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KENYA FORESTRY RESEARCH INSTITUTE

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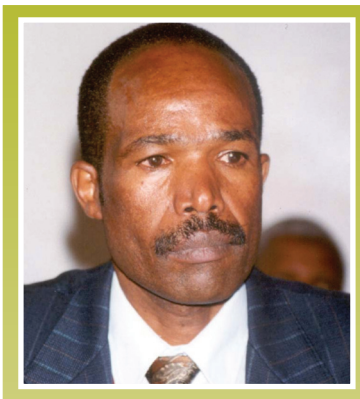
Foreword

By Director, KEFRI



I am happy to report that during the financial year under review, improvements were undertaken on the Institute's physical infrastructure and additional equipment acquired to facilitate research. With safety in the work environment in mind and a commitment to managing aspects of KEFRI operations that have significant impact on the environment, KEFRI embarked this year on a process of seeking certification in ISO 14001: 2004 so as to make its research facilities globally competitive.

A new Board of Management took office at the start of the financial year. Let me take this opportunity to thank outgoing members of the previous Board for their support and having steered KEFRI steadily towards accomplishing its vision and mission. In particular, I wish to recognize the exemplary service given to KEFRI by Chairman of the outgoing Board, Mr. Humphrey Ngibuini, a dedicated public servant long associated with KEFRI.

Among the new projects initiated by KEFRI in 2006/07 included the development of value-addition chains for non-wood forest products. Bamboo, aloes, indigenous fruits and medicinal plants all received due attention. A factory for processing aloe gel was established by collaborators in Baringo District to promote domestication the species. In addition, work on sustainable utilization of gums and resins, as well as *Osyris lanceolata* (sandalwood) was intensified. Another area where notable progress was made was in the establishment of farmer field schools for more effective management of invasive prosopis trees in the ASALS.

Research continued on the development of technologies for forestry management and conservation with key emphasis on utilizing the opportunities that came about with the enactment of the new Forest Policy and Forest Act 2005. KEFRI was involved in evaluating several approaches to community-based forest management. This report outlines the various studies undertaken to generate data and information to assist in developing guidelines for participatory forest management. Demonstration plots of *Milicia excelsa*, *Croton macrostachys* and *Polyscias* spp. were established in various strategic regional locations where the public could access and learn from them.

With support of government funding, KEFRI held a third scientific biennial conference from 6 to 9 November 2006 at KEFRI Headquarters in Muguga. The conference theme was "Forest research for enhancement of environmental conservation, livelihoods and economic development". It attracted 180 participants who included scientists, academicians, forest managers, extension officers, policy makers and private investors. A number

of international NGOs were represented while participation was also drawn from Tanzania, Uganda and Zimbabwe. 48 papers were presented as a way of sharing research results with target clients.

This conference was an effective dissemination tool for highlighting the importance of trees and forests to Kenya's development agenda where between 70 to 90 percent of the total number of households rely on fuel wood and charcoal to meet their energy requirements. Thousands of people earn their livelihoods from forestry-based nature enterprises such as carpentry, furniture-making and wood-carving. Many others grow trees on small-scale commercial basis for production of posts, poles and timber for the construction and power-transmission industries. The current ban on cutting any trees that are grown in gazetted industrial plantation forests to supply the country with pulp and paper, wood-based panels and sawn timber has made the forestry sector particularly attractive to private investors. Fortunately, guidelines for managing trees grown within and outside government-controlled forests are now available in the new Forest Policy and Forests Act 2005. Players in the sector are required to ensure sound management by preparing and seeking government approval for plans on utilization of all types of forests. In this regard, the conference was a key source of information on current good practices for wide adoption by practitioners.

As I close my remarks, I thank all KEFRI staff, our collaborators and donors for the key roles they played in ensuring success of activities scheduled in the course of 2006/07 financial year. I look forward to fruitful and meaningful interactions with all of you in the coming year.

Dr. Paul K. A. Konuche
Director, KEFRI.

Contents

1.0 Farm Forestry

A number of projects were carried out in line with KEFRI's strategic plan as follows:

Project FF/01: Diversification and genetic improvement of priority tree species.

Work on diversification of priority tree species was initiated focusing on promising species such as *Azadirachta indica* (Neem), *Gmelina arborea*, *Casuarina equistifolia*, *Milicia excelsa*, *Croton macrostachys* and Eucalypts. Demonstration plots were established in the suitable eco-regions. *Grevillea robusta* and *Markahmia lutea* root stocks were raised in preparation for further development of seed sources while seed orchards of *G. robusta* were maintained in Yala and Kuja River sites.

Using a researcher-designed, farmer-managed approach, different tree species were tested for suitability in the upper storey of agroforestry systems.

