Signature

WEEKLY MAINTENANCE SHEET

Month Ending
 Vehicle

			Date	Sign	Date	Sign	Date	Sign	Date	Sign
Check	Oil	Sump								
		Gear Box								
		Transfer Box								
		Differential Front								
		Differential Rear								
		Swivel Pin Hangings								
		Steering Box								
	Brakes	Fluid Level								
		Adjust if necessary								
	Clutch	Fluid Level								
	Fan Belt									
	Springs									
	Shock Absorbers									
	All Nuts & Bolts									
	Door Catches									
	Tyre pressures									
	Battery Acid									
	Lights	Side								
		Head								
		Rear								
Brake										
Lubricate All Grease Nipples										
Clean	Engine									
	Carburettor Air Filter									
	Interior									
Wash	Vehicle									

VEHICLE SERVICING RECORD SHEET

Vehicle

No.

.....

Date	Speedometer reading at service	Servicing Done	Next servicing due	Type of service due	Remarks	Sign

VEHICLE INSPECTION REPORT

Vehicle Make Type
 Reg. No.

Department Base
 Date

Date first put into service
 Action by R.G.: Yes/No

Speedo Reading

	G	F	P	B		G	F	P	B
ENGINE					PROP. SHAFT				
(condition)					(condition)				
Performance					Mainshaft cplg				
Bearings					Universal joints				
Oil Pessr. hot t/o					Bolts				
Compressions					Centre bearings				
Pistons									
Valve Gear					NEAR AXLE				
					(condition)				
Burning Oil					Oil level				
Oil leaks					Wheel bearings				
Oil level					Tail pinion Brng				
Oil condition					Backlash				
Bearers					Springs				
Radiator					Shackles & Pins				
Fan belt					Shock Absorbers				
Water Pump									
Water Hose					CHASSIS (condition)				
Air Cleaner					X-Members, parts				
Fuel-system Leaks					BRAKES (condition)				
Carburation					Brake foot perf.				
Ignition					Brake Hard perf.				
Controls					Brake ling. thlons				
CLUTCH					Hose, wheel, cyl				
(condition)									
Adjustment left					Master cyl. & lever				
GEARBOX					FRONT AXLE (cond)				
(condition)									
Noisiness					Stub, axle P & B				
Slipping out of gear					Wheels, nuts, brgs				
Mountings					Springs				

Departmental Standing Orders

Oil level				Shackles				
Oil leaks				Shock absorbers				

	G	F	P	B		G	F	P	B
STEERING (condition)					CAB (condition)				
Wear in box					Cab mountings				
Tightness nuts					Doors				
Drop arm					Doors hinges				
Drag link					Door catches				
Track rod					Mirror				
Steering links					Seats				
Column support					WINGS				
Column Top Bush					BONNET & LOCK				
Flex coupling									
					BODY (condition)				
Battery					Tipping gear				
Wiring									
Generator					MISC. G.T. No. Plates				
Starter					Windscreen wiper				
Horn					Reflectors				
Headlights					Paintwork				
Sidelights					Cleanliness				
Rear lights					Lubrication				
Dipper					General condition				

TYRES	NSF	OSF	NSRO	NSRI	OSRO
Wear %					
Press p.s.i.					

Defects not listed above:

.....

Inspected by:

.....
 Date:

Departmental Standing Orders

Appendix IV

- IV.1 District Prefixes
- IV.2 Standard FD Forms
- IV.3 Standard Report Headings
- IV.4A FD Estimates (Summary)
- IV.4B Illustrative Guide for Costing FFW
- IV.4C Illustrative Guide for Costing New Plantations
- IV.5 Standard Costing Heads, Items and Operations
- IV.6 Transport Analysis Sheet
- IV.7 Labour Register
- IV.8 Work Done Register
- IV.9A Monthly Work and Costing Return (FD.3)
- IV.9B Statement of Consumable Stores
- IV.10A Monthly Costing Summary
- IV.10B Annual Summary of Costs
- IV.11 Monthly Reconciliation - Costing & Expenditure
- IV.12 Equipment Inventory (FD.8)
- IV.13 Annual MP Summary Direct Charges (FD.9)
- IV.14 Annual Summary of Overheads (FD.10)
- IV.15 Annual Expenditure and Revenue Summary with Overheads (FD.11)
- IV.16 Annual Report Tables (17 tables)
- IV.17 Forestry Department Addresses
- IV.18 Permanent Records

DISTRICT PREFIXES

1.	Apac	AP		23.	Luwero		LU
2.	Arua	AR		24.	Masaka		MK
3.	Bundibugyo	BN		25.	Masindi	MS	
4.	Bushenyi	BS		26.	Mbale	ML	
5.	Gulu	GL		27.	Mbarara	MB	
6.	Hoima	HO		28.	Moroto		MR
7.	Iganga		IG	29.	Moyo		MY
8.	Jinja	JJ		30.	Mpigi	MP	
9.	Kabale		KB	31.	Mubende		MD
10.	Kabarole	KA		32.	Mukono	MN	
11.	Kalangala	KN		33.	Nebbi	NB	
12.	Kampala	KL		34.	Ntungamo	NT	
13.	Kamuli		KM	35.	Pallisa		PL
14.	Kapchorwa	KP		36.	Rakai	RA	
15.	Kasese		KS	37.	Rukungiri		RU
16.	Kibale		KI	38.	Soroti		SR
17.	Kiboga		KO	39.	Tororo		TR
18.	Kisoro		KR	40.	Ajumani	AJ	
19.	Kitgum		KG	41.	Bugiri		BG
20.	Kotido		KT	42.	Busia	BU	
21.	Kumi	KU		43.	Katakwi	KK	
22.	Lira	LR		44.	Nakasongola		NK
				45.	Sembabule	SM	

STANDARD FD FORMS

Form No.	Title	Remarks
1	Costing Sheet	"
2	Analysis Sheet - 32 lines to the page	"
3	Monthly Work and Costing Return	"
4	Compartment Description	COs to prepare
5	New Equipment Inventory	"
6	Annual Working Plan Summary	"
7	Annual Summary of Overheads	"
8	Annual Expenditure and Revenue Summary	COs
9	Rainfall Record	"
10	Particulars of Fruit and Seed Supplied	COs to prepare
11	Seed Consignment Note	"
12	Seed Ledger Sheet	"
13	Seed Issue Advice Note	"
14	Identification Slip	"
15	Botanical Collection Form	"
16	Field Note	"
17	Herbarium Form	Order from FORI
18	Compounding of Forest Offences (Form F)	HQ to print
19	Reserve Register Sheet	"
20	Timber Description Form	Order from IMS
21	Timber Grading Sheet	IMS to prepare
22	Timber Mechanics Test Sheet	"
23	Job Costing Sheet	COs to prepare
24	Enquiry Record	"
25	Certificate of Inspection and Destruction of Stores	HQ to prepare
26	Library Loan Slip (stocked in library)	"
27	Encroachment Eviction Notice	COs to prepare
28	Order for Transfer or Posting	HQ and COs to prepare
29	Staff Service Record	HQ to prepare
30	Leave Certificate	CO s and HQ to prepare
31	Requisition Acknowledgement (stores)	HQ to prepare
32	Forest Legislation Handbook Index Form	HQ and COs to prepare
33	Map Record Card (held by Mapping Officer)	Map Section to prepare
34	Nursery Calendar	COs to prepare
35	Nursery Stock Requirements	"
36	Cover for Management Plan Annual Records	HQ to decide
37	Inspection Certificate for Graded Timber	IMS
38	Cover for Management Plan	HQ to decide
39	Monthly Reconciliation of Costings and Expenditure	CO s to prepare
40	Plantation Sample Plot; Periodic Assessment of Form	Biometrics Section
41	Plantation Sample Plot; Assessment of Removals & Thinnings	"
42	Plantation Sample Plot; Main Crop Measurement	"
43	Covers for DSOs	HQ to decide

Form No.	Title	Remarks
44	Covers for Forest Manual	"
45	Fire Report Form	COs to prepare
46	Disease Report Form	"
47	Seed Indent	"
48	Nursery Germination Record	"
49	Forest Produce Movement Permit	HQ to prepare
50	Forest Produce Declaration Form	"
51	Timber Harvesting Volume Measurement Form	"
52	Forest Offences Report	COs to prepare
53	NHF Inventory Sample Plot Form	Biometrics Section
54	NHF, PSP Form Trees under 20cm dbh	"
55	NHF, PSP Form Trees above 20cm dbh	"
56	NHF Inventory Regeneration Form	"
57	Plantation Inventory Form	"

STANDARD REPORT HEADINGS

(To be used by Charge Officers and DFOs for Quarterly and Annual Reports and for HQ Annual Report)

1. Summary (give a summary of main activities including administration and personnel)
2. Policy, Legislation and Departmental Organisation
3. The Forest Estate (Forest Reserves):-
Reconnaissance, Selection, Survey and Demarcation of new reserves;
Re-survey and Re-demarcation;
Boundary Maintenance;
Forest Offences.
4. Inventories, Stock Mapping, Diagnostic Sampling, Permanent Sample Plots.
5. Silviculture (Plantations and NHF).
6. Conservation.
7. Fire and Pests.
8. Roads and Buildings.
9. Research.
10. Collaborative Forest Management
11. Local Forest Reserves.
12. Harvesting, Marketing and Eco-tourism (include activities of sawmillers, pitsawyers, casuals, etc.)
13. Extension Service, Private Forestry and Publicity.
14. Training (Formal, In-Service, Short Courses, etc.).
15. Management Plans (New Plans, Revisions, MP Records, Progress of MPs).
16. Administration, Staff and Support Staff.
17. Revenue, Appropriation-in-Aid and Expenditure (include certificate that unauthorised credit has not been given and show amounts of authorised credits).
18. Miscellaneous. (include weather, safaris, visitors, etc.)

FOREST DEPARTMENT ESTIMATES FOR THE YEAR

SUMMARY

Sub Head	Description	Next Year Estimates	Current Year Allocation	Last Year Actual Expenditure
	<u>Recurrent Expenditure</u>			
	Personal Emoluments Travelling & Transport P.O Services, Water & Electricity Other Office Expenses Materials and Supplies Training Publicity Participate National Events Maintenance of CO's Vehicle Maintenance of Field Vehicles Staff Q'trs & Rest House Maint. Forest Field Work Replacement of Vehicles Replacement of Equipment			
	<u>Development Expenditure</u>			
	Exotic Plantations New Roads, Tracks & Bridges Additional Vehicles & Equipment New Staff Houses			
	<u>Appropriation-in-Aid</u>			
	See App. IV.16 Table 17			
	<u>Revenue</u>			
	See App. IV.16			

Departmental Standing Orders

Table 16			
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ILLUSTRATIVE GUIDE FOR COSTING NEW PLANTATIONS

Bugamba	Total
A.1 Clearing. Bugamba. 100 ha @ Shs.30,000/=	
3,000,000/=	
Rwoho 10 ha @ Shs. 30,000/=	
300,000/=	
C.1 Nursery 102,000 plants @ Shs. 30,000/= per thousand 3,060,000/=	
C.2.1 Ground Prep. 100 ha @ Shs. 75,000/=	
7,500,000/=	
C.2.2 Planting 110 ha (inc. 10 ha b.u.) @ Shs. 20,000/=	
2,200,000/=	
C.2.3 Weeding 1st yr. C.1. 40 ha @ Shs. 20,000/=	
800,000/=	
Others 60 ha @ Shs. 20,000/=	
1,200,000/=	
2nd yr C.L. 20 ha @ Shs. 60,000/=	
1,200,000/=	
Others 80 ha @ Shs. 40,000/=	
3,200,000/=	
3rd yr Others 55 ha @ Shs. 20,000/=	
1,100,000/=	
C.4.3 Climber Cutting. Cpts. B.6-9 at risk	
1,000,000/=	
C.4.2 Pruning. Cpts. 4, 5, 6, 160 ha @ Shs. 50,000/=	
8,000,000/=	
8 & 9. 463 ac. @ Shs. 35/=	
6,205/=	
8 & 9 190 ha @ Shs. 35,000/=	
6,650,000/=	
C.4.1 Thinning. Cpts. 4, 8 & 9. 220 ha S. check	
select and fell @ Shs. 40,000/=	
8,800,000/=	
D.1.2 Boundaries, Rwoho. Re-open 30 km. @ Shs. 100,000/=	
3,000,000/=	
Bugamba	
D.2.1 Survey 68/69 Planting	
3,000,000/=	
Sample Plots. Demarcate 12 plots @ Shs. 40,000/=	
480,000/=	
Re-measure 12 plots @ Shs. 10,000/=	
120,000/=	
D.3.1 Establish fire lines }	
2 Maintain fire lines }	
3 Controlled burning with herbicide	
9,000,000/=	
4 Patrols inc. 2 static tank	
10,000,000/=	

Departmental Standing Orders

D.4	Pests, rats and buffalo and visits by Mafuga Insect Collector	5,000,000/=	
D.5	Roads.		1. Construction. See New Roads estimate
			2. Maintenance
		4,000,000/=	
D.6	Buildings		1. New. see New Building estimate
			2. Maintenance
		2,000,000/=	
	Station		3. Maintenance
		1,000,000/=	
D.7	Research.		Maintain 13 Rps and inc. local reserves
		4,000,000/=	
D.8	Transport UZ0313		Inc. driver's wage, repair, etc.
		12,000,000/=	
			Tractor UZ 0208
			4,000,000/=
E.1	Harvesting.		1. By FD McConnel saw, wages for 3 men
			fuel, repair etc.
		10,000,000/=	
			2. Supervision of licensees (thinning by Wood Fabricators Sawmill)
		1,000,000/=	
	Overheads: Night-watchman and Storekeeper		
		4,000,000/=	
			120,610,000/=
			120,610,000/=

APPENDIX IV.4B
DSO 4.9.19

ILLUSTRATIVE GUIDE FOR COSTING FFW

	<u>Total</u>
I. Kalinzu	
D.1 Boundaries. 5 men @ Shs. 50,000/= per month	
	3,000,000/=
D.2 Stock-mapping. Cpts. 10 & 15; 300 ha @ Shs.25,000/=	
	7,500,000/=
Diagnostic sampling. Cpts. 5 & 6; 440 ha @ Shs.5,000/=	
	2,200,000/=
Sample plots. Cpts. 16 & 5; 4 Plots @ Shs.200,000/=	
	8,000,000/=
Re-measure and repaint 9 plots @ Shs.100,000/=	
	900,000/=
D.4 Pests, Elephant control, road Re-open and maintain 11 km.	
@ Shs.60,000/=	6,000,000/=
Other expenditure on Pests.	500,000/=
D.5 Track maintenance. Re-open once per year in Cpts. 1-4, 11, 16.	
	4,000,000/=

Departmental Standing Orders

D.6 Building maintenance Station.	600,000/=
200,000/=	
D.7 Research Mainly local	1,000,000/=
D.8 Vehicle; Driver's wages, fuel, repair etc.	
10,000,000/=	
E.1 Harvesting. 2 Time assistants.	
3,600,000/=	
	40,900,000/=

II. Kasyoha - Kitomi

D.1 Boundaries. 9 men @ Shs.50,000/= p.m. (including Lubare Ridge)	
5,400,000/=	
D.6 Buildings and station maintenance.	400,000/=
D.7 RP's at Lubare Ridge	2,000,000/=
	7,800,000/=

III. Maramagambo

D.1 Boundaries. 3 patrolmen @ 50,000/= per month	
1,800,000/=	
3 " " "	
1,800,000/=	
D.6 Building Maintenance. Repair Rwenshama house	
1,200,000/=	
	4,800,000/=

IV. Mbarara Plantations

	11,680/-
C.1 Nursery	
1,000,000/=	
C.3 Regeneration inc. BU	2,000,000/=
D.1 Boundaries	1,800,000/=
D.3 Fire Protection.	4,000,000/=
D.6 Maintenance, buildings and station	500,000/=
D.7 Research	100,000/=
	9,400,000/=

Departmental Standing Orders

APPENDIX IV.5.

DSO 4.7.10

Page 1 of 6

STANDARD COSTINGS BY SECTION, HEADS, ITEMS AND OPERATIONS

(*KEY Items - see 6.12.4.1.2)

No.	Sections	No.	Heads	No.	Items	Operations and Quantities
A	INITIAL CLEARING	A1	Initial Clearing	A1.1	Initial Clearing	Initial Clearing - ha
B.	SILVICULTURE (Natural Forest)	B1	Climber Cutting	B1.1	Climber Cutting	Camp establishment Base line cutting - length (m) Treatment line cutting length *CLIMBER CUTTING - area (ha)
		B.2	Regeneration Inducement	B2.1	Regeneration Inducement	Camp Establishment - Base line cutting - length (m.) Treatment line cutting length (m.) Treatment Plot line cutting - length (m) Access clearing & frilling - area (ha) Carrying arboricide *SPRAYING - area (ha.)
		B.3	Sowing and planting (extensive, if intensive see Plantations Section C)	B3.1	Nurseries and Seed	Seed Collection & preparation - species weight Collection soil mixture ingredients - quantities Collection poles, grass Preparation of beds - area (m2) Preparation of shades Preparation of boxes, pots - number Sowing - species, weight Pricking cut species, number Watering - litres per unit area Weeding - area Mulching - area Root Pruning area Insect and Fungal pests - details Other pests (rats etc) 0 details *PLANTS ISSUED - (a) Dept. use spp. No. (b) Ornamentals No.

Departmental Standing Orders

APPENDIX IV.5. Contd.
Page 2 of 6

No.	Sections	No.	Heads	No.	Items	Operations and Quantities
				B3.2	Sowing	Camp establishment Line cutting - length (m) Ground preparation - area (ha) Carrying plants/seed *SOWING OR PLANTING - area (ha)
				B3.2	Planting	Same operations as in B3.2 Sowing
		B.4	Tending	B4.1	Repair to Felling Damage	*REPAIR TO FELLING DAMAGE - ha of felling area
				B4.2	Liberation	Same as B4.3
				B4.3	Refining	Camp establishment Base Line cutting - length (m) Treatment line cutting - length (m) Treatment plot line cutting - length (m) Access clearing and frilling - area (ha) Carrying arboricide *SPRAYING - area (ha)
				B4.4	Tending of Planted Trees	SLASHING - area (ha)
				B4.5	Thinning of Planted Trees	THINNING - area (ha)

Departmental Standing Orders

APPENDIX IV.5. Contd.
Page 3 of 6

No.	Sections	No.	Heads	No.	Items	Operations and Quantities
	SILVICULTURE (Plantations)	C1	Nursery and Seed	C1.1	Nursery and Seed (for Dept. use)	Seed Collection and - species, weight Collecting soil mix. ingredients - quantities Collecting grass, poles - quantities Preparation of beds - area (m2) Preparation of shades Preparation of boxes, pots - number Sowing - species, weight area Pricking out - species, number Watering - litre per unit area Weeding - area Mulching - area Root Pruning - area Insect & Fungal pests - details Other pests (rats, etc.) - details *PLANTS ISSUED - species, number
				C1.2	Nursery and Seed (Ornamentals)	Same operations as in item C1.1 above *PLANTS ISSUED
		C2	Establishment	C2.1	Ground Preparation	Burning - area (ha) Slashing - area (ha) Staking - area (ha) *PITTING - area (ha) Hoeing, spot, strip, clean - area (ha) Ploughing - area (ha) Draining - length, size
				C2.2	Planting (new) (1st, 2nd, 3rd, etc. years SEPARATELY	Carrying plants - species, number *PLANTING - area, species number Beating up

Departmental Standing Orders

APPENDIX IV.5. Contd.
Page 4 of 6

No.	Sections	No.	Heads	No.	Items	Operations and Quantities
				C2.3	Weeding (1st, 2nd etc. years SEPARATELY)	Slashing - area (ha) *HOEING, spot, trip, clean - area (ha) Harrowing
		C.3	Regeneration	C3.1	Beating up (Regeneration) 1st, 2nd etc. years SEPARATELY)	Ground preparation - area (ha) Carrying plants - species, number *BEATING UP - area, species, number
				C4.1	Thinning (by ages of heights SEPARATELY)	Stock checking - area Marking - area no. of trees *FELLING
				C4.2	Pruning (by heights SEPARATELY)	Selecting - area, height *PRUNING
				C4.3	Other Tending (AFTER Establishment or Regeneration is completed)	Climber cutting - area *WEEDING specify type - area
D.	OTHER WORKS	D1	External Boundaries	D1.1	Demarcation & Survey	Camp establishment Reconnaissance *LINE CUTTING -length, width Cairning, trenching - number Survey - length
				D1.2	Maintenance & Resurvey	Camp establishment & maint. Patrolman - length * LINE CLEARING (not by Patrolmen - length Cairning - number Resurvey - length

Departmental Standing Orders

APPENDIX IV.5. Contd.
Page 5 of 6

No.	Sections	No.	Heads	No.	Items	Operations and Quantities
		D2	Inventories and Surveys	D2.1	Internal & Misc. Surveys	Camp establishment and maintenance Reconnaissance Line cutting - length, width Cairning, trenching - number, length * SURVEY - length (area)
				D2.2	Soil Survey	Same operations as in D2.1 above plus Digging pits - number, size
				D2.3	Stock Mapping	Same operations as in D2.1 above plus marking and enumerating trees - area of transect
				D2.4	Exploratory Sampling	Same operations as in D2.3 above
				D2.5	Diagnostic Sampling	Same operation as in D2.3 above
				D2.6	Routine Sample Plots	Same operations as in D2.3 above
		D3	Fire	D3.1	Establishment of Planted Fire lines	Ground preparation - detail *PLANTING - area, species, number Beating up - species and number
				D3.2	Maintenance of Firelines	*BURNING, slashing hoeing, ploughing etc. - area Thinning of planted lines - area
				D3.3	Controlled burning	*BURNING - area
				D3.4	Fire Patrols and Warning systems	Patrols, Observers - detail Fire towers - detail location Water - detail, location Brooms - number
				D3.5	Supervision of fire	Fire fighting - details, location
		D4	Pest (excluding Nurseries)	D4.1	Pest Control (each pest SEPARATELY)	Fence, ditches - details, length Hunting, trapping, poisoning - details, results Digging termites nests - number Spraying, soil treatment - details, area

