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ENGLISH

FAO/ECA/FOREST INDUSTRIES ADVISORY GROUP
FOR AFRICA (FLAG)

TF/RAF/82/001/11-01

ETHIOPIA

Terminal report*

Based on the work of Helge Gunzerodt, Associate expert

Backstopping Officer: Robert M. Hallett
Industrial Rehabilitation and Management Branch

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Explanatory notes:

The following abbreviations will be used throughout the document:

ATO : African Timber Organisation
ECA : Economic Commission for Africa
FAO : Food and Agriculture Organization of the United Nations
FIAG : Forest Industries Advisory Group for Africa
HP : Hewlett Packard
MINISIS : Mini-Computer Integrated Set of Information System
MULPOC : ECA Multinational Programming and Operational Centre
PC : Personal Computer
WUARC : Wood Utilization and Research Centre, Addis Ababa

ABSTRACT

Title : "Promotion of the rational utilization of timbers from African plantations"

Project : FIAG / RAF / 82 / 006

Duty

station : Addis Ababa, Ethiopia

The objectives of the two year activities were to provide the region with technical advice on timber engineering matters, to make available technological data on uncommon species, to improve the utilization of timber, to promote the standardization of sawnwood and to enhance intra- and inter-regional marketing. These tasks were primarily pursued in the East African region (Kenya, Lesotho, Madagascar, Malawi, Tanzania, Zambia and Zimbabwe), countries which were supported both through correspondence and/or through direct consultancies during missions. All other African countries were kept informed through the distribution of information material. The efforts have had first positive reactions in Tanzania, Madagascar and Zambia.

I. INTRODUCTION

A. Background

According to surveys conducted by FIAG in the 12 countries represented through ATO it was confirmed that Africa's closed productive forests continue being reduced at fast rate. Only a steady and greatly expanded plantation and utilization program with fast-growing timber species is expected to offset Africa's dwindling natural forest resources (see Annexes 1,2 and 3). The demand for sawnwood in the region is expected to double in the next ten years the greater part of the timber being absorbed in the building industry.

FIAG has in view of this situation started to undertake activities on a regional basis to promote the wider and more optimal utilization of these resources in construction with special emphasis on industrial plantations. Timber is hereby to be considered primarily for roof trusses which are common building components used in Africa for pitched roof structures; in addition the suitability of exotic sawnwood for exterior and interior application (partitions and external walls, stairs, balcony railings, etc. to be identified.

B. Project objectives

The tasks of the activities undertaken and described here were part of the main objectives of FIAG stated as follows:

- to assist member states in developing their capabilities for identifying, defining and solving problems related to the development of forest industries
and
- to assist in promoting the growth of forest industries in a way that would assure their optimum contribution to economic and social development of the member states

As part of the second principal objective the efforts here were to concentrate on:

- providing technical advice on timber engineering matters to the countries in the region and to interested institutions and international organizations,
- providing technological data on timber species frequently planted and growing in the region in order to expand and to improve the use of forest resources in terms of finished and semi-finished wood products and timber structures,
- promoting the standardization of sawnwood in order to facilitate the industrialization process,
- promoting inter- and intra-regional marketing and enhancing competitiveness.

These tasks were pursued but only partially attained since the project FIAG/RAF/82/006 was closed nine months prior to the completion of the author's appointment.

II. ACTIVITIES

This report covers the period from September 1985 until July 1987 and describes the author's activities he conducted as Associate Expert in Timber Engineering and Timber Technology with FIAG/FAO/UNIDO/ECA at Africa Hall, Addis Ababa. He started his appointment in the project RAF/82/006 on 23 September 1985.

Apart from the summary of activities presented here more detailed information on specific outputs produced in the period can be found in the following reports of which abstracts are attached (Annex 4):

REPORT NR.	TITLE
FIAG/85/23:	"The promotion of the rational utilization of plantation timber in building construction"
FIAG/85/26:	"Selection of timber preservation methods for plantation species in Lesotho"
FIAG/86/16:	"Travel report of the mission to Malawi"
FIAG/86/17:	"Travel report of the mission to Zimbabwe"
FIAG/86/18:	"Travel report of the mission to Zambia"
FIAG/86/19:	"Travel report of the mission to Madagascar"
FIAG/86/20:	"Travel report of the mission to Kenya"
FIAG/86/25:	"Travel report of the field trip to Munessa and Shashamane"
FIAG/86/30:	"Preliminary summary of the mechanical properties of timbers from African plantations"
FIAG/86/31:	"Lecture notes on timber drying and timber preservation"
FIAG/86/37:	"Perspectives de valorisation "Bois d'oeuvre" des produits d'eclaircies des plantations de Fanalamanga (Madagascar)"
FIAG/86/38:	"Travel report of the mission to Zambia"
FIAG/86/39:	"Travel report of the mission to Tanzania"

A. Desk studies

- Revision of available literature on grading, grouping and utilization of exotic species
- Collection of statistical data on plantations in Africa
- Selection of countries to visit and outline of mission itinerary