PROJECT FF/02: Improvement of on-farm forestry, agroforestry technologies and management practices

In western Kenya, a survey was conducted in Chichila, Kipkelion, Fort-Tanan, and Tinderet administrative divisions to evaluate the status of farm forestry development and underlying reasons for encroachment into the forest. Results showed that 61% of the people around Tinderet forest were settlers, whose duration of settlement was between 30-40 years. Most farmers were involved in various forms of farming (livestock or crop production) but forestry was not reported as a major activity.

Clearing for crop and livestock production, timber for construction and firewood are the main causes of vegetation depletion on most farms. Up to 60% of the households were not self-reliant in wood products - mainly timber and firewood. Fort-Tanan (78%) and Kipkelion (70%) were the most affected.

Forestry extension services were found to be poor on the ground and mainly provided by the Ministry of Agriculture and East African Wildlife Society (EAWS). Other issues that hampered forest development were inadequate provision of germplasm (seed and seedlings). There is therefore a need to build the capacity of the community in farm forestry through establishment of nurseries and improvement of extension services. This would contribute to enhancement of self-reliance of residents in wood products, create opportunities for income generation and thereby reduce encroachment into the gazetted forests. As a result of this project, two nurseries were established in Tinderet for producing seedlings with which to demonstrate agroforestry interventions suitable for combating forest degradation.

Baseline data was collected on soil characteristics ahead of introducing improved fallows for soil fertility improvement in Kwale and Malindi Districts.

Project FF/03: Value-adding, utilization and marketing of on-farm tree products

KEFRI initiated skill-improvement seminars for practicing chainsaw and mobile saw bench-operators in 2004. In the year under review, the target areas were North Rift Valley Districts of Keiyo and Koibatek. Forestry and agricultural extension officers were invited to participate along with timber sawyers.

Timber sawyers attending training in Keiyo District

Of those trained, 76% were power saw and 24% mobile saw bench operators. The number of bench saw operators was apparently on the decline as more sawyers changed to the use of power saws, which are claimed to be faster in sawing and require less labour input. They also observed that in the meantime, the quantity and surface quality of the timber output had gone down, while the rate of tree cutting went up. This was attributed to the nature of power saw operation and lack of sawing skills as majority of the operators were new in this field and learning on the job. Power saw operators had started to migrate to the neighboring districts of Rift Valley. The operators discussed the need for formation of timber sawyers' societies in their respective districts. This idea was well received and they set a follow up meeting after the seminar to discuss and finalize modalities with the help of the respective District Forest Officers. It was also recommended to conduct training for trainers which would draw trainees from among forest officers and agricultural extension officers, especially those involved in agro forestry. A cross-section of sawyers from all the areas where sawyers had already been trained would also be considered.

In a related study, an evaluation was done in Meru Central District where training of timber sawyers initially started. The aim was to determine the effect of training on timber recovery. This involved making a comparison of timber recovered by trained operators against those not yet trained. The study also endeavored to identify areas for further intervention in small-scale on-farm timber processing. From the results, timber recovery by trained sawyers differed significantly from that from untrained sawyers. There was however no significant interaction between sawing methods and training. These results partly support the opinion that chain sawing is more wasteful than bench saw method.

This training resulted in higher timber recovery, surface quality and size uniformity from the chain and bench saw methods due to improved sawing skills even though differences among the sawing methods remained due to other factors like size of saw kerf. It was therefore recommended that training of small-scale timber sawyers be carried out in other areas of the country so as to enhance timber recovery rates. More research was required to develop new technologies to minimize the saw kerf, especially for the chain saw. A recently introduced frame milling attachment for the chain saw required to be tested further to determine its effect on timber recovery before being widely promoted.

On marketing, a report was produced based on a past survey of markets and marketing dynamics for on-farm tree products. In related studies, two demonstration plots of Moringa oleifera were established and managed for a range of products.

PROJECT FF/04: Analysis of policy and legislation guiding farm forestry development

A study on biomass energy production systems and efficiency improvement was undertaken in order to develop a wood energy plan for micro-level planning in Kiambu, Thika and Maragwa Districts. It was initiated by conducting a survey of the wood fuel situation in the three districts.

During the reporting period, studies also got under way to determine the quality and quantity available of the seed oils with potential for biodiesel production in Kenya, namely *Jatropha curcas* and *Croton megalocarpus*. A profile was developed for oil yield of six tree seed varieties found in Kenya.

J. curcas, on one hand, is an exotic plant for which studies are under way regarding its agronomy and adaptability to the Kenyan environment. *C. megalocarpus*, on the other hand, is indigenous and widely distributed at altitudes between 900-2100m above sea level. The seeds are generally not utilized even though their potential to produce a large quantity of oil has been known for over two decades.