Departmental Standing Orders

APPENDIX IV.5. Contd.
Page 6 of 6

No.	Sections	No.	Heads	No.	Items	Operations and Quantities
		D5	Communications	D5.1	Construction, Major Improvement of paths, roads, bridges (MAJOR jobs SEPARATELY)	Clearing, digging, blasting - details length carrying, surfacing, - or volume construction, ditching etc.
				D5.2	Maintenance - paths, roads, bridges	- details
				D5.3	Other Communications	- details
		D6	Buildings	D6.1	Construction, Major Improvements (MAJOR jobs SEPARATELY)	
				D6.2	Maintenance of Buildings	- details
				D6.3	Maint. of Forest Station grounds	Slashing, mowing, etc. - area
		D7	Research	D7.1	DFO's Research	Usually by RP's - details
		D8	MPA Transport (to be entered by charge officer)	D8.1	WPA Transport	Departmental transport on leave, transfer, pay trips, food delivery, - km, standard repair trips, etc. rate
E.	HARVESTING	E.1	Harvesting	E1.1	Harvesting by FD	cutting, carrying, measuring poles. - number, class, length cutting, carrying, measuring fuel - volume
				E1.2	Conversion by FD	Sawing - product, species, volume
				E1.3	Supervision of license	- details
F.	EXTENSION SERVICES	F1		F1.1	Advisory	Field visits - details
				F1.2	Shows	District, County Shows etc. - details

TRANSPORT ANALYSIS SHEET

DISTRICT/CHARGE

Year & Month	Vehicle No.	Cost Rate	MPA		MPA		MPA		Unallocable		Total	
			Km. or Hrs	Cost	Km or Hrs	Cost	Km or Hrs	Cost	Km or Hrs	Cost	Km or Hrs	Cost
Jan 1997	UZ 0236	900	102	91,80	600	540,00	20	18,00	400	360,00	1122	1,009,80
	UZ 0294	600										
	UZ 0386	650										

Departmental Standing Orders

LABOUR DISTRIBUTION BOOK

Appendix IV.7
DSO 4.7.15-17

	LABOUR OVERHEADS								C. SILVICULTURE (PLANTATIONS)										OTHER WORKS							
	Total on Muste	Absent	Headmen	Storemen	Runners	Sick	Leave	Public Holidays	Task Days Worked	C.1.1		C.3					C.3.2		D1.2	D4.1	D6.2	D7.1	E1.3			
										Watering	Weeding	Nursery &		Beating Up (Regeneration)			Weeding									
											Seed Collecting	Lifting Cassia	Staking Cpt.	Pitting Cpt.8	Pitting Cpt.8	Carrying Plants Cpt.8	Planting Cpt.8	Planting Cpt.51	First year Cpt.5	Second year Cpt.4	Bdy. Maint. Patrolm	Pest Digging Permit	Maint. Bldg.	DFO's Research	Harvesting Fuel Checker	
1																										
2																										
3																										
4																										
5	S																									
6																										
7																										
8																										
9																										
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24																										
25																										
26	S																									
27																										
28																										
29																										
30	50	3	1	1				45										31	2		9	2			1	
Total	1300	48	26	26				1200	13	45	11	64	34	57	62	193	20	197	226	60	59	12			19	

WORK DONE REGISTER

	C. SILVICULTURE (PLANTATIONS)											D. OTHER WORKS						
	C1.1 Nursery and Seed				C3.1 Beating Up (Regeneration)						C3.2 Seeding		Bdy, Maint. Patrolme n	PEST Termit e Nests	Maint. Bldg	DFO's Research	Harvesting Fuel Checker	
	Watering	Weedin g	Seed Collect ion	Lifting cassia	Stakin g Cpt.8	Pittin g Cpt.8	Pitti ng Cpt.5 1	Carryin g plants Cpt.8	Planting Cpt.8	Planting Cpt.51	1st Year Cpt.5	2nd Year Cpt.4						
1	beds 15	beds 6	Kg 1		6								1	all	nest s			
2	boxes 400	beds 6	1		4	2							2	all				
3													3					
4													4					
S.5													5					
6													6					
7													7					
8													8					
9													9					
10													10					
11													11					
S.12													12					
13													13					
14													14					
15													15					
16													16					
17													17					
18													18					
S.19													19					
20													20					
21													21					
22													22					
23													23					
24													24					
25													25					
26													26					
27													27					
28													28					
29													29					
30											3		30	all	2			

Departmental Standing Orders

30 beds	beds		plants				plant s	plants 6400	plants 8000				nest s	cho	RPs	
---------	------	--	--------	--	--	--	------------	----------------	-------------	--	--	--	-----------	-----	-----	--

MONTHLY WORK AND COSTING RETURN

Area or Range

Month and Year

.....

Total days paid on Muster Roll	No.	Total wages on Muster Roll
DEDUCT Labour Overheads		
Days paid to - Headman		Shs.
- Storekeeper and		
Runner		
Holidays - Sick, Leave &		
Total deductions		
∴ Task days worked		Average cost per task day

Costing Item & Head	Costing Operations	Cpt. etc.	Details of work done (include quantity)	Task Days		Cost Shs.
				OPN	ITEM	

Departmental Standing Orders

Appendix IV.9.B
DSO 4.7.24

STATEMENT OF CONSUMABLE STORES

M.P.A.

MONTH/YEAR.....

Description	Unit	Cost/Unit	Previous Balance	Used in Month	Current Balance	COSTING HEAD & ITEM SHOWING AMOUNT & VALUE				
						C1.1	C4.1	D6.2	E1.2	UF 61
Petrol	1									
Diesel	1									
Oil S.A.E. 30	1									
Oil S.A.E. 140	1									
Grease	kg									
Cotton Waste	kg									
Nail 1"	kg									
Nail 2"	kg									
Nail 3"	kg									
Paint Green	1									
Paint Red	1									
Paint Black	1									
Paraffin	1									
Snowcem	drum									
Cement	bag									
C.I.	sheet									
etc.										
TOTAL										

MONTHLY COSTINGS SUMMARY

MPA/MC

Month/Year

Head:							Head:							
Month	CPT	Quant	Cost				Month	CPT	Quant	Cost				
			L	M	T					L	M	T		
					DT	NDT						DT	NDT	
Total						Total								

Departmental Standing Orders

Appendix IV.11
DSO 4.7.33

MONTHLY RECONCILIATION OF COSTING AND EXPENDITURE

District/Charge

Month

MPA	Actual Expenditure	Costings Totals	Difference	Explanation of Difference in Column 4		
				2 minus 3	Transport (a) Standard Rate Minus (b) Actual Expenditure	Value of Stock (a) In Store (b) In Field
	2	3	4	5	6	7
Kalinzu	(a) FFW 3573 (b) Arb. 1760 Diesel 530 Petrol 294 <u>6157</u>	(a) 3090 (b) 75 (c) Nil <u>3165</u>	6150 3165 <u>2985</u>	(a) UF 100:897m @ -/90 = 807 (b) 510 <u>297</u>	(a) 100 (b) <u>2584</u> <u>2684</u>	297 2684 <u>+2981</u>
Bugamba	(a) NP 10,967 Stores 735 House 1,350 (b) Petrol 37 Misc. <u>135</u> <u>13,224</u>	(a) 13,841 (b) 197 (c) 735 <u>14,773</u>	13224 14773 <u>1549</u>	(a) UF 74:724m @ -/90 = 652 UF 84: 12hrs @ 12/50 = 150 (b) <u>2876</u> <u>-2074</u>	(a) 350 (b) 172 <u>+522</u>	-2074 + 522 <u>1552</u>
TOTAL						

Appendix IV.12

FD FORM 5

DSO 4.7.31

SPECIAL/NEW EQUIPMENT INVENTORY

EXCLUDES vehicles and Tractors but INCLUDES their ancillary equipment e.g. grader blades, trailers etc.

MPA

.....
..... Year
.....

Year	Serial No.	Description	Cost Shs.	Remarks
1	2	3	4	5

Note: Annual Total of Column 4 MUST be transferred to "Remarks Section" on FD9, i.e. The annual MP summary.

ANNUAL MP SUMMARY - DIRECT CHARGES

19.								
Cum.								
	A	B	C	D	E	Total Exp.	Total Revenue	Surplu s + Defici t -

MPA

.....
..... WC

	Head	Cpt.	Area	Cost/ha		Total Cost	
A	Init. Clearing						
B	1. Climber cut 2. Regen. Induce 3. Sow and Plant 4. Tending Total						
C	1. Nursery 2. Establishment 3. Regeneration 4. Tending Total						
D	1. Boundaries 2. Inventories etc. 3. Fire 4. Pests 5. Communications 6. Buildings 7. Research 8. Unallocable tpt. Total						
	Produce-type, unit						
E							

Cost of Permanent NEW Buildings INCLUDED above Shs.
.....
Cost of Permanent NEW Roads INCLUDED above Shs.

Departmental Standing Orders

Value of Free Issues EXCLUDED above Shs.
Total from FD. 8 EXCLUDED above, to be
transferred to FD. 11 Shs.
.....
Totals from all MPA's must be reconciled with FD.5 and 6.
Enter total costs and revenue in tens of shillings
Enter details of produce species etc. on reverse of form.

Departmental Standing Orders

Appendix IV.14
FD. 7
DSO 4.7.36

ANNUAL SUMMARY OF OVERHEADS

DISTRICT/CHARGE
YEAR

MPA

YEAR AND MPA	DISTRICT CHARGES	DIRECT MPA OVERHEADS		TOTAL DIRECT EXPENSES	PER CENT	INDIRECT OVERHEADS						TOTAL ALL OVERHEADS	
		P. EMOLS	T & T			DISTRICT/CHARGE	HQ (include all sections)						
							Unalloc a-ble P. EMOLS	Unallocable TRANS-PORT	P. EMOLS	TRANS-PORT	P.O. VOTE & INCIDENTALS		STORES AND EQPT.
	Total FD9 including equip. from Remarks	Vote Book & Bank	Vote	Cols 2+3+4	Col 5 to Total of Col. 5	Vote Book & Bank	(a) T&T Vote (b) Tpt. from Analysis						
1	2	3	4	5	6	7	8	9	10	11	12	13	
TOTAL													

Entries in millions of shillings to 1 place of decimals.

ANNUAL EXPENDITURE AND REVENUE SUMMARY WITH OVERHEADS

DISTRICT

Entries in thousands of shillings to 1 place of decimals

MPA

Year	Total Expenditure (FD6)	Revenue Collected (FD6)	Surplus + Deficit - (FD6)	Cumulative Surplus+ Deficit- (FD6)	Equipment. (FD6) Remarks	Overheads Total (FD7)	Fee value of free issues (FD6)	Net Total (Cols 6+7-8)	Overall Cumulative Surplus + Deficit - (Cols. 5-9)
1	2	3	4	5	6	7	8	9	10

ANNUAL REPORT TABLES

Table:

1. Statement Showing Area, Nature and Ownership of Protected Forest Land.
2. Distribution of Protected Forest Land by District.
3. Type and Distribution of Private Plantations.
4. Plantation Areas and Age Distribution by MPA.
5. NHF Harvesting, Refining and Enrichment Planting.
6. Plantation Forest Reserves Management.
7. Unit Costs of Operations.
8. Summary of Production of Roundwood and Charcoal.
9. Details of Production of Industrial Roundwood.
10. Details of Production of Poles, Fuelwood, Charcoal and other Wood and Nonwood Products and Services.
11. Industrial Production of Wood Products.
12. Capacities of Wood Industries.
13. Export of Wood and Wood Products.
14. Imports of Wood and Wood Products.
15. Personnel Strength
16. Revenue
17. Expenditure.

TABLE 1 Statement Showing Area, Nature and Ownership of Protected Forest Land
During the year (area in 000 ha)

Type of Forest and Vegetation	Forest Reserve		Uganda Wildlife Authority	Public Land (a)	Private Land (a)	TOTALS		Percentage of Total Land & Swamp (c)	
	Production	Conservation				Production	Conservation (d)	Forest Reserves	Forest Land
NHF on 1.7..... Added Lost on 30.6.....									
WOODLAND on 1.7..... Added Lost on 30.6.....									
GRASSLAND & BAMBOO on 1.7..... Added Lost on 30.6.....									
PLANTATIONS (b) on 1.7..... Added Lost on 30.6.....									
GRAND TOTAL on 1.7..... Added Lost on 30.6.....									

Notes:

- (a) Include mailo, freehold and leasehold on Public Land.
- (b) Include Private Plantations in Forest Reserves; Total Timber ha, Total Pole and Fuel ha
- (c) Total Land and Swamp Area of Uganda is 24.1 million hectares, DFOs should know the land area of their districts.
- (d) Total of Protection FRVs + Uganda Wildlife Authority Land.

TABLE 2 Distribution of Protected Forest Land by District (000 ha)
For the Year Ended 30 June 19 (to be completed by HQ)

Type of Forest and Vegetation	DISTRICTS (District Prefixes as in App. IV.1)											Total
	AP	AR	BN	BS	GL	HO	IG	JJ	KB	KA	KN	
Natural High Forest												
Woodland												
Grassland and Bamboo												
Timber Plantations												
Pole and Fuel Plantations												
Total Plantations												
Total Forest Land on this page												
												Total of previous pages
												Uganda Total

Make more pages to cover all districts.

TABLE 5 Natural High Forest Reserves: Harvesting, Refining and Enrichment Planting
For the Year Ended 30 June 19 (Area in Ha)

Forest Operation	Management Plan Areas (b)											
	1	2	3	4	5	6	7	8	9	10	11	
Harvesting												
Previously Refined with Arboricide												
Current Refining 1997/98 (a)												
Area Previously Enriched												
Current Enrichment 1997/98												
Total Enriched To-date												

(a) State the Type of Refining and Area Refined, e.g. 100 ha Climber Cutting, 50 ha felling damage repair, etc.

(b) DFOs should name the MPA, HQ may use numbers for MPA if these cannot fit on one page. Or use names of MPA and continue on additional pages.

TABLE 4 Plantation Area and Age Distribution by MPA
Year ended 30 June 19

(Area in ha)

Management Plan Area	SPECIES						Total Plantations
	Cypress	P. patula	P. caribaea	Other Pines	Total Conifer	Eucalyptus	
Mafuga	2000						
Muko	700						
Bugamba	100						
Rwoho	150						
Mwenge	100						
Lendu	1500						
Mt. Elgon	2500						
Total	6050						
Age Class							
0 - 5	nil						
6 - 10	nil						
11 - 15	50						
16 - 20	1000						
21 - 25	2000						
Over 25	3000						
Total	6050						

Note: (1) Divide MPA into two parts where Private Plantations exist, to show area of FD plantations and area of Private Plantations.
(2) The areas shown under cypress are only theoretical examples.

TABLE 3 Type and Distribution of Private Plantations
Year ended

(Area in ha)

Plantation Category	In Forest Reserves	On Other Land	Total
Timber Plantations			
Tobacco Fuel Wood Plantations			
Tea Fuel Wood Plantations			
Sugar Fuel Wood Plantations			
Other Pole and Fuel Wood Plantations			
Total			

TABLE 6 Plantation Forest Reserves; Management Status
Year Ended 30 June, 19

(Area in ha)

Species	Area on 1.7.1997	Clear Felled	Totally Destroyed	Excised	Regenerated	New Planting	Area on 30.6.1998
Cup. lusitanica							
P. pat							
P. car							
Other Pines							
Total Conifers							
Eucalyptus							
Total Plantations							

TABLE 7 Unit Costs of Operations

District or Charge Year
.....

MPA Section Heads Items	Operations	Unit Costs to nearest Shs.10/=	
		Current Year	Previous Year
e.g.			
Bugamba C.1	Nursery, cost per 1000 plants	30,000	31,000
Rwoho C.1	Nursery, cost per 1000 plants	-	35,000
Bugamba C.2.2	Planting 110 ha, cost/ha	50,000	48,000
C.4.2	Pruning to 2m, 160 ha, cost/ha	-	53,000
Kalinzu D.1.2	Boundaries, reopen 30 km, cost/km	100,000	98,000
DFO D.8	DFO's vehicle 12,000 km cost/km	110	120
	etc.		
<p>Show unit costs of operations which have been carried out in your district or charge in each MPA. If an operation has not been carried out in the current year but was recorded last year, it should be shown for previous year.</p> <p>Examples of operations are shown in DSO paragraph 4.7.9 and in App. IV.4B and 4C</p>			

TABLE 8: Summary of Production of Roundwood and Charcoal
Year ended

Category	Unit	Forest Reserves		Public Land	Private Land	TOTAL				
		NHF	Plantations			1996/97	1995/96	1994/95	1993/94	1992/93
Logs	m ³									
Poles and Posts	Solid m ³									
Fuelwood	Solid m ³									
Charcoal	Tonnes									
Total	Solid m ³									
Average FD Royalty in Shs. per m ³ overbark										
Class	1A	1B	Cypress	Pines	Eucalyptus	II	III	IV		
1996/97										
1995/96										
1994/95										
1993/94										
1992/93										

Solid volume should be shown in Table 10. If this has not been possible, show stacked volume for fuelwood and running metres for poles and HQ will work out solid volumes.

TABLE 9 Details of Production of Industrial Roundwood
For the Year (volume in m³ overbark)

Fee Class	Botanical Name	Trade or Local Name	MANAGEMENT PLAN AREA				Public Land	TOTAL				
			1	2	3	4		1996/97	1995/96	1994/95	1993/94	1992/93
1A	Mel. exe											
1B	Ent. spp Kha spp											
Total												
	Cyp. P.pat. P. arib. Other Conifers Eucs.											
Total												
II												
Total												
III												
Total												
IV												
Total												
GRAND TOTAL												

Notes: (1) Use abbreviations for species names, see fee class 1A and 1B above. (2) Where the spp. has not been identified in any fee class, show as "Others"
(3) Name the Management Plan areas, if they are too many, use numbers as above and identify them in the notes below the form, e.g. 1=Mabira, 3=Kifu, etc. (4) Prepare more pages to carry all spp. and MPAs

TABLE 10 Details of Production of Poles, Fuelwood, Charcoal, Other Wood and Nonwood Products and Services
19..... / 19.....

Category	Unit	MPA	MPA	MPA	Public Land	Total 1996/97	Total 1995/96	Total 1994/95	Total 1993/94	Total 1992/93
Conifer Plantation										
Poles	Number									
Class 1	"									
2	"									
3	"									
4	"									
5	"									
TOTAL										
Approx. volume	m ³									

Departmental Standing Orders

Hardwood Plantation Poles	Number									
Class 1	"									
2	"									
3	"									
4	"									
5	"									
TOTAL										
Approx. volume	m ³									
Bush Poles	Number									
Class 1	"									
2	"									
3	"									
4	"									
5	"									
TOTAL										
Approx. volume	m ³									
TOTAL POLES	Number									
Approx. volume	m ³									
Plantation Fuelwood	Stacked									
Bush Fuelwood	m ³									
	"									
TOTAL	Stacked									
Approx. Solid Volume	m ³									
	"									
Charcoal	Metric									
	Tonnes									

Give details of other wood and nonwood products.

TABLE 11 Industrial Production of Wood and Wood Products
Year Ended

Product	Unit	Quantity	Average Retail Price (Shs) per Unit	Total Value (Shs`000)	Average Retail Price (Shs) per m ³ of Timber Classes				
					1A & 1B	II-IV	Cypress	Pines	Eucalyptus
Sawnwood:									
IA IB	m ³								
II - IV	m ³								
Cypress	m ³								
Pines	m ³								
Eucalyptus	m ³								
Total	m ³								
Sawnmilled	m ³								
Handsawn	m ³								
Plywood	m ²								
Block Board	m ²								
Particle Board	m ²								
Paper	Tonnes								
Paper Products	Tonnes								
Matches	`000 Match boxes								
Total Value	Shs. `000								

TABLE 12 Capacities of Wood Industries
Year Ended 30 June 19

1.	Sawmills in m ³ p.a. Up to 500m	Give names of the Industries	
	501 - 1000		
	1001 - 1500		
	1501 - 2000		
	2001 - 2500		
	2501 - 3000		
	3001 - 3500		
	3501 - 4000		
	4001 - 4500		
	4501 - 5000		
	Over 5000		
2.	Plywood and Veneer	Give names of industries and their capacities	(m ² p.a)
3.	Blockboard		(m ² p.a)
4.	Particle Board		(m ² p.a)
5.	Paper		(Tonnes p.a)
6.	Paper Products		(Tonnes p.a)
7.	Matches		('000 Match boxes p.a.)
8.	Charcoal (industrial kilns) like brick or metal kilns, but not earth kilns.		(Tonnes p.a)

Departmental Standing Orders

Appendix IV.16
ANNUAL REPORT TABLES

**TABLE 13 Export of Wood and Wood Products
Year Ended 30 June 1997**

Product	Unit	Quantity	Value (000 Shs)	Destination	1995/96		1994/95		1993/94	
					Quantity	Value	Quantity	Value	Quantity	Value
Sawnwood:										
Class IA & IB	m ³									
Class II - IV	m ³									
Eucalyptus	m ³									
Cypress	m ³									
Pines	m ³									
Total										
Plywood	m ²									
Veneer	m ²									
Blockboard	m ²									
Particle Board	m ²									
Paper	Tonnes									
Paper Products	Tonnes									
Charcoal	Tonnes									
Other Products (Give Details)										
Total Value										

Note: 1. Information can be obtained from URA in Kampala, at District HQ and Customs Posts at Border.
2. Look out for and show other products including nonwood products from forest reserves.

