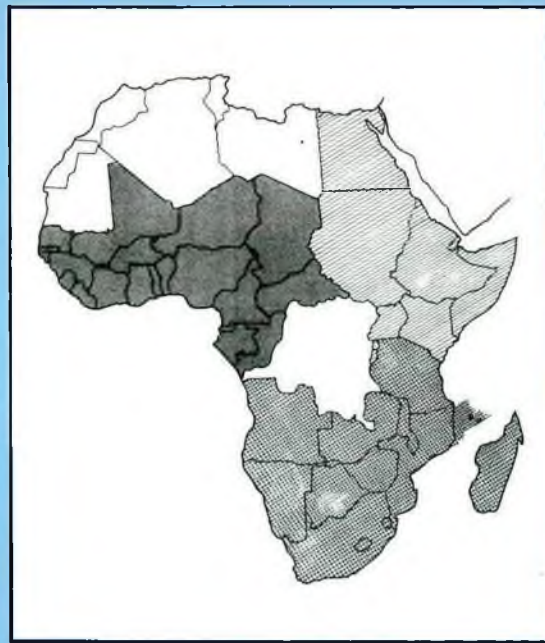




**Proceedings of the First
Meeting of the Eastern and
North-Eastern Node**



**The African Forestry Research
Network (AFORNET)**





Participants at the first meeting of the Eastern and North-Eastern Node of AFORNET,
KEFRI HQs, Muguga, Kenya, 24th- 26th May, 1999.

**Proceedings of the First Meeting of the
Eastern and North-Eastern Node of the
African Forestry Research Network
(AFORNET)**

KEFRI Headquarters, Muguga, Kenya

24th - 26th May 1999



Organised by the Kenya Forestry Research Institute (KEFRI)
Sponsored by the African Academy of Science (AAS) and the
International Foundation for Science (IFS)

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ABBREVIATIONS

AAS	-	African Academy of Sciences
AFORNET	-	African Forestry Research Network
AUA	-	Alemaya University of Agriculture
CBFR	-	Capacity Building in Forestry Research
CBO	-	Community Baased Organizations
CF	-	Community Forestry
CFM	-	Community Forest Management
CFSCDD	-	Community Forestry Soil Conservation and Development Department
CSE	-	Conservation Strategy of Ethiopia
EEC	-	European Economic Commission
EEP	-	Environmental Education Project
EPA	-	Environmental Protection Authority
ETFRN	-	European Tropical Forest Research Network
EWCO	-	Ethiopian Wildlife Conservation Organization
FAO	-	Food and Agriculture Organization of the United Nations
FDRE	-	Federal Democratic Republic of Ethiopia
FF	-	Farm Forestry
FFD	-	Farm Forestry Development
FGRP	-	Forestry Genetic Research Conservation Project
FIDP	-	Forestry Industries Development Programme
FIWG	-	Forestry Institute Wondo Genet
FOF	-	Faculty of Forestry
FORNESSA	-	Forestry Research Network for Sub-Saharan Africa
FORSPA	-	Forestry Research Support Programme for the Pacific and Asia
FRC	-	Forestry Research Centre
GEF	-	Global Environment Facility
HRDP	-	Human Resources Development Programme
IBCR	-	Institute of Biodiversity Conservation and Research
IFS	-	International Foundation for Sciences
ILCA	-	International Livestock Centre for Africa
ILRI	-	International Livestock Research Institute

INBAR	-	International Network for Bamboo and Rattan
IPF	-	International Panel on Forests
ISABU	-	Burundi Agricultural Research Institute
IUCN	-	International Union for Conservation of Nature and Natural Resources
IUFRO	-	International Union of Forestry Research Organizations
KEFRI	-	Kenya Forestry Research Institute
MEDAC	-	Ministry of Economic Development and Co-operation
MOA	-	Ministry of Agriculture
MOE	-	Ministry of Education
NCP	-	National Contact Person
NEMA	-	National Environment Management Authority
NFA	-	National Forest Authority
NFP	-	National Forest Programs
NGOs	-	Non-Governmental Organizations
NORAD	-	Norwegian Agency for International Development
NTSP	-	National Tree Seed Project
NWFP	-	Non-Wood Forest Products
PMEP	-	Planning Monitoring and Evaluation Programme
PGRC	-	Plant Genetic Research Centre
RSC	-	Regional Steering Committee
SFCDD	-	State Forests Conservation and Development Department
SIDA	-	Swedish International Development Authority
SLU	-	Swedish University of Agricultural Sciences
SIP	-	Sectarial Intergration Programme
TDDP	-	Technical Development and Dissemination Programme
TFFP	-	Tree and Forest Production Programme
TG	-	Transitional Government
THF	-	Tropical High Forest
UNDP	-	United Nations Development Programme
UNSO	-	United Nations Sudano-Sahelian Office
UWA	-	Uganda Wildlife Authority
WGCF	-	Wondo Genet College of Forestry

FOREWORD

Africa's forest research capacity falls far short of the minimum level needed to make a significant contribution to the development of its forest resources. Current capacity is limited in terms of the total number of scientists available, their scientific skills, institutional settings, and research resources. There is tremendous variation among countries, with the majority having close to nothing, while a few enjoy reasonable capacity.

The African Academy of Sciences (AAS), with the support of Sida/SAREC of Sweden has, since 1991 organized a system of competitive grants to support young African scientists. With time, it was considered necessary to support sustainable use of the built research capacity. A network to facilitate linking current and past grantees with other African scientists was conceptualized in 1994.

In 1997, the AAS undertook a study on the feasibility of establishing a network. From a survey covering 20 African countries, it was found that many scientists supported the idea of establishing an African Forestry Research Network. In June 1998, an expert consultation meeting in Addis Ababa developed a logical framework for the proposed network. A second expert consultation meeting held in Harare late 1998, resolved to establish the network with three nodes to cover West Africa, Southern Africa and Eastern Africa.

The countries in the Eastern Africa Node are: Burundi, Djibouti, Egypt, Ethiopia, Eritrea, Kenya, Rwanda, Somalia, Sudan and Uganda. During the Harare meeting, KEFRI volunteered to organize an inaugural network meeting for Eastern Africa.

The first meeting of the Eastern Africa Node was held at KEFRI between 24th and 26th May, 1999. The meeting was attended by 21 participants representing five African countries, namely, Uganda, Kenya, Ethiopia, Rwanda and Burundi. Representatives of AAS, IFS and FAO attended the meeting.

The objectives of the meeting were to:

- Draw up final terms of reference for the node

- Identify priority activities in research and training
- Select themes, national focal points, Regional Nodal Centre and representative leaders/co-ordinators
- Prepare and agree on work plan and budget
- Agree on nodal network coordination and management system

Country representatives were requested to write position papers on forestry research in their respective countries following a specific format to focus on thematic areas identified during the final consultative meeting in Harare. The areas were community-based forestry, natural forest conservation and management, socio-economic and policy, non-timber forest products, lesser known timber, and training and information exchange.

This report presents the proceedings of the meeting.

Dr. P. K. Konuche
Director, KEFRI

WELCOME AND OPENING REMARKS

Dr. P.K. Konuche, Director, Kenya Forestry Research Institute (KEFRI), welcomed the participants to the Workshop and gave a historical background. He said that, KEFRI had been restructured through consolidation of related research activities to form four core research Programmes (Farm Forestry, Natural Forests, Dryland Forestry and Forest Plantations) and a Service Programme. KEFRI hosts several research networks including the Secretariat for Integrated Tree Pest Management Network and one of the Nodes of the International Network for Bamboo and Rattan (INBAR). He mentioned that plans were underway to establish a regional network in plant gums and resins and KEFRI had been identified as the host institution.

Dr. Iba Kone, Programme Manager, African Academy of Sciences (AAS), said that this inaugural meeting of the East African Forestry Research Network was a product of a consultation process that had taken place over the last two years with many stakeholders in Forestry Research. In December 1997, a feasibility study was carried out on the establishment of this first ever Pan African Forestry Research Network. A concept paper was produced and circulated to the stakeholders for their comments. Subsequent meetings were held in June 1998 in Addis Ababa and November 1998 in Harare. He then highlighted the five proposed thematic areas for the network, which were identified at the Harare Meeting.

He proposed that the network be decentralized to involve individual scientists, provide a platform for information exchange and promote collaboration among African scientists. Three inaugural meetings had been planned to kick-start the operationalization of the activities of the networks and the Muguga Meeting was one of them.

Mr. Per Ekman, the Scientific Secretary at the International Foundation for Science (IFS), thanked the organizers for inviting him to the meeting. He delivered the apologies of the Director of IFS, Dr. Bjohn Lundgren who was not able to attend the meeting due to other official commitments. Mr. Ekman highlighted the close collaboration between IFS and AAS and noted that KEFRI has been a close partner in the area of capacity building of forestry research. Consequently, a number of KEFRI scientists have benefited from IFS research grants.

Mr. Ekman said that the network will enhance sharing of research findings among scientists in Africa and beyond.

Mr. O. Souvannavong, Food and Agriculture Organization of the United Nations (FAO) Representative, outlined the major functions of FAO and highlighted its role in assisting research organizations. He said that FAO is not a research organization, but facilitates research and cooperation between researchers, assists national research systems and promotes the application of research results in development. One of the priorities of FAO is to strengthen national research systems through regional and partnership approaches, e.g., the development of Forestry Research Support Programme for the Pacific and Asia (FORSPA) in 1995 and Forestry Research Network for Sub-Saharan Africa (FORNESSA). He said, FORNESSA and the proposed Africa Forestry Research Network (AFORNET), have the same origin and justification. The activities of both networks are expected to be complementary. The major difference is that FORNESSA is a network of institutions to facilitate capacity building and co-operation in forestry research at national and regional levels and AFORNET is a network of individual scientists. It was concluded that AFORNET and FORNESSA will improve and facilitate mobilization of the regional expertise and institutions in forestry that are critically weaker than other sectors.

