



Kenya Forestry Research Institute (KEFRI)

STRATEGIC PLAN

1999-2004



KENYA FORESTRY RESEARCH INSTITUTE (KEFRI)

STRATEGIC PLAN 1999 – 2004



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FOREWORD

The Kenya Forestry Research Institute (KEFRI), which operates under both the Science and Technology Act (CAP 250) and the State Corporation Act (CAP 446), was established in 1986. Since then, the Institute has achieved a lot in research, human capacity and infrastructural development. This has been made possible by funding from many donors, the major ones being the governments of Kenya, Japan, Germany, Canada, Belgium and the United Kingdom among other supporters. Also, to make rapid gains in research efforts, KEFRI developed partnership with many institutions and stakeholders. Some of the major research partners are Kenya Agricultural Research Institute (KARI), Forest Department (FD), International Centre for Research in Agroforestry (ICRAF), United Nations Environment Programme (UNEP), United Nations Educational Scientific and Cultural Organisation (UNESCO), African Academy of Sciences (AAS), African Centre for Technology Studies (ACTS), Centre for Agriculture and Biosciences International (CABI) several Non-Governmental Organizations (NGOs) and many contact farmers.

As KEFRI entered its tenth year in 1996, it had become evident that the Institute had undergone a process of rapid personnel and programme expansion, which created some problems in co-ordination and harmonization of research programmes. Research had become more discipline-oriented and priorities were not well focused to effectively address pressing problems facing forestry in the country. Following this realization, an internal review of the Institute was undertaken in 1995. This was followed by an external research programme and management review in late 1996 – early 1997. The external review urged KEFRI to develop a research plan with prioritized research activities. The review report also recommended development of a flexible research structure based on the following as core research programmes: Farm Forestry, Natural Forests, Plantation Forests and Dryland Forestry. A third important recommendation was that KEFRI should focus on problem-oriented and multidisciplinary research.

These recommendations were adopted by the KEFRI Board of Management. To implement these recommendations, a Priority Setting Workshop was organized in July 1997. The Workshop participants were



drawn from a large spectrum of stakeholders. The Workshop participants reviewed forestry research and development in the last decade, and identified and prioritized forestry problems which should be addressed by research. The forum also prioritized the four core research programmes and key Regional Research Centres. This Strategic Plan is therefore based on the recommendations of the July 1997 Workshop.

In order to achieve the development interests of the stakeholders as elaborated by the workshop, the Strategic Plan is expected to achieve several outputs, among them: moving from single to multidisciplinary-oriented research approach; undertaking problem oriented research; reducing duplication of efforts and thus ensuring cost-effective and efficient use of the limited resources; enabling efficient and problem focussed capacity building; decentralizing research activities to facilitate improved interaction and linkages with the users; developing beneficial partnerships and enhancing information exchange and dissemination.

The plan has seven chapters covering the following areas: KEFRI's mandate, mission, objectives, achievements; development and challenges of forestry research in Kenya; identification of problems and priority setting; research and development activities; strategy for programme implementation; resource endowment and requirements; and monitoring and evaluation.

The Board of Management commends the five year plan to the Government of Kenya, donors, our collaborators and to all those who consider research an important tool for forestry and national development.

H. M. Ngibuini

Chairman, KEFRI Board of Management

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1.0 KENYA FORESTRY RESEARCH INSTITUTE

Kenya Forestry Research Institute (KEFRI) was established to undertake research and development in forestry and allied natural resources. The following are the mandate, mission, objectives and achievements of KEFRI.

Mandate

The mandate of KEFRI is to:

- Conduct research in forestry;
- Co-operate with other research bodies within and outside Kenya carrying out similar research;
- Liaise with other organizations and institutions of higher learning in training and on matters of forestry research; and
- Disseminate research findings.

Mission

To enhance the social and economic welfare of Kenyans through user-oriented research for sustainable development of forests and allied natural resources.

Objectives

- To generate technologies for farm forestry, natural forests, drylands forestry and forest plantations.
- To strengthen research capacity.
- To document and disseminate scientific information.

Achievements

- KEFRI has established 17 research centres in the last 12 years in various ecological zones of Kenya. The headquarters is at Muguga.
- Two Social Forestry Training Centres have been established at Muguga and Kitui where, in the last ten years, over 2000 extension agents (from Kenya and other countries in Africa) have been trained.
- The Institute has acquired well-equipped laboratories and office buildings at Muguga, Kitui and Maseno.

- It has recently expanded its Library facilities and has a Tree CD-ROM package.
- KEFRI has established a Tree Seed Centre with a network of seven seed collection sub-centres in the country. The Seed Centre has over 1,000 ha of seed production stands and has an adequate capacity for training on seed technology. It has trained over 1,000 extension workers from Kenya and the African region on seed collection and handling. It has also published a Tree Seed Handbook of Kenya.
- KEFRI has developed methodologies for the establishment of exotic and indigenous tree species both under rainfed and irrigated conditions.
- It has also developed methodologies for the production of gums and resins.
- KEFRI has screened over 100 species/provenances for site/species matching and water harvesting techniques for improved tree survival and growth in dry areas.
- It has successfully introduced superior germplasm of *Casuarina equisetifolia* and *Eucalyptus grandis*.
- Working in collaboration with its research partners, the Institute has integrated *Leucaena diversifolia*, *L. leucocephala*, *Grevillea robusta*, *Calliandra calothyrsus*, *Gliricidia sepium* and *Sesbania sesban* in farming systems thereby improving crop, fuelwood and fodder yields on the farms.
- Tolerant strains of *Cupressus lusitanica* (cypress) to cypress aphid have been identified.
- KEFRI has produced over 40 technical guidelines for use by extension officers, forest managers, NGOs, farmers and schools. Among these are:
 - A dryland forestry manual.
 - A guideline for the conservation and management of *Populus ilicifolia*.

- Guidelines for the management and production of bamboo.
- A guideline for extraction of gums and resins.
- Capacity building of scientists has been strengthened. To date, out of a total of 95 graduate scientists, the Institute has 62 trained to MSc and PhD levels, while 24 are either on MSc or PhD training.

2.0 DEVELOPMENT AND CHALLENGES OF FORESTRY RESEARCH IN KENYA

2.1 Background

Prior to establishment of KEFRI, forestry research in Kenya was undertaken by various units and organisations. A forestry research unit in Kenya was started in 1934 within the Forest Department. The unit later became a Research Branch which undertook research focusing on silviculture, forest entomology, forest pathology and wood utilization. In 1948, the East African Agriculture and Forestry Research Organization (EAAFRO) was established with a Forestry Division which addressed regional forestry problems common to Kenya, Uganda and Tanzania. The priority research areas in forestry were tree breeding, silviculture, utilization, pathology, entomology and catchment hydrology. In 1973, the Research Branch of Forest Department was upgraded to Conservancy of Forests Research Services. Following the collapse of the East African Community and hence EAAFRO in 1977, the Government of Kenya decided to establish statutory bodies to take-over the research functions of the Community. The Science and Technology Act, Chapter 250 was enacted in 1979. Under this Act, KARI was established in July 1981. The Conservancy of Forestry Research Services was subsequently transferred from the Forest Department to KARI and merged with the Forestry Division of EAAFRO to form Forestry Research Department (FRD). In 1986, KEFRI was established as an independent research institution from KARI.

2.2 Challenges

2.2.1 Accelerated Deforestation

Forestry in Kenya faces a number of challenges which are closely linked to rapid human population growth. The limited area of gazetted forest land, estimated at approximately 2.8% of the total land area, is decreasing at a fast rate due to pressure from agricultural expansion and settlement. Out of the remaining area of closed-canopy forests estimated at 1.2 million ha, about 240,000 ha will be lost in the next twenty five years. Large areas of the remaining natural forests have also been over-exploited and degraded through selective cutting. The area under industrial forest

plantations is also expected to decrease from the present 164,000 ha to about 80,000 ha by the year 2020. Woodlands and bushlands in the drylands, covering approximately 38 million ha or 60% of the total land area, are also under great pressure from sedentarisation of pastoralists and migration of people from high potential areas. Annual loss of the woody vegetation in the drylands is approximately 19,000 ha. The loss of forest cover and other types of woody vegetation will lead to increasing scarcity of a wide range of forest products, environmental degradation and loss of biodiversity. In order to achieve sustainable land use systems, socio-economic problems contributing to deforestation will need to be addressed by the forestry sector. Implementation of policy and legal instruments necessary for proper conservation of forests are largely inadequate and will need to be addressed.