Appendix IV.16
ANNUAL REPORT TABLES

**TABLE 14 Imports of Wood and Wood Products
Year Ended 30 June 1997**

Product	Unit	Quantity	Value (Shs 000)	Country of Origin	1995/96		1994/95		1993/94		1992/93	
					Qty	Value	Qty	Value	Qty	Value	Qty	Value
Sawnwood:												
Hardwood	m ³											
Conifers	m ³											
Total												
Veneer	m ²											
Blockboard	m ²											
Fibre Board												

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Soft Board	m ² m ²											
Particle Board	m ²											
Pulp	Tonnes											
Paper	Tonnes											
Paper Products	Tonnes											
Charcoal	Tonnes											
Other Products (give details)	Tonnes											
Total Value												
See notes under Table 13												

Departmental Standing Orders

Appendix IV.16
ANNUAL REPORT TABLES

Table 15: Personnel Strength
Year Ended

Posts (1)	Approved Posts (Nos)	Actually Filled (Nos)	Period Postheld (Months)	Remarks (6)
CFF				
DCFF				
ACFF				
DFO				
P/NFC				
SFOs				
FOs				
Other Professional Staff (2)				
Aid Personnel (3)				
AFOs				
Senior Office Staff (4)				
Junior Office Staff (5)				
Forest Rangers				
Forest Guards				
Drivers				
Office Support Staff				
Field Support Staff				
Total				

Notes:

- (1) List the post applicable in your charge.
- (2) Show by designation, professional staff who are not foresters e.g. botanists.
- (3) Show numbers of staff supplied by donor agencies.
- (4) Senior office staff include senior government administrative officers.
- (5) Junior office staff are clerks, etc.
- (6) Make any remarks to explain why staff positions have not been filled, etc.

Departmental Standing Orders

Appendix IV.16
ANNUAL REPORT TABLES

Table 16: Revenue (Shs. `000)
Year Ended 30 June 1997

Source	1996/97 Shs.	1995/96 Shs.	1994/95 Shs.	1993/94 Shs.	1992/93 Shs.
Saw and Veneer Logs					
MPA	1				
	2				
	3				
	4				
Public Land					
Poles and Posts					
MPA	1				
	2				
	3				
	4				
Public Land					
Fuelwood & Charcoal					
MPA	1				
	2				
	3				
	4				
Public Land					
Non-Wood Products					
Specify and Show MPA or					
Public Land					
Ecotourism/Recreation					
MPA	1				
	2				
	3				
	4				
Total					
Appropriations in Aid (Specify)					
Loans and Grants					

HQ should indicate details of loans and grants i.e. total amount, amount disbursed that year and name of project.

Appendix IV.16
ANNUAL REPORT TABLES

Table 17: Expenditure
Year Ended 30 June 1997

Expenditure Items	1996/97 Shs. (`000)	1995/96 Shs. (`000)	1994/95 Shs. (`000)	1993/94 Shs. (`000)	1992/93 Shs. (`000)
Use the Form in DSO App. IV.4A Include Loans and Grants					

Departmental Standing Orders

Total					

Notes:

1. Show Accounts for Loans and Grants by showing name of Project, total amount, amount disbursed and amount actually spent.
2. This table should be used to accompany Quarterly Reports as well as part of the Annual Report.

Appendix IV.I7

**FORESTRY DEPARTMENT
ADDRESSES AND TELEPHONE NUMBERS**

STATION	ADDRESS	TEL. NO.
Forest Headquarters	P.O. Box 7124, Kampala	233485 236016 NFM&C
Project FORI	P.O. Box 1752, Kampala	255163
Apac	P.O. Box 21, Apac	
Arua	P.O. Box 21, Arua	
Bundibugyo	P.O. Box 1144, Bundibugyo	
Bushenyi	P.O. Box 23, Bushenyi	42465
Gulu	P.O. Box 13, Gulu	95
Hoima	P.O. Box 123, Hoima	0465-40043
Iganga	P.O. Box 226, Iganga	2072
Jinja	P.O. Box 1088, Jinja	22352
Kabale	P.O. Box 9, Kabale	22059/24393
Kabarole	P.O. Box 21, Fort Portal	0483-33721
Kalangala	P.O. Box 59, Kalangala	255646
Kampala	P.O. Box 7124, Kampala	233485
Kamuli	P.O. Box 18, Kamuli	
Kapchorwa	P.O. Box 27, Kapchorwa	51010
Kasese	P.O. Box 27, Kasese	0483-44196
Kibale	P.O. Box 15, Kagadi	0483-22816
Kiboga	P.O. Box 1, Kiboga	58
Kisoro	P.O. Box 28, Kisoro	0486-23101,
Kitgum	P.O. Box 24, Kitgum	95123
Kotido	P.O. Kotido	
Kumi	P.O. Box 47, Kumi	
Lira	P.O. Box 13, Lira	16
Luwero	P.O. Box 79, Luwero	610013
Masaka	P.O. Box 202, Masaka	20089
Masindi	P.O. Box 173, Masindi	20110
Mbale	P.O. Box 83, Mbale	33765
Mbarara	P.O. Box 9, Mbarara	0483-20040
Mpigi	P.O. Box 75, Mpigi	710036/710004
Moroto	P.O. Box 41, Moroto	29
Moyo	P.O. Box 162, Moyo	
Mubende	P.O. Box 114, Mityana	0464-4014
Mukono	P.O. Box 49, Mukono	290276
Nebbi	P.O. Box 9, Nebbi	
Ntungamo	P.O. Box 189, Ntungamo	
Nyabyeya Forestry College	P.O. Private Bag, Masindi	0465-20370
Pallisa	P.O. Box 113, Pallisa	
Rakai	P.O. Box 135, Kyotera	135

Soroti	P.O. Box 15, Soroti	045-611276
Tororo	P.O. Box 65, Tororo	045-4685

Appendix IV.18
DSO 4.6.1

PERMANENT RECORDS

1. Management Plans and MP Records
2. Costings
3. Vote Book .
4. Commitments Register
5. Revenue Abstract and Register of Bills
6. Map Register
7. Stores Ledger, Sub-store Inventories and Furniture Inventory (Chapter III of these DSO).
8. Library List.
9. Loans Book
10. Forest Legislation Handbook.
11. Departmental Standing Orders.
12. Research Plans.
13. Reserve Register
14. FD Technical Notes
15. Timber Leaflets.
16. Forest Manual
17. Laws of Uganda and Official Gazette. See GSO I P-c. It is important that the Gazettes and Legal supplements are carefully preserved and sent for binding when requested by the Uganda Printing and Publishing Corporation.
18. Government Standing Orders.
19. Treasury Accounting Instructions (must be indexed).
20. Establishment Instructions and Notices, Circular Standing Instructions, etc. (these should be indexed for easy reference).
21. Correspondence Register.
22. Register of Telephone Calls
23. Revenue Abstract
24. Register of Bills

Appendix V

- V.1 Standard Arrangement of Management Plans
- V.2 Fire Report
- V.3 Disease or Insect Report
- V.4A Seed Indent
- V.4B Seed Issue Advice Note
- V.4C Nursery Germination Record
- V.5 The Handling of Toxic Chemicals
- V.6 Publications Dealing With Policy and Theory Practical Instructions on NHF Management
- V.7 A Guide to Thinning and Pruning of Exotic Plantations
- V.8 The Simple Proportion Method for Choosing Select Trees and Thinnings
- V.9 Thinning Control Form
- V.10 Code for Recording Pest and Disease Observations in Plantation Sample Plots
- V.11 Random Numbers for Plantation Sample Plots
- V.12 Standard Symbols, Definitions and Units for Plantation Sample Plots
- V.13A&B Plantation Sample Plot: Initial Description and Periodic Assessment Form
- V.13C Assessment of Thinnings from Sample Plots
- V.13D Plantation Sample Plot Main Crop Measurement
- V.14 Plantation Sample Plot Radius Corrections
- V.15 Conversion of 0.2 and 0.1 acre Plots to 0.04 ha.
- V.16 NHF Diagram of the Field Work
- V.17A Stockmapping, Field Layout
- V.17B Stockmapping - Budongo Method
- V.17C Stockmapping - Block Method
- V.18A Log Volume Table No.7 Hardwoods
- V.18B Log Volume Table No.8 Softwoods
- V.19A NHF Diagnostic Sampling
- V.19B NHF Diagnostic Sampling
- V.19C NHF Diagnostic Sampling
- V.19D NHF Diagnostic Sampling
- V.19E NHF/Diagnostic Sampling Summary
- V.20 Plantations Stocking at Various Spacings
- V.21 Beating Up in Plantations
- V.22 Timber Harvest Vol. Measurement
- V.23 Forest Produce Declaration Form
- V.24 Forest Produce Movement Permit
- V.25 The Fire Plan
- V.26A NHF Inventory Sample Plot Form
- V.26B NHF Plot Information Form
- V.27A NHF PSP Form - Trees under 20cm dbh
- V.27B NHF PSP Form - Trees over 20cm dbh
- V.27C Description of Quadrat of PSP Form
- V.27D NHF, PSP Crown Diameter, Position and Form
- V.27E A List of Tree Condition Code
- V.28 NHF Inventory - Regeneration Survey Form
- V.29A Plantation Inventory Form
- V.29B Plantation Inventory Point Information
- V.30 Forest Offences Report

STANDARD ARRANGEMENT OF MANAGEMENT PLANS

Title Page

Example: “Working Plan for the Mabira Forest Reserve, Mukono District, Uganda, for the period 1997 - 2007”

Prepared by	Date
Checked by	Date
Checked/Amended by	Date
Approved by	Date

List of Contents: *(unless the M.P. is very short)*

Glossary of Vernacular Names and Terms *(if necessary)*

Foreword and Summary

Very brief details of preparation of plan. Summary of plan - a few lines of description and outline of the main prescriptions.

PART I : GENERAL DESCRIPTION

- 1. Name, Situation and Area**
If the plan is concerned with more than one block of forest, a tabular statement of areas should be included.
- 2. Legal Status, Ownership, Rights and Privileges**
Give reference only to gazetting: copy of full description in appendix.
- 3. Boundaries, Demarcation and Maps**
State whether natural or artificial and how demarcated.
- 4. Maps and Aerial Photographs**
State source (FD, SD, etc), subject, prefix, number, date and scale.
- 5. Configuration and Altitude**
- 6. Geology, Soils and Water Supply**
- 7. Climate**
Rainfall records (FD.12) in Appendix. Notes on temperature, humidity, wind strength and direction etc. are useful especially in plantation areas.

8. **History**
Give past history, including pre-reservation if known. Dates and objects of reservation, summary of previous management and exploitation, silvicultural methods, injuries, etc. Summary of past records in appendix. In areas which have been under intensive management, do not give detailed history of each compartment; this will be in compartment description to be found in Appendix.
9. **Composition and Condition of Crop**
This should be a brief general description of the growing stock at the time the plan is prepared; with planted crops it may be useful to include a tabular statement of areas by species and age-groups. Again detailed descriptions of compartments should be found in Appendix.
10. **Infrastructure**
11. **Economic Considerations**
Markets, current harvesting methods, statistics of growth and yield (summarised, detailed data if available, in appendix).
12. **Revenue and Expenditure**
(Summarised: Tabular statement in appendix).
13. **Staff and Labour**
Staff currently employed, availability of labour, salary rates, average cost per manday.

PART II : FUTURE MANAGEMENT

As brief, clear and concise as possible: do not make detailed prescriptions unless there is a reasonable chance of their being carried out. Once the main objects of management have been prescribed, it may only be possible to prescribe that the detailed works will be carried out on the basis of an Annual Works Programme. The following framework is only a guide:-

1. **BASIS OF THE PROPOSALS**
 - (a) **Objects of Management**
Do not forget the possibility of subsidiary objectives - (nature reserves, recreation, research).
 - (b) **Summary of Management Proposed**
Includes division into Management Circles (if there is more than one MC).
 - (c) **Period of Plan**
Revision every 5 or 10 years as approved by CFF.

2. **PRESCRIPTIONS FOR MANAGEMENT CIRCLES**

(i) **Division of Area**

Details of division into blocks, compartments etc. Give tabular statement of these with areas etc. in appendix.

(a) *The Compartment.* This is the permanent unit of management permanently marked on the ground (using natural features where possible), recorded on maps and as far as possible, subject to uniform treatment throughout; its size will obviously vary according to the type and intensity of management and ideally should be the same as the annual management area (a whole reserve in the case of early burning, or coupes of say, 10-50 ha in the case of intensive artificial regeneration); this is not often possible, but should be aimed at.

Compartments must be given serial Arabic numerals throughout the MP area (or exceptionally, for each block of the MP area). Division into sub-compartments should be restricted.

(b) *The Block.* Wherever a MP area is composed of non contiguous units or, in the case of large forests, where it is desirable to distinguish main territorial divisions, they should be designated “blocks” and given local place names (see Budongo MP).

(c) *The Management Circle.* Wherever any parts of a MPA are being managed with different objects or under different silvicultural systems and prescriptions, separate management circles should be formed, e.g. transmission poles MC and pole and fuel MC.

(d) *Research, Nature Reserves, Recreation Areas,* etc. (These will form separate MCs).

(ii) **Yield Regulation**

(iii) **Silvicultural System and Methods**

(iv) *Other Prescriptions.* Confined to prescriptions particular to the Management Circle. If there is only one MC in the plan and for works general to the whole area, place under “Miscellaneous Prescriptions”.

3. **MISCELLANEOUS PRESCRIPTIONS**

- (i) Boundary Maintenance
- (ii) Inventories and Surveys
- (iii) Fire Protection
- (iv) Roads and Buildings
- (v) Miscellaneous

4. **STAFF AND FINANCIAL FORECAST**

Give financial forecast as an estimate of annual revenue and expenditure.

5. **RECORDS AND CONTROL**

Prescribe the records to be maintained:

Current Records.

Annual Records (FD.8-11)

Rainfall Record (FD.12)

Maps - prescribe the keeping of maps up to date

Record of deviations from the plan

Record of additions or amendments to available information

Annual Works Programme.

6. **SUMMARY OF PRESCRIPTIONS**

List briefly the prescriptions of the plan, giving reference to the appropriate paragraphs.

APPENDICES

Compartment Description (FD.7) (district copies only)

Boundary description as gazetted

Schedule of Area (Blocks, Compartments etc.)

Past Records (FD.8-11)

Past Rainfall Records (FD.12)

References to published or unpublished material.

List of research plots, (if not too many mention them in the text)

.....

FIRE REPORT NO. 19/..... /19.....

<u>District</u>	<u>Plantation</u>	<u>Compartment (s)</u>
<u>Date</u>	<u>Species/age</u>	<u>Area</u>
<u>Time discovered</u>	<u>Time tackled</u>	<u>Time extinguished</u>
<u>Fire reported by:</u>	<u>Origin</u> Inside, Outside*	<u>Cause</u>

Amount of rain during preceding 7 days

Number of wet days during preceding 7 days

Maximum temperature during preceding 24 hours

Minimum temperature during preceding 24 hours

Maximum humidity during preceding 24 hours

Minimum humidity during preceding 24 hours

Direction and strength of wind

Slope of ground (direction and steepness)

Ground vegetation (i.e. grass, grass/herbs etc.)

Ground trash (prunings and thinnings lying on ground etc.)

.....

Distance of fire from Forest Station

Distance of fire from nearest road/foot path*

Distance to nearest water supply

Accessible to vehicle or by foot only

What kind of water supply?

.....

How many FD employees were engaged in fighting the fire?

How many volunteers were engaged in fighting the fire?

Type of fire - Ground, Crown / Ground, Crown*

Damage to crop - Will recover, scorched only, defoliated, killed*

Pre-suppression measures

Were they effective?

.....

Suppression measures (including vehicles, equipment, etc. in use)

.....

How effective were they?

.....

What post suppression measures were taken?

.....

Remarks:

Signature: Rank:

Plan: A plan should be attached to this report indicating the locality and extent of the fire, the point of origin, direction of spread and points of attack.

c.c. The Entomologist, FORI, Nakawa.

Appendix V. 3
FD. 46
DSO 5.10.1

Page 1 of 2

DISEASE OR INSECT REPORT

FOREST STATION DATE

Altitudea.s.l.

RAINFALL DURING LAST THREE YEARS(Year) Inches days
.....(Year) Inches days
.....(Year) Inches days

SPECIES AFFECTED:

AGE:

MPA/Plantation/Compt. No.

PREVIOUS HISTORY OF AFFECTED COMPARTMENT(s) (i.e. Grassland site, Hardwood, Forest, Fuel, Fuel Plantations etc)

.....
.....
.....

DESCRIPTION OF ATTACK

General Symptoms

(Is root, stem or all of the tree affected? Are trees dying? Are there any peculiar features of the disease?)

Distribution of the Disease.

(Is it affecting scattered trees in the forest or does the disease occur in groups of trees. If the latter, how big are the groups?)

How long has the disease been present?

How much of the crop is affected? (Even an approximate estimate is valuable)

Final Remarks: _____

Signature

Rank

SPECIMENS

All disease reports should be accompanied by a specimen which should illustrate the symptoms of the disease. These should be packed, as described below, as cleanly as possible. Root, stem and foliage specimens should be kept separate and on no account should soil be included in a package unless it is specifically asked for.

- A. FOLIAGE, SMALL SEEDLINGS, YOUNG TWIGS.
Press in clean blotting paper or newspaper and pack between sheets of cardboard.
- B. FLESHY FUNGI.
Dry these first in the sun, for a few days, then pack in a cardboard box with a padding of crumpled newspaper.
- C. PORTIONS OF STEM OR ROOT.
If the material is limited, transmit in a box with a packing of crumpled newspaper. If there is enough material then it is wise to divide the specimen into two portions, one of which is sealed in a polythene bag before placing in the box.

The report and specimens will then be sent to:

The Forest Research Institute Entomologist
P.O. Box 1752
Kampala

In order to ensure that diseases are not spread from one country to another, all specimens sent outside Uganda should be in a sealed parcel, labelled:

“Forest Disease Specimen”

These parcels will then be opened with special precautions.

Appendix V. 4A
FD.47
DSO 5.4

Ref:

Forest Office
P.O. Box

.....
..... 19

To:
.....
.....

SEED INDENT

Species	Plantation	Area ha.	No. of Plants	Date Required	Remarks

- Notes:
1. Original to Seed Section (or other local source), Duplicate in file.
 2. Allow 5-10% on No. of plants for culls & beating-up.
 3. Remarks - include preferred seed origin, if necessary.

.....Signature

..... Designation

Appendix V. 4B
FD.13
DSO 5.4.6

Ref:

.....
.....
.....

To

.....
.....
.....

SEED ISSUE ADVICE NOTE

Ref. your Indent No. of

The seed lots listed below were despatched to you on On receipt, please sign and return the acknowledgment at the bottom of this form.

Species	Origin	Batch No.	Quantity Kgs.	Seed Quality		
				Test No.	Germ %	No. of viable seed/g

.....
..... (Designation)

To:

.....
.....
.....

..... 19

I acknowledge receipt of the seeds listed in your Advice Note Ref of

Remarks:

.....
..... (Designation)

Appendix V. 4C
FD.48
DSO 5.4.12

.....

.....
.....

NURSERY GERMINATION RECORD

**TO BE COMPLETED IMMEDIATELY AFTER THE PRICKING OUT
IS COMPLETED AND SENT TO FORI**

1. Species: Batch No.:
 2. Plantation and Nursery:
 3. Treatment before sowing:
 4. Seed quality: Test No. Germ No. V.S./g
(from Seed Advice Note)
 5. Amount of seed sown:-
 6. Date of sowing:-
 7. Density: g per m²:-
 8. Date when main germination began:-
 9. Notes on health and size of seedlings:-
.....
 10. Date of pricking out:-
 11. Number of plants pricked out:-
 12. Number of plants left:-
 13. Remarks:-
.....
- Signature:- Date:-

To be completed before sending to Seed Section

14. Percent of viable seeds which produce plants:-
 - (a) as pricked out:-
 - (b) total:-
15. Remarks:-
.....

2 copies: 1 DFO
 1 HQ

THE HANDLING OF TOXIC CHEMICALS

Many of the chemicals used by the Department may be toxic to human beings e.g. insecticides, fungicides, herbicides, timber preservatives, etc. When using such chemicals, the following safety rules must be kept:

1. Use only under the supervision of a responsible person.
2. Follow the manufacturer's instructions closely.
3. Wear overalls and rubber gloves or barrier cream. If applying or mixing powders, a face mask or goggles may be necessary.
4. Wash off immediately any chemical falling on the skin.
5. Wash thoroughly after using toxic chemicals, and before eating or smoking.
6. Destroy or render unusable all chemical containers; do not let them be used for carrying drinking water.
7. Keep all chemicals in a safe place and under lock and key.
8. Members of the public must be warned if they are likely to visit an area where toxic chemicals have been used. Do not use toxic chemicals where domestic animals are likely to wander, or near water supplies.

A GUIDE TO THINNING AND PRUNING OF EXOTIC PLANTATIONS

Important

1. This GUIDE is not an Order. It indicates what to aim at in the majority of the softwood areas BUT may require to be VARIED on account of:- species, site/crop quality and markets.
2. SPECIFIC orders must, therefore, be included in EACH MP and may then be varied ONLY by CFF.

MP Area Plantation Date

Age	Operation P = Prune T = Thin	Thinning Spp./ha left	Pruning Max. Half ht.		Remarks
			Metres	No. to prune	
1		1370			Planted 2.7 x 2.7 metres
5-7	P.1		2	All save runts	Access prune <u>BEFORE</u> T.1
6-8	T.1	990 ± 10%			
7-9	P.2		5	All	Year AFTER T.1
11-3	P.3		7	300-345	
13-15	T.2	570-640			Occasionally down to 490
14-16	P.4		10	300-345	
20-22	T.3	300-345			

**THE SIMPLE PROPORTION METHOD FOR CHOOSING SELECT TREES
AND THINNINGS**

This method is also called the 16, 20 or 25 spot plot method. It is derived from Kenya FD TN 85 of 1962. If by the third thinning it is no longer possible to see the original planting spots, then THREE plots may be used.