GROUP SESSIONS

During the group discussions, future priority forestry research and development activities were discussed. Presentations from group deliberations presented were during the final plenary session. Based on the group deliberations and plenary consensus, the following decisions were made by the meeting:

1. Network Theme

The participants agreed to focus on the following thematic and cross-cutting prioritized issues:

(a) Thematic areas:

- Community-based forestry
- Reforestation/rehabilitation of degraded lands
- Natural forests and biodiversity
- Non-timber products

(b) Cross-cutting issues:

- Socio-economic issues and policy studies
- Collaborative research
- Capacity building
- Information dissemination to users
- Information exchange between scientists
- Establishment of data bases

2. Network Coordination and Management

(a) Network Structure

- The participants agreed that the Eastern and North-Eastern African Node should have:
- Regional Steering Committee (RSC)
- Nodal Coordinator
- National Contact Person (NCP)
- Thematic Leader who may also serve as NCP and Project Leader

(b) **Terms of Reference**

(i) *Regional Steering Committee*

- Approve Programmes and budgets
- Review network activities
- Link to other nodes, the board and other networks
- Formulate policies and contribute to development of regional constitution
- Appoint the Nodal Coordinator
- Made up of NCPs, Coordinator, AAS and Journal Editor

(ii) *Nodal Coordinator*

- Implements decisions of RSC
- Solicit for funds for nodal activities
- Publish nodal newsletters
- Secretary to Regional Steering Committee
- Coordinate activities of NCPs
- Maintain nodal membership register
- Organize congresses/workshops
- Organize exchange of scientists
- Establish nodal membership list as per thematic areas
- Represent the node at the Continental Network Board

(iii) *National Contact Person (NCP)*

- Represent country at RSC
- Provide guidance at national level, recruit and maintain register of members at national level
- Organize national seminars conferences
- Provide linkage of network to national institutions
- Disseminate information at national level
- Monitor and evaluate national projects

(iv) *Thematic Leader*

- Coordinate projects pertaining to a particular theme
- Implementate network activities relevant to a given thematic area
- Develop projects pertinent to the thematic area
- Identify sources of information relevant to the thematic area
- Provide scientific leadership to project coordinators
- Identify needs and facilitate training in the thematic area

- Facilitate the dissemination of research findings
- Formulate joint research projects
- Provide linkages with other themes
- Monitor and report project progress in the thematic area
- Recruit scientists for a given thematic area.

3. Workplan and Budget

Due to shortage of time, these items were left for the RSC to prepare.

RECOMMENDATIONS

The following recommendations were made:

- (a) **Structure of the Network.** The structure should have a Regional Steering Committee, Nodal Coordinator, National Contact Persons and Theme Leaders.
- (b) **Registration of the Network.** This should wait for development of the constitution/by-laws.
- (c) **Membership.** The network should be:
 - (i) Open to IFS and AAS former and current grantees who meet the aspiration of the network
 - (ii) Open to other scientists in forestry and allied sciences who fit into the network aspirations
 - (iii) Africans in the Diaspora and other scientists working on African forestry and allied problems.
- (d) **Role of Institutions.** The Network should be of scientists, but the institutions are contact points.
- (e) **Name of the Network.** It was unanimously resolved that the name of the network should be AFRICAN FORESTRY RESEARCH NETWORK (AFORNET).
- (f) **Sustainability of the network.** Mechanism for sustained funding should be explored to include the following:
 - (i) external funding, initially SIDA
 - (ii) consider other sources, such as EU and foundations.
 - (iii) sustainability of the network will be the responsibility of the incumbent Nodal Coordinator, National Contact Persons, Thematic Leaders and Project Leaders.

ELECTION OF NATIONAL CONTACT PERSONS AND NODAL COORDINATOR

The participants of each country met and elected a National Contact Person (NCP). The elected NCPs then met and elected Nodal Coordinators. Those elected were:

National Contact Persons:

Kenya, *Dr. Alice A. Kaudia*

Ethiopia, *Dr. Demele Teketay*

Uganda, *Dr. Joseph Obua*

Rwanda, *Mr. Jean D. Ndayambaje*

Burundi, *Mr. Omer Nsengiyumva*

Dr Alice A. Kaudia was elected by NCPs as Nodal Coordinator.

CLOSING REMARKS

The IFS representative was happy with the progress made during the Workshop. He said that IFS was looking forward to support the network, mostly through supporting the participation of grantees (past and present) in network activities.

FAO representative welcomed the formation of AFORNET and was looking forward to collaborating with it through FORNESSA, a sister network.

The AAS representative was grateful to KEFRI, for the hospitality and support in hosting the Workshop. He promised initial financial support for the network through SIDA-SAREC and moral support to the Nodal Coordinator.

The Director, KEFRI, thanked the participants for choosing KEFRI as host institution for the network and electing a KEFRI scientist as the Inaugural Coordinator. He promised to provide his personal and institutional support in ensuring the network's success.

BACKGROUND PAPER

African Forestry Research Network (AFORNET)

Alice A. Kaudia

Introduction

Networking is currently considered by researchers and development actors as an effective way of disseminating and sharing information and knowledge. Networks focusing on research have also been considered strategic in pooling research resources to enhance capacity of institutions with limited resources (Odera and Pape Sall, 1994; ODI, 1999; Thornback and Brinkman, 1999). The role of networks in pooling research resources and research capacity building is particularly valuable in Africa, where investment in research by governments has been decreasing to negligible levels. Indeed, it is documented that in terms of level of investment, Africa is at the bottom line, investing only 0.29 % of Gross National Product (Ng, 1994). Because of low level of investment, research driven forestry development has suffered. Some critical factors have been associated with the weak forestry research capacity in Africa:

- In most countries, forestry is represented by small sections within large ministries of agriculture, often poorly equipped and rarely given high priority.
- Forestry educational resources are weak, both in terms of number of institutions and range of educational/training options.
- The management of natural forests is mainly confined to harvesting of valuable species, and therefore little research has been done on improving the residual forests. The research focus has been mainly on fast growing tree species for plantations.

Since the early 1980s, several forestry networks have emerged (Rockefeller Foundation, 1998). One of the main objectives of setting networks has been to solve some of the problems like poor funding, limited communication and dissemination of research findings, limited human resource capacity and weak regional inter-institutional linkages.

In 1994, the AAS in collaboration with IFS, convened a Symposium on 'Supporting Capacity Building in Forestry Research in Africa'. A key recommendation of the symposium was that a network focussed on consolidating research breakthrough by forestry researchers is necessary. This suggestion came in recognition of the need for continued building of research capacity of past and current recipients of IFS and AAS research grants. While pursuing this goal, the AAS recognized other regional and global forestry research networking initiatives, such as that of the FAO in the formation of

FORNESSA, capacity building activities of International Union of Forestry Research (IUFRO) activities and the European Tropical Forest Research Network (ETFRN). These initiatives were considered complementary. Hence, whereas AFORNET focuses on past and current grantees of AAS and IFS as the primary target group, the other networks cover a broader component, from which the AAS and IFS grantees can still benefit.

The Field Study

Between March and May 1998, the AAS commissioned a field study in selected countries in Africa to obtain opinions of potential stakeholders on the rationale for a network, and how it should function. Specifically, through consultative discussions with key informants, the study team was expected to:

- Take stock of the background of forestry training and research in selected institutions and identify the current situation , problems and challenges
- Identify research that could be addressed by scientists through collaborative research and highlight constraints and opportunities for such collaborative research and training through networking efforts
- Propose a mission statement, goal and main objectives of the proposed Network
- Suggest the most suitable institutional arrangements for the proposed Network
- Identify guiding principles to ensure self-reliance of the Network
- Make any other recommendation that would be relevant to ensure sustainability of the proposed Network.

During the study, the team visited 20 countries in Africa. Discussions were held with over 100 individuals in selected forestry research and education institutions and organizations.

Findings from the field consultative visits were reviewed and consolidated during the third follow-up meeting held in Addis Ababa in June 1998. This meeting synthesized the findings and generated the mission, objectives and activities for the network and a logical framework for the identified activities.

The Setting-up of AFORNET

This section presents the mission, objectives and activities of the network as synthesized by the Addis Ababa Meeting.

Mission

“The network shall promote quality forestry research and position Africa’s scientists so that they can generate and disseminate knowledge; support the application of science and technology in the management and use of forest resources and contribute to sustainable socio-economic development in Africa”.

This mission was formulated into a goal for the network:

“African forestry scientists carry out important and high quality research with assured and adequate funding and full international recognition”

This mission was set in recognition of the weak policy, institutional capacity and management settings, which have not favoured rapid development of forestry research capacity in Africa.

Objectives

- To increase individual and national research competence
- To promote collaborative research between scientists
- To facilitate the identification of common problems
- To facilitate information acquisition, generation, exchange and dissemination, both within Africa and between Africa and the rest of the world
- To facilitate application of research results by users
- To generate Programmes in forestry that strengthen skills of forestry researchers
- To increase the number of forestry researchers.

The meeting listed the research areas which respondents cited to have potential of benefiting from a research network. The listed areas were prioritized on the basis of current international conventions on forestry-allied fields, and the documented country-specific priorities. The conventions referred to were the biodiversity, combating desertification and climate change. The list was also based on current global trends in the development of tropical forests: for example, concerns of the Intergovernmental Panel on Forests (IPF) of the United Nations Commission on Sustainable Development, lessons from the Tropical Forests Action Plan and current debates on strategies for tropical forestry development as presented by recent initiatives like the ETRN.