2.2.2 Gaps Between Supply and Demand of Forest Products

The supply and demand of wood products (timber, pulpwood, poles and fuelwood) shows that the country is able to meet its wood requirements up to the turn of the century.



Fig 2.1. Sawn timber

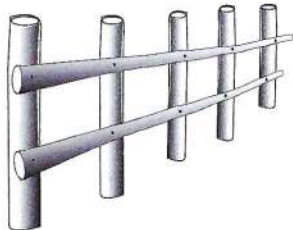


Fig 2.2. Roundwood

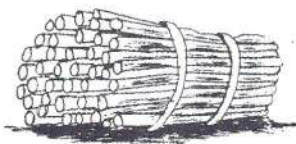


Fig 2.3. Fuelwood

According to the Kenya Forest Master Plan, wood supply in Kenya was approximately 28 million m^3 in 1994, while the demand was about 26 million m^3 . From the middle of the next decade, however, the increases in total wood supplies will not keep pace with the increases in wood demand. By the year 2020, wood demand is projected to be about 45 million m^3 while the supply will be about 38 million m^3 giving a wood deficit of 7.0 million m^3 . The deficit, which will manifest itself mainly in fuelwood, will lead to further deforestation and environmental degradation.

Although the country has the potential to be self-sufficient in industrial wood, the current harvesting policies are not geared towards sustainable supply. Presently, there is over-harvesting of immature crops in more accessible areas. Large clearfelled areas have

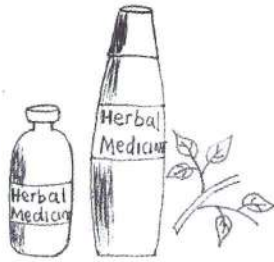


Fig 2.4. Health care

also not been replanted. The future supply of industrial wood from large-scale plantations is therefore uncertain and urgent measures ought to be taken to improve plantation management and develop alternative sources. There are potentials of increasing production of industrial wood from farmlands and this will need to be explored.

2.2.3 Inadequate Development of Farm Forestry

Over the last three decades, rapid population growth has resulted in land scarcity in high potential areas. Many small-scale farmers cannot afford high prices of inorganic fertilizers and this has contributed to decline in crop production. The expansion of agricultural activities in semi-arid areas and using inappropriate farming practices have increased deforestation and land degradation. Trees in farmlands play an important role not only in production of fuelwood and poles, but also in maintenance of agricultural productivity. Farm forestry research should therefore be developed to accelerate the current pace of tree planting, improve the management of trees on-farm and stimulate income generation from tree products to alleviate poverty. Implementation of policy and legal instruments necessary for proper development of farm forestry are largely inadequate and will need to be addressed.

2.2.4 Weak Impact of Research on Forestry Development

Sustainable forest management depends on application of science in generating improved technologies. Forestry research holds a pivotal role in forestry development, management and conservation, by developing and generating technologies necessary for forest management. Central to this is the need for development of linkages with national and international organizations, enhanced participation of stakeholders and supporting formulation of policy and legal framework to be in harmony with land use systems.

2.2.5 Inadequate Research and Development Capacity

Capacity to undertake forestry research, management and planning lags behind agricultural sub-sector. In particular, attention is needed to improve capacity for research development and implementation, Research and Development in farm forestry, extension approaches and information dissemination.

3.0 PROBLEM IDENTIFICATION AND PRIORITY SETTING

3.1 Criteria for Priority Setting

Kenya has diverse ecological conditions. It is also faced with many socio-economic problems. The problems for research are many, but resources are limited. Priority setting is therefore necessary. In July 1997, KEFRI organized a workshop attended by stakeholders where forest development problems were identified and research priorities were set using the following criteria:

- (a) Is the problem identified a lack of knowledge or a lack of application of existing knowledge?
- (b) Is the problem easy to deal with and likely to bring results in a reasonable time?
- (c) If successful, will the results be disseminable?
- (d) Will the results impact on a large number of people?
- (e) Will the results impact on a large area?
- (f) Will the results have significant, positive economic impact?
- (g) Will the results have significant, positive environmental impact?
- (h) Is the problem consistent with national priorities?

3.2 Problem Analysis

During the Workshop held in July 1997, the stakeholders came up with problems facing the development of farm forestry, natural forests, dryland forests and woodlands, and plantation forests. Using the criteria for priority setting as presented in Section 3.1 above, the stakeholders identified and ranked the following as Core Research Programmes:

1. Farm Forestry
2. Natural Forests
3. Dryland Forestry
4. Plantation Forestry

The identified problems were also ranked under each of the four research programmes as summarized below.

3.2.1 Farm Forestry

There were six priority problems ranked as follows:

1. Inadequate technologies and lack of management guidelines for farm forestry;
2. Under-developed marketing and utilization systems for farm forestry products;
3. Inadequate supply of high quality propagation materials;
4. Ineffective extension approaches;
5. Insufficient recognition of indigenous knowledge and practices; and
6. Unclear policy and inappropriate legislation for farm forestry.

3.2.2 Natural Forests

Eight problems were identified and ranked as follows:

1. Inadequate information to support policy decisions on management and conservation of natural forests;
2. Natural forests are undervalued;
3. Over-reliance on few indigenous species for wood and non-wood products and services;
4. Inadequate information to develop management plans for sustainable multiple use of natural forests;
5. Large areas of Kenya's natural forests are undergoing degradation;
6. Insufficient information on biodiversity inventory and conservation;
7. Lack of knowledge of measurable indicators of sustainably managed natural forests and degradation; and
8. Certification methods for natural forest products not developed.

3.2.3 Dryland Forestry

Six problems were identified and prioritized as below:

1. Large areas of Kenya's drylands are undergoing degradation/deforestation;

2. Inadequate information on availability and utilization of wood and non-wood dryland resources;
3. Lack of clear management guidelines for dryland forest resources management;
4. Insufficient validation and documentation of indigenous knowledge and practices in dryland forest resource management and conservation.
5. Serious constraints to tree establishment; and
6. Unclear land and tree ownership in relation to forest resource management.

3.2.4 Plantation Forests

There are six problems ranked as follows:

1. Inadequate supply of high quality propagation materials;
2. Large losses of plantations due to pests, human interference and damage by game;
3. Insufficient economic/financial analysis of silvicultural operations;
4. Inefficient harvesting and utilization of wood products;
5. Under-utilization of non-timber forest products; and
6. Over-reliance on a few exotic species.

3.2.5 Service Programme

Three problems were identified and ranked as follows:

1. Inadequate database, documentation and publishing capacity;
2. Inadequate production of technical packages and management guidelines; and
3. Lack of forum for interactive research and technology transfer.

4.0 RESEARCH AND DEVELOPMENT PROGRAMMES

4.1 Research and Development Focus

To address the challenges facing the forestry sector, policy objectives have been formulated and these include conserving natural forest cover, alleviating poverty and promoting forest industry. These goals and objectives not only reflect a comprehensive agenda for strategic, applied and adaptive research in forestry, but also adopts interactive and integrated orientation towards natural resource management. The aim is to understand and synthesize the processes involved in forestry R&D and natural resource management in addition to determining and predicting the short, medium and long-term technologies to be generated. KEFRI's proposed R&D programmes are organized into four research programmes: Farm Forestry, Natural Forests, Dryland Forestry and Forest Plantations which are supported by a Service Programme. This chapter highlights areas of research focus. The ranked problems and key research activities are listed in Annex1.

4.1.1 Farm Forestry

The focus of this programme is to contribute to the current efforts of tree planting, conservation and utilization activities by farmers in order



Plate 4.1 Trees are an integral part of the rural agricultural landscape

to diversify farm products and improve living standards. To achieve this objective, the programme will strengthen linkages amongst extension agents, researchers and farmers through development of effective extension approaches as well as production of appropriate management guidelines. Research focus will be on development of fast growing species with high market demand and their management practices. Marketing research, facilitation on establishment of on-farm tree seed sources, evaluation of traditional tree management practices and policy research will be other activities. There is need to develop appropriate on-farm technologies suited to specific situations.