1. The following figures are obtained:-
 - (a) from the Stock Check

number of trees per hectare
number of blanks per hectare
number of spots per hectare (i.e. trees plus blanks)
 - (b) from MP prescriptions:

Number of trees to be left per hectare (990, 570 to 640, 300 to 345)
Number of selects to be chosen per hectare (300 to 345)

2. Calculate the fraction to use for the number of trees to be left standing after thinning, thus:-
 - (a)
$$\frac{\text{Trees per ha. to be left}}{\text{Number of SPOTS per ha.}}$$
 - (b) reduce the fraction determined at (a) to denominators of $\frac{\quad}{16}$ $\frac{\quad}{20}$ and $\frac{\quad}{25}$ with nearest whole number numerators.
 - (c) in order to decide which fraction will give you the best results, multiply the numerator in each case by the figure obtained by dividing number of SPOTS per ha., by the denominator. The result nearest to the number of trees per. to be left is the best fraction - and therefore size of plot to use.

Example 1 (of a first thinning at age 6-8)

- | | | | | |
|------|-----|--|------------|------------------------------------|
| (i) | (a) | assumed stock results | trees/ha = | 1250 |
| | | | blank/ha = | 120 |
| | (b) | number of trees to be left (T.1) = 1370 | | |
| (ii) | (a) | fraction of trees to be left $\frac{990}{1370}$ | | |
| | (b) | $\frac{990}{1370} = \frac{12}{16}$ | or | $\frac{14}{20}$ or $\frac{18}{25}$ |
| | (c) | $1370 \div 16 = 85 \times 12 = 1020$ (-990 = + 30)
$1370 \div 20 = 68 \times 14 = 952$ (-990 = + 38)
$1370 \div 25 = 54 \times 18 = 972$ (-990 = + 18) | | |

Thus the fraction $18/25$ will give the best results.
i.e. in a 25 SPOT plot leave 18 TREES.

Example 2. (of a second thinning at age 13-15)

- (i) (a) assumed stock check results trees per ha. = 950
blanks per ha. = 450
SPOTS per ha. = 1400
- (b) number of trees to be left = 605 per ha.
(mid point 570 - 640)
- (ii) (a) fraction of trees to be left $605/1400$
- (b) $\frac{605}{1400} = \frac{7}{16}$ or $\frac{9}{20}$ or $\frac{11}{25}$
- (c) $1400 \div 16 = 87 \times 7 = 609$ (-605 = + 4)
 $1400 \div 20 = 70 \times 9 = 630$ (-605 = + 25)
 $1400 \div 25 = 56 \times 11 = 616$ (-605 = + 11)

Thus the fraction $7/16$ will give best results
i.e. in a 16 SPOT plot leave 7 TREES.

Example 3. (of selection at age 11 - 13)

- (I) (a) assumed stock check results trees per ha. = 950
blanks per ha. = 450
number of SPOTS/ha = 1400
- (b) number of trees to be selected (pre P.3)
= 320 (approx. mid point 300 - 345)
- (ii) (a) fraction of trees to be selected $\frac{320}{1400}$
- (b) $\frac{320}{1400} = \frac{4}{16}$ or $\frac{5}{20}$ or $\frac{6}{25}$
- (c) $1400 \div 16 = 87 \times 4 = 348$ (-320 = + 28)
 $1400 \div 20 = 70 \times 5 = 350$ (-320 = + 30)
 $1400 \div 25 = 56 \times 6 = 336$ (-320 = + 16)

THUS $6/25$ will give the best results
i.e. in a 25 SPOT plot select 6 TREES.

THINNING CONTROL FORM

MPA/Plantation

(all figures spha)

Cpt.	Block (unit of uniform s.p. ha)	1st Thinning					2nd Thinning					3rd Thinning					4th Thinning									
		Age	Stocking	Ht	Selects	Thin propn	Age	Stocking	Ht.	Selects	Thin propn	Age	Stocking	Ht.	Selects	Thin propn	Age	Stocking	Ht.	Selects	Thin propn.					

A. CODE FOR RECORDING PEST AND DISEASE OBSERVATIONS IN PLANTATION SAMPLE PLOTS

General

The various types of biotic damage should be indicated on Form FD 71 (Revised) against the individual trees, using the symbols given below:-

Types of Damage

1. Overt damage: Damage that is apparent from the outset.
D : Defoliation
C : Cankers, dead tops and other stem necroses
G : Galls, mistletoes and other hyperrophies.
B : Borers.

In classes C, B and G, the location of the damage is to be included in the record; this will refer to the fifth part of the tree in which it is found where 1 indicates the top fifth, 2 the second to 5 indicating the basal fifth of the tree.

2. Cryptic damage: Damage that only becomes apparent with the death of the tree, or as its felling.
R : Root disease leading to death.
H : Heart rots, butt rots or borer damage, etc.

The location or extent of damage is not required for this class.

NOTES:

Simplicity is the key not of this system and it therefore concentrates on the type of biotic damage rather than the cause.

B. CODE FOR RECORDING THINNINGS AND WINDFALLS

T : Thinnings

T(W) : Windfall or any other premature thinning.

RANDOM NUMBERS FOR PLANTATION SAMPLE PLOTS

(a) Random numbers from 0 - 27 for Selection of Grid Coordinates and Thinnings for Volume Measurement

3	26	16	11	14	10	24	14	20	27	7	7	24	16	27	26	7	13	14
10	12	26	27	5	3	15	12	10	14	21	26	22	9	6	18	23	1	16
22	15	5	4	3	27	20	27	0	5	17	24	23	18	27	0	7	27	26
17	0	5	12	22	19	3	6	27	0	5	26	12	10	24	26	3	7	18
23	13	26	8	16	20	10	6	26	2	26	10	2	25	5	2	18	26	13
20	2	16	7	16	15	4	9	14	19	22	17	18	5	18	23	2	13	26
26	9	7	6	0	0	26	2	5	7	15	16	7	3	14	7	21	1	15
17	27	11	17	4	11	11	2	11	20	13	14	2	12	22	12	17	10	7
24	17	24	12	18	13	4	24	5	14	3	22	18	0	22	21	15	7	3
6	9	20	13	16	22	24	10	9	2	6	26	7	9	2	6	11	4	18
4	27	14	20	24	26	24	16	20	4	5	6	25	19	7	17	0	3	27
21	8	10	26	21	4	10	20	16	2	7	13	23	4	16	10	26	11	16
25	2	23	13	16	9	25	26	0	8	10	8	23	4	4	25	3	15	22
12	18	7	3	8	7	20	4	11	16	23	1	4	7	23	21	22	13	1
6	18	14	17	15	6	27	16	14	13	9	15	10	22	0	24	21	19	27
1	7	8	13	4	25	16	16	11	19	15	17	13	4	0	0	22	16	23
16	17	7	4	27	13	11	2	5	15	6	12	20	8	3	7	6	24	4
19	16	10	7	14	18	12	23	27	6	16	26	17	13	6	18	0	15	1
10	9	19	21	9	24	0	16	14	15	5	27	14	9	0	12	13	0	8
12	19	26	19	12	15	21	1	22	20	9	2	17	13	23	25	12	4	27
7	6	11	18	7	27	2	1	12	1	8	26	20	22	24	26	23	18	5
12	3	0	12	27	10	2	8	22	10	11	21	3	21	19	1	6	13	22
7	10	22	25	14	4	3	25	8	6	12	19	24	5	9	12	24	21	23
7	23	2	24	16	0	11	13	7	2	16	23	12	3	6	2	12	27	1
25	19	24	3	22	15	7	12	0	27	23	2	4	7	6	3	9	19	1
13	8	19	14	22	6	26	14	9	3	1	18	26	1	2	14	3	5	0
26	3	10	26	14	19	24	13	13	24	13	10	13	24	18	4	12	11	23
5	8	4	16	6	19	22	19	20	20	25	11	1	1	2	20	22	4	2
16	19	10	26	26	22	0	22	21	17	3	2	11	15	8	17	14	14	14
20	22	10	6	3	3	13	13	9	11	2	3	3	2	16	11	1	23	7
20	20	6	24	4	18	24	26	17	1	2	7	10	8	8	17	16	0	26
2	7	26	9	6	14	13	17	11	12	24	16	14	25	1	16	22	23	24
2	24	20	13	26	14	1	12	13	22	2	16	4	18	23	8	25	20	20
11	8	13	9	17	24	17	26	20	1	26	5	18	15	14	6	0	8	2
17	2	3	6	17	14	23	1	1	2	10	19	18	8	21	25	27	7	8
19	6	8	10	9	24	23	0	12	16	21	17	23	15	15	14	9	4	7
7	25	0	25	6	14	5	6	12	9	9	10	3	10	21	3	9	12	14
22	0	1	17	16	19	13	7	7	11	16	27	3	4	10	25	6	3	20
26	14	19	11	11	19	9	14	6	18	9	18	6	19	7	17	23	11	24
20	8	24	16	8	24	24	13	27	26	1	10	5	1	16	13	26	3	5
14	5	13	10	0	25	18	12	11	8	7	10	5	24	21	21	27	21	10
12	5	10	0	27	12	12	17	19	16	11	26	23	20	23	7	9	18	27
27	23	5	24	1	19	10	19	7	9	6	12	3	15	20	27	2	16	7

(b) Random Numbers from 1 - 10 for the Selection of Standing Trees for Volume Measurements

3	3	3	7	1	3	1	3	6	5	1	5	4	4	1	4	2	2	2	6	1	1	3	2	6
7	6	6	6	6	8	2	6	10	10	4	10	7	7	2	7	10	3	7	7	7	4	9	6	7
6	1	2	9	3	3	8	7	4	2	5	6	1	3	2	5	2	1	6	2	5	6	4	4	2
10	6	7	10	8	5	9	8	10	6	9	8	7	5	3	7	10	4	8	9	6	9	5	8	6
1	2	9	6	2	1	6	2	4	4	3	2	3	3	5	6	3	4	1	2	3	1	4	5	6
2	3	10	8	4	3	10	7	9	9	4	7	7	8	7	10	4	6	4	4	7	7	7	6	8
3	6	2	6	3	3	4	5	2	5	4	4	3	1	2	4	5	5	2	1	2	4	2	1	5
9	9	6	10	10	5	5	6	8	7	6	7	9	6	4	10	8	10	3	8	3	10	4	7	7
2	2	4	2	3	9	3	6	5	2	1	7	1	8	2	3	2	3	5	4	2	9	8	2	6
4	8	8	7	5	10	5	8	9	10	6	10	6	10	3	6	10	4	7	5	3	10	10	4	7

**STANDARD SYMBOLS, DEFINITIONS AND UNITS
FOR PLANTATION SPs**

The majority of the symbols prescribed below are based on those recommended for international use by IUFRO (1959). Those definitions marked with an asterisk will have their data computed per hectare as well as per plot.

<u>Symbol</u>	<u>Definition</u>	<u>Unit</u>
SP	Sample Plot	-
a	Area of sample plot	hectare
t	Age	year
n	x number of trees	no.
S	Survival per cent	per cent
hdom	Dominant height	metre
h	Arithmetic mean height	metre
d	Arithmetic mean diameter at 1.3m	centimetre
ddom	near dbh of dominant trees	"
G	x Basal area	sq. metre
dg	Diameter corresponding to mean basal area	centimetre
vs	x Silvolum	+ cu. metre
I	x Periodic annual increment	+ cu.m/ha./ann.
It	x Mean annual increment	+ cu.m/ha./ann.
Ser. No.	Serial number of thinning operation	-
n'	x Number of stems remaining after thinning	no.

(+ Strictly "silves" but Approx. cu. metre).

Departmental Standing Orders

INITIAL DESCRIPTION AND PERIODIC ASSESSMENT FORM

MPA/Plantation _____ Cpt. _____ Plot _____
 Species _____
 Planting Date - Month _____ Year _____ Spacing _____
 x
 Topography _____ Aspect _____ Slope _____

LOCALITY MAP

Surveyed by: Date:
 Checked by
 Date:

Plot Plan showing access line, direction of planting rows and the order of numbering the trees.

Signature of officer responsible for the field work
 Date:

Signature of officer who has checked the plot in the field and the entries above
 Date:

MPA/Plantation

PLOT IDENTIFICATION SPECIES AND P. YEAR						ASSESSED BY: CHECKED BY:		
DATE OF ASSESSMENT			DATE OF LAST ASSESSMENT				DATE OF LAST THINNING	
TREE NO.	DBH	NOTES	TREE NO.	DBH	NOTES	TREE NO.	DBH	NOTES
1			21			41		
2			22			42		
3			23			43		
4			24			44		
5			25			45		
6			26			46		
7			27			47		
8			28			48		
9			29			49		
10			30			50		
11			31			51		
12			32			52		
13			33			53		
14			34			54		
15			35			55		
16			36			56		
17			37			57		
18			38			58		
19			39			59		
20			40			60		
HYPSOMETER USED:			NO THINNINGS:			TOTAL NUMBER OF LIVING TREES:		
DOMINANT HEIGHT (4 TREES)				MEAN HEIGHT (10 TREES):				

TREE	HGT	HORIZ DIST	READING TO TOP	2M	TREE NO.	HGT	HORIZ DIST	READING TO TOP	2M
1					1				
2					2				
3					3				
4					4				
					5				
					6				
					7				
					8				
					9				

Departmental Standing Orders

					10				
--	--	--	--	--	----	--	--	--	--

Appendix V.13C
FORM FD.41

**ASSESSMENT OF THINNINGS & OTHER REMOVALS FROM
A PERMANENT PLANTATION SAMPLE PLOT**

MPA /Plantation

PLOT IDENTIFICATION									
SPECIES AND PLANTING YEAR:									
DATE OF ASSESSMENT					ASSESSED BY:				
TREE NUMBER	TOTAL LENGTH	DIAMETER						VOL. OB/UB	REASONS FOR FELLING
		BREAST HEIGHT	90%	70%	50%	30%	10%*		

NOTES:

* Percentages of total length of tree from its top. These may be replaced by fixed lengths of stem.

Departmental Standing Orders

Appendix V.13D
FD.42

PLANTATION SAMPLE PLOT

MAIN CROP MEASUREMENTS

MPA/Plantation

.....
.....

Species

Sowing/Planting date

.....

Last felling date

.....

Date									
Age									
h. dom									
dg. dom									
I									
T									
n/ha									

THINNINGS

Date									
Age									
n/ha									
Vs/ha									
n/ha									
T									

PRUNINGS (height, etc.)

Date	Age								

NOTES on health, weed vegetation, n.r., litter, etc.

Date	Age								

Appendix V.14

RADIUS CORRECTION TABLE FOR 0.04 Ha SAMPLE PLOTS

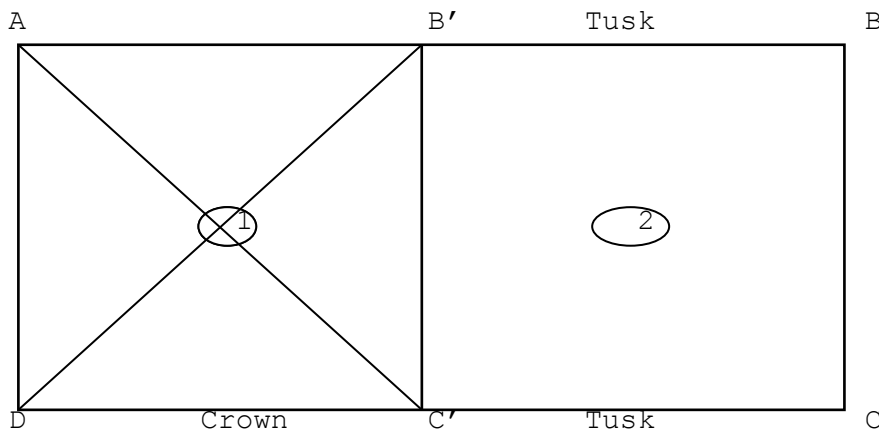
<u>Slope (Degrees)</u>	<u>Radius (Metres)</u>
0 - 5	11.28
6 - 9	11.40
10 - 13	11.50

Departmental Standing Orders

14, 15	11.65
16, 17	11.75
18	11.85
19	11.95
20	12.0
21	12.10
22	12.20
23	12.25
24	12.35
25	12.45
26	12.55
27	12.65
28	12.75
29	12.90
30	13.00
31	13.15
32	13.30
33	13.45
34	13.60
35	13.75
36	13.95
37	14.10
38	14.30
39	14.50
40	14.70
41	14.95
42	15.20
43	15.45
44	15.70
45	15.95
46	16.25
47	16.55
48	16.85
49	17.20
50	17.55
51	17.95
52	18.30
53	18.75
54	19.20
55	18.65

**Conversion of Existing 0.2 Acre Rectangular Plots to 0.1 Acre Plots
(0.04 ha)**
(From D.S.O. Amdt. 1/65)

156. At the next re-measurement of plots that are retained (see para. 153) the old type plot will be measured in the previous way. Immediately afterwards it will be reduced to 0.1 acres in area by cutting it in half to form a 1 ch. x 1 ch. square. One of the halves, selected randomly by the toss of a coin, will be discarded. As in the old plots the new line necessary to demarcate the new plot will be sited so that it passes between two rows of trees and leaves no doubtful edge trees. New corner trenches will be dug to demarcate it. The two discarded corner trenches of the old plot will be filled in. The new plot will also have to be re-surveyed - see diagram below:-



(NB. In this case, it is presumed that the Tail/Tusk half No. (2) has been discarded).

ABCD = old plot 2 x 1 cans.
A B' C' D = new plot 1 x 1 cans.

B' and C' must fall on the line AB and CD respectively.
Survey A B' C' D and diagonals B' D and A C'.

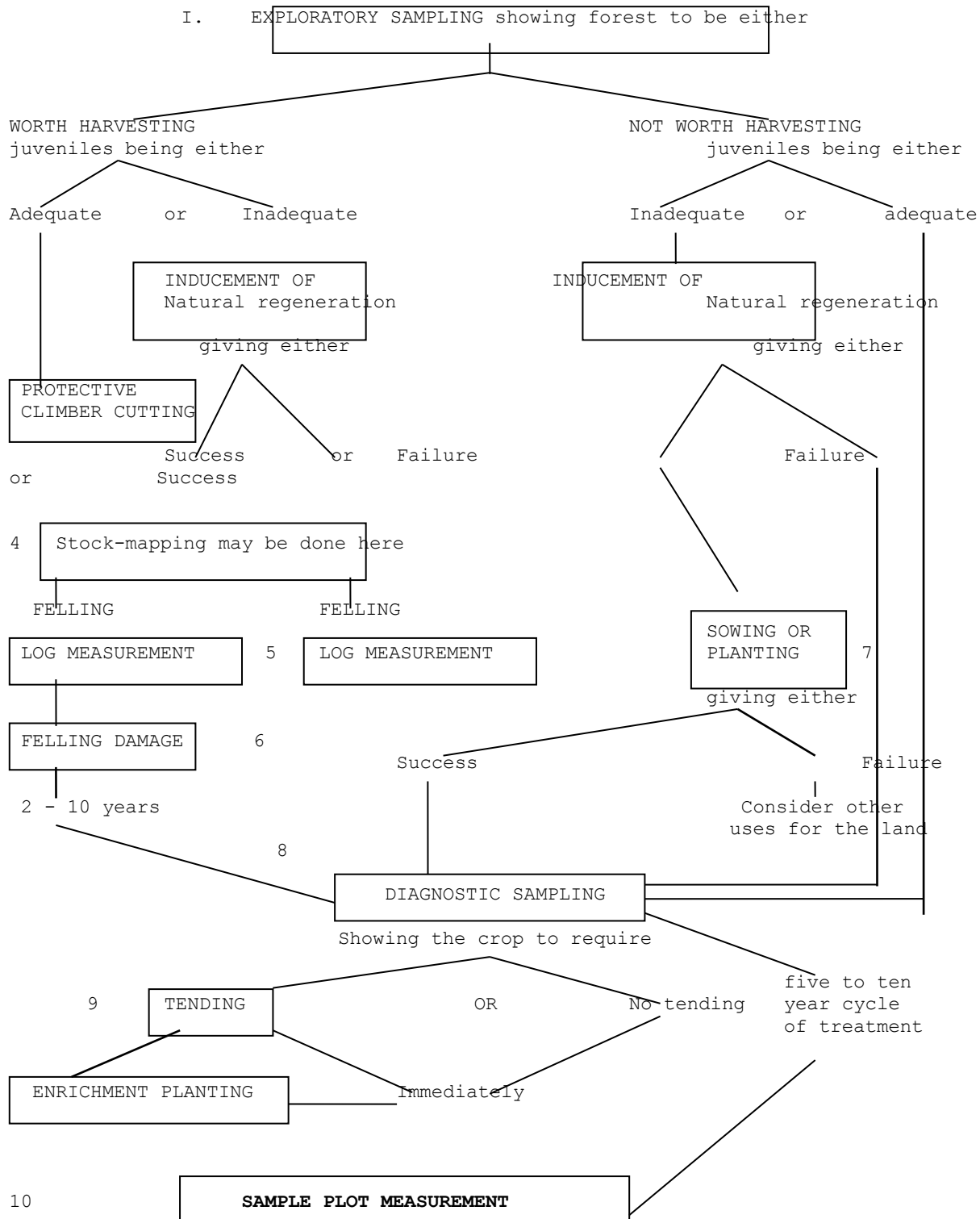
Details of survey to be put on form FD.68 (revised). The survey will be computed at HQ. Slope angles must be recorded for each line if they are over 5°.

157. If the trees in the old plot are not numbered, they will be numbered and labelled in the new plots in the same way as described in para. 141. If the trees in the old plot are already numbered then the trees in the plot will retain the same numbers although labelling may have to be adjusted to the 6' point. The numbers on the trees excluded from the new plot will be removed.