A final consultative meeting was held in Harare in November 1998. The objectives of this meeting were:

- To provide a basis for the establishment and implementation of the network, based on a harmonized approach to the proposed scientific and technical activities.
- To identify priority areas and activities to be promoted at sub-regional levels.
- To agree on a strategy for inter-institutional collaboration and strengthened coordination between the key players in research, training and the management of scientific information and data.

The Harare Expert Consultative Meeting identified five research themes. The themes were prioritized as follows:

- (1) Natural forest management and biodiversity conservation
- (2) Community-based forestry
- (3) Reforestation and rehabilitation of degraded lands
- (4) Socio-economics and policy issues
- (5) Non timber forest products and lesser-known timbers

It was also recommended that the network should focus on the first three research themes without absolute exclusion of the last two in the long run. Key research issues and potential outputs were identified for each of the research areas. These were:

Theme 1: Natural forest management and biodiversity conservation

Key issues:

- Quantifying and clarifying the ecological features and functions of natural forest ecosystems.
- Valuing of forest products and services.
- Generating information on the silvics (autecology and synecology) of naturally-occurring species and natural forest silvicultural methods.
- Developing improved models for harvesting and utilizing forest products.
- Assessing the impact of harvesting forest products.
- Assessing watershed management impact.

- Harmonizing criteria and indicators for sustainable forest management.
- Germplasm conservation of important (plant and animal) species.

Potential outputs:

- Ecology and functions of natural formations described
- Resource assessment and valuation of natural forests completed
- Silvicultural protocols produced and silvics of species described
- Protocols for sustainable harvesting and utilization developed
- Guidelines for management practice for water conservation produced
- Criteria and indicators for sustainable management agreed and harmonized
- Programmes for gene conservation and germplasm supply drawn up

Theme 2: Community-based forestry

Key issues:

- Local communities must be beneficiaries.
- Agreements with communities must cover all types of forests, including plantations, natural forests and trees on farms.
- Ownership issues must be clarified to include both land and resources in communally owned land, privately owned land and state owned land.
- Institutional arrangements must be favourable to enable participation to be developed, so that policy and legislation encourage community involvement and to ensure optimal use of local and traditional knowledge.

Potential outputs:

- Management guidelines produced for different forest products and services
- Participatory research, co-learning and monitoring methods enhanced
- Information and skills exchange schemes implemented with communities

Theme 3: Reforestation and rehabilitation of degraded sites

Key issues:

- Need to identify and assess pressure on natural resources due to human activities resulting in degradation and deforestation
- The importance of assessing climate changes, especially drought resulting in loss of vegetation

- Reversing the use of inappropriate technologies, which result in soil deterioration and increased salinization
- The importance of controlling movement of sand and dust storms in relation to land degradation

Potential outputs:

- Suitable species and provenances for degraded and saline sites identified and germplasm made available
- Appropriate management technologies developed – especially to increase tree survival and growth
- Enhanced productivity and adaptation of trees to site, especially through genetic improvement
- Degraded sites rehabilitated by protection with natural regeneration and/or planting

Three regional nodes of the Network were formed and institutions to host the inaugural meetings were selected. The nodes and inaugural host institutions are:

Eastern and North-eastern Africa:	Kenya Forestry Research Institute
Western and Central Africa :	Forestry Research Institute of Ghana
Southern Africa:	Forest Research Institute of Malawi

A list of activities to be undertaken by the nodes was prepared. The activities are:

- Identification and invitation of nodal membership by February 2000. This is to be based on individuals within cooperating institutions
- Setting up nodal information centres. This includes identifying other existing databases and making them available to network members
- Fund raising activities
- Publication of information and newsletters as appropriate
- Formulating joint research projects
- Organizing and/or recommending training opportunities and workshops
- Monitoring/evaluation of nodal activities
- Maintain a nodal membership list, indicating themes of interest
- Establish national contact points.

Thematic Meetings and Publications

It was agreed that the first thematic meeting should be held in 2000, preferably in the first half of the year. The choice of theme and venue will be decided in consultation with AAS.

The title should be chosen in view of the possibility of collaborating with other African and international organizations. These thematic meetings will be used to launch a new publication series to be entitled "The Annals of the African Forest Network". This will initially be in both hard copy and electronic form. An editorial board will be drawn from all the nodes to ensure quick publication of papers after each meeting. This was preferred to the setting up of a new journal.

Training Activities

Modal personnel will be trained. The following subject areas were identified for prioritization by the nodes during the inaugural meetings:

- Research grant and proposal writing
- Report writing
- Research planning and management
- Research design and statistics
- Information management
- Risk assessment and evaluation
- Preparation of extension materials

Other Activities

Other proposed activities are:

Publishing

- (1) Producing a bibliography on grey and published literature on the research themes of the node
- (2) Listing unpublished information by subject area and country
- (3) Re-publishing important past information with limited current circulation.

Research guidance to younger scientists

The co-ordinator and other senior members of each node should give guidance to younger scientists and help to identify suitable people for inter-country exchange Programmes

Publicity

All nodes should publicize their role, including that in training of researchers, at any international and national meetings attended by network members

Identification of focal points

Nodes should identify priority common research areas between countries and assist in the establishment of focal points

Draw terms of reference for the node

Each node was expected to draw a final terms of reference after reviewing the proposal made during the Harare meeting.

Determination of training needs

Each node is expected to review and prioritize the training subject areas identified during the Harare meeting

Network thematic workshop

Make suggestions for the first thematic workshop to be held during the first half of 2000

New forestry journal?

Explore the need for a new "Journal of African Forest Research" and discuss the role of a new series of workshop publications "Annals of "AFORNET"

Production of training materials from research findings

Discuss how research findings can be translated into materials suitable for inclusion in forestry training courses.

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COUNTRY REPORTS ON FORESTRY SITUATION

1. Status of Forestry Sector in Kenya

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Introduction

The total area of land which can be put under wooded land-use in Kenya is estimated at 48.6 million ha. Out of these, 1.2 million ha. are under gazetted indigenous forests, 0.17 million are forest plantations, 9.5 million ha. are farmlands and settlements and 37.6 million are woodlands, bushlands and wooded grasslands (Merc., 1994).

It is estimated that a total of 30,000 ha. of forest estate are lost annually. Out of that total, 5,000 ha. are lost from natural gazetted forest to fire, encroachment and other reasons. About 6000 ha. are clearfelled annually from plantations and 19,000 ha. lost from bushlands and woodlands. Most of it lost to farmlands and settlement, which eventually partially develop into community forests.

Community-based forestry

According to FAO (1997), community forestry is a term used to describe the participation of communities in the management and use of forest resources. The community forestry approaches include social forestry, farm forestry and joint forest management. In Kenya, participatory involvement of communities in forest management after gazettement is limited. The more widespread approaches to community forestry management in Kenya are social and farm forestry (including agroforestry). The approaches are mainly practised in the area under farmlands and settlements, currently estimated to be over 9.5 million hectares. Farmland area is steadily expanding into the natural forests, plantations, woodlands and bushlands, through encroachment, degazettement and excisions.

In plantation forestry, communities have been involved in the establishment through "shamba system", under which local residents are allowed to cultivate areas earmarked for establishing forest plantations. Limited grazing was also permitted for sheep and cattle. Under the agreement, farmers benefited by producing food for themselves, while providing low-cost labour and security to the forests. The system was, however, abused by the Forest Department and farmers: the Department failed to provide proper supervision and gave more land to outsiders. In response, local shamba owners destroyed saplings to prolong their cultivation. The system had many advantages including fostering food security.

In natural forests, the issue of joint management has not been widespread as the practise of clearfelling is not applicable. However, certain communities with high dependency on natural forests have used them as common property. In such cases, joint management approaches have been accepted as normal practise. Examples of successful joint forest management can best be exemplified by "Ekwar" of Turkana Districts and "Kaya" forest of Coastal Province. The Ekwar forests are important for the survival of the Turkana communities as they provide food and fodder during dry seasons, while the Kaya Forest has been protected for religious reasons.

Ownership

The gazetted forest land is owned by government and is either managed by Forest Department or Kenya Wildlife Services or both. There are also other closed canopy forests gazetted as national monuments managed by the National Museums.

Outside the gazetted forests, the County Councils hold in trust for the local people some of the forests. It is estimated that the total area for such forests could be more than 100,000 ha. The management of such forests is, however, wanting as the County Councils do not employ forestry technical staff. These areas are sometimes subject to destructive harvesting as the management plans are not in place and direct control is lacking.

There are forest areas both indigenous and plantations, which are under private ownership. Some of them are important for catchment and streamline conservation purposes. Such land owners might not have the technical know-

how in management and should be provided with technical assistance. Within the farm areas, more technologies should be developed to optimize income and encourage raising of trees together with crops or livestock.

Natural Forests Conservation and Management

Distribution

The regional distribution of the closed canopy natural forests according to IUCN (1995) is as follows:

- (1) coastal forest regions consist of 82,500 ha. of indigenous forest
- (2) dry zone forest regions consist of 211,000 ha.
- (3) Montane forest regions consist of 748,500 ha.
- (4) Western forest regions have an area of 49,000 ha.

The main objectives of natural forest conservation and management are to conserve soil, water, biodiversity, modify climate and improve the productive potential of these forests. Forests reduce the speed of erosive forces, such as wind and surface run-offs, leading to good filtration of water into the soil. In protected (forested) catchment areas, the surface flow is controlled and siltation rate is reduced.