Tree species	seeds/year/tree (kg)	No. of seeds/kg	% oil
Jatropha curcas	2 - 2.5	1375	30-35%
Croton megalocarpus	25	1100	30%
Balanites aegyptiaca	55-80	500-1500	40-46%
Ricinus communis (castor oil)	-	-	50-55%
Tamarindus indica	150-200	600-3000	7%
Calodendrum capense	-	600	60%

A tree nursery specializes in production of Agro-forestry seedlings

2.0 Natural Forests Research Programme

Project NF/01: Conservation and Management of Natural Forests

Of the several activities supported by IFRI Project included piloting of Participatory Forest Management (PFM) in three forests, the establishment of two new research sites for collecting biophysical and socio-economic data as well as building the capacity of forest adjacent communities in forest management. This was addition to studying and documenting challenges faced by communities in managing forest resources. One policy and two community briefs were completed and issued. Project staff attended a regional meeting to review forest institutional arrangements where information was shared with similar institutions in East Africa.

Participatory forest management was also the subject of investigation in the EMPAFORM Project when a method for monitoring the sharing of benefits was developed and tested in two selected forests in Kenya. Indicators were also developed for monitoring PFM implementation for the selected forests.

SAMREM CRSP Project supported studies and documentation of effective systems of incentives necessary for implementing decentralization policies in forestry sector. Capacity was developed for selected members of key organizations and user groups to participate and analyze major impacts and linkages of policy reform processes. One national advisory committee was formed to monitor impacts of decentralization policies at different levels within communities.

Project NF/02: Propagation, management and utilization of timber and non-timber natural forest products

Bamboo seedlings were propagated from cuttings and put on display to the public in Muguga, Maseno, Gede and Londiani Regional Centres. A method for propagating bamboo plantlets through in-vitro techniques was developed in Muguga laboratories. The potential of bamboo in making furniture was demonstrated with three bamboo furniture products displayed in all KEFRI Centres. Five bamboo products produced the previous year were refined and displayed in all Centres.

The status, distribution and uses of at least five medicinal plants was studied and documented in all KEFRI Regional Centres. This included documentation propagation, conservation and management of *Osyris lanceolata*, *Warbugia ugadensis*, *Prunus Africana*, *Securidaca longipedunculata*, *Fagararopsis hildebrandtii*, *Zanthoxyllum usambarensis*, *Z. giletti*, *Styrchos henningsi*, *B. zanha africana*, *Acacia eliator*, *Rhamnus prinoides* and *Carissa edulis*.

In collaboration with public institutions, indigenous medicinal plant groves were established in demonstration plots for ex-situ conservation in all regions where KEFRI operates.

An Eastern Africa Bamboo Project (EABP) was funded by Common Fund for Commodities (CFC) and executed by the United Nations Industrial Development Organization (UNIDO). It was implemented in Kenya under the Ministry of Environment and Natural Resources (MENR). Its main objective was alleviating poverty in rural communities by improving technological skills in the production systems of bamboo products.

During the period under review, KEFRI participated in preparation of training and dissemination manuals, capacity building in product development and conducting training for project beneficiaries and extension agents in the propagation, cultivation and management of bamboo. Key steps were taken towards developing a regulatory framework in the management and exploitation of bamboo resources in the country.

Drawing financial support from the project, a booklet titled "Guidelines for Establishment and Managing Plantations of Bamboo in Kenya" was revised by consultants. The revised version is now

titled now 'Guidelines for Growing Bamboo' and contains more details, incorporating information on introduced species. These guidelines were also translated into Kiswahili in order to reach a wider audience.

The project also funded market studies by local and international consultants who reported that local traders faced stringent restrictions in the harvesting of bamboo. They found out that available bamboo products were imported mainly from China. A potential for boosting local production lay in establishing bamboo plantations for reforestation of degraded gazetted forests. Farmers were also interested in establishing woodlots of bamboo and the project promoted plantation establishment of local and exotic species of bamboo on farms.

A team of environmental and legal practitioners were engaged in reviewing legal implications of a current ban on harvesting bamboo. The findings of the policy review and recommendations for action were presented to a policy liaison committee on natural resources - comprising of KEFRI, KFS, KWS, NMK and FAN. The committee resolved that the findings and recommendations should be presented to stakeholders in a national bamboo workshop. As a strategy for reviewing the ban, policy makers from the Ministry of Environment and Natural Resources (MENR) were sponsored on a study tour of China to raise their awareness of the importance of bamboo as they guided the development of a policy to regularize harvesting.

Project NF/03: Rehabilitation of Natural Forests

The manner in which natural forests respond to human interference was the subject of a study in which succession trends in degraded forest land were documented. Plots that were previously established in Kakamega, Gwasi, Nguriunditu, Hombe and Kwale forests were maintained and monitored. Techniques for rehabilitating degraded natural forests were developed and demonstrated in Wire, Kikuyu escarpment and Mau forests. Two demonstration mangrove rehabilitation plots were established in Lamu District. Other demonstration plots previously established in Malindi and Kilifi Districts were maintained and monitored.

