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## KEFRI - KWAP

### WORKSHOP ON TREE SEED DISTRIBUTION AND MARKETING

ELBURGON, 18 - 20 JULY 1994

### WORKSHOP PROCEEDINGS

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## PREFACE

The Kenya Woodfuel and Agroforestry Programme (KWAP) was established in 1984. The first phase of the programme (1984-1988) focused on the development of agroforestry technologies, extension, and monitoring and evaluation methodologies.

Phase two (1989-1991) was chiefly on the trial out of techniques for transfer of technologies in the districts of Kakamega and Kisii (these have since been split to Kakamega, Vihiga, Kisii, and Nyamira districts).


The current phase of KWAP (1991-June 1996) focuses in four districts around participatory approaches within the framework of a Farming Systems Approach. More specifically the programme focuses on the role of the tree in the different farming systems of the eight districts of operation (four backstopping and four new districts, i.e. Busia, Migori, Kericho, and Uasin Gishu). The approaches used in phase 1 and 2 of the programme did not lend themselves for multi-disciplinary initiatives, the results of which led to slower integration of activities.

The Agroforestry Farming Systems Approach (AFSA) entails collaborative planning meetings with heads of departments, members of the agroforestry implementing task force, divisional and locational agroforestry committees or catchment committees.

In order to guarantee sustainability of the agroforestry knowledge in the country without institutionalising the project, activities which address policy discussions were planned for. Included were topics such as Seed Strategy, Gender and Development, Institutionalization, and Integrated Extension.

This report covers one of such policy workshops on seeds. Experience has shown that the availability of enough quantities of tree seeds of the right species and at the right time constitutes a major hinderance to successful tree planting. Many tree planting programmes have to scramble for the little available seeds locally, these leads to escalated prices or importation of seeds of the required species from outside working areas and the country at large.

KWAP has co-organised and sponsored this workshop as a going concern and follow up of the initiatives already taken. We hope that the outcome will be of use to all rural based tree planting programmes and that the recommendations made will be taken seriously.

  
Musa K.L. Enyola  
Team leader  
KWAP

## SUMMARY OF RECOMMENDATIONS<sup>1</sup>

The Tree Seed Regulations was welcomed as a good start; projects dealing with tree seeds should not be alarmed since the proposed rules are there to create order and bring about stability in the seed "industry". The workshop felt, however, that:

1. The articles "*Seed Dealer*", "*Seed Collector*" in the Seed and Plants Varieties Act Cap. 326 (Tree Seed Regulations, 1993) need to be clarified.
2. The (relevant) *NGOs should be included* in the National Forestry Tree Seed Committee (NFTSC).
3. The NFTSC should *inventorize the activities* of the NGOs, *identify their training needs* in the area of Tree Seed and recommend appropriate training at Kenya Forestry Seed Centre (KFSC)
4. The Quality Control Unit (QCU) should avail to the seed dealers *minimum standards* to adhere to. Initially the QCU should assist dealers meet the standards through awareness creation. There should be regular inspection of dealers and seed sources with a view of identifying technical gaps and trouble shooting.
5. In registration of seed dealers, KEFRI should distinguish between *commercially* oriented and *service* oriented dealers.
6. The Tree Seed Zonation should be improved by inclusion of the *soil factor* as a basis of zoning.

It was agreed upon by the workshop that free issue of seeds or seedlings in the long run will not be sustainable, though reasons given for that approach included donor pressure and lack of awareness in some areas of the importance of trees. The strong recommendation was that:

7. *All tree seed should be for sale* effective from January 1995. The Directors Forestry and KEFRI should see to it that the information is circulated to all through the appropriate channels and fora like the DDC.
8. The *price of seed* purchased from dealers and collectors should be harmonized and based on the existing KEFRI price list.
9. All seed for distribution should be *packed in a standard way*. KFSC will work out appropriate packets to be ratified by individual organizations. KFSC should carry out seed marking tests to avoid seed recycling from vendors to organizations.

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<sup>1</sup>For detailed Working groups deliberation, see section 3

All persons and organizations dealing with tree seeds should get more serious as far as seed handling and quality is concerned. The workshop recommends that:

10. *Seed documentation* should be emphasized by all actors involved in any aspect of tree seed handling
11. All seed collectors and dealers should correctly observe all the *aspects of tree seed handling techniques*, vis a vis, sampling of seed trees, seed collection techniques, extraction and cleaning, testing, storage, documentation and distribution.
12. KEFRI should provide *training curriculum* for all cadres dealing with tree seeds, from managers to harvesters.
13. KEFRI should finalize the necessary *registration forms for tree seed dealers* as provided in the Act and arrive at appropriate fees to charge for the Act to take effect.
14. *Seed testing* should be decentralized to KFSC outstations. KFSC should present proposals to potential donors to equip the stations with the required basic facilities for seed testing.