Deficiencies in resource assessment

Major deficiencies in natural forests resource assessment have been noted. In the past, forests were only valued for round wood, game and fuelwood, while the services such as catchment protection, biodiversity, climate change mitigation and social values were taken for granted. There is need to reassess the natural forests and value them for these other functions.

Production of round wood was accepted as the main purpose of natural forest and over-dependence on a few species has been a problem. Out of the estimated 2000 tree and shrub species in Kenya, less than 60 species have been used commercially. Research for understanding their ecology and management for sustainability has been limited

The methods that have been used in the harvesting of wood in natural forests have been inefficient. In natural forests, mixed species grow together. Usually the harvesting is selective with little or no attention given to the young trees or

other species in the vicinity. Trials on filling the gaps through enrichment planting have proved to be expensive since the ecology of most of the species is not well understood. The harvesting of non-timber forest products is rampant, hence difficult to quantify.

Water catchment management

About 4% of the land in Kenya is categorised as mountaineous with major escarpments that form watershed areas covered by about 70% of the forest land. These areas are characterized by steep slopes and potentially erodible soils. It is suggested that changes of land use to arable production on areas with over 12% slope, should be accompanied by terracing or contouring. Any areas changed to pasture should be maintained with permanent vegetation cover.

Criteria and indicators of sustainable forest management

Criteria and indicators for sustainable forest management must take account of the relative importance of the various services provided, as well as the different levels of threats to the forest area (Table 1.1). The values and services provided by forests and their respective threats have been grouped into the following major categories:

Criteria	Threats
Biodiversity	Over-exploitation
Environmental protection	Pressure for conversion
Commercial wood production	Habitat by wildlife or fire
Local forest use	
Tourism and recreation	
Institutional support	

Germplasm conservation

Germplasm conservation of important tree species is mainly done in field gene banks, which include plantations, seed orchards and tree banks. There are other plants and animals that are classified as endangered, threatened or rare and endemic, which are protected in the National Parks and Game Reserves. These cover 4.4 million ha. of land. In total, there are over 80 species of plants classified as rare and about 46 mammals threatened. A few highly endangered species of plants of potential agricultural importance are conserved in the National Gene Bank at Muguga.

Table 1.1. Criteria for assessing individual forests

General Criteria	Detailed Criteria
Biodiversity	<ol style="list-style-type: none"> 1. Habitat rarity 2. Species richness 3. Threatened species
Environmental protection	<ol style="list-style-type: none"> 1. Soil protection 2. Water catchment protection 3. Local spring-line water source
Commercial wood production	<ol style="list-style-type: none"> 1. Commercial timber and posts 2. Fuelwood and charcoal 3. Potential commercial production
Local Forest use	<ol style="list-style-type: none"> 1. Firewood, pole-wood and charcoal 2. Honey and medicine 3. Grazing and thatching
Tourism and recreation	<ol style="list-style-type: none"> 1. International tourist value 2. Local and recreation 3. Education and research
Institutional support	<ol style="list-style-type: none"> 1. Generation of recurrent revenue 2. Effectiveness of organization 3. Effective infrastructure
Threats	<ol style="list-style-type: none"> 1. Over-exploitation 2. Excision and development 3. Population pressure and forest size 4. Habitat damage by wildlife or fire

Reforestation and Rehabilitation of Degraded Lands

Causes of degradation

Poor land-use planning and practices can lead to degradation of land in natural forests, plantations and farmlands, creating sites that require reforestation and rehabilitation. In natural forests, the ban on harvesting of live indigenous trees has created a lucrative market for indigenous timber. Due to high demand, a lot of illegal selective felling continues, leaving the natural forest degraded. Such sites are usually filled with fast growing pioneer species of low value.

In plantation forestry, extensive clearfelling without proper management plan for reforestation or natural regeneration, is the root cause of gaps filled with weedy species. Such areas later require high resource in-puts for intensive land preparation before planting.

There are also poor cultivation and on-farm management practices that cause land degradation. In places where farmers have a lot of land, some practices such as shifting cultivation and short natural fallow may lead to erosion and loss of soil fertility. Such sites could either be rehabilitated through short planted fallows with legume trees/shrubs or by afforestation.

Most of the areas that can be classified as degraded lands are located in the arid and semi-arid lands (ASALs), which covers 80% of the total land area. Additional areas can be found on mining sites. Accelerated degradation in ASALs may be attributed to harsh environmental conditions and the heavy dependency on natural vegetation.

In drylands, degradation may be reduced through controlled grazing and stocking of cattle.

Socio-Economics and Policy Issues

The management of forest resources is governed by the National Forest Policy. The version in use was published in 1968. A new version drafted in 1994 has not been published. The 1968 Forest Policy focused on catchment protection and timber production with strong government control of the forest sector. The current draft policy has shifted the emphasis to the contribution of forest to the benefit of communities. It also recognizes international environmental and other forest conventions and principles.

The policy is implemented through the Forest Department with the mandate to manage gazetted forest reserves. A complementary role in management is fulfilled by the Kenya Wildlife Services with the mandate to manage indigenous forests occurring within the National Parks, National Reserves and Sanctuaries. The two organizations currently work closely under a memorandum of understanding for joint management of selected indigenous forests of particular importance.

The forest policy is backed by other policies such as the National Environmental Policy and several legislative frameworks. There are 12 Legislative Acts directly touching on forest sector, including the Forest Act and Timber Act. At local levels the forest sector is protected by the Chief's Authority Act.

Non-wood Forest Products and Lesser Known Timbers

FAO (1995) defined NWFP as goods of biological origin other than wood derived from forests and allied land use. The non-wood forest products (NWFP) extracted from the indigenous forests are diverse and were traditionally used for subsistence, but of late large quantities are sold for cash income. The NWFP plays a major role in the welfare of the communities by providing food and nutrition, medicine, employment, income and contribute to foreign exchange earnings through services such as tourism and ecotourism.

In areas where medical facilities are limited, the local communities mostly depend on medicinal plants for human and animal treatment. In the area around Arabuko Sokoke, up to 108 forest species are regularly used for medicinal purposes (Lukundu, 1991) and 64 species by the Mau forest dwellers (Lubanga, 1991).

Gum arabic is a product of *Acacia senegal*, *A. seyal* and other closely related species which are naturally distributed in the arid and semi-arid lands. The gum is a commodity of international trade as it is used in food, beverage, pharmaceutical, printing and textile industries (Chikamai, 1998). The other NWFP from the dry regions include frankincense and myrrh, which are also used in industries to produce fragrances and pharmaceuticals.

Other NWFP include meat and artifacts of animal origin, such as brushes made from ostrich feathers. Large supply of game meat is often obtained from special ranches where there are deliberate interventions to increase the production,

such as the Elangata Wuas Ecosystem Management Programme now known for ostrich farming (Odera, 1998). Otherwise, on subsistence basis most communities around the forest have been hunting birds and small mammals for meat.

Out of the estimated 2000 tree and shrub species in Kenya, less than 60 species are well known in the commercial sector. The remaining are less known in the commercial circles, but have played important roles in art and crafts, such as wood curving, basket making, and making of musical instruments, handles for implements and other domestic utensils.

Training

Training in forest management and allied land-use is conducted in several institutions in the country. The Faculty of Forest Resources and Wildlife Management at Moi University, provides special training from graduate to post-graduate level in all areas of forestry. Allied training in Natural Resource Management and Environmental Sciences are being provided at Egerton University and Kenyatta University. Faculties of Botany University of Nairobi and Kenyatta are also providing complementary training for forest scientists.

Londiani Forestry College has been the training centre for foresters at certificate and diploma levels. Training on Environmental Sciences at a similar level is provided by Kenya Polytechnic. Londiani also trains forest guards. A similar training on handling of firearms and drill is provided by the Kenya Wildlife Services at Manyani Training School.

Industrial training on utilization of forest resources is provided at Forestry Industrial Training College in Nakuru.

KEFRI provides both regional and national in-service training on seed handling and social forestry in its two centres at Muguga and Kitui. The training in KEFRI has also facilitated information exchange. During the courses, participants have always been given copies of the latest publications.

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2. The Status of Forestry in Uganda: A Country Report

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Introduction

Uganda has a total land area of 241,000km², out of which 12% or 30,980 km² is gazetted. Out of the total protected area, 12,757 km² are forest reserves under the Forest Department and local governments, while Game Reserves and National Parks cover 321,000 ha.

The combined effect of high economic growth and population growth has a significant effect on the forestry sector. Rural areas support 90% of Uganda's population. The rural and urban population use woodfuel for domestic energy needs. In urban areas, charcoal is the main source of energy. Fuelwood consumption is estimated at 16.7 million tons annually, while annual charcoal production is estimated at 418,000 tons (statistics department MPED, 1997). Consequently, wood energy provides 92% of the total energy requirements, while petroleum and electricity provides a total of 18.7 petajoules (PJ) of energy equivalent to 8% of Uganda's energy requirements.

There is a building boom in the country with 10% p.a growth rate in the construction sector. Similar growth rates have also been experienced with regard to forestry products directly used by the construction industry such as sawn timber and poles. Other sectors which are dependent on fuelwood and charcoal and are experiencing high growth rates, include hotels and restaurants, tea, tobacco and brick making.

Demographic projections show that urban population will soon be 20% of the 1991 population (16 millions) With increased urban population, it is expected that there will be a corresponding increase in consumption of forestry products.

Uganda's economy is based on agriculture and the contribution of the agricultural sector to GDP was estimated at 54% in 1993/94 (Gov, 1995). As a result, the combined effect of population growth and agricultural expansion will adversely affect the availability of forest products. Table 2.1 shows the predicted impact of Agricultural expansion on forest vegetation cover.