4.1.2 Natural Forests

The main objectives of natural forest conservation and management are to conserve soil, water, biodiversity and the productive potential of forests. Kenya's natural forests have been over-exploited, degraded and are currently not managed sustainably. Limited research has been done to provide information needed to guide the conservation and management of natural forests. Research will focus on policy issues, economic value of conservation and its quantification, creating better understanding of wood properties, monitoring regeneration and growth, development of

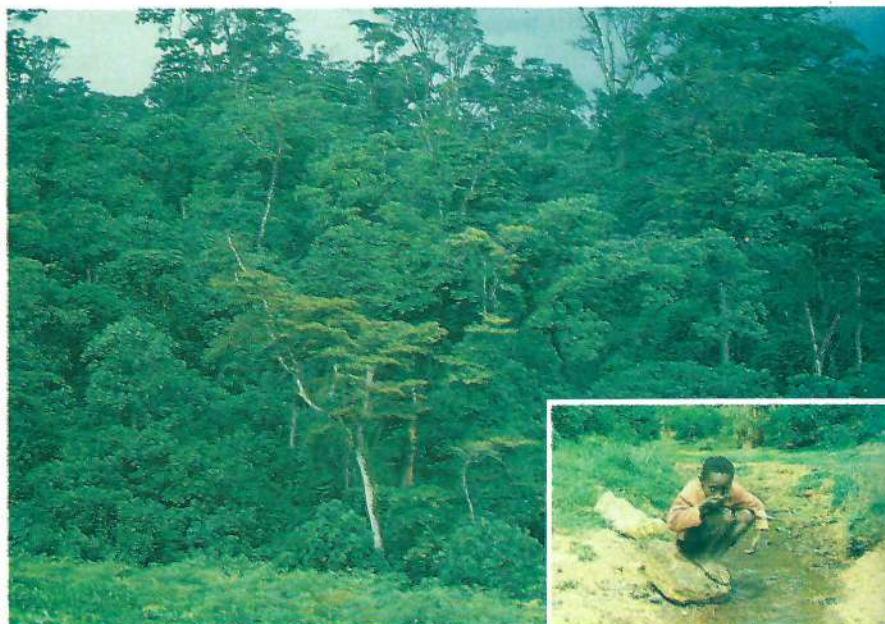


Plate 4.2. Natural forests provide a variety of products and services.

rehabilitation systems and provision of information to enhance biodiversity conservation.

4.1.3 Dryland Forestry



Plate 4.3 Drylands occupy two-thirds of Kenya's surface area. Reverting dryland degradation is a critical challenge.

The objective of drylands forestry programme is to place the woodlands, wooded grasslands and bushlands under effective management. This will contribute to the sustainability of extensive pastoralism; yield an increased sustainable flow of wood and non-timber forest products and facilitate conservation of biodiversity and habitats. Research will focus on developing technologies for improving the utilization of forest products, monitoring trends in vegetation changes, documentation of traditional knowledge, identification of drought and pest resistant trees and policy related research.

4.1.4 Plantation Forests

The major problems facing the development of forest plantations are low rate of replanting in harvested areas, reliance on a few exotic species which are being threatened by pests and diseases, poor silvicultural



Plate 4.4. Well managed plantations are a base for meeting our timber, pulp and paper, and service related needs.

management and inefficient use of wood. The main objective of forest plantation programme is to meet the country's demand for industrial wood. Future research activities will be directed at improving the supply of high quality tree seed, diversification of plantation species, reducing damage due to pests and diseases, cost-benefit analysis of silvicultural operations and improvement of wood utilization.

4.1.5 Service Programme

The programme's goal is to facilitate research through documentation and dissemination of findings, acquisition of literature, identification, coordination and management of income generating activities by the institute. The income generation activities include; training, sale of wood, timber, seedlings, tree seeds, processed forest products and technical expertise through consultancy services.

The programme will undertake to improve generation of income, information documentation and dissemination and partnerships with stakeholders in the forestry sector. Production of user friendly research derived information will be emphasised to ensure that non-technical clients benefit from forestry research.

A key objective of the Service Programme is to facilitate efficient communication and promotion of application of research findings. To

achieve this objective, the programme will undertake activities aimed at; strengthening the KEFRI library facilities, training scientists and information staff in scientific writing and documentation, improving capacity and efficiency in information technology skills. In addition, efforts will be made to strengthen research management liaison and linkages among researchers, managers and extension agents especially at the Regional research centres.



Plate 4.5. Research findings are published and disseminated.

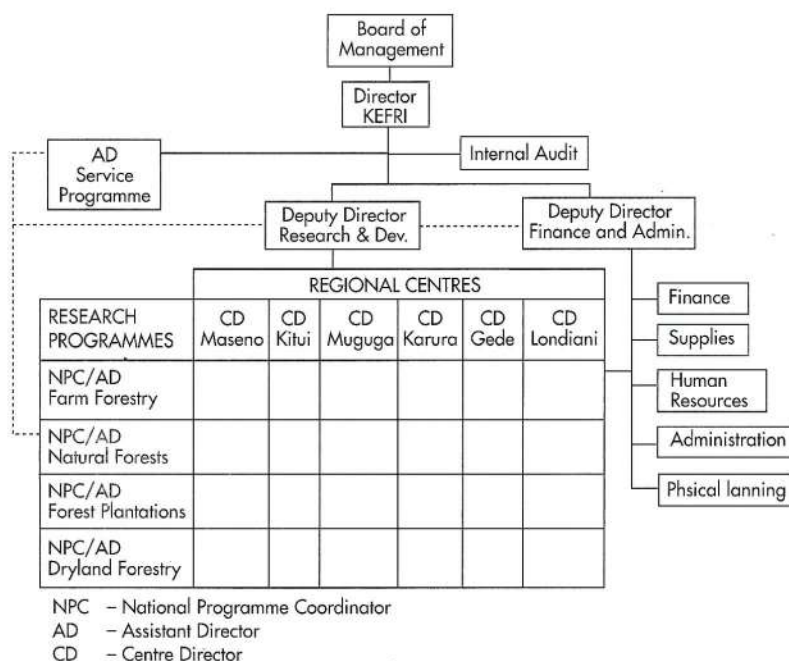
5.0 STRATEGY FOR IMPLEMENTATION OF RESEARCH PROGRAMMES

5.1 KEFRI Organization Structure

The new structure (Fig. 5.1) shows the various levels of operation and management. The top level comprises the Board of Management which is responsible for research and management policies. The Director who is responsible for the overall operation of KEFRI is assisted by two Deputy Directors (DD); one responsible for research and development (R&D) and the other for finance and administration (F&A). The DD (R&D) will oversee four core research programmes, while the DD (F&A) will co-ordinate all matters pertaining to human resources, finance, supplies, administration and physical planning.

A Service Programme under the Director's Office, headed by an Assistant Director, will be responsible for sourcing of funds, funding policy and procedures, tree seed production and distribution, information documentation and dissemination, liaison and consultancy, and income generating activities. Additional responsibilities will include liaising with Programme Co-ordinators in planning, monitoring and evaluation of projects.

Fig 5.1 KEFRI Organization Structure



The Internal Audit will also be attached to the Director's office.

Existing disciplinary research divisions have been consolidated to form a multi-disciplinary approach to research and development with four Core Research Programmes as shown in the organogram. The Core Programmes will be managed by National Programme Co-ordinators/Assistant Directors who will report directly to the DD (R&D).

The Regional Centres will be managed by Centre Directors who will also report to the DD (R&D). Within the Core Research Programmes, research projects will be managed through Working Groups of participating scientists.

The Regional Centres will be responsible for implementation of research projects through Field Centres and collaborators particularly those within their localities. Annex II shows locations of Regional Centres and Sub-centres.

5.2. Research Implementation Process

Research activities within programmes will be categorized into working groups. The categories are:

- (a) Natural Ecosystems
- (b) Agroforestry
- (c) Stand Management, Growth and Yield
- (d) Integrated Pest Management
- (e) Timber and Non-Timber Products
- (f) Socio-Economics and Policy

This approach will create a 6 x 4 matrix into which each experimental activity will be placed, with individual experiments being linked into specific groups or projects. Each experiment or group of experiments will be implemented by a multi-disciplinary team of scientists with a project/Working Group Leader. Composition of the working group will be determined by relevant skills of individual scientist. The Working Group Leader will be appointed on the basis of the relevance of his/her technical skills for the task of a particular working group.

5.3 Research Programme Co-ordination and Management

Proper co-ordination between scientists and stakeholders will be encouraged to facilitate research programme implementation. The Director will provide overall co-ordination. A co-ordination team comprising the Director, two Deputy Directors, Assistant Directors Programme Co-ordinators will organize regular meetings to review the progress of project implementation, monitoring and evaluation so as to identify constraints and make appropriate recommendations.