B. Distribution of promotional material

- Inquiry to all African countries to collect information on timber properties, local standards and typical enduses of exotic timber informing at the same time about FIAG initiatives (FIAG/85/23; Annexes 4 and 6)

- Advice and information on selected preservation methods (FIAG/85/26)
- Seminar on timber drying and timber preservation held at Warka furniture factory, Addis Ababa (FIAG/86/31) in July 1986

C. FIAG Data Base

- Collection of data on timber properties and creation of computerized data base using the MINISIS system on the ECA computer HP 3000
- Transfer and creation of database on FIAG Personal Computer HP Vectra using software package dBASE III Plus
- Updating of database

D. Assistance to other organizations and institutions

1. Wood Utilization and Research Centre (WUARC)

- Development of a testing program for timber properties of exotic species in Ethiopia
- Selection of appropriate testing material (FIAG/86/25)
- Elaboration of terms of reference for consultant
- Contribution to consultancy in all phases, edition and partial writing of the report (by Ingemar Saerfors, SIDA/WUARC)

2. French Technical Assistance: Experimental Housing Program in Cooperation (REXCOOP)

- Advice on the consideration of timber as building material (roof structures, doors and windows) on low cost housing project in Nazreth, Ethiopia

3. Division of Human Settlements (HABITAT)

- Discussion to establish the feasibility to include timber as building material into the regional low cost housing program

E. Missions

An important component of the promotional and advisory activity were the two missions to those East African countries with the major forest plantations which were at the same time producing significant quantities of sawn timber from these resources. A further selection criteria was their reaction to the FIAG-Questionnaire sent out to all African countries in November 1985.^{1/} Two journeys were therefore undertaken in 1986 to Kenya, Zambia and Madagascar while on one occasion Malawi, Tanzania and Zimbabwe were visited (Annex 5). The mission findings were presented in the reports FIAG/86/16-20 and FIAG/86/37-39 summarized in Annex 4 of this report. A consequence of this activity was the founding of a "Plantation Timber Study Team" in Dar es Salaam, which is now in the process of initiating the "Wood Industry Association of Tanzania". Similar steps are being considered in Zambia under direction of the Zambian Bureau of Standards.

F. Installation of FIAG Personal Computer

- Transfer and set-up of HP-Vectra PC at FIAG offices

- Installation of: 1. Software
 - Advance Link (Linkage to ECA HP 3000)
 - dBASE III PLUS
 - Wordstar Professional
 - LOTUS 123
 - Freelance
 - Display Write

- 2. Hardware
 - Daisy Wheel printer
 - 7475A HP 6-pen plotter
 - 360 Kb Internal floppy disk
 - HP mouse

- Application of software packages for text editing and for the development of graphic illustrations

^{1/} See Annex Six for map and list of institutions etc. and addresses. Those replying are marked with an asterisk (*).

III. FINDINGS

The need in Africa for a strong support in the field of timber utilization has been confirmed throughout the described activities. In spite of an acute shortage of housing, of school buildings and other institutional structures, wood is not being used sufficiently and, if it is considered, lack of know-how and/or poor workmanship worsen its image even further. It was however noticeable that in most countries visited an awareness has developed amongst those involved in both forestry and forest products sector to coordinate their efforts. The idea of creating local and regional forest products associations has been welcomed and at present pursued with varying intensity and at different levels. The elaboration of regional standards on timber testing and a subsequent eventual establishment of regional unified grading rules for fast growing timber will be perhaps the most important task for these planned associations. Until today most East African countries have adopted either English, American, Australian or New Zealand standards (in anglophone states) or they are following the French system (in francophone states); both solutions can not be considered satisfying since the systems very often prove erroneous and/or simply not applicable to local conditions. Zimbabwe has therefore conducted a study involving a large experimental part comparing testing rules from different countries eventually to develop own standards; the result will be of great interest for the region.

Testing series conducted in Ethiopia in 1986/1987 at the WUARC have yielded results on mechanical properties of exotic softwoods which are similar to those found in other African countries. The results are at present being used in the development of prototype constructions.

In Zambia, Tanzania and Madagascar the main priority at present is the utilization of their thinning recoveries to avoid a further deterioration of their vast plantations. Suggestions for appropriate processing technology and for utilization were made (FLAG/86/37), and recommendations were given on the handling, seasoning and on other essential pretreatments of the commonly unknown exotic species.