Table 2.1. Predicted effect of Agricultural expansion on forest vegetation (1993-2000)

Forest Vegetation	Area 1993/94 Km ²	Area in 2006 Km ²
Plantation	350	500
Tropical high forest (fully stocked)	6,500	5,000
Tropical high forest (degraded)	2,750	2,200
Woodland	39,750	29,000

Source: National Biomass Study Report, Forest Department, 1997

Most of the agricultural expansion occurs in the woodlands and it is predicted that vegetation cover would decrease by 30% over a period of 15 years. Woodlands provide the bulk of firewood and charcoal for use in urban area. Therefore, there is need to balance economic and population growth with investments in sustainable forest resource use and management.

Uganda's Forest Policy

The overall objective of the Forest Policy in Uganda is to balance the consumption of forest products with the annual forest increment, minimizing the use of forest capital. The specific objectives of the 1988 Forest Policy in Uganda are:

- To maintain and safeguard enough forest land to ensure sufficient supplies of forestry products and services
- To manage the forest efficiently to optimise economic and environment benefits to the country
- To promote an understanding of the needs for forest and tree products through sensitization workshops, open days and scientific research
- To promote environmentally sound forest harvesting, biodiversity conservation and ecosystem approaches to forest management
- To encourage research in all aspects of forestry

Natural Forest Conservation and Management

The Forest Department has been re-located into various ministries over the last 10 years. Beginning in 1987, it was moved from the Ministry of Agriculture and Forestry to Ministry of Environmental Protection, then to Ministry of Water, Energy and Minerals, then to Ministry of Natural Resources and now it is under the Ministry of Lands, Water and Environment. These series of ministerial re-locations have weakened the department rather than strengthened it as evidenced by the splitting of the role of forest-related institutions. The following institutions all have a role to play in the forestry sector with sometimes conflicting roles and responsibilities rather than complimentary:

- Uganda Wildlife Authority (UWA)
- National Environment Management Authority (NEMA)
- Energy Department
- Ministry of Industries and Tourism
- Ministry of Agriculture, Animal Industries and Fisheries

There is no clear government policy on coordination of the above institutions' activities.

Since 1992, the Forest Department has been subjected to restructuring under the Public Service Restructuring Programme. The latest development is that the government is de-versting itself from running the department and has proposed to create a semi-autonomous body to be known as the National Forest Authority (NFA). The assumption is that the authority will have enough resources to generate its own finances to support its development goals. So far, the immediate task is to restructure the department and formulate forestry development Programmes, policies and legislation in preparation for forming

this authority. In this regard some donors have expressed interest in supporting the department's initiative.

Sustainability of the forest resource has been one of the major goals of the Forest Department as envisaged in the Forest Policy. Over the years, the department has been faced with increased challenges of realizing this goal. Table 2.2 shows the trend in Tropical High Forest (THF) cover loss in the last 88 years.

Table 2.2. Historical trends in tropical high forest (THF) cover (1900-1987)

Year	THF area (ha.)	Share of land area %
1900	3,090,000	12.7
1926	2,627,700	10.8
1958	1,117,600	4.6
1967	688,937	2.7
1978	732,000	3.0
1985	765,000	3.2
1987	729,865	3.0

Source: *Forest Department Report 1994.*

Since 1987, the rate of deforestation and degradation of forest resources has been halted. Through the forest rehabilitation project, forest boundaries were re-opened and enrichment planting carried out in degraded forests.

Table 2.3 shows the projected changes in land cover up to the year 2006 as derived from the estimated rate of deforestation of 70,000 ha. per annum by the National Biomass study.

Recent Initiatives in the Management of Natural Forests

With financial support from the Global Environment Facility (GEF) and European Economic Commission (EEC), 60% of the forest estate perceived to have important biodiversity resources has been put on the inventory and the reports published. The results of this inventory have been used to establish 20% of its estate as strict nature reserves, 30% as a buffer zone with limited harvesting and the remaining 50% for harvesting on a sustainable basis. Baseline data for the long term ecological monitoring of Uganda's forests has also been established. Currently, Uganda is implementing the cross-border biodiversity project funded by GEF and United Nations Development Programme (UNDP).

Table 2.3. Changes in vegetation cover with time

Forest type	1993/94 area (Km ²)	2006 (Km ²)	Change (Km ²)
Eucalyptus plantation	190	250	60
Conifer plantation	160	250	90
Tropical High forests (fully stocked)	6,500	5,000	-1,500
Tropical High forest (degraded)	2,750	2,200	-550
Woodlands	39,750	29,000	-10,750

National Biomass Study Report, 1997.

Reforestation and Rehabilitation of Degraded Lands

To date, investment in forestry related enterprises is mainly in the forest industries and to some limited extent afforestation Programmes by the private sector. In the last 5 years, about 50 new portable sawmills with an average capacity of 4000m³ per annum, have been installed in the conifer plantations.

Current estimates put the total investment in saw milling machinery well over US\$ 3 million.

There are also three large-scale investors engaged in afforestation work. Their total planting target is about 140 ha. per year. So far about 500 ha. have been planted at an investment cost of approximately US\$ 300,000. The Forest Department has also been encouraging small scale tree farmers to establish peri-urban pole and fuelwood plantations. Their total plantation establishment over the last 5 years is estimated to be about 2500 ha. The total investment by small -scale tree farmers in peri-urban plantations has been about US\$ 1.2 million over the last 5 years. This figure contrasts sharply with the Forest Department's investment in afforestation Programmes over the last 2 years with about 100 ha. of pines planted so far.

In addition to the forest rehabilitation project, the following initiatives have been undertaken under the national tree planting programme, which was launched in 1992:

- Establishment of the Tree Seed Centre under the support of United Nations Sudano-Sahelian Office (UNSO) and Norwegian Agency for International Development (NORAD)
- Implementation of a DANIDA supported Farm Forestry Project in 18 districts in the country
- Implementation of Lake Victoria Catchment Pilot Afforestation Project, where over 400,000 seedlings have been raised in conjunction with communities in 5 districts around Lake Victoria.
- Private sector support (e.g. GEF/UNDP Small Grants Programme) for tree planting, whereby Non-governmental Organization (NGO), Community-Based Organizations (CBOs) and commercial investors have been supported to actively participate in massive tree planting in.

Constraints Faced During Reforestation and Rehabilitation of Degraded Lands Initiatives Include:

- Lack of effective extension services
- Low prices of forest produce from government controlled lands
- Inadequate supply of quality tree seed
- None conducive land tenure policy
- Inadequate private sector investment support in tree planting activities

- ineffective utilization of the forest resources for industrial purposes
- unsustainable timber production systems and low lumber recovery percentage (40-50%) due to inappropriate harvesting techniques and inefficient timber conversion technology
- low stumpage prices that do not take into account management, harvesting and forest replacement costs
- institutional instability in the natural resources and environmental protection sector
- shortage of funds, facilities and trained manpower
- lack of commercial forest management that allows the use of funds generated from the sale of timber from NFPA's.

It is evident that further depletion of the rapidly declining high forests will be inevitable, if the constraints are not addressed urgently by the government.

Woodlands and bushlands

Savannah woodlands that occur mainly in the pastoral and agro-pastoral zones are important sources of fuelwood products such as gums, incense, myrrh and honey for the local communities.

There are several constraints associated with the establishment of sustainable woodland and bushland management (EFAP, 1994; Tilaya, 1998). These include:

- inability of pastoralists (due to their periodic absence from the land), to prevent other groups from using woodlands and bushlands, and disputes among different social groups over property rights of the resources
- difficulties in developing a viable collective management system, which balances the benefits different groups prefer to obtain (e.g interests in collection of fuelwood vis-a-vis construction and grazing interest)
- availability of limited information on the extent and condition of woodland and bushland resources, land use pattern, modalities of defining traditional access rights to the resources and lack of information on indigenous management practices
- absence of extension packages for improved woodland and bushland management and the inability of the extension services to foster co-operation between local communities and the government in the management and sustainable utilization of woodlands and bushland resources.

Current estimates put the total investment in saw milling machinery well over US\$ 3 million.

There are also three large-scale investors engaged in afforestation work. Their total planting target is about 140 ha. per year. So far about 500 ha. have been planted at an investment cost of approximately US\$ 300,000. The Forest Department has also been encouraging small scale tree farmers to establish peri-urban pole and fuelwood plantations. Their total plantation establishment over the last 5 years is estimated to be about 2500 ha. The total investment by small -scale tree farmers in peri-urban plantations has been about US\$ 1.2 million over the last 5 years. This figure contrasts sharply with the Forest Department's investment in afforestation Programmes over the last 2 years with about 100 ha. of pines planted so far.

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- Inadequate supply of quality tree seed
- None conducive land tenure policy
- Inadequate private sector investment support in tree planting activities

Community Forestry in Uganda

The Forest Department is now in the process of involving local communities and other stake holders in forest management. This process has been termed Collaborative Forest Management (CFM).

A number of forests have been selected as pilot areas for the promotion and implementation of Collaborative Forest Management (CFM). A coordinating unit has been established at the Forest Department to spearhead and coordinate the Programme.

In Uganda, community forestry is taking place in the following forms:

- Local authorities are establishing and managing local forest reserves for local benefits
- Collaborative forest management in government forest reserves, with 40% of the revenue managed by local committees
- Private farmers establishing plantations on short term lease of gazetted forest land

Government provides short term leases at affordable rates (1US\$ per ha./year) to interested individuals or groups of individuals.