Departmental Standing Orders

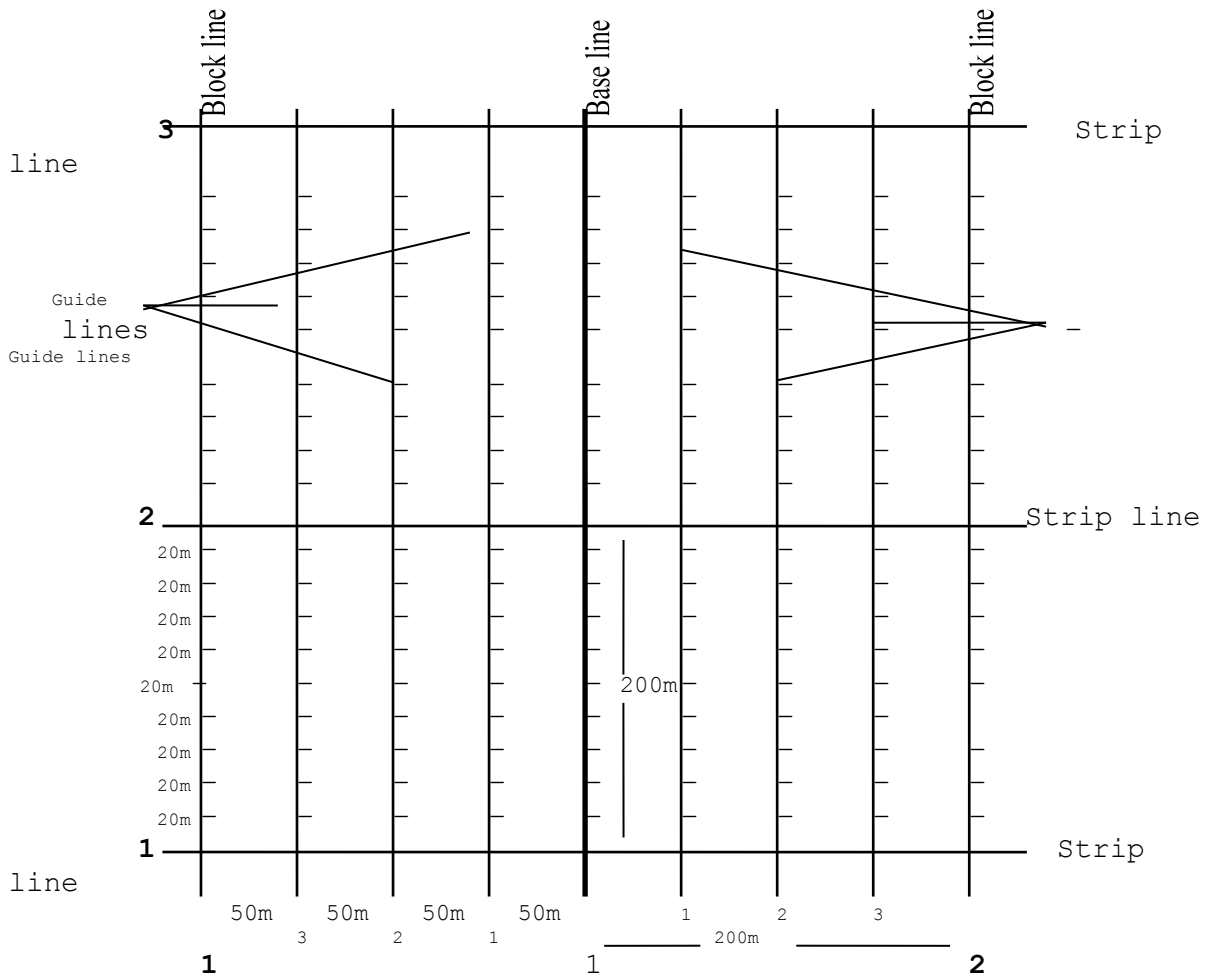
158. The first assessment of the new plot will follow immediately on the last assessment of the old plot, but thinnings need not be measured on this. The heights of a systematic sample of 10 trees and the volumes of two of these will be measured as described in paras. 145, 146 and 147 above.

**NATURAL HIGH FOREST MANAGEMENT
DIAGRAM OF THE FIELD WORK**



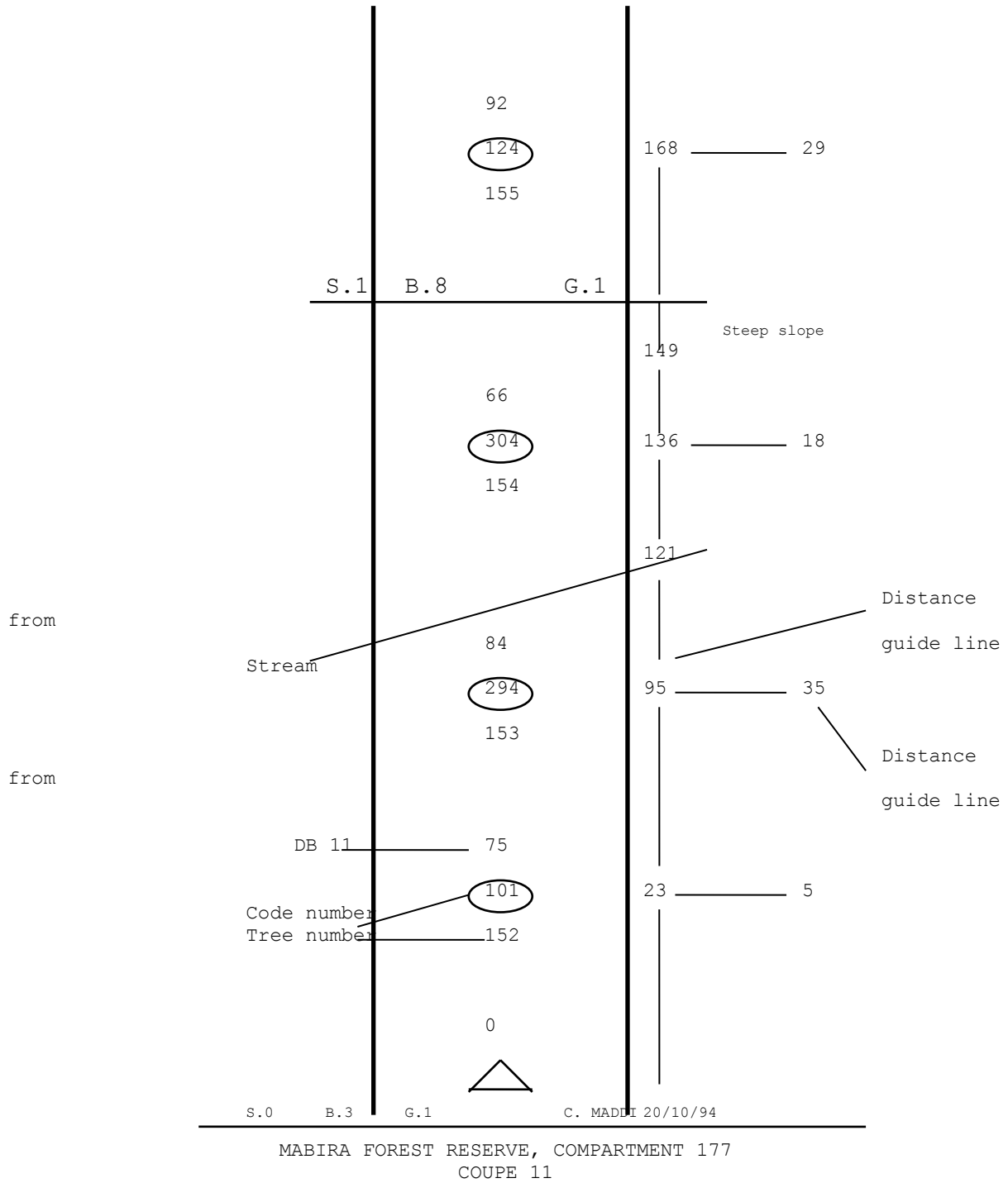
STOCKMAPPING

Field Layout of Baseline, Block Strip and Guidelines



STOCKMAPPING - BUDONGO METHOD

Field Book



Departmental Standing Orders

Appendix V.17C
DSO 5.7.9

BLOCK METHOD

DIAGRAMMATIC REPRESENTATION OF THE DATA

B23		B22		B21		B20		B19		B18		B17		B16		B15		B14		B13		B12	
NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³
1	2 .11	1 2	21.05	1	7.23	1	42.09	1	28.73	1	5.49	1	11.49	1	39.63	1	37.29	1	39.65	1	14.28	1	- -
1		4		8		8		9		1		5		11		4		9		4		4	
2	112.7	2 29	225.	2	171.2	2	301.2	2	346.8	2	313.0	2	403.64	2	332.7	2	343.7	2	167.3	2	109.1	2	4 10
38	1	3 31	07	2	7	2	8	2	9	2	0	2	105	2	4	2	3	2	3	2	6	3	- -
3	46.38		66.	132	24.15	95		99		105	49.62	141	28.55	129	44.00	104	39.35	59	43.19	36	24.77	3	- -
22			01	3		3	12.94	3	48.38	3		3		3		3		3		3		3	
				14		7		19		22		14		23		18		16		11		11	
B1		B2		B3		B4		B5		B6		B7		B8		B9		B10		B11			
NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³	NT	M ³
1	1 .33	1		1	13.86	1	25.28	1	124.1	1	16.92	1	20.25	1	27.87	1 5	27.07	1	78.41	1	29.67		
1		15	42.40	4		7		9	5	5		5		6		16		16		7		7	
2	61.02	2 91	247.3	2	377.9	2	257.9	2	391.3	2	1	2	432.55	2	259.1	2	245.8	2	158.8	2	99.68		
23	21	2 2	2	2	1	2	8	2	8	2	1	2	131	2	83 7	82	8	2	1	2	29.19		
3	.86	3 21		121		85	34.00	52	49.38	131		154	33.71	3	39.12	3	65.24	55	53.48	33			
12			45.95	3	37.06	3		3	192.1	3	64.05	3		22		24		3		3		3	
				18		14		16	4	27		18						52		11		11	

B = Block
 NT = Number of Trees
 M³ = Volume in Cubic Metres
 1 = Fee Group I
 2 = Fee Group II
 3 = Fee Group III

Departmental Standing Orders

Appendix V.18A

LOG VOLUME TABLE NO. 7 (HARDWOODS)

This table is for use with logs measured by completed 10 centimetre mid-diameter classes and completed 20 centimetre length classes.

Length Class in cms	MID-DIAMETER CLASS OF LOG IN CENTIMETRES																						
	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250
	VOLUME OF LOG INCUBIC METRES, TRUE MEASURE, OVER BARK																						
	(Volumes of Log in Cubic Metres, True Measure, Over Bark)																						
140	.14	.239	.356	.498	.663	.851	1.0	1.29	1.55	1.84	2.147	2.477	2.830	3.207	3.608	4.032	4.480	4.951	5.446	5.964	6.506	7.072	7.661
160	4	.270	.404	.564	.751	.965	63	9	8	1	2.433	2.807	3.208	3.635	4.089	4.570	5.077	5.611	6.172	6.759	7.374	8.014	8.682
180	.16	.302	.451	.630	.839	1.07	1.2	1.47	1.76	2.08	2.720	3.137	3.585	4.063	4.570	5.107	5.674	6.271	6.898	7.555	8,241	8.957	9.703
200	4	.334	.499	.697	.928	8	05	2	6	6	3.006	3.468	3.963	4.490	5.051	5.645	6.272	6.931	7.624	8.350	9.108	9.900	10.72
220	.18	.366	.546	.763	1.01	1.19	1.3	1.64	1.97	2.33	3.292	3.798	4.340	4.918	5.532	6.182	6.869	7.591	8,350	9.145	9.976	10.84	5
240	3	.398	.594	.830	6	2	47	5	4	2	3.578	4.128	4.717	5.346	6.013	6.720	7.466	8.252	9.076	9.940	10.84	3	11.74
260	.20	.429	.641	.896	1.10	1.30	1.4	1.81	2.18	2.57	3.865	4.458	5.095	5.773	6.494	7.258	8.063	8.912	9.802	10.73	3	11.78	6
280	2	.461	.689	.962	4	5	89	8	1	7	4.151	4.789	5.472	6.201	6.975	7,795	8,661	9,572	10.52	5	11.71	6	12.76
300	.22	.493	.737	1.02	1.19	1.41	1.6	1.99	2.38	2.82	4.437	5.119	5.849	6.629	7,456	8.333	9.258	10.23	8	11.53	1	12.72	8
320	1	.525	.784	9	3	9	30	2	9	3	4.724	5.449	6.227	7.056	7.937	8,870	9.855	2	11.25	1	12.57	9	13.78
340	.24	.557	.832	1.09	1.28	1.53	1.7	2.16	2.59	3.06	5.010	5.779	6.604	7.484	8.418	9.408	10.45	10.89	5	12.32	8	13.67	9
360	1	.588	.879	5	1	2	72	5	7	8	5.296	6.110	6.982	7.912	8.900	9.946	3	2	11.98	6	13.44	2	14.81
380	.26	.620	.927	1.16	1.37	1.64	1.9	2.33	2.80	3.31	5.582	6.440	7.359	8.339	9.381	10.48	11.05	11.55	1	13.12	6	14.61	0
400	0	.652	.974	1	0	6	14	8	4	3	5.869	6.770	7.736	8.767	9.862	3	0	2	12.70	1	14.31	4	15.83
420	.27	.684	1.022	1.22	1.45	1.75	2.0	2.51	3.01	3.55	6.155	7.100	8.114	9.194	10.34	11.02	11.64	12.21	7	13.91	3	15.55	2
440	9	.716	1.069	8	8	9	56	1	2	9	6.441	7.431	8.491	9.662	3	1	7	2	13.43	6	15.18	7	16.85
460	.29	.748	1.117	1.29	1.54	1.87	2.1	2.68	3.22	3.80	6.728	7.761	8.869	10.05	10.82	11.55	12.24	12.87	3	14.71	1	16.50	3
480	8	.779	1.164	4	6	3	97	4	0	4	7.014	8.091	9.246	0	4	8	5	2	14.15	1	16.04	0	17.87
500	.31	.811	1.212	1.36	1.63	1.98	2.3	2.85	3.42	4.05	7.300	8.421	9.623	10.47	11.30	12.09	12.84	13.53	9	15.50	8	17.44	5
520	7	.843	1.259	1	5	6	39	7	8	0	7.586	8.752	10,00	7	5	6	2	3	14.88	7	16.91	3	18.89
540	.33	.875	1.307	1.42	1.72	2.10	2.4	3.03	3.63	4.29	7.873	9.082	1	10.90	11.78	12.63	13.43	14.19	5	16.30	6	18.38	6
560	7	.907	1.354	7	3	0	81	1	5	5	8.159	9.412	10.37	5	6	4	9	3	15.61	2	17.78	6	19.91
580	.35	.938	1.402	1.49	1.81	2.21	2.6	3.20	3.84	4.54	8.445	9.742	8	11.33	12.26	13.17	14.03	14.85	1	17.09	3	19.32	7
600	6	.970	1.449	3	1	3	23	4	3	1	8.731	10.07	10.75	3	7	1	6	3	16.33	7	18.65	9	20.93
620	.37	1.00	1.497	1.56	1.90	2.32	2.7	3.37	4.05	4.78	9.018	3	5	11.76	12.74	13.70	14.63	15.51	7	17.89	1	20.27	9
640	5	2	1.544	0	0	7	64	7	1	6	9.304	10.40	11.13	0	8	9	4	3	17.06	2	19.51	2	21.96
660	.39	1.03	1.592	1.62	1.98	2.44	2.9	3.55	4.25	5.03	9.590	3	3	12.18	13.22	14.24	15.23	16.17	3	18.68	8	21.21	0
680	4	4	1.639	6	8	0	06	0	9	1	9.877	10.73	11.51	8	9	6	1	3	17.78	8	20.38	5	22.98
700	.41	1.06	1.687	1.69	2.07	2.55	3.0	3.72	4.46	5.27	10.16	3	0	12.61	13.71	14.78	15.82	16.83	9	19.48	6	22.15	2
720	4	6	1.734	2	6	4	48	3	6	7	3	11.06	11.88	6	0	4	8	3	18.51	3	21.25	7	24.00
740	.43	1.09	1.782	1.75	2.16	2.66	3.1	3.89	4.67	5.52	10.44	3	8	13.04	14.19	15.32	16.42	17.49	6	20.27	3	23.10	3
760	3	7	1.829	9	5	7	90	7	4	2	9	11.39	12.26	3	1	2	6	3	19.24	8	22.12	0	25.02
780	.45	1.12	1.877	1.82	2.25	2.78	3.3	4.07	4.88	5.76	10.73	3	5	13.47	14.67	15.85	17.02	18.15	2	21.07	1	24.04	5
800	2	9	1.924	5	3	1	31	0	2	8	5	11.72	12.64	1	2	9	3	3	19.96	3	22.98	3	26.04
820	.47	1.16	1.972	1.89	2.34	2.89	3.4	4.24	5.09	6.01	11.02	4	2	13.89	15.15	16.39	17.62	18.81	8	21.86	8	24.98	6
840	1	1	2.019	1	1	4	73	3	0	3	2	12.05	13.02	9	3	7	0	4	20.69	8	23.85	6	27.06
860	.49	1.19	2.067	1.95	2.43	3.00	3.6	4.41	5.29	6.25	11.30	4	0	14.32	15.63	16.93	18.21	19.47	4	22.66	5	24.92	7
880	1	3	2.114	8	0	7	15	6	7	9	8	12.38	13.39	6	4	4	7	4	21.42	4	24.72	9	28.08
900	.51	1.22	2.162	2.02	2.51	3.12	3.7	4.58	5.50	6.50	11.59	5	7	14.75	16.11	17.47	18.81	20.13	0	23.45	3	26.87	9
920	0	5	2.210	4	8	1	57	9	5	4	4	12.71	13.77	4	5	2	5	4	22.14	9	25.59	2	29.11
940	.52	1.25	2.257	2.09	2.60	3.23	3.8	4.76	5.71	6.75	11.88	5	4	15.18	16.59	18.01	19.41	20.79	8	24.25	0	27.81	0
960	9	6	2.305	1	7	4	99	2	3	0	1	13.04	14.15	2	6	0	2	4	22.87	4	26.45	5	30.13
980	.54	1.28	2.352	2.15	2.69	3.34	4.0	4.93	5.92	6.99	12.16	5	2	15.60	17.07	18.54	20.00	21.45	2	25.04	8	28.75	2
1000	8	8	2.400	7	5	8	40	6	1	5	7	13.37	14.52	9	7	7	9	4	23.59	9	27.32	8	31.15
	.56	1.32		2.22	2.78	3.46	4.1	5.10	6.12	7.24	12.45	6	9	16.03	17.55	19.08	20.60	22.11	8	25.84	5	29.70	3
	8	0		3	3	1	82	9	8	0	3	13.70	14.90	7	9	5	7	4	23.32	4	28.19	0	32.17
	.58	1.35		2.29	2.87	3.57	4.3	5.28	6.33	7.48	12.73	6	7	16.46	18.04	19.62	21.20	22.77	4	26.64	3	30.64	4
	7	2		0	2	5	24	2	6	6	9	14.03	15.28	4	0	2	4	4	25.05	0	29.06	3	33.19
																				0			6

APPENDICES

Departmental Standing Orders

.60	1.38	2.35	2.96	3.68	4.4	5.45	6.54	7.73	13.02	14.36	15.66	16.89	18.52	20.16	21.80	23.43	25.77	27.43	29.92	31.58	34.21
6	4	6	0	8	66	5	4	1	6	6	1	2	1	0	1	4	7	5	8	6	7
.62	1.41	2.42	3.04	3.80	4.6	5.62	6.75	7.97	13.31	14.69	16.03	17.32	19.00	20.69	22.39	24.09	26.50	28.23	30.79	32.52	35.23
5	5	2	8	2	07	8	1	7	2	7	9	0	2	8	9	5	3	0	5	9	9
.64	1.44	2.48	3.13	3.91	4.7	5.80	6.95	8.22	13.59	15.02	16.41	17.74	19.48	21.23	22.99	24.75	27.22	29.02	31.66	33.47	36.26
5	7	9	7	5	49	2	9	2	8	7	6	7	3	5	6	5	9	5	3	2	0
.66	1.47	2.55	3.22	4.02	4.8	5.97	7.16	8.46	13.88	15.35	16.79	18.17	19.96	21.77	23.59	25.41	27.95	29.82	32.53	34.41	37.28
4	9	5	5	9	91	5	7	8	4	7	4	5	4	3	3	5	5	1	0	5	1
.68	1.51	2.62	3.31	4.14	5.0	6.14	7.37	8.71	14.17	15.68	17.17	18.60	20.44	22.31	24.19	26.07	28.68	30.61	33.39	35.35	38.30
3	1	1	3	2	33	8	5	3	1	7	1	3	5	0	0	5	1	6	8	8	3
.70	1.54	2.68	3.40	4.25	5.1	6.32	7.58	8.95	14.45	16.01	17.54	19.03	20.92	22.84	24.78	26.73	29.40	31.41	34.26	36.30	39.32
2	3	8	2	6	74	1	2	8	7	8	8	0	6	8	5	7	1	5	0	4	
.72	1.57	2.75	3.49	4.36	5.3	6.49	7.79	9.20		16.34	17.92	19.45	21.40	23.38	25.38	27.39	30.13	32.20	35.13	37.24	40.34
2	5	4	0	9	16	4	0	4		8	6	8	7	6	5	5	3	6	3	3	6
.74	1.60	2.82	3.57	4.48	5.4	6.66	7.99	9.44		16.67	18.30	19.88	21.88	23.92	25.98	28.05	30.85	33.00	36.00	38.18	41.36
1	6	1	8	3	58	7	8	9		8	3	6	8	3	2	5	9	1	0	6	7
.76		2.88	3.66	4.59	5.6	6.84	8.20	9.69			18.68	20.31	22.36	24.46	26.58	28.71	31.58	33.79	36.86	39.12	42.38
0		7	7	6	00	1	6	5			0	3	9	1	0	6	5	7	8	9	8
.77		2.95	3.75	4.71	5.7	7.01	8.41	9.94			19.05	20.74	22.85	24.99	27.17	29.37	32.31	34.59	37.73	40.07	43.41
9		3	5	0	41	4	3	0			8	1	0	8	7	6	1	2	5	2	0
799		3.02	3.84	4.82	5.8	7.18	8.62	10.1				21.16	23.33	25.53	27.77	30.03	33.03	35.38	38.60	41.01	44.43
.81		0	4	3	83	7	1	86				9	1	6	4	6	8	7	2	5	1
8		3.08	3.93	4.93	6.0	7.36	8.82	10.4				21.59	23.81	26.07	28.37	30.69	33.76	36.18	39.47	41.95	45.45
.83		6	2	7	25	0	9	31				6	2	4	2	6	4	2	0	8	3
7		3.15	4.02	5.05	6.1	7.53	9.03	10.6					24.29	26.61	28.96	31.35	34.49	36.97	40.33	42.90	46.47
.85		2	0	0	67	3	7	76					3	1	9	6	0	7	7	1	4
6		3.21	4.10	5.16	6.3	7.70	9.24	10.9						27.14	29.56	32.01	35.21	37.77	41.20	43.84	47.49
.87		9	9	4	09	7	4	22						9	6	6	6	3	5	3	6
6		3.28	4.19	5.27	6.4	7.88	9.45	11.1							20.16	32.67	35.94	38.56	42.07	44.78	48.51
.89		5	7	7	50	0	2	67							3	6	2	8	2	6	7
5		3.35	4.28	5.39	6.5	8.05	9.66	11.4								33.33	36.66	39.36	42.94	45.72	49.53
.91		1	5	1	92	3	0	13								6	8	3	0	9	8
4			4.37	5.50	6.7	8.22	9.86	11.6										40.15	43.80	46.67	50.56
.93			4	4	34	6	8	58										8	7	2	0
3			4.46	5.61	6.8	8.39	10.0	11.9												47.61	51.58
.95			2	8	76	9	75	04												5	1
2				5.73	7.0	8.57	10.2	12.1													
.97				1	17	2	83	49													
2					7.1	8.74	10.4	12.3													
					59	6	91	95													

Departmental Standing Orders

Appendix V.18B

LOG VOLUME TABLE

This table is for use with logs measured by completed 2 centimetre mid-diameter classes and completed 20 centimetre length classes.