Natural Forest Rehabilitation of Kikuyu Escarpment Forest Enrichment Planting

A plot about 1.5 ha was demarcated and planted with indigenous tree species to augment the naturally regenerating plants in-situ. Lines each of about a meter in width were cleared at a spacing of 3.5 m. Pitting was done along the cleared lines at a spacing of 3.5 m from one hole to another. Where a seedling or a coppicing stump occurred along or near the cleared line no pitting was done at that point. After long rains of April-2007, fifteen indigenous tree species were planted in the plot at random.

No	Tree species	Survival (%) at 2 months	Remarks
1	*Podocarpus falcatus*	81.4	New to the site
2	*Vitex keniensis*	82.9	New to the site
3	*Warbugia ugandensis*	92.9	Indigenous to the site
4	*Olea europea* var. *africana*	59.0	Indigenous to the site - *browsed by wildlife*
5	*Dovyalis abyssinica*	90	Indigenous to the site - *browsed by wildlife*
6	*Cardia africana*	84.3	New to the site
7	*Brachylaena huillensis*	81.4	New to the site
8	*Prunus africana*	81.4	New to the site - *browsed by wildlife*
9	*Erythrina abyssinica*	85.7	New to the site
10	*Markhamia lutea*	87.2	New to the site
11	*Croton megalocarpus*	85	New to the site
12	*Casomoora edulis*	61.4	New to the site
13	*Juniperus procera*	100	Indigenous to the site
14	*Polyscias fulva*	85.7	New to the site - *browsed by wildlife*
15	*Dombeya torida*	78.6	New to the site

The survival assessment done two months after planting showed an overall survival of over 80%.

The following was observed:

- *Olea europea* var. *africana*, *Dovyalis abyssinica*, *Prunus africana* and *Polyscias fulva* were heavily browsed by wildlife
- The seedling at the planting time seemed to be performing the best
- Some seedling theft occurred along the footpath
- Some livestock grazing has occurred on one side of the plot
- Grasses and the annual herbaceous weeds are quickly covering the seedlings
- *Euclea divinorum*, *Cussonia spicata* , *Elaeodendron buchananii*, *Teclea simplicifolia*, *Fagaropsis angolensis*, *Ehretia cymosa* and *Rhus natalensis* are some of the naturally occurring shrubs and tree seedlings growing in the site.

The Way Forward

- Maintain the plot through clearing unwanted bushes and spot-weeding
- Replace the stolen and the dead seedlings
- Livestock to be kept outside the plot
- Extend the plot by at least another hectare
- Erect a billboard
- Large sized seedlings to be used for all future plantings

3.0 Drylands Forestry Research Programme

Project DF/01: Management, improvement and domestication of priority drylands species

Appropriate ways for propagating *Melia volkensii* (Mukau) were investigated. The behaviour of seed while in storage was studied while improvements were made in the methods used in raising seedlings through cuttings and tissue culture. The final output was a demonstration plot of Mukau that was established in Kitui using seedlings raised from cuttings.

A range-wide evaluation of Mukau populations was also undertaken in order to determine genetic diversity and variability. A clonal seed orchard was established in Kitui and provenance trials set up there in addition to Kibwezi and Maseno.

Terminalia brownii seed was collected from different ecological sites and tests carried out to determine its germination potential and viability.

Project DF/02: Management of invasive plant species

Management of Prosopis as an invasive plant species came into the limelight when a national project was launched at a field day held in Baringo District. A national Prosopis Task Force held meetings as scheduled throughout the year and 4 farmer field schools received support from the project. In the meantime, to scale up activities, plots were established for the purpose of demonstrating management and control technologies in other affected areas such as Turkana and Bura. Local management committees received support in facilitating their meetings. Improved charcoal production kilns were also established for demonstration purposes and to promote burning of charcoal as another management strategy for Prosopis. Improved charcoal production kilns were also established for demonstration purposes and to promote burning of charcoal as another management strategy for Prosopis.

On another front, local natural enemies of Prosopis were documented in the process of developing a biological control method to keep spread of this tree in check. Algarobius prosopis, a seed-feeding beetle, was imported and reared in quarantine. Permission for release in Baringo was granted by the KSTCIE.

Preliminary results on drying six wood samples of *Prosopis juliflora* in a solar kiln indicated that this brought the average moisture content down to 11.1 % in just 10 days. There were no visible drying defects noted. Wood carvers who paticipated in this study at the Malindi Handicrafts Cooperative had worked with the species before and considered it to be a very `hard' wood to work with. Previous work done by other carvers at Gikomba market in Nairobi produced similar sentiments. *P. Juliflora* is already utilized in making crafts items that are commercially traded as a principle and secondary product respectively in Peru and Mexico and therefore indeed, has potential for wood carving in Kenya.