The need to involve local communities in the management of forest reserves may be attributed to the following:

- Continued degradation and deforestation
- Corruption among government officials
- High cost of monitoring forest resources
- Lack of funds to carry out afforestation programmes
- The current Programme of decentralization of administration to the Districts

Constraints to community forestry (CF)

The main constraints to the operationalization of CF include:

- Lack of legal framework supporting collaborative management of forest reserves

- Local communities would like to own the forest reserves (to own the trees and land) in which they are collaborating
- Conservative traditional foresters are hindering the implementation of CF

Non-Timber Forest Products

Non-timber forest products are fibres, food, medicines, resins, dyes and animal products. Other services from the forest such as recreational activities and tourism are extremely important in most forest reserves. Considerable eco-tourism has been actively promoted by the Uganda Wildlife Authority (UWA) e.g. guerilla tracking in Bwindi. The forest estate under UWA is 3230 km², mainly of THF and high altitude forests.

The Forest Department is piloting eco-tourism in three forest reserves: Budongo, Mabira and Mpanga Natural High Forests. These forests are rich in biodiversity.

However, wood energy is the most important non-timber forest product. Wood energy provides 92% of the total energy requirements for Uganda.

Training Activities

The Faculty of Forestry and Nature Conservation (formerly the Department of Forestry) at Makerere University and Nyabyeya Forestry College, are the two institutions responsible for training foresters at professional and technical levels, respectively. It has been proposed that Nyabyeya Forestry College which is now under the Ministry of Education, should be linked to the Faculty of Forestry and Nature Conservation as a constituent college.

Under the new Faculty, the following degree Programmes have been proposed:

- (1) BSc. Forestry
- (2) B.Community Forestry
- (3) BSc. Wood Science and Technology
- (4) B. Rural Resource Management
- (5) BSc. Wildlife Management (to be offered jointly with Faculties of Science and Veterinary Medicine).

Conclusions

The main responsibility for managing Uganda's forest resources is vested in the Government Forest Department for central forest reserves, the district authorities for local forests and UWA, for forests delineated as National Parks. On the other hand, the National Environment Management Authority (NEMA) ensures that all forest resources are managed in a sustainable manner.

At present, the government is relieving itself from running the Forest Department and is in the process of creating a semi-autonomous body to be known as the National Forest Authority (NFA). The assumption is that the authority will have enough resources to generate its own finances to support its development goals. Meanwhile, the government is encouraging private investment in forestry-related enterprises, such as forest industries and afforestation Programmes.

The Forest Department is in the process of implementing community forestry in the country. Pilot studies have been carried out and a number of memoranda of understandings have been made with communities.

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3. Status of Forestry Development, Conservation and Utilization in Ethiopia

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Introduction

Country profile physiography and population

Ethiopia occupies the interior of the Eastern Horn of Africa stretching between 3 and 180° North as well as 33 and 48° East, with a total area of 1.13 million km² (Anony, 1988). In size, it is the ninth largest country in Africa. The population is 55 million (CSA, 1996), with 3% annual growth is approximately the third most populated country in the continent. Out of the total population of the country, 46.7 million live in rural areas, while 8.2 million live in urban areas. The average population density in Ethiopia is about 34 persons/km², and ranges between 8 and 95 persons/km² (Anony, 1988).

Forest and Woody Vegetation Resources of Ethiopia

The available information on the forest and woody vegetation resources of Ethiopia is very limited. There is inadequate information on location, extent and volume of the standing growth stock, annual growth rates or rates at which these resources are being depleted. Although there is controversy over the precise figure of the former forest cover in Ethiopia, historical sources indicate that forests used to cover large areas of the Ethiopian highlands (Logan, 1946; von Breitenbach, 1963; Anony, 1988; Friis, 1992; Rodgers, 1992). The natural high forests of Ethiopia, which were estimated to have once covered a large part of the country, declined to only 4.4 % by 1960 (von Breitenbach, 1962), 3% in the 1980s (Anony, 1988) and to about 2.3% at present (Rogers, 1992; GTZ, 1997). Forests disappear at the rate of 150,000-200,000 ha./year. The country might be completely deforested in a few decades (Anony, 1994),

The loss of forest resources is especially severe in the Ethiopian highlands. The transformation is most advanced in the north and east of the country, where the population has been concentrated for many centuries. It is only in parts of the south and south-west that many forest blocks remain and these forests are under serious pressure from agricultural development and resettlement.

Types and area coverage of forests

The forest resources of Ethiopia had been estimated to cover more than 27.5 million ha. of land in 1992 (EFAP, 1994). These resources comprise natural high forest, categorized as slightly and heavily disturbed high forests, woodlands, bushlands, plantations and on-farm trees (Table 3.1).

Table 3.1. Estimates of the area, growth stock, and Incremental yields of the various forests (EFAP, 1992)

Forest Resources	Areas (Million ha.)	Growth Stock (M ³ s/ha.)	Annual Incremental Yields	
			Per Unit Area (M ³ s/ha./y)	Total (Million M ³ s)
Natural High Forest:	2.3	-	-	0.3
slightly disturbed	0.7	90-120	5-7	-
highly disturbed	1.6	30-100	3-4	-
Woodland	5.0	10-50	1.2	6.4
Bushland	20.0	5-30	0.2	4.0
Plantations	0.2	-	9.6-14.4	1.6
Farm forests	NA	NA	NA	NA

* NA - Not Available

Natural high forests

Natural high forests are commonly defined as land covered by a closed stand of trees with a more or less continuous canopy rising 7 to 30m and a sparse ground cover of few grasses. Ethiopia's remaining natural high forests include various types of montane forests concentrated in the less populated southern and western parts of the country. The central and northern parts are almost completely deforested. Humid, mixed forests occur in southern Ethiopia and Harare region, with trees of *Podocarpus*, *Croton*, *Olea*, *Schefflera* and *Hagenia* at higher altitudes. In the south-west, broad-leaved forest, *Aningeria adolfi-friederici* is the main emergent, growing to 40 m. Bamboo, (*Arundinaria alpiina*) is found in clumps within the high forests.

Woodlands and bushlands

In Ethiopia, woodlands and bushlands are largely restricted to the agro-pastoral and pastoral zones. The lowland woodland includes species of various *Acacia*, *Boswellia*, *Commiphora*, *Balanites*, *Euphorbia*, *Combretum* and *Croton*. In the mountain woodlands, the main components are *Acacia abyssinica*, *Protea*, *Cussonia*, *Hagenia abyssinica*, *Erica arborea*, *Hypericum* and *Juniperus procera*.

Plantations

Plantations include industrial and peri-urban plantations established and operated by the government, as well as community woodlots and catchment/protection plantations. Eucalyptus and Cupressus are the main species in industrial plantations (58 and 29%, respectively), followed by *Juniperus procera* (4%), *Pinus* (2%) and other species (7%). Peri-urban plantation, created to supply urban centres with poles and fuelwood, are located around Addis Ababa and other major towns. Community woodlots are plantations created and managed by groups of farmers or a community. They can be either protection-oriented or production-oriented (e.g. woodlots for fuelwood). The community woodlots, similar to the peri-urban plantations, consist mainly of *Eucalyptus globulus* and *Eucalyptus camaldulensis*.

Farm Forestry

Despite the fact that farm forestry (FF) practices are not well studied and documented, traditional practices exist in various forms throughout the country (EFAP, 1994).

According to EFAP (1992), FF is among the six core sub-programmes identified to be developed within "The Tree and Forest Production Programme (TFPP)". This shows the strategic shift from public to farmer-based sector forestry development. The objectives of Farm forestry Development (FFD) are to:

- promote the integration of trees into farms to produce fuelwood, poles and fodder
- promote sound arable land management
- increase total agricultural production, even though some of the arable land will be allocated for tree production.
- Establish secure land and tree tenure for the farmer
- Establish an effective, integrated and participatory service,
- Target input subsidies to support the adoption of farm forestry practices
- Secure an adequate initial supply of seedlings from government-operated nurseries until farmers or communities can produce seedlings
- Collaborate with local organizations, development associations, elders and religious leaders, where appropriate.

Community Forestry

In Ethiopia, community forestry has been undertaken for two main purposes: to provide fuelwood and construction material for the community and to reclaim degraded areas, particularly hillsides. Communal woodlots, 10 to 80 ha. in size, used to be maintained by producer cooperatives that were established during the Socialist Government. However, less than 5% of Ethiopian farmers were involved. As a result, the communal woodlots covered a small area of 20,000 ha. (EFAP, 1994).

As part of its soil and water conservation programme, the Ministry of Agriculture (MOA) initiated catchment/protection plantation on a large scale in the late 1980s. The plantations were of varying sizes, up to 80 ha. Larger plantations were officially state plantations. The plantation establishment was

undertaken with "food for work" support from the World Food Programme, mainly in food deficit areas. As these plantations were established using a state forestry development approach, farmers participatin in their establishment or management was limited. In addition, no compensation was offered for the loss of grazing and/or other types of land. After establishment, guards were employed by the government and posted to protect the forests. There was no arrangement for benefit sharing. Neither community members nor local organizations were allowed to use the forests, except the grass growing in the plantation area that could be used by members of the Peasant Association on a cut and carry basis. Thus, while the plantations were referred to as community or protection forests, the farmers largely considered them to be state forests.

Since little or no community labour went into plantation maintenance, the main burden for maintenance fell on the governeemt, which did not have the resources for this work except "food for work". Hence, most of the plantations failed to produce the desired results due to low survival rates and lack of maintenance. When community woodlots were eventually handed over to the local communities during the second half of 1991, no help was provided for their management. As a result, most of the community plantations established during the 1980s with the help of World Food Programme have largely been destroyed. This has given community forestry a negative reputation among rural communities, that will take some time to change.