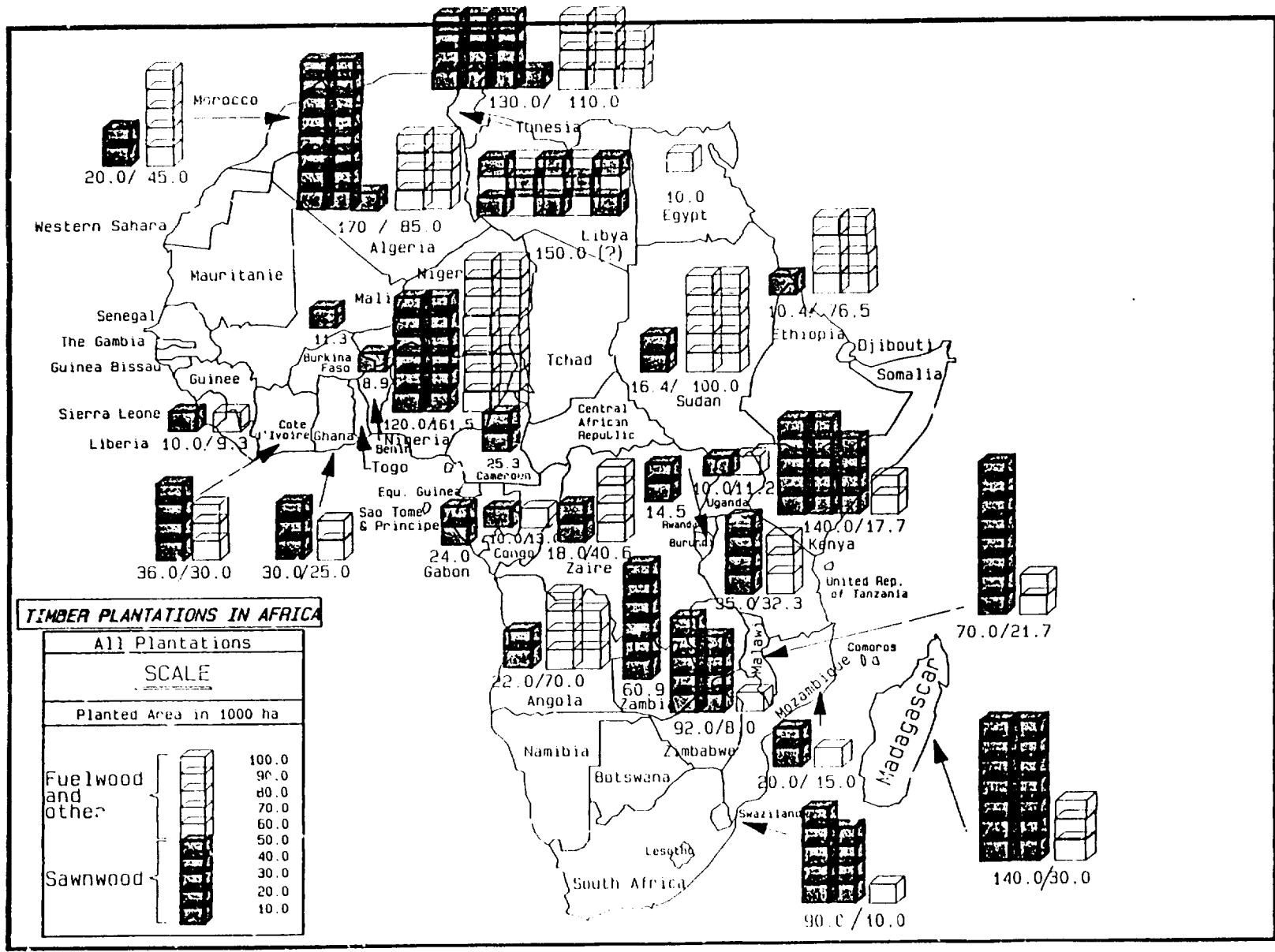
IV. RECOMMENDATIONS

The recommendations stated in the following are very much in agreement with those issued in R. Francis' report on "Increasing timber construction in Africa" (DU/RAF/82/006/11-5; 1987). An eventual follow-up activity should continue pursuing already started initiatives such as those described by the author:

- Support the creation of timber industry associations in the region with particular attention to those already started (Tanzania)
- Co-ordinate initiatives regarding elaboration of regional standards taken by local authorities
- Upgrading of timber seasoning and timber preservation techniques:
 1. Anti-sapstain treatments
 2. Pressure treatments with water soluble or organic chemicals
 3. Diffusion treatments with fungicides and/or insecticides
 4. Hot-cold soaking treatments (for agricultural areas)
 5. Sap displacement or Boucherie treatments
- Establishment of trussed rafter industries or enterprises involved in the manufacture of other wooden building components (doors, windows, frames)
- Co-operation with other organizations on building programs:
 1. Follow-up of HABITAT on regional traditional housing scheme
 2. Analyse possibilities to support REXCOOP on local project in Nazreth, Ethiopia
 3. Continue contact to WUARC and to its Swedish counterpart Orgut-Swedforest Consortium

TIMBER PLANTATIONS IN AFRICA

ANNEX ONE



TOTAL TIMBER PLANTATIONS IN AFRICA

(according to the 1st revision of the Cross Reference Tables, FIAG, 1986)