Prosopis samples undergoing the drying process at Malindi

Samples drying in a solar kiln at Malindi

Conclusions

Indications have shown that this species can be carved and dried using the solar kiln. The wood carvers at the Malindi Handicrafts Cooperative were able to carve a couple of samples of the Prosopis and some had worked with the species before. However, they did comment that it is a very `hard' wood to work with. Previous work done by other carvers at Gikomba market in Nairobi had similar sentiments. That not with standing they said that the wood was beautiful aesthetically and had potential as a wood carving species. Mr. Grover Ainsworth of PVC- Kenya who is working for the MESP Micro-Enterprises Support Program who are one of the sponsors at the Malindi Handicrafts Cooperative was very keen on the outcome of this work. Prosopis is the US is known as Mesquite and he had not seen it being used for wood carvings. However, in Peru and Mexico *P. Juliflora* is used in making crafts items that are commercially traded as a principle and secondary product respectively (Pasiecznik, N.M et. al., 2001). Indeed there is potential of this species for wood carvings

Project DF/03: Utilization and marketing of dryland forest resources

In Baringo District, the distribution and production potential of *Aloe secundiflora* was determined. A survey was carried out to identify insect pests and diseases of commercial aloes. 3 meetings took place in support of the Baringo Aloe Bio-Enterprise.

A complete survey was undertaken to document the distribution of two indigenous fruit trees, namely *Adansonia digitata* and *Berchemia discolor*. The result was a map. Similarly, plant sources of dyes and tannins in North Eastern Kenya were documented.

The trees whose fruits were selected for product development were Baobab and Tamarindus while an efficient method was developed for minimizing waste in wood-carving. A study was conducted to document ethno-botany of the area around Garissa (Bori Lungi and Jujora).

Project DF/04: Information on dry land biodiversity and appropriate technologies for woodland management

A project on Intensified Social Forestry (ISFP) was undertaken in which different forestry extension approaches were compared in Kitui District. Performance of crops and trees under conservation tillage was monitored while traditional termite control methods were documented and validated.

4.0 Forest Plantations Research Programme

Project FP/ 01: Forest Plantations Establishment and Management

Reports of poor germination of seed distributed by Kenya Forestry Seed Centre were investigated and addressed. In addition, 1500 grafted seedlings of selected *Vitex keniensis* (Meru Oak) and a similar number of grafted *Vitex payos* were raised for establishment of seed sources.

The establishment of seed stands of major commercial forestry tree species was given priority in KEFRI Regional centres as follows:

- 2 ha each of *Pinus patula* and *Cupressus lusitanica* seed orchards established in Londiani
- 2 ha of *Eucalyptus camaldulensis* seed stands established at Kitui and Meru
- 1 ha of *Eucalyptus regnans* stand established in Nyandarua
- 1 ha of improved *Vitex keniensis* seed stand established in Meru
- 4 ha of *Eucalyptus grandis* seed stand progeny trials established at Muguga and Londiani
- 4 ha of *Cupressus lusitanica* seed progeny trials established at Muguga and Londiani
- 1 ha seed stand of *Gmelina arborea* was established at Gede after a plantation was selected and thinned.

Pinus patula and *Cupressus lusitanica* were the two commercial timber species selected for demonstrating plantation establishment through management of natural regeneration. The cost of so doing was documented. Demonstration plots of each species were set up at Lorenge and Uplands in areas with old regeneration approaching ten years of age. Final assessments on the growth performance of *Pinus radiata* as a plantation species were undertaken in Londiani. Similarly, trial plantations of *Croton macrostachyus* were established in Nandi and *Zanthoxyllum gillettii* at Londiani.

To determine profitability of forestry enterprises and tree products, cost-benefit analysis studies (growth, yield and economics) of growing *Casuarina equistefolia* were carried out. Data was also collected for analysis of profitability and marketing of Eucalyptus spp.

FP/02: Forest Insect Pest and Disease Monitoring

The Institute continued to offer advisory services on management of forest pests and diseases. These efforts were enhanced by updating the electronic data maintained on various pests and diseases and by following up new developments in the field in collaboration with Kenya Forest Service. Forest officers reported any incidents of concern through a prescribed format as outlined in Technical Order No. 40. Diseases and pests of eucalytus hybrid clones were monitored in 8 clonal trial sites. Data was gathered for quantifying growth and economic loss due to attack by the blue gum chalcid. Likewise, the occurrence of chalcid was monitored on quarterly basis and damage trends on host trees assessed in 10 sample plots. The variability of attack was compared between *Eucalyptus* species and hybrid clones.

The population dynamics of cypress aphid were documented in 4 permanent sample plots on quarterly basis.