Length class in cms	MID DIAMETER CLASS OF LOG IN CENTIMETRES																								
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
100	.00 1	.00 2	.00 4	.00 7	.01 0	.01 5	.01 9	.02 5	.03 1	.03 8	.04 6	.05 4	.06 3	.07 3	.08 3	.09 4	.10 6	.11 8	.13 1	.14 5	.16 0	.17 5	.19 1	.20 7	.22 5
120	.00	.00	.00	.00	.01	.01	.02	.03	.03	.04	.05	.06	.07	.08	.09	.11	.12	.14	.15	.17	.18	.20	.22	.24	.26
140	1	3	5	8	2	7	3	0	7	5	4	4	6	8	1	5	0	5	2	9	7	6	5	6	
160	.00	.00	.00	.01	.01	.02	.02	.03	.04	.05	.06	.07	.08	.09	.11	.12	.14	.16	.17	.19	.21	.23	.26	.28	.30
180	1	3	6	0	4	0	7	4	3	2	2	4	6	9	3	8	4	1	9	8	8	9	0	3	6
	.00	.00	.00	.01	.01	.02	.03	.03	.04	.05	.07	.08	.09	.11	.12	.14	.16	.18	.20	.22	.24	.27	.29	.32	.34
	1	3	7	1	6	3	0	9	8	9	1	3	7	2	8	5	4	3	3	4	7	0	5	1	7
	.00	.00	.00	.01	.01	.02	.03	.04	.05	.06	.07	.09	.10	.12	.14	.16	.18	.20	.22	.25	.27	.30	.33	.35	.38
	1	4	7	2	8	5	4	3	4	6	9	3	9	5	3	3	3	4	7	1	6	2	0	8	8
200	.00	.00	.00	.01	.02	.02	.03	.04	.06	.07	.08	.10	.12	.13	.15	.18	.20	.22	.25	.27	.30	.33	.36	.39	.42
220	1	4	8	3	0	8	7	8	0	3	7	3	0	9	9	0	2	6	1	7	5	4	4	6	9
240	.00	.00	.00	.01	.02	.03	.04	.05	.06	.08	.09	.11	.13	.15	.17	.19	.22	.24	.27	.30	.33	.36	.39	.43	.47
260	2	5	9	5	2	1	1	2	5	0	6	3	2	2	4	7	1	7	5	4	4	6	9	4	0
280	.00	.00	.01	.01	.02	.03	.04	.05	.07	.08	.10	.12	.14	.16	.18	.21	.24	.26	.29	.33	.36	.39	.43	.47	.51
	2	5	0	6	4	3	4	7	1	7	4	3	3	5	9	4	1	9	9	0	3	8	4	1	1
	.00	.00	.01	.01	.02	.03	.04	.06	.07	.09	.11	.13	.15	.17	.20	.23	.26	.29	.32	.35	.39	.42	.46	.50	.55
	2	5	0	7	6	8	1	7	4	2	3	5	8	4	1	0	0	3	6	2	9	8	9	2	
	.00	.00	.01	.01	.02	.03	.05	.06	.08	.10	.12	.14	.16	.19	.21	.24	.27	.31	.34	.38	.42	.46	.50	.54	.59
	2	5	1	8	8	8	1	6	2	0	0	2	6	2	9	8	9	2	6	3	1	1	3	7	2
300	.00	.00	.01	.02	.02	.04	.05	.07	.08	.10	.12	.15	.17	.20	.23	.26	.29	.33	.37	.40	.45	.49	.53	.58	.63
320	2	6	2	0	9	1	5	0	8	7	9	2	7	5	4	5	8	3	0	9	0	3	8	5	3
340	.00	.00	.01	.02	.03	.04	.05	.07	.09	.11	.13	.16	.18	.21	.24	.28	.31	.35	.39	.43	.47	.52	.57	.62	.67
360	2	6	3	1	1	4	8	5	4	4	7	2	9	8	9	2	7	5	4	6	9	5	3	2	4
380	.00	.00	.01	.02	.03	.04	.06	.07	.09	.12	.14	.17	.20	.23	.26	.29	.33	.37	.41	.46	.50	.55	.60	.66	.71
	2	7	3	2	3	6	2	9	9	1	5	2	0	1	4	9	7	6	8	2	8	7	7	0	5
	.00	.00	.01	.02	.03	.04	.06	.08	.10	.12	.15	.18	.21	.24	.27	.31	.35	.39	.44	.48	.53	.58	.64	.69	.75
	3	7	4	4	5	9	5	4	5	8	4	2	2	4	9	6	8	2	8	7	8	2	8	6	
	.00	.00	.01	.02	.03	.05	.06	.08	.11	.13	.16	.19	.22	.25	.29	.33	.37	.41	.46	.54	.56	.62	.67	.73	.79
	3	8	5	5	7	2	9	9	1	5	2	1	3	8	4	4	5	9	6	5	6	0	7	5	7
400	.00	.00	.01	.02	.03	.05	.07	.09	.11	.14	.17	.20	.23	.27	.30	.35	.39	.44	.49	.54	.59	.65	.71	.77	.83
420	3	8	6	6	9	4	2	3	6	2	0	1	5	1	9	1	4	1	0	1	5	2	1	3	8
440	.00	.00	.01	.02	.04	.05	.07	.09	.12	.14	.17	.21	.24	.28	.32	.36	.41	.46	.51	.56	.6	.68	.74	.81	.87
460	3	8	7	7	1	7	6	8	2	9	9	1	6	4	5	8	4	2	4	8	24	4	6	1	8
480	.00	.00	.01	.02	.04	.06	.08	.10	.12	.15	.18	.22	.25	.29	.34	.38	.43	.48	.53	.59	.65	.71	.78	.84	.91
	3	9	7	9	3	0	0	2	8	6	7	1	8	7	0	5	3	4	8	4	3	6	1	9	9

Departmental Standing Orders

	.00	.10	.01	.03	.04	.06	.08	.10	.13	.16	.19	.23	.26	.31	.35	.40	.45	.50	.56	.62	.68	.74	.81	.88	.96
	3	9	8	0	5	2	3	7	3	3	5	1	9	0	5	2	2	5	1	1	3	8	5	6	0
	.00	.01	.01	.03	.04	.06	.08	.11	.13	.17	.20	.24	.28	.32	.37	.41	.47	.52	.58	.64	.71	.77	.85	.92	1.0
	3	0	9	1	7	5	7	1	9	0	4	1	1	4	0	9	1	7	5	7	2	9	0	4	01
500	.00	.01	.02	.03	.04	.06	.09	.11	.14	.17	.21	.25	.29	.33	.38	.43	.49	.54	.60	.67	.74	.81	.88	.96	1.0
520	4	0	0	2	8	8	0	6	5	7	2	0	2	7	5	6	1	8	9	3	1	1	5	2	42
540	.00	.01	.02	.03	.05	.07	.09	.12	.15	.18	.22	.26	.30	.35	.40	.45	.51	.57	.63	.70	.77	.84	.92	.99	1.0
560	4	0	0	4	0	0	4	0	0	4	0	0	3	0	0	3	0	0	3	0	0	3	0	9	83
580	.00	.01	.02	.03	.05	.07	.09	.12	.15	.19	.22	.27	.31	.36	.41	.47	.52	.59	.65	.72	.79	.87	.95	1.0	1.1
	4	1	1	5	2	3	7	5	6	0	9	0	5	3	5	0	9	1	7	6	9	5	4	37	24
	.00	.01	.02	.03	.05	.07	.10	.12	.16	.19	.23	.28	.32	.37	.43	.48	.54	.61	.61	.75	.82	.90	.98	1.0	1.1
	4	1	2	6	4	6	1	9	2	7	7	0	6	6	0	8	8	3	8	3	8	7	9	75	64
	.00	.01	.02	.03	.05	.07	.10	.13	.16	.20	.24	.29	.33	.39	.44	.50	.56	.63	.70	.77	.85	.93	1.0	1.1	1.2
	4	2	3	8	6	8	4	4	7	4	5	0	8	0	5	5	8	4	5	9	7	8	24	13	05
600	.00	.01	.02	.03	.05	.08	.10	.13	.17	.21	.25	.29	.34	.40	.46	.52	.58	.65	.72	.80	.88	.97	1.0	1.1	1.2
620	4	2	3	9	8	1	8	8	3	1	3	9	9	3	0	2	7	6	9	5	6	0	58	50	08
640	.00	.01	.02	.04	.06	.08	.11	.14	.17	.21	.26	.30	.36	.41	.47	.53	.60	.67	.75	.83	1.9	1.0	1.0	1.1	1.2
660	4	2	4	0	0	4	1	3	9	8	2	9	1	6	6	9	6	7	3	2	15	02	93	88	87
680	.00	.01	.02	.04	.06	.08	.11	.14	.18	.22	.27	.31	.37	.42	.49	.55	.62	.69	.77	.85	.94	1.0	1.1	1.2	1.3
	5	3	5	1	2	6	5	8	4	5	0	9	2	9	1	6	5	9	6	8	4	34	28	26	28
	.00	.01	.02	.04	.06	.08	.11	.15	.19	.23	.27	.32	.38	.44	.50	.57	.64	.72	.80	.88	.97	1.0	1.1	1.2	1.3
	5	3	6	3	4	9	8	2	0	2	8	9	4	3	6	3	5	0	0	5	3	66	62	63	69
	.00	.01	.02	.04	.06	.09	.12	.15	.19	.23	.28	.33	.39	.45	.52	.59	.66	.74	.82	.91	1.0	1.0	1.1	1.3	1.4
	5	4	7	4	6	2	2	7	6	9	7	9	5	6	1	0	4	2	4	1	02	97	97	01	10
700	.00	.01	.02	.04	.06	.09	.12	.16	.20	.24	.29	.34	.40	.46	.53	.60	.68	.76	.84	.93	1.0	1.1	1.2	1.3	1.4
720	5	4	7	5	7	4	5	1	1	6	5	9	7	9	6	7	3	3	8	7	31	29	32	39	50
	.00	.01	.02	.04	.06	.09	.12	.16	.20	.25	.30	.35	.41	.46	.55	.62	.70	.78	.87	.96	1.0	1.1	1.2	1.3	1.4
	5	4	8	6	9	7	9	6	7	3	3	8	8	2	1	4	2	5	2	4	60	61	67	77	91

Departmental Standing Orders

Appendix V.19A
DSO 5.40-62

NHF DIAGNOSTIC SAMPLING

MPA/Forest
 Cpt..... Coupe Line

Observer				Date			Instructions									
P L O T	1st LHTVT			C R O W N	Impeders			2nd LHTVT		Basal Area					Notes and Assess- ment	
	Specie s	Size class			C	U	Speci es	Specie s	S	Size class						
			10 to 30						I Z E	10 to 20	20 to 30	30 to 40	40 to 50	50 +		
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
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48																
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Note: HTVT = High Timber Value Trees.

Departmental Standing Orders

Appendix V.19C
DSO 5.7.56

NHF DIAGNOSTIC SAMPLING SUMMARY

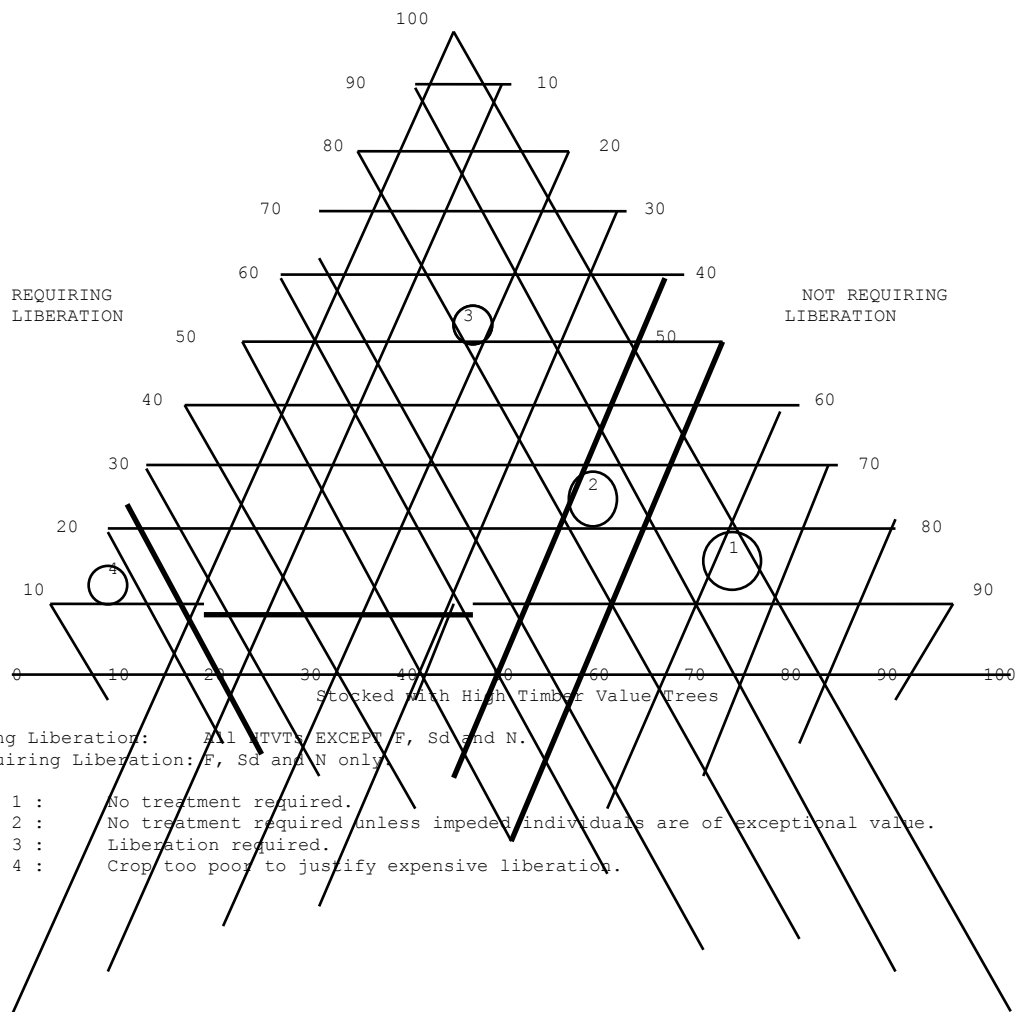
INTERPRETATION DIAGRAM

MPA/Forest

Cpt/Coupe

D.S. Date

Interpreted by



Departmental Standing Orders

Appendix V.19D
DSO 5.7.56

DIAGNOSTIC SAMPLING SUMMARY

MPA/Forest

Cpt/Coupe

Date

Budongo Cpt. 38

LINE	PLOTS	Condition of HTVT					HTVT No.	Size of HTVT					2nd HTVT	B.A. Summary						Principal Impeders, Comments	
		N	F	TT	T	T		S/Sap	P	10 to 29	30 to 50	50+		10	20	30	40	50+	Total		
1	1-100	20	10	18	24	28	96	30	14	16	18	10	90	1.48	1.32	1.21	1.50	6.51	12.02	Cel.bro.Cyn. (D)	
	101-200	30	4	6	18	42	100	50	22	18	6	4	96	1.71	1.03	1.30	1.42	3.73	9.119	Cyn.Cel.pro.D (D)	
	201-300	16	10	12	12	50	96	42	20	12	12	10	74	1.52	1.27	1.22	1.08	7.00	12.09	" " "	
												4									
1	151-62																				
2	101-26	28	6	4	20	42	100	48	24	16	8	4	92	1.43	1.12	1.36	1.07	4.50	9.48	38 plots converted to h. figures	
Total																					
No./ha.																					
%																					

HTVT = High Timber Value Trees

Departmental Standing Orders

Appendix V.19E
DSO 5.7.56

NHF D.S. SUMMARY - BASAL AREA (m²)
(10cm Diameter Classes)

MPA/Forest

Cpt/Coupe

Date

Dia. Class cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	30	40	50	60	70	80	90	100
10																												
20																												
30																												
40																												
50																												
60																												
70																												
80																												
90																												
100																												
110																												
120																												
130																												
140																												
150																												
160																												
170																												
180																												
190																												
200																												
210																												
220																												
230																												
240																												
250																												
260																												
270																												
280																												

STOCKING AT VARIOUS SPACINGS

Formula:
$$N = \frac{10,000}{a \times b}$$

where N = stocking in stems/ha.

a and b = spacing in metres.

Spacing in metres	Stocking in stems/ha.
1.5 x 1.5	4444
2.0 x 2.0	2500
2.5 x 2.5	1600
2.7 x 2.7	1372
3.0 x 3.0	1111
3.5 x 3.5	816
4 x 4	625
5 x 5	400
6 x 6	278
7 x 7	204
8 x 8	156
9 x 9	123
10 x 10	100
10 x 3	333

BEATING UP IN PLANTATIONS

(a) Beating up in Softwood Plantations and Seedling Crops of Pole and Fuel Plantations

Assessment of Survival

A 10% assessment of survival will be done two months before any beating up is carried out. This will be done by following method.

- (i) The planted area will be divided into convenient blocks of not more than 30 ha using either natural features such as roads etc., or artificial boundaries. Where the boundaries are irregular, a baseline must be set out, which can be a single row of trees.
- (ii) From the base line or convenient straight edge, a series of 9 spot plots will be assessed along every 9th row. The centre positions of each plot will be situated at every 10th planting spot along each sample row. Should the position lie alongside an unplanted ant hill or rock, etc., then it will be moved back until 9 planting spots can be obtained in a 3 spot x 3 spot plot, see diagram p.2.
- (iii) Condition of each tree in a plot will be drawn on graph paper with a "spot" for a living tree and a "X" for a dead or missing tree.
- (iv) Assessment of the survival of trees in each block will be calculated as follows:-

$$\% \frac{\text{Total number of live trees in all plots}}{\text{Total number of planting spots (live plus dead or missing trees in all spots)}} \times 100 \text{ survival}$$

- (v) The areas of less than 75% survival will be visited by the Forester or Forest Ranger and comments made on the cause of deaths which may be from:-
 - (a) Shallow soils
 - (b) Rats
 - (c) Other agencies.

Decision made on the chances of survival of further areas.

- (vi) Any other area which it is decided will be beat up will be done as follows:-

One or a pair of workers will walk along the central row of three rows. Then a blank is reached along this row the planting spot to right and left will be investigated. Should either or both of these be blank then the blank in the central row will be planted. Continue this process until the whole block is covered.

(b) **Beating up on coppice crops**

- (i) Within two months from the date of felling each half hectare of a coupe, the Ranger will assess stocking of live stools using the method described above. Each half hectare will form assessment block.
- (ii) Where the stocking of live stools is less than 50%, the area will be left untended until preparation for beating up or complete replanting is due. All coppice and woody growth will be cut back in the middle of the dry season. The area will be fired for a clean burn at noon on a dry day towards the end of the dry season. The Ranger will take care to avoid the spread of fire by firing from all round the beat up area, starting on those sides where the risk of fire spreading is greatest, and using his full labour force to control the fire at the edges. Spots for planting will be dug as soon as the early rains allow each working of the soil.
- (iii) Following planting clean hoeings in dry areas and slashing in other areas will be done at approximately monthly intervals. The area beneath the canopy of plant must not be hoed and any large weeds in this area will be hand pulled. Soil will be hoed towards the rows of plants and not away from them. Coppice will be cut right back when the beat up plants have started active growth. This will normally occur about two months after planting.
- (iv) These establishment operations will cease within 12 months from the date of planting. On good sites, they may be completed and canopy formed within 6-9 months.