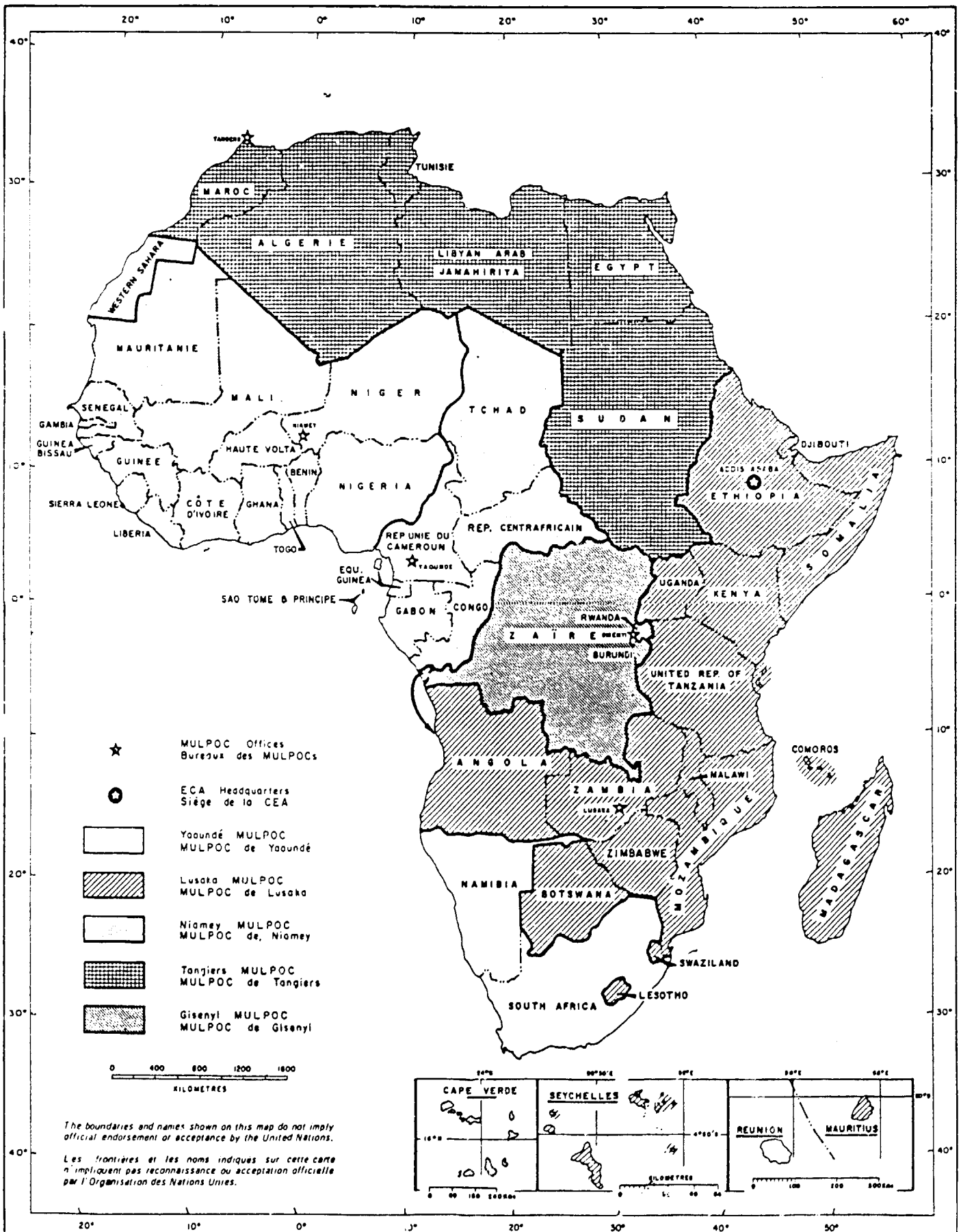
Mulpoc (*)	Softwoods		Sub - total	Hardwoods		Sub - total	Total area (ha)			
	Species	Area (ha)		Species	Area (ha)					
Gisenyi	Cupressus lusitanica & Pinus spp.	24 200	26 200	Not classified Terminalia superba Others	39 400 10 900 6 600	56 900	83 100			
	Pinus patula & Pinus caribea	2 000								
Lusaka	Pinus patula Cupressus lusitanica Pinus spp. & Cupressus spp. mixed Others	251 740 60 300 229 880 137 640		679 560	Eucalyptus camaldulensis Eucalyptus spp. (grandis, saligna) Others			160 500 74 610 92 630	327 740	1 007 300
	Pinus spp. (caribea, P. oocarpa)	24 300			Gmelina arborea Tectona grandis Terminalia spp. Others	118 030 98 580 73 950 154 800	445 360	469 660		
Niamey	Pinus spp. & Cupressus (unspec.) Others	253 190 170 500	423 690		Acacia senegal Eucalyptus spp. (camaldulensis) Others	106 000 72 000 234 860				
Tangiers	Pinus spp. & others	11 580		11 580	Akoumea kleineana Eucalyptus spp. Terminalia superba Others	19 000 12 500 6 700 22 500			60 700	72 280
Yaounde										
Total area (ha)			1 165 330				1 303 560	2 468 890		

(*) Mulpoc grouping, please see attached map

TOTAL TIMBER PLANTATIONS IN MULPOCS

ANNEX TWO

MULPOC GROUPINGS



ABSTRACTS OF FIELD REPORTS ELABORATED FROM 1985 - 1987

FIAG/85/23

"The promotion of the rational utilization of plantation timber in building construction"

The report is basically an inquiry concerning a possible co-operation between FIAG and African institutions involved in the utilization and promotion of plantation timber in building construction. It informs the institutions about the data FIAG has at present on the subject and requests their assistance to confirm and update FIAG's documentation.