FP/03: Improvement and Management of Eucalyptus species and clones

Efforts to improve *Eucalyptus* species through genetic mapping of selected outstanding *E. grandis* required the genetic composition of one hundred trees to be determined and documented. Hybridization of *Eucalyptus* species produced crosses of *E. grandis*, *E. camaldulensis*, *E. urophylla* and *E. regnans*. These seedlings were established in Muguga. Performance of improved *E. grandis* seedlings was monitored at Muguga and Turbo with the goal of acquiring plant breeder's rights. Guidelines on costs and benefits of growing eucalyptus were prepared.

In related studies, the growth, yield, wood properties and economics of growing Eucalyptus clones were documented for 15 hybrid clones introduced into Kenya from South Africa. Ten of the clonal establishment trials were assessed and 3 new ones established. Genotypic interactions with the environment were documented.

FP/04: Advanced tree improvement

Eucalyptus hybrid trials were established with a view of making recommendations on which hybrids were best suited to different ecological zones. Altogether, 3 trials were established, 15 maintained and 8 assessed. Pest and disease incidences were also monitored in the trials.

There was an initiative to improve commercial tree nursery production of major plantation species by adopting vegetative methods at the nursery in KEFRI Headquarters. The target was to stock 10000 clones of eucalypts, pines and cypress in addition to another 500000 seedlings.

A casuarina plantation

Eucalyptus plantations supply fuelwood for tea processing

5.0 Service Programme

Information Documentation and Publishing Services

Research findings were documented, published and disseminated for public consumption as listed in the section on publications in Appendix 2. KEFRI library continued to play its role in subscribing to on-line journals, acquiring new books and receiving others as donations. The Institute's website was also updated regularly and a database named Web-AGRIS posted there. A separate database on KEFRI experimental trials and studies that is maintained by the Programme was also updated.

Information and communication strategies

To improve information communication, technical specifications for providing internet services in Londiani, Gede and Muguga were developed. Two officers based at KEFRI Headquarters also received training, one in the Linux operating system and the other on CISCO. Scientists and technical staff received follow-up training on data management and analysis at Maseno, Londiani, Kitui and Gede Regional Research Centres. The biometrician also participated in Centre Research Advisory Committee meetings at Londiani, Maseno, Karura and Muguga Centres and made two advisory visits to Maseno and Gede Regional Research Centres.

Interactive research and technology transfer

The Service Programme conducted six Forest Resources Officers' courses, attended by 160 officers drawn from the Forest Department (FD) in the Ministry of Environment and Natural Resources. An annual Regional Training Course on Enhancing Adoption of Social Forestry in Africa attracted 22 participants from 18 countries. A special course on Social Forestry was conducted for 10 participants from Ghana. KEFRI Social Forestry Training Centre also hosted study tours for Japanese students and held other client-specific courses on request.

FD officers were joined by other government and non-governmental organization staff in a course designed to teach tem more about participatory extension and resource management. This tailor-made course targeted Kenya Forest Service officers in forestry extension, plantation, natural forests and woodlands management. Its purpose was to enhance knowledge and skills as well as disseminate information on recent scientific developments and management issues in forestry. During the year under review, 3 such courses were held and attended by a total of 75 participants.

Another 14 participants received training on Timber Grading and Promotion. This course is held annually at KEFRI and leads to gazettement of timber graders, skilled in the use of softwood timber grades for structural use.

Audio-visual unit staff of the Social Forestry Training Centre helped produce a number of documentary videos covering different aspects of forestry technologies developed by KEFRI, as follows:

- Prosopis species research in Garissa, Bura, Hola as well as Turkana and Baringo Districts;
- Maseno RRC Open Day;
- First Participatory Forest Management (PFM) Conference held at KEFRI Muguga from 6th – 8th June 2007
- An Initiative to Conserve Mukogondo Forest.

The unit also shot digital photographs and upgraded the KEFRI photo gallery by adding 130 new photographs.

Liaison

As scheduled, meetings took place in the course of the year to strengthen linkages between KEFRI and the FD, Ministry of Environment and Natural Resources. Two Policy Liaison and four technical meetings as well as six field meetings took place as scheduled. This went a long way in fostering cooperation between researchers and officers of the Forest Department and identifying items for follow-up and action.

Among the issues raised by the FD for further research were:

- Easier methods of estimating the value of scattered trees on farms.
- Best sites for growing eucalypts planting relative to water conservation.
- Information on the economics of establishment and returns of growing eucalypts.
- Checklist of termite resistant tree species for the planting in dry land areas, including Tharaka.
- Propagation and management of East African sandalwood and propagation of indigenous species which experience difficulties with propagation from seed. They include *Melia volkensii*, *Prunus africana*, *Ocotea usambarensis*, *Vitex keniensis* as well as giant bamboo, rattans and aloes.
- Management of *Cinara pinivora*.
- Selection of good sources of seeds and seed pre-treatment regimes for selected indigenous species.
- Extraction of perfume from seed of *Calondedrum carpense* (Muroroa) and bio-diesel from *Croton megalocarpus* and *Jatropha* species.
- Management of invasive species such as *Lantana camara* in forests.