The workshop brainstormed on ways of collaboration and sharing of information between organizations dealing with tree seed. It was agreed that:

15. All potential seed dealers should convene a meeting to discuss *possible areas of collaboration* on seed procurement and distribution preferably under the chairmanship of the DFO.
16. *Networking* for sharing of relevant tree seed information will be through the Rural Forestry Newsletter of the Forest Department. KFSC will create the appropriate format for reporting.

## LIST OF ABBREVIATIONS

A:	Answer
C:	Comment
DANIDA	Danish International Development Agency
DDC	District Development Committee
DFO	District Forestry Officer
FD	Forest Department
GK	Government of Kenya
GTZ	German Technical Agency
ICRAF	International Centre for Research in Agroforestry
KARI	Kenya Agricultural Research Institute
KEFRI	Kenya Forestry Research Institute
KFSC	Kenya Forestry Seed Centre
KGGCU	Kenya Grain Growers Cooperative Union
KENGO	Kenya Energy Non-Governmental Organisations
KREDP	Kenya Renewable Energy Development Project
KWAP	Kenya Woodfuel and Agroforestry Programme
MOE	Ministry Of Energy
NGO	Non Governmental Organization
NFTSC	National Forestry Tree Seed Committee
Q:	Question
QCU	Quality Control Unit
WEP	Women and Energy Project

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## OPENING ADDRESS

By Dr. J. Odera, Director Kenya Forestry Research Institute.

Ladies and gentlemen,

It gives me great pleasure, on behalf of Kenya Forestry Research Institute and Kenya Woodfuel and Agroforestry Programme, to extend a very warm welcome to all of you to this workshop on **Tree Seed Distribution and Marketing**. I am happy to note that you have chosen to hold this meeting in a rural setting to fully appreciate to who the results of the deliberation address. I know that this is one of the follow ups of the 1st National Tree Seed Workshop held in Nairobi in July 1991. From Nairobi to Elburgon shows that the participatory approach to planning is firmly rooted in both the Government and Non Governmental planning agencies.

In a nutshell I would wish to capture the backdrop to which the workshop is addressing itself to and throw the net a little wider by discussing the state of forests in Kenya. Kenya's forested land covers only 3 per cent of the total area, out of which over 19,000 ha is lost annually due to the rising demand for wood products, expansion of agriculture and settlement etc. Forestry in Kenya contributes to about 10 percent of our G.D.P. and woodfuel provides more than 90 per cent of the total energy used for domestic purposes and accounts for about 77 per cent of the total energy bill.

In order to restore and maintain a habitable environment. the government has taken great strides, in stimulating forest renewal through formal and informal channels including promotion of mass participation by the citizens. The role of the Government has handsomely been complimented by NGO's efforts, especially in promotion of forestry by what is referred to in some circles, the forestry practices by non-professional foresters. It has been correctly deduced that only this form of forestry will salvage not only the natural and planted forests but the destiny of man indeed. In research the role of the users of research results has and especially in recent times taken a prominent role. I would like to take this opportunity to highlight some of the recent achievements in forestry research in Kenya. Our research strategy has been geared towards the provision of appropriate technologies for the wise use of the country's forests and related resources on sustainable basis. Important contributions include:

- (a) Development of agroforestry technologies that utilize perennial tree species for improving food production and energy requirements, especially among the small scale farmers.
- (b) Provision of tree species and tree management technologies that are suitable for forest development in dry land areas which comprise 80 per cent of our country's area.
- (c) Development of sound methods for collecting, handling and storage of tree seed, establishment of germplasm banks under in situ and ex situ conservation strategies, some of which are not only important to the forestry sector but also for their medicinal and nutritional values.

- (d) Improved wood processing techniques including sawmilling for maximizing recovery and reduction of wastes.
- (e) In the forest management front Kenya has adopted strategies incorporating gains in genetic improvement copulative from tree improvement research and application of biotechnology for improved productivity.