FIAG/85/26

"Selection of timber preservation methods for plantation species in Lesotho"

Upon request of the Lesotho Department of Conservation and Forestry a number of suitable timber preservation methods specifically for Lesotho are summarized here in two tables. The report also comprises comprehensive background documentation on timber preservation in general and it suggests a mission of the expert to Lesotho to assist in the final decision about the implementation of the selected method.

FIAG/86/16 - FIAG/86/20,
FIAG/86/37 and FIAG/86/38

"Travel reports of missions to Malawi, Zimbabwe, Madagascar, Kenya and Zambia"

The missions to the five countries had the purpose to investigate the

ANNEX FOUR (2)

present situation in the utilization of timbers from plantations concentrating on grading methods and applied standards. In addition it was intended to introduce and to discuss FLAG activities regarding the promotion of timber in construction.

Malawi: Findings of this report summarize the present situation in the country and it lists principal factors inhibiting the optimal utilization of timber. Areas of possible assistance were identified and included into the recommendations.

Zimbabwe: The document outlines the importance to upgrade locally grown exotic timbers and stresses the necessity in this context to provide outside assistance in the field of timber grading.

Zambia: The initial mission findings as well as those from the follow-up visit conclude in the observation that inspite of the country's substantial resources in timber plantations and regardless of estimated increases in timber production, major efforts are still necessary in the upgrading and the marketing of plantation timber. Initiatives to coordinate activities between the forestry division and the forest products sector are in progress and would require outside support.

Madagascar: In a preliminary study on Madagascar's plantations with special focus on those located in the Fanalamanga/Moramanga project it is stated that timber originating from (at present conducted) thinning operations is characterized through its small diameter and its low quality. The original report endorsed therefore the need for a short term consultancy on the optimal utilization of thinning recoveries which was subsequently undertaken. The follow-up report contains specific recommendations as far as technologies to be applied are concerned, and it also specifies terms of references for four possible consultancies to be undertaken. Three of these require outside assistance and one task can be completed with local resources.

ANNEX FOUR (3)

Kenya: The report comments on the favorable situation for forest products in Kenya. Both, plantation management as well as markets are established firmly although some attention should be given to find permanent links between the different interest groups involved in forest industries.

FIAG/86/25

"Travel report of field trip to Muessa and Shashamane"

The report describes the visit to some of Ethiopia's major plantations of exotic softwoods. In the course of the journey trees were selected to establish mechanical properties of the timber, an activity of the local research centre (WUARC), to which FIAG is giving technical assistance.

FIAG/36/30

"Preliminary summary of the mechanical properties of timbers from African plantations"