The following issues were also noted:

- Incidences of blue gum chalcid had been reported in the eastern region of the country.
- Death of a *V. keniensis* plantation in Chuka station and old camphor trees in Chogoria and Ruthumbi forests. The cause was not yet established.
- In Igembe Division of Meru North, *Eucalyptus grandis* seedlings were attacked by termites at a high rate after planting
- There were reports of insect damage on *Catha edulis* (Miraa) in Meru region.
- Information given to farmers on growth rates of *E. grandis* and *E. grandis x camaldulensis* hybrids was incorrect. It led to very high expectations and farmers' disappointment.

In order to further consolidate the research services offered by KEFRI to FD, a task force was set up and met on quarterly basis to review and monitor implementation of the Forestry Technical Orders. Gaps which required research inputs were identified.

Seed Centre

KEFRI renewed its registration as a tree seed dealer with KEPHIS. Twenty-four seed sources were maintained by thinning, cleaning and labeling. New seed sources were established for species in demand in Kibwezi region.

Seed surveys and testing were routinely undertaken while 5500kg of clean seed of over 20 species was collected. 4000kg of the seed was sold. KEFRI Gede Regional Research Centre seed collection facilities were upgraded to give the Centre the status of a tree seed distribution outlet. The cold storage at Kenya Forestry Seed Centre, Muguga, was renovated. Laboratory equipment was purchased or repaired as necessary while dispatch and extraction units in various other KEFR1 Centres were also given a facelift.

The recruitment of casual labor strengthened the capacity at Kenya Forestry Seed Centre for seed collection. The hired persons received training in professional tree climbing. Where necessary, refresher courses were conducted for foresters, technicians and selected collectors.

Revenue generation

The Service Programme undertook a number of activities for revenue generation. They included seed collection and sale of seedlings, production of publications for sale and charges levied towards training conducted at the Social Forestry Training Centre. Fuel wood and other forest produce was offered for sale at the Muguga Forestry Research Estate while wood products or processing services were provided to the public at a fee at the Karura Research Centre wood workshop.

6.0 Human Resources Division

For management purposes, the Division comprises of the following sections:

(a) Training
(b) Personnel Registry
(i) Compliment control
(ii) Appointments
(iii) Records
(c) Salaries
(d) Pension
(e) Payroll

Activities

The HR Division was guided by the KEFRI Personnel Manual, Board of Management resolutions and Central Government circulars as issued by various authorized agencies in the implementation of KEFRI rules and regulations.

- Employee Satisfaction Survey
  The division conducted a survey on employee satisfaction to determine how the level of employee satisfaction had changed from the previous year.

- Visit to Centres
  KEFRI Regional Centres and Sub-centres were visited and meetings held in order to address employee problems.

- Records' management
  Better records were maintained, especially in the compliment control by enforcing the use of the Employee Data Sheet and addressed various personnel problems.

- Training Needs Assessment
  A training needs assessment survey was conducted.

- Performance Evaluation
  Performance evaluation was conducted for all the staff.

- Salaries and wages administration
  Salaries and wages were processed and paid in time.

- Position and responsibility changes
  Transfers, promotions, demotions, dismissals and retirements were carried out successfully during the year.

- Schemes of Service
  The Division completed preparation of Schemes of Service.

- Employee health, safety and welfare
  Routine activities like processing leave and traveling allowances, pension and retirement scheme contribution deductions, salary advances and maintaining employee records were carried out effectively within the year. The Institute lost 10 members of staff during the year through death, five resigned, 28 retired and two were dismissed, realizing a total staff turn-over of 45 members.

- Labor relations
  The Division handled court cases related to Industrial Court and held consultative meetings with unionized staff of the Institute. It was the responsibility of this Division to ensure industrial harmony through regular consultations with workers' representatives

- Human Resource Development
  Six officers pursued long-term training at doctorate level while 207 others received group training of various descriptions as related to their line of duty. Two officers undertook training at Diploma level while eight more registered for short courses lasting between a few days and up to six months.

Appendix 1: Board of Management

Appointed Members:

Mr. Patrick M. Mung'ala	-	Chairman
Prof. Florence Lenga	-	Member
Dr. James M. Onsando	-	Member
Dr. Winston Mathu	-	Member
Dr. Fridah Mugo	-	Member
Mr. D. S. Mohammed	-	Member
Dr. Paul K. A. Konuche	-	Director, KEFRI and Secretary to the Board

Ex-Officio Members

The Permanent Secretary – Ministry of Environment and Natural Resources
The Permanent Secretary – Ministry of Finance
The Secretary – National Council for Science and Technology
State Corporations Inspectorate

Appendix 2: Reports and Publications

Books and manuals

Chikamai B.N, Githiomi J.K, Gachathi F.N. and Njenga M.G. 2006. Commercial Timber Resources of Kenya. Karura Forest Products Research Centre, KEFRI. 164pp.