In more recent times the contribution of forest resources in the socio-economic environment and cultural well being of Kenyans has gained more recognition. In this regard, the demand for quality tree seed by the farming community has increased about ten times during the last five years alone.

### **THE FORESTRY TREE SEED SCENARIO**

Mr. Chairman, the Forestry Tree Seed Scenario at the present is mixed. I would like to go on record as saying that monumental gains have been made on one hand and on the other that challenges still loom. Nevertheless the huge gains reduce the present problems to those of the 'fine tuning' nature rather than the more grotesque type of institution building. Exact figures on seed demand are hard to come by due to the present nature of demand and supply protocols. But judging from reports from various organizations attending the workshop, the figures lies above 10 tonnes of seed. In the late and early 80's, two events combined to sky-rocket the seed requirements of the country. One was the popularization of the agroforestry concept, itself as a result of the threat posed by unmitigated deforestation to meet energy and other wood demands from classical forests. The other was the dawning on people that indigenous trees can also be cultivated with an equally rewarding gain as exotics. The two escalated the seed demand from something erstwhile taken for granted to the present state where it requires a gathering like we have now to discuss how to streamline the industry. In between, a lot of groundwork has been done and am compelled to mention names.

The Government of Germany through GTZ, played a key role in supporting the emergence of the tree seed industry. It funded for 9 years the Kenya Forestry Tree Seed Centre which now prides a capacity to collect seed, test them, research on them and distribute to all users to meet the big chunk of the demand met by a single supplier. It also has the capacity to extend the knowledge gained through publications and both formal and informal training. But on the side, the role of other Government functionaries, the NGO's and the individual peoples effort has been commendable. It is worth noting that about 70% of seeds bought by NGOs' come from farmers. It was therefore prudent to call all actors together and the 1st National Forestry Seed Workshop in 1991 availed a forum where all actors had an opportunity to talk to each other. I am sure that since 1991 actors have been in touch but we should congratulate the KWAP management for availing the opportunity for another forum where all of us can sit and push the frontiers of the tree seed industry further.



Mr. Chairman, may I briefly mention a few words concerning regulatory guidelines on seed handling which I am sure will be a concern to the meeting.

Kenya is one of the few countries in the third world which have recognized the need to promote and control the quality and the stability of future tree populations through a legal machinery. Our regulations have taken into consideration:

- (a) The need to control indiscriminate distribution and use of low quality seeds,
- (b) The adoption of results of genetic improvement and related research findings and
- (c) The protection and conservation of endangered species.

All of which are necessary in the establishment of a reputable seed industry, an enhanced forest development inertia and an improved, stable and habitable environment.

In this regard, the Kenya Forestry Seed Centre has taken a lead that will enable the country to backstop both seed quality control measures and appropriate handling methods, but it is incumbent on you participants to enable the regulations to be operational. Suffice to say here that the regulation should result to the benefit for the user and should not be viewed as cudgel with which to hit the tree planting program of the country.

In introducing the seed scenario, I mentioned that the problem at hand is of fine tuning and details but I would like to caution the meeting that it is more costly in time and money to customize a product to the taste of the consumer. Therefore, the workshop is challenging and as policy developers in this meeting, we should therefore be prepared to burn a little midnight oil to arrive at veritable consensus on how tree seed distribution and marketing can best work within the new legal framework suggested by the legal regulations for forestry reproductive material.

Mr. Chairman, ladies and gentlemen, it is now my pleasure and duty to declare this workshop officially open and wish you all a lively and fruitful deliberations.

Thank you.

## INTRODUCTION.

### 1.1 The seeds and plant varieties (tree seeds) regulations.

By W. Omondi, Head of KFSC, Muguga

The first seed law: *Thou shalt not sow thy fields with mingled seeds.*  
(Leviticus 19:19)

#### **Introduction**

The Seeds and Plant Varieties Act was passed in 1972 with the main aim of regulating the production and use of seeds and the introduction of new plant varieties in Kenya and it is from this act that the Tree Seed Regulation derives its power. The act requires that all processes of seed production, collection, distribution and marketing be inspected against set standards and conditions. The regulation is made in such a way that they are in conformity with others controlling similar activities e.g the agricultural seeds.

The regulation aims to guarantee and sustain high productive forestry and agroforestry systems through the participation of the general public, local organizations and various Governmental departments while at the same time aims at promoting the adoption of research recommendations from research programs. It has thus been developed on assumption that most users are not aware of the existing technology and the dangers of using planting materials of inferior quality.