5.4 Integrated Approach to Programme Implementation

The Institute's programmes were previously aligned along disciplinary lines and this led to narrowness in visualizing and lack of thoroughness in tackling research problems in an integrated manner. To some extent this structure led to duplication of work and hence waste of resources. It is now recognized that internal collaboration and team work efforts is the basic stride towards solving problems of forestry development holistically.

There was need therefore for merger of related research activities to enhance multi-disciplinary approach to research problems. This requires a strategy of networking among all KEFRI research programmes to facilitate programme implementation, information update and exchange. Team work and multi-disciplinary approach to research problems will also be an asset towards preparation of comprehensive and multi-disciplinary proposals for donor funding.

5.5 Information Dissemination and Documentation

For research findings to be useful, they must be disseminated properly to beneficiaries. A strategy for information dissemination has been established within KEFRI. Currently information is being disseminated through different types of media that include print media, conferences, seminars, workshops, field days, training courses, and agricultural shows. The Social Forestry Centres at Muguga and Kitui and Maseno Centre will be strengthened as avenues for disseminating research findings to users.

Strong links will be established between the Regional Research Centres and the local extension services to facilitate effective dissemination of research information. The research centres will be responsible for



Plate 5.1 A farmer presents his experiences during one of the National Social forestry Prize days at KEFRI, Muguga

organizing regular meetings for researchers, extension agents and the users of research findings and create a forum for exchange of ideas and evaluation of research progress. The Regional Centre Directors will also be responsible for organizing field days, participating in training of extension agents and jointly setting up demonstration plots with extension agents to enhance technology transfer.

Facilities for electronic linkages with other collaborating institutions will be developed in order to network and to access information and materials that are not within KEFRI. There is, therefore, need to be connected to the local networks, Internet and library facilities. Databases will be established and, where necessary, standardized with those existing in other institutions to avoid duplication of activities and identify potential partners. The databases will be managed and periodically updated by the Service programme.

For research findings to be effectively communicated, researchers and extension agents will be trained on development of extension materials, effective communication, information documentation, analysis and dissemination methods. Training will also include the use of modern equipments to achieve the goals of effective information exchange.

5.6 Collaboration and Partnership

There is need for KEFRI to enhance close linkages with related research institutions to support development of the forestry sector. This will reduce duplication of efforts and thus improve efficiency in use of limited resources.

Currently, KEFRI collaborates closely with various regional, national and international organizations that are involved in forestry research and development. Stronger links will continue to be maintained with the Forest Department, wood-based industries, KARI, Moi University, National Museums of Kenya (NMK), Kenya Wildlife Service (KWS), local NGOs and farmers. International collaboration will be strengthened with research institutions in the East African region, especially with Forest Research Institute (FORI, Uganda), Ethiopian Agricultural Research Organisation (EARO, Ethiopia) and Tanzania Forestry Research Institute (TAFORI, Tanzania). Existing linkages will be strengthened with regional and sub-regional networks such as Forestry Research Network for Sub-Saharan Africa (FORNESSA) and Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) and also with international bodies such as ICRAF, Centre for International Forestry Research (CIFOR), Centre for Agriculture and Biosciences International (CABI), International Union of Forestry Research Organizations (IUFRO), International Plant Genetic Resources Institute (IPGRI), African Centre for Technology Studies (ACTS) and Food and Agricultural Organization (FAO).

5.7 Forestry Research Advisory Committee

A Forestry Research Advisory Committee (FRAC) will be established. The membership will comprise the Director of KEFRI, the Chief Conservator of Forests, the Deputy Director (Research) at KEFRI, the Deputy Chief Conservator of Forests in charge of technical matters at FD, the four programme co-ordinators from KEFRI, and heads of divisions of Natural Forests, Plantations, and Extension at FD. Other members will include a representative from NGOs, wood-based industries, MoA, and farmers. FRAC will meet regularly to review: existing projects, new project proposals, priorities, research outputs and their applications. Research Advisory Committees (RACs) will also be established at regional centre level to identify research problems in the field, review existing projects and project proposals and give recommendations to FRAC for review.

6.0 RESOURCE ENDOWMENT AND REQUIREMENTS

6.1 Human Resources

6.1.1 Status of Scientific Staff

At present (1998), KEFRI has a total staff strength of 1,470 comprising scientists, technicians, enumerators, nursery attendants, seed collectors, janitors, drivers, mechanics, administration, supplies and finance staff. There are 95 research scientists, (PhD, 11; MSc, 51; and BSc, 33). There are 24 scientists on training (PhD, 13 and MSc, 11).

Table 1 shows scientific staff requirement for the next five years. Generally, the Institute will not require to recruit new staff, but scientists who have not acquired postgraduate training will be encouraged to train in areas where capacity is inadequate. The Service Programme will be headed by an Assistant Director while the four research programmes will be headed by four Programme Co-ordinators. There will be six Centre Directors for Kitui, Muguga, Maseno, Gede, Londiani and Karura. There will also

Table 1. Scientific Staff Projection

PROGRAMME/SERVICE	PROJECTED REQUIREMENT
Farm Forestry	19
Natural Forests	11
Dryland Forestry	16
Plantation Forestry	16
Service Programme	13
Total	75

be Deputy Centre Directors at Muguga, Kitui and Maseno. This brings the total number of scientists needed to 75. The trend in the past is that approximately 20 percent of the Institute's scientists have been on training at a given time. This is expected to continue in the next five years. This, therefore, implies that there will be no excess number of scientists.

6.1.2 Capacity Building

KEFRI has prioritized training of its staff to enhance productivity. The future focus will be to train and properly designate scientists according to the needs of the research programmes. Annex III and IV indicate the projected short-term and long-term training in the next five years.

6.2 Physical Facilities

The existing facilities are shown in Table 2. Table 3 shows the physical facilities and financial requirements in the next five years (details are in Annex V). KEFRI physical facilities are fairly good at Kitui, Muguga and Maseno. However, facilities in other research centres are inadequate and

Table 2. *Physical facilities at headquarters (Muguga) and regional centres*

TYPE OF FACILITY	RESEARCH CENTRES					
	Muguga	Kitui	Maseno	Karura	Londiani	Gede
Staff Houses						
Senior	20	4				
Medium	18	2		1		4
Junior	33	-		7		10
Offices	123	18	31	4	4	3
Catering	1	1	1	-	-	-
Laboratory	21	3	4	1	1	1
Show Room	-	-	-	1	-	-
Stores	11	5	2	1	1	4
Power House	1	1	-	-	-	-
Workshop	2	1	-	1	-	-
Pump House	2	3	-	-	-	-
Glass Houses	1	4	3	2	-	-
Garage	1	2	-	-	-	-
Library	2	1	1	-	-	-
Meeting Room	6	4	1	-	-	-
Hostels	3	4	-	-	-	-
Nursery House	3	1	1	-	-	1

Table 3. Summary of budget for facilities required in the next five years (Ksh. Millions) - 1999 to 2004

ITEM	YEAR					TOTAL
	1	2	3	4	5	
Research Facilities	214.2	100.5	50	40	35	439.7
Staff & Guest Houses	111.52	87.5	75	65	-	339.02
15 Vehicles	116	-	-	-	-	116
Equipment	140	145	125	-	-	410
Infrastructure	7	4	2	-	-	13
Training	12	16	14	10	4	56
Sub Total	600.72	353	266	115	39	1373.72

improvement is required to support the recommended decentralization of research activities. Physical facilities: laboratories, offices, houses and glass houses must be constructed to improve research facilities especially in the field centres.

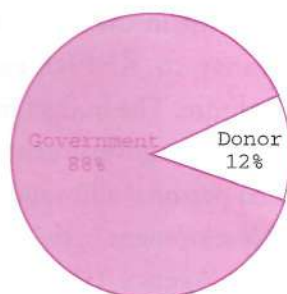
6.3 Financing Strategy

6.3.1 Government Funding

In the last two years, approximately 20% and 80% of the total budget were spent on operational and personnel costs respectively. Efforts will be made to increase the allocation of funds for operations to approximately 30 - 40% of the total budget.

6.3.2 Donor Funding

Fig 6.1. Government and Contribution to KEFRI's R&D Funding



Donor funding, especially in the form of infrastructural development, has been an important source of funding for the Institute. KEFRI will continue to seek donor assistance for improvement of research facilities in regional centres and for specific projects. To improve the level of donor funding, the office of the Assistant Director (Service Programme) will support the Director in sourcing for donor funds. Special

requests will be made to enable strengthening of the six Regional Research Centres. Workshops will periodically be held to inform donors and to source funding.