Appendix V.22

FD.51

DSO 5.7.18

FOREST DEPARTMENT

TIMBER HARVESTING VOLUME MEASUREMENT

Reserve/County Cpt. # Coup # Date Officer's Name Serial #
 Date

.....

Licensee Name
 Permit # Expires

Tree	Species	Defect Allowance	Log #	Log Mid-Dia (cm)	Length (m)	Volume (m ³)	Value in Ug.Shs.
Total on this page							

Original : to Customer
Duplicate : to FD/HQ - Utilisation
Triplicate : to Charge Officer
Quadruplicate : to remain in book with the Ranger

GOVERNMENT OF UGANDA
FOREST DEPARTMENT

FOREST PRODUCE DECLARATION FORM

(CAP. 246)

Date:

TO THE DISTRICT FOREST OFFICER

P.O. BOX

1. M/s
.....
.....
.....

of
.....
..... with permit/trading licence #
.....

has legally acquired the following forest products:

(i) Timber
Size Species # of pices

.....
.....
.....

.....
.....
.....

.....
.....
.....

.....
.....
.....

.....
.....
.....

.....
.....
.....

Departmental Standing Orders

- (ii) Charcoal
.....
..... bags (#)
- (iii) Firewood
.....
..... pieces/bundles (#)
- (iv) Billets
.....
..... pieces (#)
- 2. Royalty Value
.....
.....
.
- 3. Forest Reserve/County
.....
.....
- 4. Name of Officer i/c
.....
..... Designation
- 5. Signature
.....
.....
.....

Declaration: I hereby declare that the above information is TRUE to the best of my knowledge.

Original to DFO
Duplicate to CAO/District
Triplicate to remain in Book

Appendix V.24

FD 81

DSO 5.7.26

GOVERNMENT OF UGANDA
FOREST DEPARTMENT

FOREST PRODUCE MOVEMENT PERMIT (CAP.246, 12111)

(PERMIT VALID FOR ONE TRIP ONLY WITHIN FIVE DAYS OF DATE OF ISSUE)

Important: Transport, storage and dealing in timber that is not appropriately coded by official hammer and accompanied by this form make the timber liable for confiscation with possible prosecution.

Date:
District of Origin Code #
FR Serial Code #

M/s/Dr: (Vehicle Owner/Driver) ID
Card No:

Vehicle Reg. # Make
Capacity

Is hereby authorised to move the following forest produce

From:
..... To:
.....
.....

<u>Type of Produce</u>	<u>Size</u>	<u>Species</u>
.....
.....
.....
.....
.....

Estimated value of produce in Ushs.
.....

The said produce having been legally obtained from
.....
.. (Forest Station)

Departmental Standing Orders

NAME: (Licence)
.....
..... and paid all fees due

(If licenced pitsawyer give Registration No:
.....
.....)

This permit expires on
.....
.....)

Name of Issuing Officer
.....
.....)

Signature of Issuing Officer
.....
.....)

Designation
.....
.....)

DISTRIBUTION: Original to Customer at destination
Duplicate to Transporter
Triplicate to Forest Dept. HQ - Kampala
Quadruplicate to Uganda Revenue Authority
Quintuplicate to Remain in Book with Issuing Officer

THE FIRE PLAN

1. The following notes are produced to facilitate the writing of Fire Plans at the local levels of District and Plantation. It is not foreseen at this stage that a national fire plan will be required during the next decade however local fire plans must be written for all softwood plantations and for some of the larger fuel and pole plantations.

2. For further clarification of the points raised, reference must be made to:-

“Elements of Forest Fire Control” - FAO 1953. A copy of this publication is held in most district libraries.

3. A Fire Plan must be written in 3 parts:-

- I. Prevention plan;
- II. Pre-suppression plan;
- III. Suppression plan.

4. The details are contained in the following notes and set out in diagrammatic form in fig. 1.

I. THE PREVENTION PLAN

(a) Education

(i) **Public education programmes:** This can be attained through press and radio, posters, signs and gadgets, films and lectures, demonstrations, personal contacts and competitions.

(ii) **School education programmes:** Inclusion of fire prevention lessons in school curricula particularly those close to the protection area. School forest plots to create a personal interest and to teach the value of forests. Arbor day activities, competition in essay writing and poster design.

(iii) **Adult education programmes:** An adult education programme should stress the value of forests and particularly the loss which an individual may suffer through the burning of the forest. Press, radio, posters, signs and gadgets such as ashtrays, post office stamp cancellation die slogans. Demonstrations and personal contacts and organisation of local groups.

(b) Publicity

This section is more of an extension of the education programme but should be used more as a directive than a guide to local organisations.

(c) **Legislation**

This is generally covered in the Forests Act but the relevant sections should be quoted and if necessary elaborated as a series of instructions covering:-

- (i) Acts which are forbidden;
- (ii) Special precautionary measures;
- (iii) Legal duties of citizens;
- (iv) Authority of Forest Officers;
- (v) Protection of Officers;
- (vi) Law enforcement;
- (vii) Regulations.

(d) **Forest Management**

- (i) Method of cutting;
- (ii) Development of roads;
- (iii) Pure stands;
- (iv) Sub-division of the forest by cultivated or grazed areas;
- (v) Planned grazing of the forest.

These are generally included as prescriptions in the Management Plan but must be referred to and emphasized in a detailed Fire Plan.

(e) **Reduction of the Hazard**

- (i) Standing dead trees;
- (ii) Other fuels;
- (iii) Controlled burning;
- (iv) Destruction of wild bee hives or cultivation and management of an organised bee keeping industry.

These notes must give clear and precise instructions for the removal or reduction of the fire hazard, particularly controlled burning. In the latter instance, cross reference should be made, where appropriate, to the section on operations to be carried out alongside public highways or rights of way are of particular importance.

II. **THE PRE-SUPPRESSION PLAN**

(a) **Personnel**

(i) **Training of executive levels:** The executive levels should include all staff from the District Forest Officer down to the Forest Ranger. Normally, this will be attained through reports and publications but should also include specific training schemes, or discussions organised through the Forest Department HQ.

(ii) **Training of the labour force:** Instructions on the use of tools and equipment required for a pre-suppression programme which should cover both the use and maintenance aspects.

Appendix V.25
Page 3 of 5

(b) **Co-operation**

Notes on who and how to contact the various local landowners, officials, Fire Brigade and Police. Arrangements should be made to have a list of names, addresses and telephone numbers prominently displayed. Personal contacts is most important and friendly relations with the local population vital.

(c) **Provision and the Maintenance of Equipment**

Some of the tools or equipment used in the pre-suppression activities will also be used in suppression activities and probably other aspects of the forest programme. However, it is important to set down instructions clearly on the provision and maintenance of this equipment which should cover:

- (i) Fire danger forecasting equipment;
- (ii) Detection equipment;
- (iii) Communications equipment;
- (iv) Transportation equipment;
- (v) Equipment for the construction and maintenance of firebreaks, etc.
- (vi) Suppression equipment.

(d) **Detection**

- (i) Ground patrols;
- (ii) Lookout systems.

(e) **Communications**

- (i) Telephones;
- (ii) Radio;
- (iii) Other (runners, drums, horns, etc)

(f) **Transportation**

In order to increase the speed of transportation of men and equipment, good dry weather roads are necessary. Organised routes for both man and equipment to predetermined and identified "rendez-vous points" are vital and should be shown clearly on the fire plan maps. Notes and instructions on the following where appropriate are important.

- (i) On foot by men or animals;
- (ii) By watercraft;
- (iii) By motorised equipment;
- (iv) By air.

(g) **Water Supplies**

The distribution, quantity, capacity and provision of water supplies is normally included briefly in the Management Plan and must be elaborated here with the details also shown on fire plan maps.

- (i) For static water supplies;
- (ii) For fire fighting;
- (iii) For drinking and, if necessary, cooking.

(h) **Firebreaks and Firelines**

These are prescribed in the Management Plan but must be set out in detail in this section of the Pre-suppression plan. Forward planning where planting programmes are in operation is vital.

- (i) Natural fire breaks;
- (ii) Existing roads, trails and tracks;
- (iii) Cleared firebreaks;
- (iv) Tree covered breaks;
- (v) Firelines.

III. **THE SUPPRESSION PLAN**

(a) **Methods to be used:**

The actual methods of extinguishing a fire must be prescribed in detail covering the following:-

- (i) Water, sand or light soil;
- (ii) Fire beaters - manufactured or branches of trees;
- (iii) Clean firelines;
- (iv) Backfiring or counter firing.

(b) **Training**

Training programmes can be organised with that prescribed in the pre-suppression plan and should be broken down into the following categories:

- (i) Executives;
- (ii) Fire Officers and foremen;
- (iii) Special equipment operators;
- (iv) Labour.

(c) **Correct Practices**

Under this section, the correct procedure or practice to be followed on the outbreak of a fire until the fire has been extinguished and the site abandoned. This is divided into three groups:-

(i) **Initial action:** The person discovering the fire should report or advise the duty office or dispatcher of the exact location of the fire, its size, and any other relevant information.

(ii) **The dispatcher's duties:** He receives, records and checks the location of reported fires. He decides on what action to take and

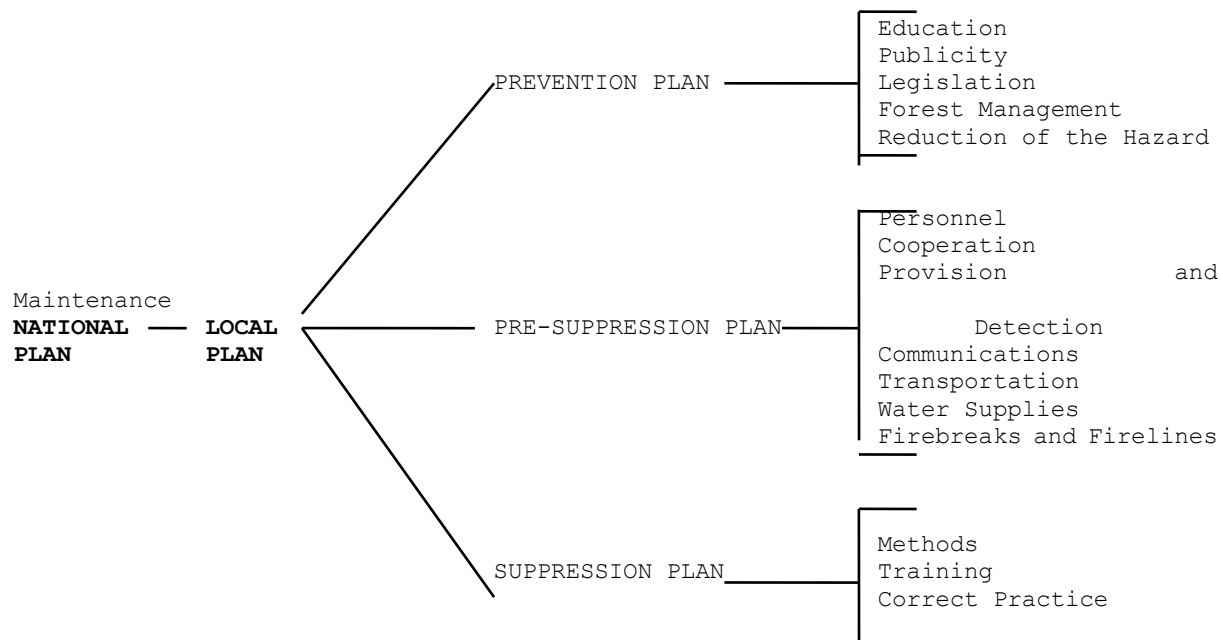
sends a fire fighting crew to the fire. He remains in contact with the officer-in-charge at the fire, if possible, and sends support personnel and equipment, if necessary, etc.

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Page 5 of 5

(iii) **At the fire:** The officer in-charge at the fire must keep the dispatcher informed of all conditions and progress. He must:-

1. Make a rapid estimation of the fire;
2. Select the point of attack;
3. Locate control lines;
4. Organise the construction of firelines;
5. Organise back-firing when necessary;
6. Arrange mopping up;
7. Install patrols after the fire;
8. Decide when to abandon the site of the fire;
9. Complete a fire report.

FIRE PROTECTION PLAN



PLOT INFORMATION

By column, the information to be filled in is:

<u>Column</u>	<u>Information</u>
1-2	District Code Each district has a code number assigned to it These are presented separately
3-4 are listed in High Forests.	A code has been given to every Forest Reserve. These the Forest Department File 4/13 - List of Tropical
5 for example:	The MPA or forest reserve may be divided into blocks, Budongo.

<u>Block</u>	<u>Code</u>
Biiso	1
Busaju	2
Siba	3
Kitogo	4
Nyakafunjo	5
West Waibira	6
East Waibira	7
Kaniyo-Pabidi	8

6-7
Compartment number
It is taken from the map-codes: 01, 02 ...etc.

8-9
Forest type - for example Budongo
The forest is classified into various forest types.
The following codes apply in case of Budongo:

<u>Forest Type</u>	<u>Code</u>
C - Cynometra climax forest	01
Cy - Cynometra young forest	02
CE - Cynometra exploited forest	03
CK - Cynometra-Mixed forest	04
CKy - Cynometra-Mixed young forest	05
CKE - Cynometra-Mixed exploited forest	06
K - Mixed forest	07
Ky - Mixed forest-young	08
KE - Mixed forest exploited	09
WK - Woodland-mixed forest	10
W - Woodland forest	11
S - Swamp forest	12
R - Riverine forest	13

- 12-13 Each line of the sampling system is numbered. The line number is filled in here.
Codes: 1-99
Enter: 01, 02, etc.
- 14-15 Plot Number - on each line plots are numbered starting with 1.
Code: 1-99
Enter: 01, 02, etc.
- 16 Subplot number - The inventory plots are subdivided into 5 subplots as indicated in the diagram in section 6.1.
Codes: 1-5
Enter: 1, 2, etc.
- 17 Slope
Slopes are classified into the following classes:
Slope: Code:
Flat to rolling 1
rolling to steep slope 2
very steep slope 3
- 18 Drainage
The following classification will apply
Drainage Code
well drained 1
moderate to imperfectly drained 2
poor to very poorly drained 3
- 19-20 Year harvested
Year last harvested is entered here.
This information is taken from the maps or from the WP Records.
Code
Unharvested forest 00
1964 enter 64
1973 enter 73
- 21-22 Year of treatment
In case the forest was treated by using arboricides, the year of last treatment is entered here. Untreated forest 00
1964 enter 64
etc.
- 23 Regeneration Code
Slight 1
Medium 2
Heavy 3

Departmental Standing Orders

- 24 Pitsawing - signs of pitsawing activity will be recorded here.
- | | | |
|---------------|------|---|
| | Code | |
| no indication | | 0 |
| slight | | 1 |
| medium | 2 | |
| heavy | 3 | |
-
- 25 Climber tangle
- In order to evaluate the conditions and competition under which the regeneration is developing a climber tangle will be coded as follows:
- | | | |
|--------|------|---|
| | Code | |
| none | | 0 |
| slight | | 1 |
| medium | 2 | |
| heavy | 3 | |

Individual Tree Information

- 26-27 Tree number - Trees are numbered consecutively on each plot or subplot. If more than 25 trees are found on a subplot, use a new tally sheet and start numbering with tree number 26, 27, etc.
-
- 28, 29, 30 Species Code - For the purpose of the field work, the species code will have three digits. These digits are only first three figures of the larger species code that will be used during the computer compilation of data. The list of the codes and species is given in Appendix 26A. Species that are not identified (unknown species) will be coded 400.
-
- 31-33 Height of Buttress - from the ground to the top of the buttress - measured to the nearest half a metre
e.g. 2.5m enter 025
11.0m enter 110
-
- 34-39 Relascope readings for the height of the buttress will be recorded here - column 34-36 top reading (usually +); column 37-39 - bottom reading (+)
-
- 40-48 Height from the ground to the crown point (cp) measured to the nearest half a metre. Same principles as for the buttress height measurements apply.
-
- 49-51 DBH or diameter just above buttress. Diameter measured to the nearest cm.
- | | | |
|----------|-------|-----|
| e.g. 36m | enter | 036 |
| 115m | enter | 115 |

52-55 Where diameter cannot be measured directly using a diameter tape, a wide scale relascope will be used. A distance from the tree (in m) will be recorded in column 52-53 and a number of relascope units (RU) - or bands will be recorded in decimals in columns 54-55.

Appendix 26B
Page 4 of 5

56-65 Diameter at approximately mid point between the ground (or in case of buttressed tree the top of the buttress) and the crown point. Measured to the nearest cm. The height from the ground at which the mid point diameter is taken will be recorded in columns 59-61. When using the relascope, same principles apply as in the measurement of dbh.

66-69 Top diameter measured by the relascope to the nearest cm at the crown point. Distance from the tree is recorded in columns 66-67 and the number of Relascope Unit (RU) or bands in decimals is recorded in columns 68-69.

Quality Defect Assessment
Columns 70 and 71 will contain information on form defect and columns 72-74 describe visible rot in tree.

70	Form defect - degree:	Code
	No defect	0
	Partial or minor	1
	Poor form	2
	Cull - (not merchantable)	3

71	Form defect - type (applies for code 1, 2 and 3 of degree)	
	Curve, twist, broken top	1
	Bulges	2
	Buttress to X metres	3
	Buttress to CP	4
	Other form defect	5
	Rot-heart or butt rot	

72	Degree	
	None	0
	Some	1
	Extensive	2

73-74	Height of rot (for codes 1 and 2 above only)	
	Rot present but height up	
	Step not apparent	00
	Heart rot to CP	99
	Heart rot for X metres	-

indicate height of rot up
stems e.g. 16

75	Elephant Bark Damage		
	None	0	
	Partial damage		1
	Completely ringed		2

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Page 5 of 5

Note: Partial damage (code 1) is usually associated with heart or butt rot and assessed as such. Completely ringed trees (codes 2) are considered as 100% cull.

76	Felling Damage		
	None	0	
	Slight		1
	Heavy	2	

7.2 Regeneration Survey sample plot form
The regeneration survey sample plot form is basically self explanatory and easy to follow.
Column Information
1, 2 Same line number as for inventory sample plot form
3,2 Regeneration plots are numbered consecutively
codes 1-99 enter 01, 02, etc.
5.6 The regeneration sample plots are located opposite the inventory sample plots. Enter the
inventory plot number.

7-12 Same as in inventory sample plot form-forest type and year taken from the map on from the FD records.

Species Count The names and codes of the more common species expected to be found on the regeneration plots as already filled in. The count or the number of seedlings or saplings found within the plot is entered beside the code number of the particular species.

In case a less common species is identified on the plot, the scientific or vernacular name will be entered in the field together with the number of stems counted. The species codes will be added later.

Departmental Standing Orders

Appendix V.26A
FD53
DSO 5.8.20

NATURAL FOREST INVENTORY SAMPLE PLOT FORM

MPA/Forest Team Leader Checked by:
..... Date:

District	Forest	Block	Comp	Forest Type	Sampling Block	Line No.	Plot No.	Subplot	Slope	Drainage	Year exploit.	Year Treat	Rege n.	Pit-sawing	Climber tangle
1 2	3 4	5	6 7	8 9	10 11	12 13	14 15	16	17	18	19 20	21 22	23	24	25

MPA/Forest: _____

Team _____ Leader _____

Date: _____

Checked _____ by _____

No.	Species Name vernacular or scientific	CODE	HEIGHT										DIAMETER						QUALITY				DAMAGE	
			BUTTRESS		GROUND TO CP				DBH				MID		TOP		FORM	RCT	Elephant	Felling				
			M	RELASCOPE	M	RELASCOPE	CM	Dist a-nce	RU	CM	Height from ground	Dist a-nce	RU	Dist a-nce	RU	D	T	D	Height					
			Top	Bottom	Top	Bottom	(m)	(m)	(m)	(m)	(m)	(m)												
26 27		28 29	34 35	37 38	40 41	43 44	46 47	49 50	52 53	54 55	56 57	59 60	62 63	64 65	66 67	68 69	70 71	7 2	73 74	75	76			
0 1		30	36	39	42	45	48	51	53	55	58	61	63	65	67	69								
0 2																								
0 3																								
0 4																								
0 5																								
0 6																								
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1 5																								
1 6																								
1 7																								
1 8																								
1 9																								
2 0																								
2 1																								
2 2																								
2 3																								
2 4																								

APPENDICES

PLANTATION INVENTORY FORM

PLANTATION:

SPECIES:

YEAR OF PLANTING:

TEAM LEADER:

DATE:

District	Forest	Comp.	Subcomp.	Stratum	Year of Planting	Planted species	Line No.	Point No.	Elevation	Slope	Drainage	Treatment	Disturb	Ground cover	Soil	Crown closure	B . A . F .			
1	3	5	7	8	9	10	12	14	16	18	20	21	22	23	24	25	26	27	28	29
2	4	6			11	13	15	17	19											

TREE NO.	SPECIES CODE	DBH (cm)	HEIGHT (m)	D E F E C T																	REMARKS:								
				1ST log TO 4.5M							REST OF THE TREE																		
				F	W	R	A/M	S	FIR	Q	Fx	F	IN	R	A/M	S	FIR	BT											
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	
0	1																												
0	2																												
0	3																												
0	4																												
0	5																												
0	6																												
0	7																												
0	8																												
0	9																												
1	0																												
1	1																												
1	2																												
1	3																												
1	4																												
1	5																												

CHECKED BY:

DATE:

NATURAL FOREST INVENTORY - REGENERATION SURVEY FORM

MPA/Forest: _____
by: _____

Team Leader: _____

Date: _____

Checked

1	2	3	4	5	6	7
DISTRICT		FOREST		BLOCK	COMP.	