#### **Purpose**

To promote stability, sustainability, productivity and genetic diversity in forestry and agroforestry by ensuring the provision and use of high quality seed and the protection and sound management of their sources.

#### **Application**

The regulation applies to breeders, seed collectors, dealers and distributors. The collectors and dealers are those persons who shall be involved in the collection, distribution and marketing of tree seeds in Kenya and are duly registered by the National Tree Seed Committee. The committee has the major mandate to develop and regularly review the National Seed Policy.

The regulation gives special recognition to the reproductive material for major plantation species to ensure stability and assurance of future wood and timber products. In addition, it shall facilitate the establishment of private seed enterprises to encourage the development of a viable seed industry. Farmers with acceptable seed sources shall therefore conserve them for the economic value.

## **Import and Export**

Although the import of forestry seed or any other reproductive material could be necessary to cater for the shortfalls in local production or for specific research programs, it needs to be controlled to avoid the introduction of undesirable germplasm and to reduce the risk of introducing harmful organisms. The regulation also ensures that all seed going into international trade are of acceptable standards and that no seeds shall be exported when local demand exceeds production. That is important to safe guard national interest.

## **Designated Authorities**

KEFRI, through the Seed Quality Control Unit is suitably placed to operate as a Quality Control Agency and shall be directly responsible for the monitoring and ensuring the quality of all reproductive material collected by registered dealers. In addition the centre is charged with responsibility of testing of seed lots for commercial distribution in accordance with international rules.

The customs department shall be charged with the control of imports and exports. To achieve this they shall inspect all documents for all seed moving in and out of the country to ensure they meet the requirements spelt out in the regulations.

The Forest department being the custodian and user of seeds of major plantations species shall ensure complete protection of seed sources within their jurisdiction while at the same time ensuring that major plantations are set up using appropriate germplasm. The department's representation in the National Seed Committee shall also ensure it a greater role in the formulation of the National Seed Policy.

## **Challenges**

The regulation shall only achieve its objective when the majority of the users appreciate the benefits of high quality planting material. The development, production and promotion of use of improved planting material is therefore a prerequisite to successful enforcement of the regulations.

## **Discussion**

- Q: Should the Kenya Woodfuel and Agroforestry Programme apply to become an official seed distributor, being under a Ministry just like KEFRI?
- A: Yes, KWAP should apply like every other NGO dealing with seeds.
- Q: Is quality control only possible by KEFRI? What about in-house quality control of tree seeds by NGO's, Ministries, and private companies?
- A: Quality control should incorporate everything: genetic control, purity, germination, and proper documentation. If this can be done in-house then that should be encouraged. Still, a national body should set the standards and be checking adherence to these standards by all seed dealers.
- Q: Are fruit trees included in this Act?
- A: No, they are captured under the horticultural crops regulations and handled by KARI.
- C: But some of these species are used in agroforestry for more than fruits only.
- A: Domesticated fruit species are under KARI, wild fruit species under KEFRI.
- Q: Phytosanitary certificates for export are not issued by KEFRI?
- A: No, these are issued by NAL for seeds of agricultural crops as well as tree seeds.

- Q: How many players are there in Kenya in the tree seed market?
- A: Many if one includes schools, churches, and (small) private organizations.
- C: Maybe a country wide survey should be done on players in the tree seed market and species handled.
- A: This is a good idea; the KFSC has a long list of seed buyers and users which could be incorporated in such survey.
- C: NGO's are dealing with two problems on different levels: how to solve today's problem of seed availability, and on the other hand how the legal regulations will affect tree seed procurement on the long run.
- C: With increased commercialisation, consumer protection against the use of inferior material becomes necessary. And the findings of breeding and plant improvement programmes should be passed on to users in a defined and regulated system. A legal system of control of tree propagation material is lacking: there are no standards, the consumer is not protected, and producers/dealers are not bound to keep high standards. An example of the importance of high quality seeds for development programmes is given in Table 1.

**Table 1:** Quality of *Dovyalis caffra* (Kei apple) seeds and its effect on expenses incurred for tree planting activities; comparison of two seedlots of *Dovyalis caffra* (Kei apple) to determine the amount of money required for 100,000 seedlings.