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Thesis

Kiptot E. 2007. Seeing beyond Fertilizer Trees: A case study of a community based participatory approach to agroforestry research and development in Western Kenya. PhD Thesis. Wageningen University, Wageningen, The Netherlands. 184pp

Journal papers

Baggs E.M., Chebii J., and Ndufa J.K. 2006. A short-term investigation of trace gas emissions following tillage and no-tillage of agroforestry residues in Western Kenya. Soil and Tillage Research 90 (2006) 69 – 76.

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Muchiri M.N., Kamondo B.M., Ochieng D., Tuwei P., and Wanjiku J. (eds). 2007. Forestry research in environmental conservation, improved livelihoods and economic development. Proceedings of the 3rd KEFRI Scientific Conference. KEFRI, Muguga. 361pp.

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Appendix 3a: Balance Sheet

KENYA FORESTRY RESEARCH INSTITUTE
BALANCE SHEET AS AT 30TH JUNE 2007

		2007 Kshs.	2006 Kshs.
ASSETS	Notes		
Non-Current Assets			
Property, Plant & Equipment	2	*988,874,599*	*997,836,568*
Intangible Assets	14	*3,029,339*	*3,786,674*
Current Assets			
Inventories	3	*16,894,152*	*20,204,220*
Receivables	4	*6,130,949*	*5,819,448*
Investments: Treasury Bills/FDRS	5	*34,424,950*	-
Cash at Bank	6	*74,072,497*	*122,298,417*
Total Assets		*1,123,426,486*	*1,149,945,327*
CAPITAL GRANTS AND LIABILITIES			
Capital and Reserves			
Government Grant for Capital Assets		*1,053,869,167*	*1,061,973,403*
External Grant for Research	7	*28,303,118*	*20,774,342*
Sinking Fund	26	*32,398,516*	*39,823,526*
Revaluation Surplus Reserves		*131,442,930*	*131,442,930*
Accumulated Deficit		*(139,243,204)*	*(120,160,079)*
		1,106,770,526	*1,133,854,122*
Current Liabilities			
Payables and Accruals	8	*5,194,863*	*5,982,275*
Medical Scheme Funds	28	*11,461,097*	*10,108,930*
		16,655,960	*16,091,205*
Total Capital Grant and Liabilities		*1,123,426,487*	*1,149,945,327*

Chairman .....
P. Mungala
Date: .....

Director .....
P.K.A. Konuche (Dr.)
Date: .....

Appendix 3b: Income and Expenditure

KENYA FORESTRY RESEARCH INSTITUTE
BALANCE SHEET AS AT 30TH JUNE 2007

INCOME AND EXPENDITURE FOR THE YEAR ENDED 30TH JUNE 2007

	Note	2007 Kshs	2006 Kshs
Income			
Government Grants	9	547,592,532	441,588,084
External Grant for Research	7	38,580,002	58,189,357
Interest on TB,FDR and Savings A/c	10	653,507	1,865,390
Other Income	11	30,300,755	30,231,494
Insurance Compensation	27	1,476,500	-
Gain on Sale of Fixed Assets	12	2,241,978	-
		620,845,272	**531,874,326**
Expenditure			
Operating Expenses	13	(614,963,167)	(506,665,523)
Financial Expenses	23	(792,976)	(504,625)
Establishment Cost	24	(1,000,000)	(2,600,000)
		(616,756,143)	**(509,770,148)**
Surplus before Depreciation & Deferred Income		4,089,129	22,104,177
Depreciation	2a	(45,125,223)	(46,139,166)
Amortization for Intangible Asset		(757,335)	-
Deferred Income	2b	24,055,404	25,969,507
Changes in Inventories [Forestry Plantations & Seedlings	21	(1,948,310)	3,858,652
Surplus/Deficit for the Year		**(19,083,125)**	**5,793,171**

Distribution of KEFRI's Research Centres

Regional Centres Contact Details

Coast Regional Research Centre - Gede
P. O. Box 1078 Malindi - 80200
Tel: +254-42-32022, +254-2-2386358
Email: cdgede@kefri.org

Karura Forest Products Research Center
P. O. Box 64636 Nairobi - 00620
Tel: +254-302011628/9, +254-733-764726
Email: cdkarura@kefri.org

Kitui Regional Research Centre
P. O. Box 892 Kitui - 90200
Tel: +254-44-22311, +254-20-2386356
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Lake Basin Regional Research Centre - Maseno
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Fax: +254-573-51592
Email: cdmaseno@kefri.org

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