6.3.3 Collaborative Research

The existing collaborative links with various research and development organizations will be strengthened and new ones developed. In addition, joint sourcing for funds with other relevant institutions will be enhanced. Close working relationships will be strengthened with beneficiaries of forestry research to develop mission-oriented research targeted to particular clients. Such a strategy has a great advantage in ensuring direct transfer of technologies and benefits, enhancing feedback and cost sharing in research implementation.

6.3.4 Contract Research

KEFRI has the capacity to carry out consultancy services in forestry and related fields. The Institute will advertise its capability for such demands to potential clients.

6.3.5 Income Generation

Income generating activities will be initiated and managed by the Service Programme. This would relieve core research programmes from devoting much of their time in income generating activities at the expense of undertaking research. The following income generating activities have been identified: sale of tree seed and seedlings, timber and furniture at Karura Centre, logs from closed experiments, use of conference and catering services and conducting short term forestry courses. Management of Karura Workshop and that of training and catering facilities at Muguga and Kitui will be improved with the help of professional advice.

6.4 Financial Status

The main sponsor of research and development in the Institute is the Kenya Government. Government grants to KEFRI comprise approximately 90% of KEFRI's total expenditure. The budget for 1998/99 is approximately Ksh. 255 million. Most of the government funding goes towards payment of salaries and related personal allowances. A few donors have assisted the Institute in the development activities. These include Japan International Co-operation Agency (JICA), Federal

Republic of Germany (FRG), European Union (EU), the Belgian government and other smaller donor funding. During 1998/99 Financial Year, total donor funding is approximately Ksh.64.4 million. There is need to boost the development budget in order to have the physical facilities and infrastructure in place which is a prerequisite for the implementation of this strategic plan. The physical facilities in the field centres will be rehabilitated and upgraded to facilitate the proposed decentralization of research activities.

Efforts will however be made towards mobilization of resources by soliciting funds from donors and private organizations. Also, the existing income generating activities will be strengthened in order to improve the financial status of the Institute.

6.5 Proposed Budget

Implementation of this strategic plan will require substantial financial resources for personnel expenses, operational expenses and capital development (training included). Currently, there are only four projects which are supported by donors. These include: Social Forestry Project, Promotion of Sustainable Forest Management, Agroforestry Research for Integrated Development in Semi-arid Areas of Kenya (ARIDSAK) and Agroforestry Research Networks for Africa (AFRENA) Projects. Capital development and maintenance are critical to ensure the establishment of physical facilities and infrastructure particularly at the research centres. The main objective of this plan is to decentralize research activities to the centres. Efforts will be made to improve research facilities in these centres through construction and renovation of staff houses, offices, glass-houses and seed propagation sheds. Details of the recurrent and capital budgets in the next five years are shown in Annexes V and VI.

7.0 MONITORING AND EVALUATION

Monitoring and evaluation (M&E) are important management tools for measuring accomplishments and detecting the need for adjustment in the course of implementing research programmes. At present, M&E within KEFRI is not done systematically, except for projects which receive external support. Performance appraisal of staff is, however, carried out periodically. External evaluation of the institute has been done twice (1990 and 1997) since the establishment of KEFRI in 1986.

To ensure that implementation of the current strategic plan is on course and relevant to the needs of our clients, M&E will be made more systematic. Continuous monitoring will be introduced at research programme, project and management levels. The Deputy Directors (R&D and F&A) will co-ordinate M&E. The Programme Co-ordinators, Centre Directors and Working Group/Project Leaders will be trained to improve their M&E skills. The following tools and procedures will be standardized and adopted for M&E:

- Use of logical framework in programmes/project planning.
- Bi-annual research programme review.
- Annual staff evaluation.
- Quarterly and annual reports.
- Mid-term internal evaluation every three years.
- External evaluation every five years.

Acronyms

AAS	African Academy of Sciences
ACTS	African Centre for Technology Studies
AFRENA	Agroforestry Research Networks for Africa
ARIDSAK	Agroforestry Research for Integrated Development in Semi-arid Areas of Kenya
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
BADC	Belgium Administration Development Corporation
CABI	Centre for Agriculture and Biosciences International
CIFOR	Centre for International Forestry Research
DD	Deputy Director
DF	Drylands Forestry
EEAFRO	East African Agriculture and Forestry Research Organisation
EARO	Ethiopian Agricultural Research Organisation
F&A	Finance and Administration
FAO	Food and Agricultural Organization
FORNESSA	Forestry Research Network for Sub-Saharan Africa
EU	European Union
FD	Forest Department
FORI	Forest Research Institute
FP	Forest Plantations
FRAC	Forestry Research Advisory Committee
FRD	Forestry Research Department
FRG	Federal Republic of Germany
ICRAF	International Centre for Research in Agroforestry
IPGRI	International Plant Genetic Resources Institute
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forestry Research Organizations
JICA	Japan International Co-operation Agency
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
KWS	Kenya Wildlife Service
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture
NARO	National Agricultural Organization
NGO	Non-Governmental Organization
NMK	National Museums of Kenya
ODA	Overseas Development Agency
R&D	Research and Development
RAC	Research Advisory Committee
RL	Research Liaison
TAFORI	Tanzania Forestry Research Institute
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNEP	United Nations Environment Programme

ANNEXES

Annex I: Problem ranking and research activities

Programme	Ranked Problems	Ranked Activities
Farm Forestry	1. Inadequate technologies and lack of management guidelines for farm forestry	1.1 Conduct baseline needs surveys and land use characterization in key research sites. 1.2 Undertake species and provenance selections, tree improvement and management activities including pests and disease control measures. 1.3 Carry out studies on soil stabilization, fertility enhancement and interaction between trees and crops. 1.4 Design, establish, monitor and evaluate model farm forests. 1.5 Prepare appropriate farm forestry management guidelines.
	2. Under-developed marketing and utilization systems for farm forestry products.	2.1 Carry out research and document existing marketing systems for farm forest products. 2.2 Develop strategies for improving marketing of farm forest products. 2.3 Develop biophysical and economic models for proven farm forestry systems
	3. Inadequate supply of high quality propagation material	3.1 Conduct studies on the current status of on-farm propagation materials. 3.2 Development and improvement of appropriate on-farm propagation materials and methods. 3.3 Facilitate establishment of seed sources.
	4. Ineffective extension approaches.	4.1 Analyze existing farm forestry extension and adaptive research approaches. 4.2 Develop appropriate extension approaches and methods for various socio-economic groups. 4.3 Strengthen collaboration with extension institutions.
	5. Insufficient recognition of indigenous knowledge and practices	5.1 Document traditional knowledge on farm forestry practices and management. 5.2 Develop improved management practices for farm forestry through interactive research.
	6. Unclear and inappropriate policy	6.1 Review and analyze existing policies that influence farm forestry development.

Annex I: (Contd)

Programme	Ranked Problems	Ranked Activities
Natural Forests	1. Inadequate information to support policy decisions on management and conservation of natural forests.	1.1 Monitor the trend of changes of natural forests and loss of biodiversity. 1.2 Evaluate the role of community involvement in the utilization and management of natural forests. 1.3 Determine costs and benefits of natural forest conservation efforts.
	2. Natural forests are undervalued	2.1 Conduct quantitative analysis of total value of representative natural forest types. 2.2 Determine properties of natural forest products. 2.3 Generate knowledge and create awareness on the value of natural forests.
	3. Over-reliance on a few indigenous species.	3.1 Research on alternative species for diversification of utilization. 3.2 Promote the use of softwood in furniture and other products.
	4. Inadequate information to develop management plans for sustainable multiple-use of natural forests.	4.1 Establish permanent sample plots for monitoring natural forest dynamics. 4.2 Develop methodology for species growth modelling.
	5. Large areas of natural forests are undergoing degradation	5.1 Study regenerative capacities of various forest types. 5.2 Develop forest restoration techniques.
	6. Insufficient information on biodiversity inventory and conservation	6.1 Document knowledge on indigenous forest management and utilization. 6.2 Assess impacts of forest use on biodiversity in selected forests. 6.3 Develop methodologies for biodiversity conservation. 6.4 Develop hydrological models to enhance protection of water catchment.
	7. Lack of knowledge of measurable indicators of sustainably managed natural forests and degradation.	7.1 Identify and evaluate measurable indicators.
	8. Certification methods for natural forests products not developed	8.1 Monitor progress made in certification processes