	Lot A	Lot B
Germination %	90	20
Purity %	95	50
Pure germinating seeds (Pages)(%)	86	10
Pages/Kg	25,800	3,000
Kg/seed required	4.0	33.0
Price in Ksh	2,400	19,800

- No of seeds/Kg 30,000
- Price/Kg Ksh 600.000
- Use: line hedge

## 1.2 The forest seed zones of Kenya.

By B.M. Kamondo, KFSC, Muguga

### Introduction

Seeds and plants contain genetic information inherited from their parents trees. This information is a result of interaction between environment and genotype and is formed over hundred and thousand of years. The broader the genetic information of a population of trees (genetic variation), the more flexible the population is to changing environmental conditions. The genetic variation is thus the basis for adaptability and productivity of populations. It allows the trees to adapt, (and pre-adapt) to a site and cope with the ever changing vagaries of nature. It is therefore prudent to ask oneself whether the seeds one intends to sow at a given place have the ability to confer to the offsprings the required adaptation levels to see the offsprings through the rotation or growing cycle. The tree seed zonification is a tool that can be used to promote this site matching and to lessen the dangers of failure in our tree plantations due to mismatching of seeds to site.

### Purpose

- Exploit genetic variation and pre-adaption of species through collection per provenance and provenance matching during distribution
- Ease collection and distribution of tree seed. Operationalising the philosophies on seed collection and distribution is now relatively easy with demarcated seed zones.
- Preliminary buck stopping tool for seed collection and distribution before provenance trials are carried out for our indigenous species.

All above will reduce the risks in man-made forests by ensuring stability and productivity of future plantations.

### Bases of Zonification

The system is based on ecological consideration and estimations of the genetic differentiation. The Agro-climatic map of Kenya was taken as the basis for the seed zone delineation as most relevant climatic factors (temperature and temperature extremes, precipitation and evaporation) are contained in it. Soil characteristics have not been included in the delineation since it would have lead to small impractical zones. Due to the fact that no detailed genetic variation and provenance testing for indigenous species have been done, the resultant zones have therefore to be considered as stop gap measures and are temporary and subject to review through further research efforts.

### Application

The seed zones can be used as a tool in seed collection and distribution. In order to be in a position to distribute seeds conforming to the ecological conditions of a planting site, the seed collector should try to collect seed from all zones in which a species occurs.

However, this is not always possible and guidelines on transferability of seeds is necessary. The following is recommended (see appendix 3):

- . Seedlots should be used preferably in the zone of collection. There is unrestricted transferability here for in actual sense, seed is not moving from the site of collection. This is the safest use of seed as far as zonification is concerned
- Seedlots can be safely transferred from the same seed zones that are not necessarily occupying the same geographical location and are in space separated. The interchange shall only take place in case there is no seed lot from the same zone (in space) available. e.g, aberdare range shares similar conditions with Mt. Kenya and bear same zone conditions. Seed can be transferred in between but only in case there is no seed from each of the areas. This is because the physical separation is a source of variation and the same species from the two areas tend to have separate genetic information by virtue of having separate breeding systems that help them survive in their particular locations.
- Where there is evidence for adaptability under the new environment conditions, seed can be transferred between two different zones. The wider the difference between this zones is, the more careful one should be in carrying out such a transfer.

#### **The Seed Zone Book/Map**

To ease the process further, KFSC has published the Forest Seed Zones of Kenya book which bears the seed zone map. Every area of the country falls under a given zone identifiable by a zone number (Table 2). To help users focus nearer to their area of operation, the whole country has been divided into 11 regions coded 01 to 11. This is just a physical demarcation and not seed zone demarcations.

If you restrict yourself to a region like 04, which is Nyeri, you have zones that are in Mount Kenya and Mount Aberdare that have same climatological and altitudinal attributes. This can not be distinguished by the zone number because the zone is the same e.g zone 05 is found both on Mount Kenya and Mount Aberdare. But it is important to distinguish them since as mentioned earlier, physically separated population of the same species are genetically different (in spite of the 2 areas having similar environmental conditions) and should be used interchangeably only if seed from each zone is unavailable. Such occasions are therefore distinguished by including a decimal in the seed zone number e.g, 05.1 for the zone in Mount Kenya and 05.2 for the zone in Mount Aberdare. To know your particular zone, you need to know the exact location on the map, or to know the Altitude, Mean Annual Rainfall, and Mean Annual Temperature and then look at pages 24-30 of the book to read off the seed zone in question.