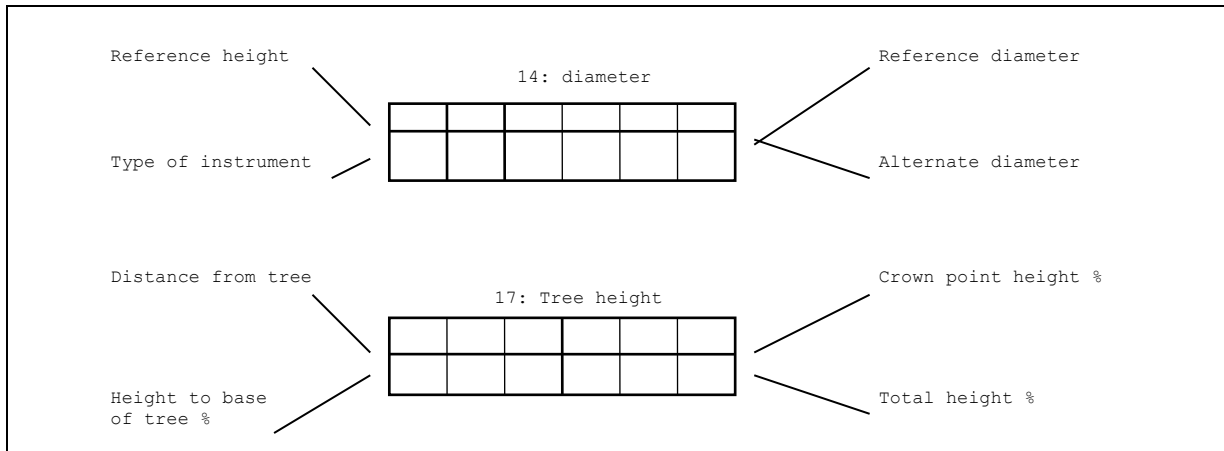
8	9	10	11	12	13	14	15	16	17	18	19	SPECIES					
LINE NO.	PLOT NO.	INVENTORY PLOT NO.	FOREST TYPE	YEAR EXPLOITED	YEAR TREATED	ALBIZIA	ALSTONIA	ANINGIRIA	ANTIARIS	CELTIS	COLA	CYNOMET	CHLOROPH.				
						201	228	230	231	240	442	249	102				
CHRYSOPH	CORDIA	ENTAND.	ERYTHROP.	FAGARA	FAGAROPS	GUAREA	HOLOPTEL	KHAYA	LOVOA	MAESOPSIS	MORUS	MILDBRA	NEWTONIA				
243	207	103	261	108	208	117	119	110	113	211	272	270	216				
OLEA	PIPTADEN	PRUNUS	RICINOD	SHREBERA	TRICHILIA	RINOREA	FUNTUMIA									UNKNOWN	
115	219	220	519	285	222	520	264						400				

8	9	10	11	12	13	14	15	16	17	18	19	SPECIES					
LINE NO.	PLOT NO.	INVENTORY PLOT NO.	FOREST TYPE	YEAR EXPLOITED	YEAR TREATED	ALBIZIA	ALSTONIA	ANINGIRIA	ANTIARIS	CELTIS	COLA	CYNOMET	CHLOROPH.				
						201	228	230	231	240	442	249	102				
CHRYSOPH	CORDIA	ENTAND.	ERYTHROP.	FAGARA	FAGAROPS	GUAREA	HOLOPTEL	KHAYA	LOVOA	MAESOPSIS	MORUS	MILDBRA	NEWTONIA				
243	207	103	261	108	208	117	119	110	113	211	272	270	216				
OLEA	PIPTADEN	PRUNUS	RICINOD	SHREBERA	TRICHILIA	RINOREA	FUNTUMIA									UNKNOWN	
115	219	220	519	285	222	520	264						400				

8	9	10	11	12	13	14	15	16	17	18	19	SPECIES					
LINE NO.	PLOT NO.	INVENTORY PLOT NO.	FOREST TYPE	YEAR EXPLOITED	YEAR TREATED	ALBIZIA	ALSTONIA	ANINGIRIA	ANTIARIS	CELTIS	COLA	CYNOMET	CHLOROPH.				
						201	228	230	231	240	442	249	102				
CHRYSOPH	CORDIA	ENTAND.	ERYTHROP.	FAGARA	FAGAROPS	GUAREA	HOLOPTEL	KHAYA	LOVOA	MAESOPSIS	MORUS	MILDBRA	NEWTONIA				
243	207	103	261	108	208	117	119	110	113	211	272	270	216				
OLEA	PIPTADEN	PRUNUS	RICINOD	SHREBERA	TRICHILIA	RINOREA	FUNTUMIA									UNKNOWN	
115	219	220	519	285	222	520	264						400				

Description of the Quadrat Record of PSP Form (App. V.27A & B)

Field No.	Field Name	Description
1	PSP number	Unique number for the PSP
2	Quadrat	Quadrat number
3	Trees	The number of trees entered on the form. This should not include any trees entered on Form 2 (trees below 20 cm)
4	Quadrat & site notes	This allows for up to 6 coded notes of 2 letters each, as discussed in section 8.2
5	Measurement date	This can be entered according to local convention as day/month/year or month/day/year. The form allows 4 digits for the year, to avoid confusion with the change of century (1900s to 2000s)
6	OIC measurement party	The name of the person responsible for filling the form is entered here, to allow later queries to be referred back if required. This entry is not stored in the computer.
11	Tree no.	Tree number, which should be unique for the plot.
12	Species name	The common name of the species is written in the upper box in the field. The species code is looked up and entered in the lower box later on, in the camp or on completion of the quadrat.
13	Loc.	The tree location coordinates. The upper box contains the X (east) coordinate and the lower box the Y (north) coordinate, both in <i>decimeters</i> .
14	Diameter	The diameter box comprises 4 fields, as shown in box 14 of the figure shown below. The normal reference diameter is entered in <i>millimetres</i> . If measured other than at 1.3 m, the height of the point of measurement (POM) is interested in <i>decimetres</i> as shown. If a second, alternate diameter is required because of buttress development (see section ...), then this is entered below the established reference diameter measurement. If the measurement is made other than with standard diameter tape, then the type of instrument is coded with a letter in the box (R for Relascope, C for Calipers).
15	Crown class	The Dawkins crown position is entered in the upper box (1-5), and the crown form in the lower box (0-5). See App. V.27D.
16	Crown radius	Four crown radii should be measured mutually at right angles, in <i>decimetres</i> , and entered in the 4 boxes provided in any order.
17	Tree height	The tree height measurements are entered directly as instrument readings to avoid field calculation. Box 17 in the figure shown below shows how the boxes are organised. The top left height field is the distance from the tree in <i>diameters</i> . % readings when clinometer is used. Below this is entered the height to the base of the tree (usually with a preceding minus sign) in %. The upper right box is the crown point height, and the lower right box is the total height. Both are recorded as % readings.
18	Coded notes	Up to 6 coded notes, of 2 letters each, can be entered in the boxes provided, e.g. ED for elephant damage.
19	Checksum	This figure is completed at the base camp or in the office.



CROWN DIAMETER, POSITION AND FORM

Crowns are classified on the following scale

- 5 **Emergent:** Crown plan fully exposed vertically and free from lateral competition at least within the 90° inverted cone subtended by the crown base.
- 4 **Full overhead light:** Crown plan fully exposed vertically but adjacent to other crowns of equal or greater height within the 90° cone.
- 3 **Some overhead light:** Crown plan partly exposed vertically but partly vertically shaded by other crowns.
- 1 **No direct light:** Crown plan entirely shaded vertically and laterally.

The following crown form scores are defined.

- 5 **Perfect:** The best size and development generally seen, wide, circular in plan, symmetrical.
- 4 **Good:** Very nearly ideal, silviculturally satisfactory, but with some slight defect of symmetry or some dead branch tips.
- 3 **Tolerable:** Just silviculturally satisfactory, distinctly asymmetrical or thin, but apparently capable of improvement if given more room.
- 2 **Poor:** Distinctly unsatisfactory, with extensive dieback, strong asymmetry and few branches, but probably capable of surviving.
- 1 **Very poor:** Definitely degenerating or suppressed, or badly damaged, and probably incapable of increasing its growth rate or responding to liberation.

A List of Tree Condition Codes

BS	Broken stump: Only a broken stump has been found at the tree's coordinates.
BT	Broken top: The crown has completely broken off.
CD	Crown damage: Major branches have been broken in the crown.
CI	Climber infestation: The crown of the tree has been invaded by climbers, which are seriously competing with the tree's own foliage. This code should not be applied if the climber foliage is generally below the main tree crown, and therefore not offering serious competition.
DB	Dead bark: Bark has been lost over part of the stem, exposing wood underneath.
DC	Diameter change: The reference diameter is now part of the buttress and can no longer be measured. The alternate diameter is adopted instead (see Section 6.1.3).
DF	Defoliation: The tree has lost all or some of its foliage, leaving apparently dead branches. This should not be confused with foliage loss associated with broken branches (CD), but may arise from insect attack, bats, foliage eating mammals, drought, after fire, etc.
DT	Dead tree: The tree is apparently dead, but remains standing.
DU	Diameter unreliable: The diameter measurement is unreliable because of large climbers, splits, damage or wounds at the point of measurement.
EX	Excrescences: Lumps of callus or wood bulge from the stem, sometimes bearing epicormic branches. Commonly caused by insect or fungal attack.
FB	Fluted bole: The bole has substantial concave sections up its length and cannot be properly measured.
FD	Fire damage: The tree shows evidence of charring of the bark or wood.
FU	Fungi: Fruiting bodies of fungi are growing from the stem or surface roots.
FW	Flowering: This is noted if the tree is in flower, or has recently flowered and is bearing or dropping fruit.
IN	Ingrowth: This code is used only at remeasurement (not initial demarcation). The tree has appeared above the measurement limit and is being marked and measured for the first time.
LD	Logging damage: The tree has suffered damage obviously attributable to logging.
LS	Logged stump: A sawn stump, indicating logging, is found at the tree's coordinates.
LT	Leaning tree: The tree has been pushed or has fallen from its normal position and is some degrees from the vertical.
NT	No tree: The tree is missing. There are no indications of the tree at the required coordinate.
OD	Optical diameter measurement: Used when the tree's diameter has been measured by relascope or dendrometer, rather than by tape.
RB	Rotten buttress: The butt or buttress is rotten and partially hollowed.
RT	Rotten timber: Evidence of rot entering the tree from visible rotten pockets left by broken branches.
ST	Strangled tree: The tree has been invaded and its crown dominated by stranglers. Normal diameter measurement will be impossible if this code is present.
TF	Tree fallen: The tree has completely fallen.
US	Unknown or uncertain species identification: The species code entered (if any) is provisional or approximate.

**PUBLICATIONS DEALING WITH POLICY, THEORY,
PRACTICAL INSTRUCTIONS AND SUCCESS OF NHF MANAGEMENT
TECHNIQUES IN UGANDA**

1. Alder, D. and Synnott, T.J. 1992. PSP Techniques for Mixed Tropical Forest (OFI).
2. Dawkins, H.C. 1958. The Management of NHF with Special Reference to Uganda, OFI, Paper No. 34.
3. Earl, D.E. 1968. Latest Techniques in the Treatment of NHF in South Mengo District. Paper to the 9th Commonwealth Forestry Conference.
4. F.D. 1961. The Forests and the Forest Administration of Uganda.
5. F.D. Annual Reports up to 1973/74.
6. F.D. Forest Manual.
7. F.D. Working Plans for Budongo 1964-74; Kibale 1964; Kalinzu and Bugoma 1961.
8. F.D. 1970. DSO 1970 Edition.
9. F.D. Silvicultural Research Plan.
10. F.D. Assessment of Silvicultural Research Plots and PSPs.
11. Hughes, J.F. and Lang Brown, J.R. 1962. The Planning and Organisation of Current Silvicultural Treatments in the Central Forest Reserves of South Mengo. Paper to the 8th Commonwealth Forestry Conference.
12. Kityo, P.W. and Plumptre R.A. 1997. The Uganda Timber Users' Handbook.
13. Lockwood Consultants Ltd. (for CIDA), 1973. Forest Resources Development Study for Uganda.
14. Plumptre, R.A. 1972. Problems of Increasing the 1996 Intensity of Utilisation of THF. CFR 51.
15. Plumptre, R.A. and Carvalho, J. 1991. The Marketing of Uganda Hardwoods, F.D. Kampala.

16. Plumptre, R.A. 1996. Links Between Utilisation, Product Marketing and Forest Management in tropical Moist Forest. CFR 75(4).

Appendix V.6

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17. Plumptre, A.J. and Reynolds, V. 1994. The Effect of Selective Logging on the Primate Populations in Budongo FRV. *Journal of Applied Ecology*, 31.
18. Plumptre, A.J. 1995. Importance of Seed Trees for Natural Regeneration of Selectively Logged Tropical Forest. CFR 75.
19. Rukuba, M. 1975. Monocyclic Management System in the NHF in Uganda. Paper Presented at the FAO Technical Conference on the Tropical Moist Forests, FAO Rome, 1974.
20. Rukuba, M. 1992. Linkages Between Wise Forest Management for Forest Production and Local Markets and Industries, Example from Uganda. Proceedings of the Oxford Conference on Tropical Forests 1992, OFI.
21. Synnott, T.J. 1969. Long Term Planning in Forest Management and Timber Production in E. Africa. Paper Presented at Conference on Africa in World Affairs, Makerere University.
22. Wood, T.W. 1978. Appraisal of the Management of the NHF and Silvicultural Research. UNDP/FAO Project UGA/74/019 Field Document No.2.

Point Information

By column, the information to be filled in is:

<u>Column</u>	<u>Information</u>																												
1-2	Each district has a code number assigned to it. These are presented separately, e.g. Luwero District (for Katugo) has a code number 32, Mubende (for Singo Hills) code is 30 and Jinja (for Namafuma) is 12.																												
3-4	Each plantation was assigned a code number. These are presented separately, e.g. Katugo code is 29, Namafuma 11, Singo Hills 38.																												
5-6	Compartment number - It is taken from the map. Codes: 01-99 Enter 01, 02...14, 15, etc.																												
7-8	Subcompartment - the number is taken from the map. Since many subcompartments are indicated on the map by a letter, the codes for the individual sub-compartments will be as follows: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th><u>Subcomp.</u></th> <th><u>Code</u></th> </tr> </thead> <tbody> <tr><td>a</td><td>01</td></tr> <tr><td>b</td><td>02</td></tr> <tr><td>c</td><td>03</td></tr> <tr><td>d</td><td>04</td></tr> <tr><td>e</td><td>05</td></tr> <tr><td>f</td><td>06</td></tr> <tr><td>g</td><td>07</td></tr> <tr><td>h</td><td>08</td></tr> <tr><td>i</td><td>09</td></tr> <tr><td>j</td><td>10</td></tr> <tr><td>k</td><td>11</td></tr> <tr><td>l</td><td>12</td></tr> <tr><td></td><td>etc.</td></tr> </tbody> </table>	<u>Subcomp.</u>	<u>Code</u>	a	01	b	02	c	03	d	04	e	05	f	06	g	07	h	08	i	09	j	10	k	11	l	12		etc.
<u>Subcomp.</u>	<u>Code</u>																												
a	01																												
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i	09																												
j	10																												
k	11																												
l	12																												
	etc.																												

9. Stratum
Through photointerpretation, the plantation areas are stratified into four main density (crown closure) classes. These are delineated on the map. Read from the maps and enter:

<u>Code</u>		<u>Crown closure</u>
0	- unstocked	(0 - 30%)
1	- low density	(30 - 50%)
2	- medium density	(50 - 75%)
3	- high density	(75% +)

- 10-11 Year of planting - read from the management map or from MP Records
Year of planting Enter
 1974/5 75
 1973/4 74
 etc.
- 12-13 Planted species
 Indicate the planted species as indicated on the map.
Species Code * = other
 Pinus spp 10
 Pinus patula 11
 Pinus caribaea 12
 Pinus radiata 13 *
 Pinus elliotii 14 *
 Pinus merkursii 15 *
 Pinus oocarpa 16
 Pinus taeda 17 *
 Other pine species 19
 Cuppressus spp 20
 Cuppressus lusitanica 21
 other Cuppressus species 29

Eucalyptus spp
 Eucalyptus spp 30
 Eucalyptus grandis 31
 Eucalyptus camadulensis 22
 other Eucalyptus species 39

 Other species 90
- 14-15 Line Number - The line number of the sampling grid is filled in here.
 Codes: 1-99
 Enter: 01, 02, etc.
- 16-17 Point Number - On each line, plots are numbered starting with 1.
 Codes: 1-99
 Enter: 01, 02, 03, etc.
- 18-19 Elevation - Average elevation in metres
 600-699 m 06
 700-799 07
 :
 :
 1100-1199 11
 1200-1299 12
 etc.

- 20 Slope - The slope will be measured in percent (%) by a clinometer or relascop and appropriate code entered here:
- | | <u>Code</u> | |
|--------|-------------|---|
| 0-5% | 0 | |
| 5-10% | 1 | |
| 10-20% | | 2 |
| 20-30% | | 3 |
| 30-40% | | 4 |
| 40-50% | | 5 |
| 50-60% | | 6 |
| > 60% | 7 | |
- 21 Drainage
- | | | |
|---------------------------------|--|---|
| Well drained | | 1 |
| Moderate to imperfectly drained | | 2 |
| Poorly drained | | 3 |
- 22 Treatment - The thinning code is entered here,
- | | <u>Code</u> | |
|-------------|-------------|---|
| No thinning | | 0 |
| Thinned | 1 | |
- (A search for stumps is made to ascertain whether a sub-compartment has been thinned in the past or not).
- 23 Disturbance - Indication is made as to whether the area around the point was disturbed by any way either by man (illicit cutting, cultivation, etc) or by nature - windthrows, etc.
- | | | |
|---------------------|---|---|
| Without disturbance | | 0 |
| Disturbed | 1 | |
- 24 Ground Cover
- | | | |
|------------------------|--|---|
| Weeds & grass to 0.5 m | | 0 |
| Weeds & grass 0.5m + | | 1 |
| Shrubs & hardwoods | | 2 |
- 25 Soil - For the moment, this will be ignored, classification is being developed.
Code 0.9 Enter 0
- 26 Crown Closure - ignore

29 B.A.F. - Basal area factor will be entered here in decimals as follows.

<u>BAF</u>	<u>Number of Bands in wide scale relascope</u>	<u>Code</u>
1	1	1.00
2	-	2.00
2.25	1½	2.25
3	-	3.00
3.06	1¾	3.06
4	2	4.00
6.25	2½	6.25
9	3	9.00

Individual Tree Information

30, 31 Tree number - Trees are numbered consecutively on each point. If more than 15 trees are found on a point, use a new tally sheet and start numbering with tree number 16, 17, etc.

32.33 Tree code (species code) - See codes for columns 12, 13.

34-36 DBH - diameter at breast height measured to the nearest millimetre

37-39 Height - dominant height - two largest trees on a plot measured to the nearest half a metre.

Defect - Quality assessment

40-45 Defect on a first log - 4.5m from the ground.
Enter 1 if defect present
Enter 0 if no defect is visible.

46 Quality assessment of the first log
No defect-first quality log 0
Defect present-but log can still be utilised for sawing 1
Defect present-wood cannot be utilised 2

47-55 Defect on remaining part of the tree
No defect 0
Defect visible 1

FOREST OFFENCES REPORT

A. NEW CASES

1 (a) Offence discovered on: Date Month
..... Year

(b) Offence committed on: Date Month
..... Year

2 (a) Nature of offence (*brief details*)
.....
.....

(b) Name of person/persons involved and address:
.....
.....

3 (a) Offence reported by:
.....
.....
(b) Officer's designation:
.....
.....

4 Exhibits:
(a) Sawn timber (*if any*) Species
.....
No. of pieces per size
.....
(b) Other forest produce/materials
.....
.....

5 Tools/Equipment involved:
(a) Hand or Power saws
No.....
(b) Axes/Pangas
No.....
(c) Motor vehicle Reg. No.
.....
.....
(d) Motor boat/canoe (*specify*)
.....
.....

6 Action taken:
(a) Offender/offenders arrested Yes or No

- (b) Offence reported to Police Yes or No
- (c) Offence reported to Local Authority (LCs) Yes or No
- (d) Response by Police or Authority (*brief details*)

.....

.....

7 Any court action taken (*details*)

.....

.....

.....

.....

.....

B. OLD CASES (current financial year)

8 (a) Nature of offence:

.....

.....

(b) Name of person/persons involved

.....

9 (a) Court action taken on Date Month

..... Year

(b) Cause No.

.....

.....

(c) Prosecution led by

.....

.....

(d) Designation

.....

.....

10 (a) Last court proceedings (*brief details*)

.....

(b) Name of person/persons involved

.....

C. CASES CONCLUDED (current financial year)

11 (a) Nature of offence

.....

.....

(b) Name of person/persons involved

.....

12 (a) Cause No.

.....

.....

Departmental Standing Orders

(b) Prosecution led by

.....
.....

(c) Designation

.....
.....

13 (a) Judgement passed on: Date Month
..... Year

(b) Penalty

.....
.....

(c) Any other court order

.....
.....

NHF PSP FORM : TREES UNDER 20 cm DIAMETER

1: PSP number 2: Quadrat 3: Trees 4: Strip pos. 5: Measurement date 6:
DIC measurement team

11: Tree no. 12: Species name & code 13: Location 14: Diam 15: 16: 17: Height 18:
19: Checksum

Coded notes

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Form for recording data from poles, saplings and seedlings.

DATA RECORDING AND PROCESSING

Departmental Standing Orders