Annex I: (Contd)

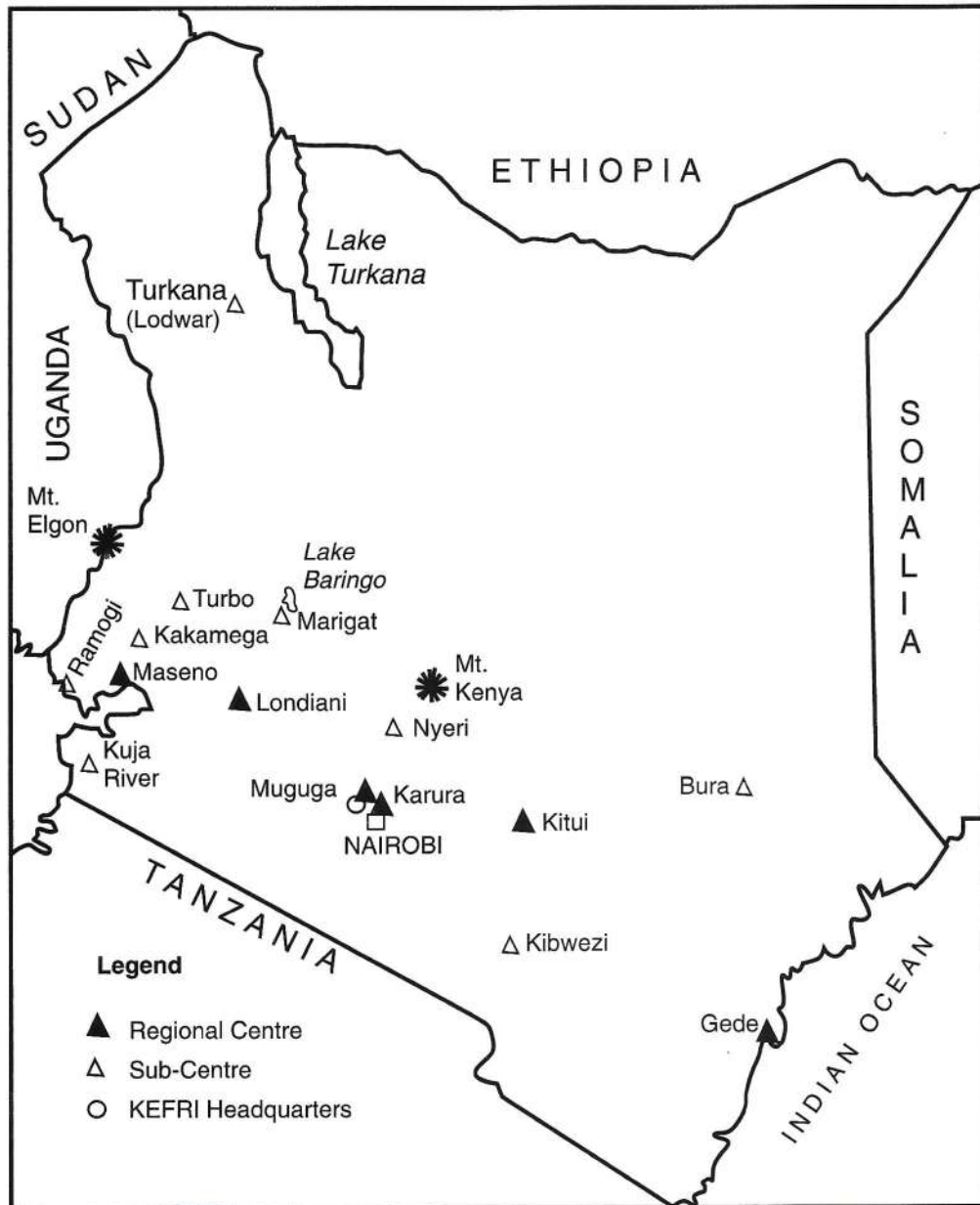
Programme	Ranked Problems	Ranked Activities
Dryland Forestry	1. Deforestation and degradation of large areas in drylands	1.1 Undertake baseline surveys on the extent of degradation. 1.2 Develop methodologies for monitoring trend of changes in woodlands. 1.3 Develop methods for sustainable regeneration and restoration of woodlands. 1.4 Develop technologies for introduction and management of alternative sources of fodder and other requirements.
	2. Inadequate information on availability and utilization of wood and non-timber dryland resources	2.1 Assess and document use of woodland resources by local communities. 2.2 Evaluate properties of wood and non-wood products in the drylands. 2.3 Develop technologies for improved utilization and production of forestry related products
	3. Lack of clear management guidelines for dryland forest resource management	3.1 Develop management guidelines for dryland forests.
	4. Insufficient validation and documentation of indigenous knowledge and practices in dryland forest resource management and conservation	4.1 Assess and document the role of indigenous knowledge and practices. 4.2 Improve identified gaps in the existing practices.
	5. Serious constraints to tree establishment.	5.1 Evaluate tree species for pest and drought resistance. 5.2 Develop and improve technologies to enhance soil moisture retention
	6. Unclear land and tree tenure arrangements in dryland forest resource management.	6.1 Evaluate the effects of land tenure on tree planting and conservation.

Annex I: (Contd)

Programme	Ranked Problems	Ranked Activities
Plantation Forests	1. Inadequate supply of high quality propagation material	1.1 Improvement of seed sources, seed handling and distribution. 1.2 Improvement of productivity of the major plantation species through tree breeding technologies.
	2. Large losses of plantations due to pests, diseases, human interference and game damage	2.1 Establish pest and disease monitoring and data base system. 2.2 Evaluate and develop tree species resistant to pests and diseases. 2.3 Select and diversify species varieties for plantations. 2.4 Identify management approaches to reduce human interference and game damage.
	3. Insufficient economic/ financial analysis of silvicultural operations	3.1 Evaluate and determine costs and benefits of various silvicultural operations.
	4. Inefficient harvesting and utilization of wood products	4.1 Evaluate and advice on log recovery rates of sawmills. 4.2 Research on design and production technology for furniture manufacture. 4.3 Undertake analysis of wood properties of selected species.
	5. Under-utilization of non-timber forest products	5.1 Document and create awareness on non-timber forest products from plantations. 5.2 Develop harvesting techniques and identify marketing strategies.
	6. Over-reliance on few exotic species	6.1 Evaluate wood properties of other alternative species and determine their potential.
Service Programme	1. Inadequate database, documentation and publishing services 2. Inadequate production of technical packages and management guidelines 3. Lack of forum for interactive research and technology transfer	1.1 Strengthen the KEFRI Library. 1.2 Strengthen the KEFRI Publishing Unit 2.1 Train scientists in scientific and proposal writing. 2.2 Train staff in documentation and information technology skills. 3.1 Strengthen/Establish Research Liaison offices at Regional Centres 3.2 Link researchers to beneficiaries, resource managers and extension agents to strengthen information gathering and dissemination. 3.3 Conduct interactive fora for training and information exchange.

Annex II

Location of KEFRI's Regional Centres and Sub-Centres



Annex III: Short-term Training

Priority Areas of Training	Target Group	Course Objectives	Number Eligible	Duration (Weeks)	Remarks
1. Proposal Writing, Scientific Writing and Communication skills	All scientists	Improve skills in proposal writing and communication skills	80	2 - 3	Immediate attention
2. Research Management	Programme Coordinators and Centre Directors	Improve leadership skills, Research planning, monitoring, evaluation and resource management	12	1-3	Train all in year one
3. Laboratory/Field Operations	Technologists Technicians and Foresters	Improve laboratory and field supervisory skills	60	3 - 6	Explore attachment options
4. Information Technology	Information/ Library staff and Printing Technicians	Improve efficiency in information documentation, dissemination and computer skills.	21	1 - 3	Use of modern equipment and information technology
5. Resource Management (upper level)	Senior managers in Finance and Administration	Improve skills in resource management.	10	1-3	Immediate attention
6. Security	All security staff	To acquire relevant skills required for security operations	40	1-3	Immediate attention required
7. Managers (lower level)	Middle level resource managers	Improve resource management skills	8	1-3	
8. Secretarial Course	Secretaries and copy typists	Improve skills in modern secretarial techniques	36	6	Focus on improved computer use
9. Hostel Management and House Keeping	All catering and house keeping staff	Improve catering and hostel management.	30	1 - 3	
10. Clerical Training	Clerical staff	Improve efficiency in clerical duties	50	1 - 6	
11. Artisan, Motor Vehicle proficiency	All artisans, janitors, drivers	Improve skills in general and motor vehicle maintenance	89	1 - 3	Focus on attachments