The main factors that constrain the development of community woodlots and/or catchment/protection forests have been summarized by EFAP (1994). These include:

- *The Public Good Problem.* Protection downhill agricultural and grazing land by tree planting on steep slopes, produces benefits that cannot be appropriated solely by any single individual or, in some cases, by a single community. Those that plant and maintain trees, receive only a fraction of the total benefits, i.e small amounts of fuelwood and poles. The main benefits of reduced erosion, i.e higher crop yield downstream, stabilization of the watershed, and sustainable biodiversity, accrue to the population at large. Incentives to farmers, especially uphill inhabitants is necessary.
- *The Free Rider Problem.* Whereas all farmers in the watershed may support the protection scheme, most would prefer to count on their

- ineffective utilization of the forest resources for industrial purposes
- unsustainable timber production systems and low lumber recovery percentage (40-50%) due to inappropriate harvesting techniques and inefficient timber conversion technology
- low stumpage prices that do not take into account management, harvesting and forest replacement costs
- institutional instability in the natural resources and environmental protection sector
- shortage of funds, facilities and trained manpower
- lack of commercial forest management that allows the use of funds generated from the sale of timber from NFPAs.

It is evident that further depletion of the rapidly declining high forests will be inevitable, if the constraints are not addressed urgently by the government.

Woodlands and bushlands

Savannah woodlands that occur mainly in the pastoral and agro-pastoral zones are important sources of fuelwood products such as gums, incense, myrrh and honey for the local communities.

There are several constraints associated with the establishment of sustainable woodland and bushland management (EFAP, 1994; Tilaya, 1998). These include:

- inability of pastoralists (due to their periodic absence from the land), to prevent other groups from using woodlands and bushlands, and disputes among different social groups over property rights of the resources
- difficulties in developing a viable collective management system, which balances the benefits different groups prefer to obtain (e.g interests in collection of fuelwood vis-a-vis construction and grazing interest)
- availability of limited information on the extent and condition of woodland and bushland resources, land use pattern, modalities of defining traditional access rights to the resources and lack of information on indigenous management practices
- absence of extension packages for improved woodland and bushland management and the inability of the extension services to foster co-operation between local communities and the government in the management and sustainable utilization of woodlands and bushland resources.

Currently, only basic information on the vegetation zones is available. Information on many details, such as species composition and ecological processes, is lacking. Nevertheless, the use of these vegetation zones makes it possible to identify important regions and representative ecosystems in need of conservation.

Conservation of biodiversity

Biodiversity conservation by government organizations has a shorter history in Ethiopia than in many other countries of Eastern Africa. The focus of conservation in Ethiopia has been on large fauna, i.e. large mammalian

herbivores, ostriches, crocodiles and their predators and, to a lesser extent, birds. It is generally believed that rural communities had, and to some extent still have, traditional resource management practices, including some elements of biodiversity conservation. There seems to be little systematic documentation of such practices.

The then Plant Genetic Resources Centre (PGRC) of Ethiopia (now Institute of Biodiversity Conservation and Research, (IBCR), has been largely responsible for the conserving and undertaking of research on biological diversity in the country by proclamation (Federal Negarit Gazeta, 1998). Established in 1976, IBCR has collaborative ties with a large number of international bodies.

The National Tree Seed Project (NTSP), was initiated in 1992. One of the objectives of NTSP is to identify, protect and conserve, existing well adapted tree seed sources of high priority (indigenous and exotic species). This is to be achieved by *in situ* or *ex situ* conservation of seed sources of indigenous species, currently threatened with genetic erosion or extinction.

Constraints

The constraints that limit the effective conservation of ecosystems and genetic resources in Ethiopia are summarized as follows:

- Lack of coordination of conservation activities
- Lack of mechanisms to use eco-tourism and other revenues from Parks and Sanctuaries, etc. for conservation purposes
- Shortage/lack of qualified personnel and training opportunities
- Absence of specific training in biological conservation in Ethiopia
- Inadequate database

- Poor forest management practices
- Low awareness of people about environmental issues
- Little participation at local level
- Technical problems with regard to *ex-suit* conservation of genetic resources
- Difficulty of assessing adequate coverage of representative or otherwise important Ethiopian ecosystems
- Often, endemic species are concentrated in the montane areas and arid lowlands, yet most national parks and sanctuaries cover species occurring in a wide altitudinal belt or at medium altitude, which are generally widespread and relatively common in Eastern Africa
- In terms of the major vegetation zones, it is apparent that several important ecosystem types are not being covered by current conservation efforts. These include:
 - (i) most Afromontane Forest Types, e.g. *Juniperus*, *Podocarpus*, *Hagenia*, etc.
 - (ii) moist lowland forest
 - (iii) Combretaceous Bushlands
 - (iv) *Acacia-Commiphora* bushlands
 - (v) Semi-desert Grassland
 - (vi) Stony Desert Vegetation.

Reforestation and Rehabilitation of Degraded Lands

Non-Wood Forest Products

In Ethiopia, non-wood forest products cover a wide range of products. They are naturally produced by certain forest species of the genera, such as *Boswellia*, *Acacia*, *Olea*, *Hagenia*, *Eucalyptus*, *Commiphora*, *Pinus* as well as by bamboo, palms, reeds, grasses and residue products after liquidating lumber.

The most important non-wood forest products in Ethiopia include:

- honey and wax, bamboo (*Arudinaria alpina*).
- (*Oxytenanthera abyssinica*), reeds (*Arundo donax*), wild date (*Phoneix reclinata*).
- Gum Arabic (from *Acacia albida* and *A. senegal*).
- resin from soft wood species.
- coffee, spices and incense (*Commiphora* spp., *Boswellia* spp.).
- edible plant products (fruits, seed, edible oil, fat and fodder).

- fibres.
- essential oils, tannins, dyes, resins, gums and latex.
- ornamental plants.
- giant/long grasses, which can be used to produce panel products .
- raw grass as roofing cover for local house construction, edible and non-edible animal product.
- medicine.
- mushrooms.
- various extractives.
- flavourings, sweeteners, balsams and pesticides.

Bamboo can be used as substitute of wood: as building material, poles, fences, water pipes, bags, tools, musical instruments, walking sticks, shuttle and weaving materials, furniture, pulp and paper, fishing rods. The promotion of bamboo as substitute for sawn wood in the production of low-cost furniture, construction and other materials, should be supported by applied research. Solid bamboo has been tested as a concentrate reinforcement or substitute steel and the results have revealed success. However, further investigation including regeneration of the resource and prototype tests are needed, before wide application of the results.

The Ethiopian climate and extended flowering season are favourable for apiculture. The annual production of honey is some 24,000 tons, equal to about one third of the total production in Africa (EFAP, 1994). The potential of honey and wax production has been seriously reduced by the destruction of the natural vegetation that provides the sources of nectar. Up to now, honey production in Ethiopia has been mainly based on traditional methods, using hives made from naturally occurring materials suspended in trees to attract swarms of local bees. Production from traditional hives is low, the average is 8 kg of honey and 1 kg of beeswax per hive annually.

Gums and incense are collected from several Ethiopian trees and shrubs. They are used for making different beverages, medicines and water-soluble glues. Incense is mainly used in religious rituals as well as in traditional coffee ceremonies to produce aromatic smoke. About 1,500 tons of gum and incense is sold annually through official trading channels. Nearly 50% of the produce is exported (EFAP, 1994). The demand for incense exceeds the supply.

Constraints

- Degradation and the gradual destruction of natural resources, on which both apiculture and the collection of gum and incense depend, are the biggest threats
- In-efficient methods of production, harvesting and processing of non-wood forest products
- Lack of adequate research on the biology, ecology, management, harvesting techniques, processing, marketing, indigenous knowledge and economic importance of species with valuable non-wood products

The Policy Framework for Forestry Development

The Federal and Regional Governments of Ethiopia, recognize the economic, ecological and social values of forests, and support their conservation and management for sustainable use. However, there is no formal forest and land use policy in Ethiopia. A definite policy framework is a prerequisite for the proper planning and implementation of the development, sustainable utilization and conservation of forest resources. Recently, the Ministry of Agriculture has formulated a forest policy that is under consideration and discussion by the relevant stakeholders. When the final draft of the policy is ready, it will be submitted to the Council of Ministers for approval.

The "Forestry Conservation, Development and Utilization Proclamation No. 94 of 1994" is the current policy statement that governs the management and conservation of forests in the country (EFAP, 1994; million, 1998). The proclamation states that "the sustainable utilization of the country's forest resources is possible through the participation of the people and benefits sharing by the concerned communities". The proclamation recognizes three types of forest ownership:

- State forests: to be designated by the Council of Ministers. These forests cover more than one region
- Regional forests: to be designated by the regions
- Private forests: forests developed by individuals and associations

The MOA or the appropriate body, may designate any forest as protected forest "in order to make it free from human or animal interference for the purpose of protection of the environment and genetic resources". Utilization of State and Regional Forests will be in accordance to the management plans to be developed by the ministry or the appropriate regional body. The forests will be utilized by:

- (i) the Federal Government or appropriate regional bodies
- (ii) concessionaries
- (iii) inhabitants of forest areas (may utilize state or regional forests in an amount necessary to satisfy their ordinary domestic needs by paying appropriate fees in accordance to the management plan and the appropriate regional body).

Permits will be required from the MOA or appropriate regional body for activities (such as tree cutting, settling, grazing, hunting, or honey extraction) to be carried out in the forests. No one will be allowed to cut, utilize or harvest the protected tree species (*Hagenia abyssinica*, *Cordia africana*, *Podocarpus falcatus* and *Juniperus procera*) from state or regional forests.