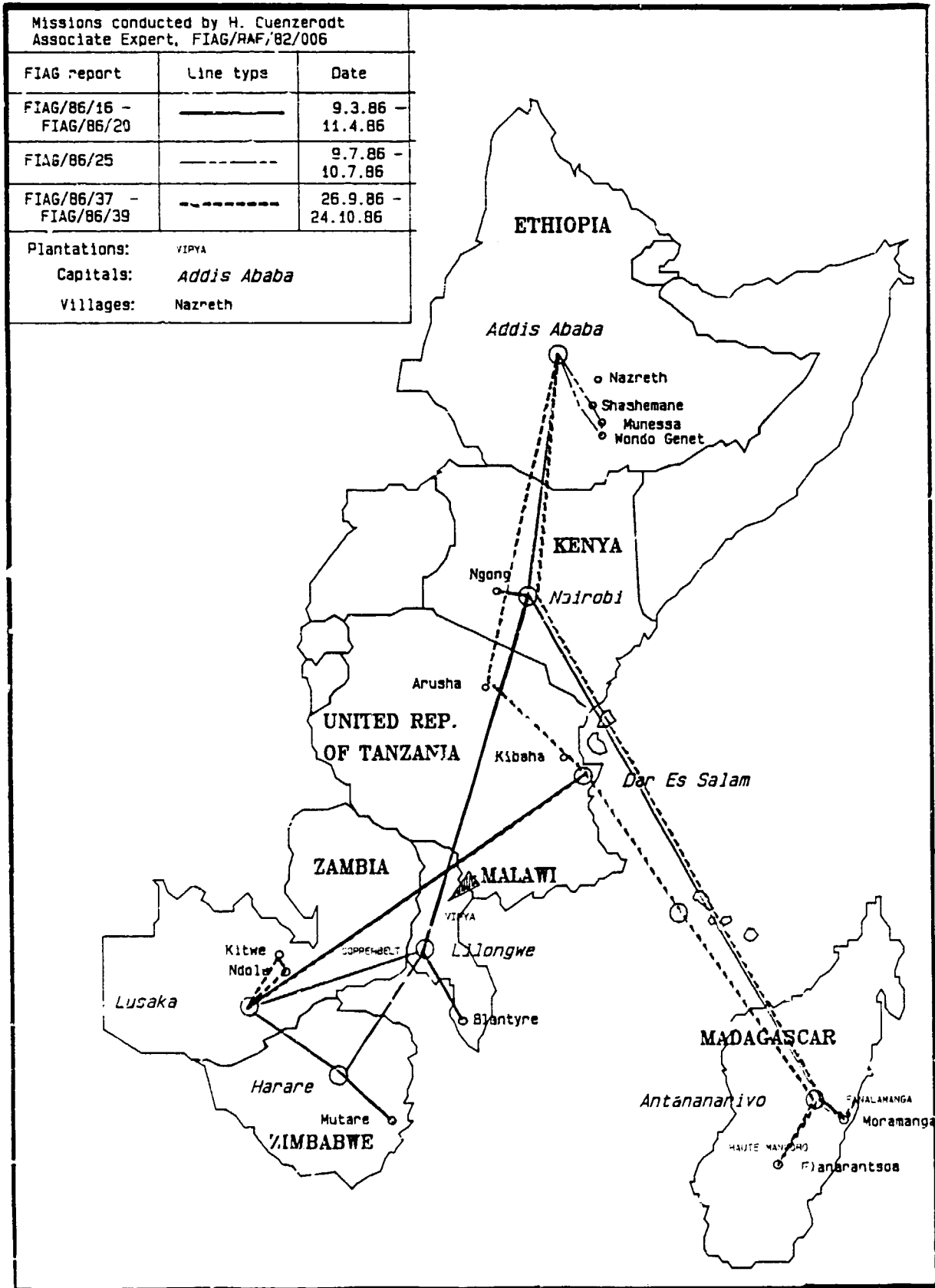
The brief document summarizes information collected on mechanical properties of principal African plantation timbers. It points out that data is scarce since comprehensive studies on the topic have not been undertaken or are not yet available. The species discussed