Annex IV: Long-term Training

Priority Areas of Training	Target Group	Course Objectives	Number Eligible	Duration, Years	Remarks
1. Training at Masters level	A.R.Os, and R.Os	Improve knowledge and skills in research	18	2-3	Prioritize by Seniority
2. Laboratory/Field Operations	Technologists Technicians and Foresters	Improve laboratory and field supervisory skills	60	1-3	Explore attachment options
3. Information Technology	Information/Library staff and Printing Technicians	Improve efficiency in information documentation and dissemination. Acquire computer hardware diagnosis and maintenance	21	1-2	Focus on use of modern equipment and information technology
4. Training at PhD level	R.Os, S.R.Os P.R.Os	Improve knowledge and research skills	10	3-4	Focus on applied and participatory research methods
5. Resource Management (Lower level)	Middle level resource managers	Improve resource management	8	1-3	Part-time
6. Secretarial Course	Secretaries and copy typists	Improve skills in modern secretarial techniques	36	1-2	Focus on diploma level training
7. Hostel Management and House Keeping	All catering and house keeping staff	Improve catering and hostel management.	30	1-2	

KEY

A.R.O. – Assistant Research Officers; R.O – Research Officers; S.R.O – Senior Research Officers; P.R.O – Principal Research Officer

Annex V: Proposed Recurrent Budget for 1999/2000-2003/2004 (Ksh. millions)

Expenses	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Personnel Expenses (Salaries, gratuity and house and medical allowances)	216.0	223.0	232.0	240.0	250.0
Common Operational Expenses	17.5	18.5	19.4	20.5	22.5
Administration/ Research and Management	5.6	5.7	6.0	7.2	8.5
Farm Forestry	2.6	3.8	4.0	5.5	7.8
Natural Forests	2.6	3.0	3.8	5.0	7.0
Dryland Forestry	2.6	2.8	3.0	4.0	5.0
Plantation Forestry	2.6	2.4	3.6	3.5	4.2
Service Programme	2.5	3.0	3.6	4.5	6.0
Regional and Sub-centres	3.3	3.5	4.2	5.0	7.2
Total	255.3	265.7	279.6	295.2	318.2

Annex VI: Details of Required Budget for Capital and Human Resource Development

ITEM	(KShs. Millions) Year					Total
	1	2	3	4	5	
Research Facilities						
35 Offices	22	10.5	10			
5 Laboratories	100	40	-			
3 Glass-houses (Turbo, Londiani and Nyeri)	25	20	20	40	35	
5 Libraries/books	20	15	-	-	-	
4 Multipurpose seminar/meeting rooms	47.2	15	-	-	-	
Sub-total	214.2	100.5	50	40	35	439.7
Staff and Guest Houses						
10 Houses for senior level staff	40	30	30	20		
10 Houses for middle level staff	30	20	15	20		
10 Houses for junior level staff	20	15	10	15		
3 Guest houses for catering facilities (Gede, Londiani, Maseno)	21.52	22.5	20	10		
Sub-total	111.52	87.5	75	65		339.02
Vehicles						
2 Troopers (Programmes)	10					
8 Saloon Cars (Centre Directors and Programme Coordinators)	8					
12 4WD Pickups (Centres and Programmes)	36					
6 4WD Station Wagons (Centres)	6					
4 Lorries (Karura, Londiani, Kitui, Muguga)	32					
4 Tractors (Karura, Londiani, Kitui, Muguga)	16					
2 Minibuses (Muguga, Kitui)	8					
Sub-total	116					116
Equipment						
30 Computers	20	38	25			
laboratory equipment	70	67	80			
Field equipment	30	20	-			
Office Furniture and Equipment	20	20	20			
Sub-total	140	145	125			410
Infrastructure and Catering						
Supply of Water, Electricity Telephone, and Sewage system	3					
Catering equipment	2	4	2			
Sub-total	7	4	2			13
Training (Long and Short-term courses)	20	16	14	10	4	64
Grand Total	608.72	353	266	115	39	1381.72

Annex VI: Tentative Schedule of Implementation of Research Activities

1.0 Farm Forestry

1.0 Farm Forestry	Problem/Activities	1999/2000	2000/01	2001/02	2002/03	2003/04
1.1	Inadequate technologies and lack of management guidelines for farm forestry					
1.1.1	Baseline needs surveys and land use characterization in sites where research activities are to be conducted					
1.1.2	Species and provenance diversification, selection, breeding and management activities including pests and disease control measures.					
1.1.3	Studies on soil stabilization, fertility enhancement and interaction between trees and crops.					
1.1.4	Design, establish, monitor and evaluate model farm forests.					
1.1.5	Preparation of appropriate farm forestry management guidelines.					
1.2	Under-developed marketing and utilization systems for farm forestry products.					
1.2.1	Carry out research and document existing marketing systems of farm forest products.					
1.2.2	Develop strategies for improving marketing of farm forest products.					
1.2.3	Develop bio-economic models for proven farm-forestry systems					
1.3	Inadequate supply of high quality propagation material					
1.3.1	Studies on the current status of on-farm propagation materials.					
1.3.2	Development and improvement of appropriate on-farm propagation materials and methods.					
1.3.3	Facilitate establishment of seed sources of high quality mother trees and shrubs.					
1.4	Ineffective farm forestry extension approaches.					
1.4.1	Analyze existing farm forestry extension and adaptive research approaches.					
1.4.2	Develop appropriate extension approaches and methods for various socio-economic groups.					
1.4.3	Strengthen collaboration with extension institutions.					
1.5	Insufficient recognition of indigenous knowledge and practices					
1.5.1	Documentation of traditional knowledge on farm forestry practices and management.					
1.5.2	Improvement of farm forestry management practices through interactive research.					
1.6	Unclear policy and inappropriate legislation for farm forestry					
1.6.1	Review and analyze existing policies that influence farm forestry development.					

2.0 Natural Forests

Problem/Activities	1999/2000	2000/01	2001/02	2002/03	2003/04
2.1 Inadequate information to support policy decisions on management and conservation of natural forests	—	—	—	—	—
2.1.1 Monitor the trend of changes of natural forests and loss of biodiversity	—	—	—	—	—
2.1.2 Evaluate the role of community involvement in the utilization and management of natural forests	—	—	—	—	—
2.1.3 Determine costs and benefits of natural forest conservation efforts.	—	—	—	—	—
2.2 Natural forests are undervalued	—	—	—	—	—
2.2.1 Quantitative analysis of total value of representative natural forest types	—	—	—	—	—
2.2.2 Determine properties of natural forest products	—	—	—	—	—
2.2.3 Improve knowledge and create awareness on the value of natural forests.	—	—	—	—	—
2.3 Overreliance on a few indigenous species	—	—	—	—	—
2.3.1 Research on alternative species for diversification of utilization	—	—	—	—	—
2.3.2 Promotion of use of softwood in production of furniture and other products.	—	—	—	—	—
2.4 Inadequate information to develop management plans for sustainable multiple-use of natural forests	—	—	—	—	—
2.4.1 Establish permanent sample plots for monitoring natural forest dynamics	—	—	—	—	—
2.4.2 Develop methodology for species growth modelling.	—	—	—	—	—
2.5 Large areas of natural forests are undergoing degradation	—	—	—	—	—
2.5.1 Study regenerative capacities of various forest types	—	—	—	—	—
2.5.2 Develop forest restoration techniques.	—	—	—	—	—
2.6 Insufficient information on biodiversity inventory and conservation	—	—	—	—	—
2.6.1 Documentation of indigenous knowledge on forest management and utilization	—	—	—	—	—

2.0 Natural Forests *Cont.*

Problem/Activities	1999/2000	2000/01	2001/02	2002/03	2004/04
2.6.2 Assess impacts of forest use on biodiversity in selected forests	—	—	—	—	—
2.6.3 Develop methodologies for biodiversity conservation	—	—	—	—	—
2.6.4 Develop hydrologic models to enhance water catchment.	—	—	—	—	—
2.7 Lack of knowledge of measurable indicators of sustainably managed natural forests and degradation	—	—	—	—	—
2.7.1 Identify and evaluate measurable indicators.	—	—	—	—	—
2.8 Certification methods for natural forests products not developed	—	—	—	—	—
2.8.1 Monitor progress made in certification processes	—	—	—	—	—