At present, the status of forests in the country as well as the rules and institutes governing their management seems unclear. So far, no distinction is made between state and regional forests and the regulations are not properly enforced to provide sector as well as regional and federal governments. The existing rules and regulations for the management of forests disregards the rights and interests of local people. Conflicts are common between agriculture and forestry. This is due to lack of a national land use policy that can provide a national framework for resolving conflicts. Consequently, planning and implementation of forest development, utilization and conservation Programmes have been difficult (Million, 1998).

However, the government of Ethiopia has adopted a number of political and economic policies that are relevant to the forestry sub-sector. Among these, the macro-policies include:

- Constitution of the government
- Regional self-government establishment proclamation
- Definition of powers and duties between the federal and regional governments

Among the themes and principles embodied in the macro- level policies, regionalization, decentralization, participation and reduction of the role of the state in the economy, are relevant to the development and conservation of forest resources in the country (Million, 1998).

Forestry education and training

Forestry education was introduced to the country in the 1950s at the then Ambo School of Agriculture and Forestry. Before its termination, about 90 foresters were trained at Diploma level. In 1977, forestry education was re-initiated under the MOA in the then Forestry Institute of Wondo Genet (FIWG), now Wondo Genet College of Forestry (WGCF). This college produced forestry technicians that specialized in General Forestry through a 2 year Diploma programme. The intake of students increased from 20-30 students per year at the beginning to about 80-90 students per year in the 1990s. The Institute was heavily supported by Swedish International Development Authority (SIDA). Input of technical assistance staff remained high for a considerable time and declined only towards 1989.

In the mid 1980s, SIDA and the Swedish University of Agricultural Sciences (SLU) were approached to look into the possibility of initiating a BSc. training programme for Ethiopians.

One year after the initiation of the BSc. programme at Wondo Genet, another BSc. programme was launched by the Faculty of Forestry (FOF) established in the then Alemaya University of Agriculture (AUA, now Alemaya University, AU). To avoid duplication of efforts, the BSc. programme initiated at Wondo Genet had to be terminated after the three intakes.

In 1988, the Institute was accredited as a College with the name "Wondo Genet College of Forestry (WGCF)". In January 1996, it was officially decided to move the BSc. Programme from AUA to Wondo Genet. At present, the WGCF offers forestry education at both diploma and BSc. Levels.

By 1999, 1231 foresters had graduated, i.e 975 at Diploma (47 of which are women), 212 at BSc. and 44 at MSc. levels.

Constraints

The constraints and issues related to forestry education and training are summarized by EFAP (1992). as follows:

- Absence of a comprehensive forestry education policy or strategy
- Unsatisfactory quality and orientation of professional forestry education
- Neglect of in-service training, absence of vocational training in forestry and related fields

- Lack of objective and result-oriented personnel development planning, supported by an appropriate information system to give timely information on training needs, achievement, productivity and costs
- Inadequate inter-institutional collaboration and interaction between “users” and “producers” of personnel
- Weak links between training and research
- Limited budget

Information exchange

Research on forests and forest products in Ethiopia has been underway (both within and outside the country). However, for quite a long time, the quantitative and qualitative forestry research results and other relevant information have been accumulating over the years, the capacity to collect, store, process, retrieve and exchange/disseminate has been either inadequate or totally absent. This being the case, the intensification of forestry research continues, adding more input to the already existing body of information.

Lack of technology transfer mechanism has been a constraint, not only to forestry, but also to other sectors of agriculture. As a result, extending research outputs to end-users and implementing them have been very difficult so far.

Ethiopian Forestry Action Programme (EFAP)

Objectives and guiding principles

The objectives of forestry development include:

- Increased production of forestry products on a sustainable basis, including timber, fuelwood, poles, fodder and other non-wood forest products
- Increased agricultural production through reduced land degradation and increased soil fertility
- Conservation of forest ecosystems, including genetic and wildlife resources
- Improvement of the welfare of rural communities, especially women.

To address the objectives, the action programme needs to be guided by four fundamental principals to:

- ensure sustainable resource management
- promote a participatory process of development

- facilitate private sector forestry
- adopt an integrated approach to forestry sub-sector development.

Primary and supportive development programmes

The proposed action programme comprises a series of complementary primary and supportive development programmes. The former addresses the forestry development objectives directly.

Primary development programmes

This comprises of:

- The Tree and Forest Production Programme (TFPP): to increase sustainable supply of forest products and provide conservation services for land management. This includes:
 - (i) Industrial Plantation Forestry
 - (ii) Peri-urban Plantation Development
 - (iii) Community Woodlands Development
 - (iv) Protection Forestry Development
 - (v) Farm Forestry Development
 - (vi) Minor Forest Products Development
- The Forest Resource and Ecosystems Management Programme (FREMP): to protect the remaining natural forests and woodlands so that they make maximum contribution to soil and watershed protection and conservation of existing ecosystems, while allowing for limited, controlled commercial production. This includes the following:
 - (i) Natural Forests Management
 - (ii) Woodlands Management
 - (iii) Ecosystem Management
- The Forest Industries Development Programme (FIDP): to contribute to economic and industrial development, based on the principles of commercial viability and sustainable use of forest resources
- The woodfuel Energy Efficiency Development Programme (WEDP): to reduce dependence on traditional fuels (fuelwood and dung) and reduce the burden on rural women, the providers of household fuel

Supportive development Programmes

The primary development programmes are backed by four supportive development programmes:

- The Technology Development and Dissemination Programme (TDDP): involves forestry research and extension, to encourage sound forestry practices and disseminate relevant technologies
- The Sectoral Integration Programme (SIP): involves land-use planning, soil and water conservation, livestock management and fodder production, encouragement of linkages between the development of forestry and that of closely related productive sectors and the planning and management of land resources
- The Planning, Monitoring and Evaluation Programme (PMEP): includes strategic land use planning and monitoring and evaluation functions in the forestry development process
- The Human Resources Development Programme (HRDP): secures and trains personnel needed to develop, manage and conserve forests and forest land resources through Education and Training in Forestry and Natural Resource Management and Environmental Education.

Reference

Note: Please contact the author for full references.

4. Status of Forestry Development in Rwanda

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Rwanda has a total land area of 26,338 km². The country had a population of 766,600 in 1996 and a density of 302 inhabitants/km²

Forestry Status

The country is not self-sufficient in wood products especially wood energy. Large areas of the forest were destroyed during the 1990-1994 war. Importation from Tanzania and Democratic Republic of Congo supplements deficits.

Constaints

Major constraints to forest development in Rwanda are land shortage, insufficient knowledge on ecology and silviculture of natural forests, poor management practices in both plantations and natural forests and poorly developed marketing systems. The country lacks a clear forest policy. There is no action plan for conservation of biodiversity. Research has also suffered because of the war. There are very few qualified foresters.

Natural Forest Management and Biodiversity

The extent and distribution of natural forests and their conditions is not known. The following are key research issues:

- Assesment of current status of biodiversity
- Identification of strategies and production of action plans for conservation of biodiversity
- Production of management guidelines for sustainable utilization of natural forests
- Valuation of natural forests
- Domestication and conservation of indigenous tree species

Community Based Forestry

Research should be done to enable development of community-based forestry. Specific areas that call for research focus are:

- Clear policy on ownership of forest plantations
- Involvement of the community in tree establishment and management
- Community based management of forests
- Assessment of local knowledge

5. The Status of Forestry with a Focus on the Forestry Research in Burundi

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Forestry Research in Burundi

Background information

Forestry development and research in Burundi dates back to 1929 when establishment of arboreta and introduction of exotic species was started at the National Institute of Agronomy Studies. In 1963, the research was transferred to the Institute of Agronomic Sciences of Burundi (ISABU) within the Ministry of Agriculture and Livestock.

Beginning 1993, forestry research slowed down because of insecurity. In 1995, official financial support from the French Government was stopped and this worsened the situation.

Overall, the continued political instability has stalled progress in research. There are many constraints principally associated with lack of funds and qualified personnel.

Community Based Forestry

Key Issues

- Survey on community based management of forest resources
- Contribution to generation of legal frameworks necessary for community based management of forestry resources

Natural Forest Management and Biodiversity Conservation

Key issues

- Silviculture of local species of economic and ecological importance
- Enrichment planting techniques of natural forests
- Production and conservation of germplasm (gene banks for rare or threatened species)

Reforestation and Rehabilitation of degraded sites

Key issues

- Research on proper methods of establishment and intensification of forest plantation
- Control of pests and disease (termites)
- Silviculture of Eucalyptus species
- Reconversion of aged stands
- Production and conservation of germplasm (Tree Seed Centre)

Socio-economics and Policy Issues

Key issues:

- Socio-economic evaluation for the production of poles, charcoal and timber

Non-timber forest products

Key issues

- Selection and management of useful plants in agriculture
- Selection and management of medicinal plants
- Selection and management of plant species producing essential oil

Theme VI Training

Key issues

- To bring awareness of the decision makers on the necessity of opening a Faculty of Forestry at the National University of Burundi (Bsc, MSC, PhD).

- To bring awareness of the decision makers to increase the capacity of forest extension services by creating more technical schools.
- Dissemination of information to end users.

Information Exchange

Improvements to enable access to internet, subscription to Journals and exposure of scientists through participation in International meetings is necessary.

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The African Forestry Research Network (AFORNET) is a network of scientists with interest in forestry and natural resources management research, knowledge dissemination and application. It was founded in 1998 with support from the African Academy of Sciences and the Sida/SAREC of Sweden

MISSION

"The network shall promote quality forestry research and position Africa's scientists so that they can generate and disseminate knowledge; support the application of science and technology in the management and use of forest resources and contribute to sustainable socio-economic development in Africa"

GOAL

"African Forest Scientists carry out important and high quality research with assured and adequate funding and full international recognition"

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