in the report are *Pinus kesiya*, *Pinus patula*, *Pinus radiata*, *Cupressus lusitanica* and *Eucalyptus grandis*. Included is also a list of important species of which properties are still not clearly defined.

FIAG/86/39

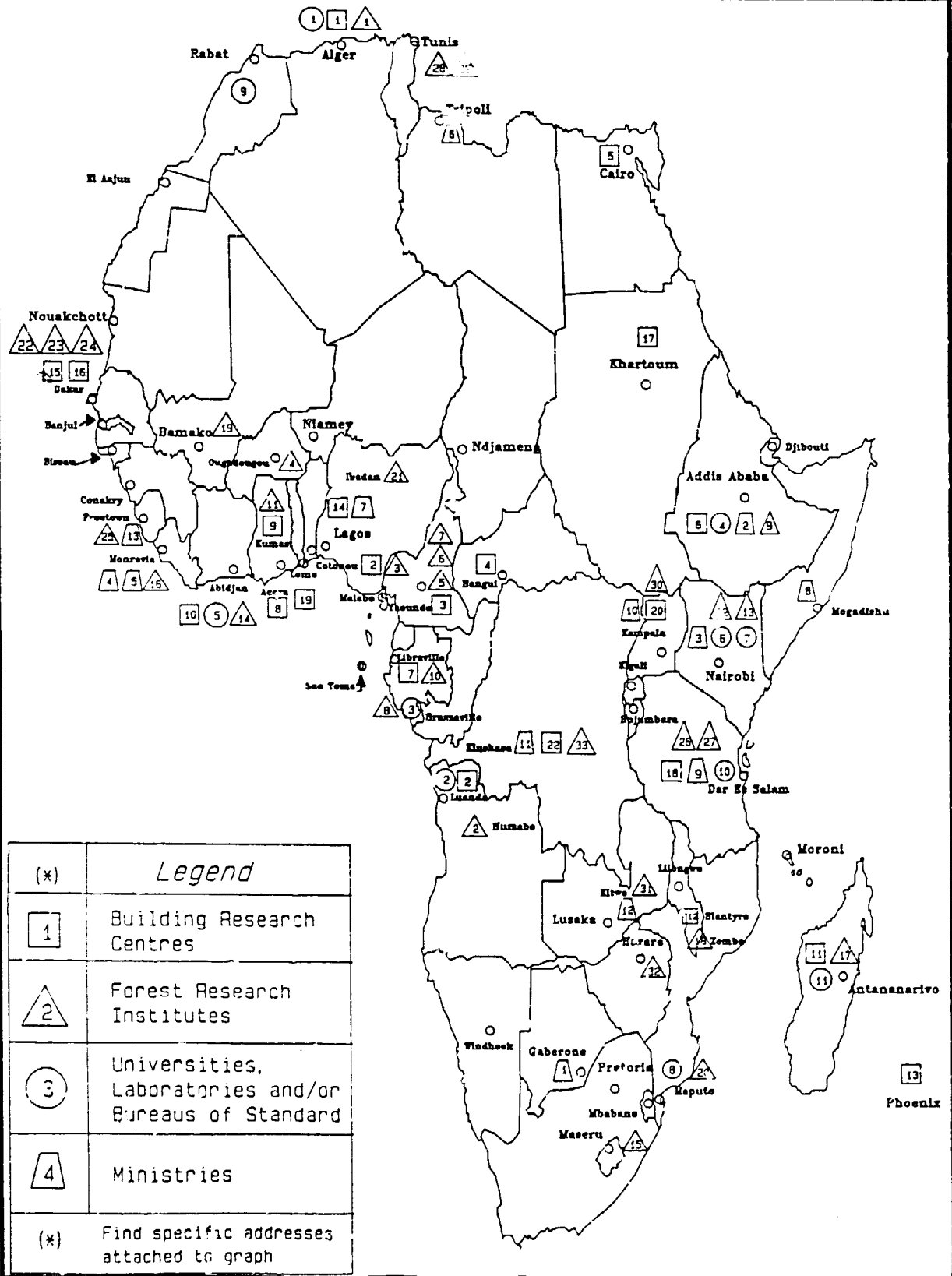
"Travel report of the mission to Tanzania"