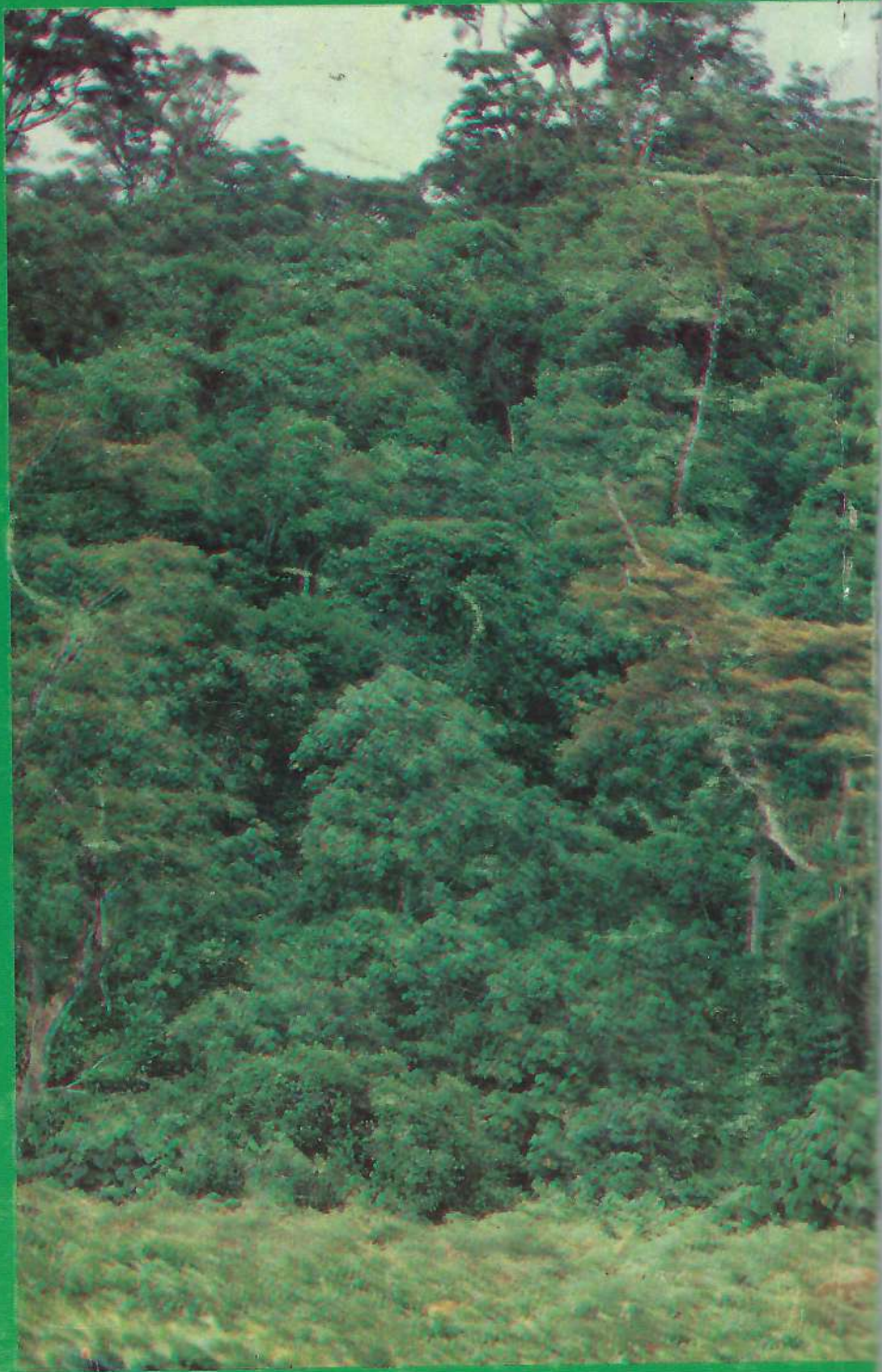
3.0 Dryland Forestry

Problems/Activities	1999/2000	2000/01	2001/02	2002/03	2003/04
3.1 Large areas of Kenya's drylands are undergoing degradation/deforestation	—	—	—	—	—
3.1.1 Undertake baseline surveys on what is on the ground	—	—	—	—	—
3.1.2 Develop methodologies for monitoring trends of changes in woodlands	—	—	—	—	—
3.1.3 Develop methods for sustainable regeneration and restoration of woodlands	—	—	—	—	—
3.1.4 Develop technologies for introduction and management of alternative sources of fodder and other requirements.	—	—	—	—	—
3.2 Inadequate information on availability and utilization of wood and non-timber dryland resources	—	—	—	—	—
3.2.1 Assess and document use of woodland resources by local communities	—	—	—	—	—
3.2.2 Evaluate properties of wood and non-timber products in the drylands	—	—	—	—	—
3.2.3 Develop technologies for improved utilization and production of forestry related products.	—	—	—	—	—
3.3 Lack of clear management guidelines for dryland forest resource management					
3.3.1 Develop management guidelines for dryland forests.					
3.4 Insufficient validation and documentation of indigenous knowledge and practices in dryland forest resource management and conservation					
3.4.1 Assess and document the role of indigenous knowledge and practices	—	—	—	—	—
3.4.2 Improve identified gaps in the existing practices.	—	—	—	—	—
3.5 Serious constraints to tree establishment					
3.5.1 Evaluate tree species for pest and drought resistance	—	—	—	—	—
3.5.2 Develop and improve technologies to enhance soil moisture retention.	—	—	—	—	—
3.6 Unclear land and tree tenure arrangements in dryland forest resource management					
3.6.1 Evaluate the effects of land tenure on tree planting and conservation.	—	—	—	—	—

Problems/Activities	1999/2000	2000/01	2001/02	2002/03	2003/04
4.1 Inadequate supply of high quality propagation material	—	—	—	—	—
4.1.1 Improvement of seed sources, seed handling and distribution.	—	—	—	—	—
4.1.2 Improvement of productivity of the major plantation species through tree breeding technologies.	—	—	—	—	—
4.2 Large losses of plantation due to pests, diseases, human interference and game damage	—	—	—	—	—
4.2.1 Establish pest and disease monitoring and data base system.	—	—	—	—	—
4.2.2 Evaluate and develop tree species resistant to pests and diseases.	—	—	—	—	—
4.2.3 Select and diversify species varieties for plantations.	—	—	—	—	—
4.2.4 Identify management approaches to reduce human interference and game damage.	—	—	—	—	—
4.3 Insufficient economic/financial analysis of silvicultural operations	—	—	—	—	—
4.3.1 Evaluate and determine cost benefits of various silvicultural operations.	—	—	—	—	—
4.4 Inefficient harvesting and utilization of wood products	—	—	—	—	—
4.4.1 Evaluate and advice on log recovery rates of sawmills.	—	—	—	—	—
4.4.2 Research on design and production technology in furniture manufacture.	—	—	—	—	—
4.4.3 Undertake analysis on wood properties of selected species.	—	—	—	—	—
4.5 Underutilization of non-timber forest products	—	—	—	—	—
4.5.1 Document and create awareness on non-timber forest products from plantations.	—	—	—	—	—
4.5.2 Develop harvesting techniques and identify marketing strategies.	—	—	—	—	—
4.6 Overreliance on few exotic species	—	—	—	—	—
4.6.1 Evaluate wood properties of other alternative species and determine their potential.	—	—	—	—	—

5.0 Service Programme

Problem/Activities	1999/2000	2000/01	2001/02	2002/03	2003/04
5.1 Inadequate database, documentation and publishing services	—	—	—	—	—
5.1.1 Strengthening of the KEFRI library	—	—	—	—	—
5.2 Inadequate production of technical packages and management guidelines	—	—	—	—	—
5.2.1 Training scientists in scientific writing	—	—	—	—	—
5.2.2 Training staff in documentation and information technology skills.	—	—	—	—	—
5.3 Lack of forum for interactive research and technology transfer	—	—	—	—	—
5.3.1 Strengthen/Establish Research Liaison offices at Regional Centres	—	—	—	—	—
5.3.2 Development of linkages amongst beneficiaries, resource managers, extension agents and researchers to strengthen information gathering and dissemination	—	—	—	—	—
5.3.3 Conducting interactive fora for training and information exchange.	—	—	—	—	—



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