The main purpose of this exploratory mission was to establish personal contacts with the "Plantation Timber Study team" at the University of Dar es Salaam, to discuss and to eventually elaborate general guidelines for follow-up activities. The report describes characteristics of the plantation timber situation in the country and endorses initiatives directed to the formation of forest industries associations.

MISSION ITINERARIES







INSTITUTIONS SENT THE QUESTIONNAIRE FIAG/83/23 IN NOVEMBER 1983



ANNEX SIX (2)

□	Building Research Centres	△	Forest Research Institutes	○	Universities, Laboratories and/or Bureaus of Standard	▽	Ministries
1	Algerian Building Research Institute Qued Saman El Hannasch Algers, Algeria	1	Centre National de Recherche et d'Experim. BP 37, Cheraga Cheraga, Algeria	1	Nat. Lab. of Public Works (LNTPB) Route des 4 canons Algers, Algeria	1	Min. of Works and Communication POB 0025, Gaborone Botswana
2	Regional Office (CEBTP), BP 1270 Cotonou, Benin	2	Institut de Recherche Agronomique, BP 406 Huambo, Angola	2	Lab. of Engineering of Angola, CP 6500 Luanda, Angola	2	Regional Housing Off. US AID/Ethiopia POB 1014, Addis Ababa Ethiopia
3	Regional Office (CEBTP), BP 2004 Yaounde Cameroon	3	Unite de Recherche Forestiere, BP 06 707 Cotonou, Benin	3	Nat. Lab. for Research and Public W., BP 752 Brazzaville, Congo	3	Ministry of Works POB 11973, Nairobi Kenya
4	Regional Office (CEBTP), BP 846 Bangui, CAR	4	CTFT de Burkina Faso BP 303, Ouagadougou Burkina Faso	4	Eth. Standards Inst. POB 1310, Addis Ababa Ethiopia	4	Materials Testing and Research Division Bureau of Techn. Serv. Min. of Public Works Monrovia, Liberia
5	General Organisation for Housing, Building and Planning Research P.O.Box 1770 Cairo, Egypt	5	IRA-Centre pour la Recherche Forestiere BP 832, Ouuala Cameroon	5	Dep. of Public Works Lab. of Building and Public W., BP 4003 Abidjan Cote d'Ivoire	5	The National Housing Authority, UN Drive Water Street Monrovia, Liberia
6	HRRO/MMUD P.O.Box 3386, Addis Ababa, Ethiopia	6	Centre de Promotion du Bois, BP 369 Yaounde, Cameroon	6	Univ. of Nairobi, Dep. of Civ. Eng., POB 30197 Nairobi Kenya	6	The Technical Planning Authority, POB 600 Tripoli, Libya
7	Regional Office (CEBTP), BP 766 Libreville, Gabon	7	Centre de Recherches Forest. de Mkolbisson BP 2102, Yaounde Cameroon	7	Housing Research and Dev. Unit, Univ. of Nairobi, POB 30197 Kenya	7	Federal Min. of Works Civ. Eng. Serv. Div. PMB 12635, SW Ikoyi Lagos, Nigeria
8	Council for Scientific and Industrial Research, POB M 32 Accra, Ghana	8	CTFT du Congo BP 764, Pointe Noire R.F. du Congo	8	Lab. de Eng. de Mec. CP 1918, Con Phumo Mocambique	8	Nat. Housing Agency Mogadishu, Somalia
9	CSIR, Building and Road R.L., Univ. PB 40 Kumasi, Ghana	9	IFR, Forestry and Wildlife Conserv. Dev. Auth. POB 1034, Addis Ababa Ethiopia	9	P.W. Dep. Testing and Research Lab., BP 667 Casablanca, Morocco	9	Tanzania Nat. Scient. Res. Council, POB 4302 Dar es S., Tanzania
10	CRAU, Univ. d'Abidjan BP 8992, Abidjan Cote d'Ivoire	10	Inst. de Recherches Agr. and Forestieres BP 2246, Libreville Gabon	10	Univ. of Dar es S., Fac. of Eng., POB 35131, Dar es Salaam Tanzania	10	Min. of Agriculture and Forestry, Forest Products Office POB 1752 Kampala, Uganda
11	Regional Office (CEBTP), BP 1151 Antananarivo Madagascar	11	FPRI (Ghana Forestry Commission), Univ. POB 6 U. of Science and Techn., Kumasi, Ghana	11	Centre Nat. de la Recherche Appliquee au Development Rural BP 904, Antananarivo Madagascar	11	Dep. of Public Works Civil Building Direct. BP 27A Kinshasa-Sombe Zaire
12	Malawi Housing Corp. POB 414, Blantyre Malawi	12	For. Research Dep., Kenya Agr. Res. Inst. POB 74, Kikuyu Kenya			12	Nat. Housing Authority POB RW 74, Ridgeway Lusaka, Zambia
13	Regional Office (CEBTP), Phoenix Mauritius	13	Forest Department POB 30513 Nairobi, Kenya			13	Min. of Agriculture and Forestry, Tower Hill, Freeto Liberia
14	Federal Housing Auth. Badagry Road, PMB 3200 Surulere, Lagos Nigeria	14	CTFT de la Cote d'Ivoire BP 33, Abidja, OB Cote d'Ivoire				
15	African Institut for Economic Development and Planning, BP 3186 Dakar, Senegal	15	For. Res. Section Lesotho Woodlot Project POB 774, Maseru Lesotho				
16	Regional Office (CEBTP), BP 189 Dakar, Senegal	16	For. Development Auth. POB 3010, Monrovia Liberia				
17	Building and Road Research Institute Univ. of Khartoum POB 35, Khartoum Sudan	17	Dep. de Recherches Forestieres et Pisc. BP 904, Antananarivo Madagascar				
18	Building Research Unit POB 1964, Dar-es-S. Tanzania	18	FRI of Malawi Kufa Road, POB 270 Zomba, Malawi				
19	Centre for Building and Housing, BP 911 Lome, Togo	19	Inst. Nat. de la Recherche Zootechn., Forestiere et Hydrol. BP 1704, Bamako Rep. du Mali				
20	Building R.U., POB 7188, Kampala Uganda	20	Dep. de Florestas e Fauna Brava, POB 3652 Maputo, Mozambique				
21	Regional Office (CEBTP), BP 1403 Kinshasa, Zaire						

ANNEX SIX (3)

 Building Research Centres	 Forest Research Institutes	 Universities, Laboratories and/or Bureaus of Standard	 Ministries
	<p>21 Forest Research Institute of Nigeria, PMB 5034 Ibadan Nigeria</p> <p>22 Centre Nat. de Recherches Forestieres, Dep. de Rech. sur la Production Forestiere et Hydrol. Parc de Hann, BP 2312 Dakar, Senegal</p> <p>23 Centre Nat. de Rech. Forestieres, Dep. des Rech. sur la Production Forestiere et Hydrul. Parc de Hann, BP 2312 Dakar, Senegal</p> <p>24 Institut de Sciences de l'Environnement, Fac. des Sciences, Univ. de Dakar, c/o Ambassade de Belgique, BP 524 Dakar, Senegal</p> <p>25 Forest Research and Training Centre, Baabawo Street, c/o Divisional Forest Office, Kenema Sierra Leone</p> <p>26 Lowland FRI, Tanzania FRI, POB 30072 Kibaha, Tanzania</p> <p>27 Div. of Forestry, Univ. of Dar es S., Sub Post Off. Chu Kikuu, Morogoro, Tanzania</p> <p>28 Inst. Nat. de Recherches Forestieres, BP 2 Ariana 2048, Tunisie</p> <p>29 Inst. Sylvo-Pastoral Tabarka, Tunisie</p> <p>30 Nakawa For. Res. Centre Spring Rd., POB 1752 Kampala, Uganda</p> <p>31 Div. of For. Prod. Res. Forest Rd, POB 22388 Kitwe, Zambia</p> <p>32 For. Research Centre POB HG 595, Highlands Harare, Zimbabwe</p> <p>33 Service Permanent d'Inventaire et d'Amenagement Forestiere, Rue Punbu, BP 10 120 Kinshasa, Zaïre</p>		