**Table 2: The forest seed zones (forest ecological zones) of Kenya.**

Seedzone	Climate	Mean ann. rainfall (mm)	Mean annual temperature (°C)	Mean max. temperature (°C)	Mean min. temperature (°C)	Abs. min. temperature (°C)	Altitude (m)	Vegetation
01	humid, cold to very cold	1100-2700	< 10	< 16	< 4	< -4	> 3050	moist forest (Afro-alpine Highlands)
02	humid, very cool	1100-2700	10-12	16-18	4-6	-4- -2	2750-3050	moist forest (Upper Highlands)
03	humid, cool	1100-2700	12-14	18-20	6-8	-2-0	2450-2750	moist forest (Upper Highlands)
04	humid, fairly cool	1100-2700	14-16	20-22	8-10	0-2	2150-2450	moist forest (Lower Highlands)
05	humid, cool temperate	1100-2700	16-18	22-24	10-12	2-4	1850-2150	moist forest (Lower Highlands)
06	humid, warm temperate to fairly warm	1100-2700	18-22	24-28	12-16	4-8	1200-1850	moist forest (Midlands)
07	sub-humid, very cool to cool	1000-1600	10-14	16-20	4-8	-4-0	2450-3050	moist and dry forest (Upper Highlands)
08	sub-humid, fairly cool to cool temperate	1000-1600	14-18	20-24	8-12	0-4	1850-2450	moist and dry forest (Lower Highlands)
09	sub-humid, warm temperate to fairly warm	1000-1600	18-22	24-28	12-16	4-8	1200-1800	moist and dry forest (Upper Midlands)
10	sub-humid, warm to very hot	1000-1600	22-30	28-36	16-24	8-16	0-1200	moist and dry forest (Lower Midlands, Lowlands)
11	semi-humid, fairly cool	800-1400	14-16	20-22	8-10	0-2	2150-2450	dry forest and moist woodland (Lower Highlands)
12	semi-humid, cool temperate	800-1400	16-18	22-24	10-12	2-4	1850-2150	dry forest and moist woodland (Lower Highlands)
13	semi-humid, warm temperate to fairly warm	800-1400	18-22	24-28	12-16	4-8	1200-1850	dry forest and moist woodland (Upper Midlands)
14	semi-humid, warm to very hot	800-1400	22-30	28-36	16-24	8-16	0-1200	moist and dry forest (Lower Midlands, Lowlands)
15	semi-humid to semi-arid, fairly cool to cool temperate	600-1100	14-18	20-24	8-12	0-4	1850-2450	dry woodland and bushland (Lower Highlands)
16	semi-humid to semi-arid, warm temperate to fairly warm	600-1100	18-22	24-28	12-16	4-8	1200-1850	dry woodland and bushland (Upper Midlands)
17	semi-humid to semi-arid, warm to very hot	600-1100	22-30	28-36	16-24	8-16	0-1200	dry woodland and bushland (Lower Midlands, Lowlands)
18	semi-arid, fairly cool to cool temperate	450-900	14-18	20-24	8-12	0-4	1850-2450	bushland (Lower Highlands)
19	semi-arid, warm temperate to fairly warm	450-900	18-22	24-28	12-16	4-8	1200-1850	bushland (Upper Midlands)
20	semi-arid, warm to very hot	450-900	22-30	28-36	16-24	8-16	0-1600	bushland (Lower Midlands, Lowlands)
21	arid, warm temperate to very hot	300-550	18-30	24-36	12-24	4-16	0-1850	bush- and scrubland (Upper, Lower Midlands, Lowlands)
22	very arid, hot to very hot	150-350	24-30	30-36	18-24	10-16	0- 900	desert scrub (Lowlands)

### **How to incorporate the exotic tree species**

The seed zoning system is not directly applicable to exotic tree species. But on the zones, the exotics that have been established to be doing well in these areas have been superimposed. Table 7 on page 31-34 of the book shows where to expect a given exotic to occur. It covers most of the major exotics in the country. The criteria for drawing up the list was the growth performance of existing plantations and is neither a provenance recommendation nor a recommendation for the use of these species.

### **Discussion**

- Q: Do these seed zones apply to cuttings and seedlings too?
- A: It applies to all what has been defined in the Tree Seed Regulations as propagative materials.
- Q: What about the principle of a broad genetic base; is this seed zoning not promoting in-breeding of the species?
- A: There are rules for seed collection. Seeds should be collected from as many (good) individuals and from many different sites to safeguard a healthy genetic base.
- C: It is important to realise for what purpose you need the trees. From seed stands and orchards it should be possible to collect high quality seeds for certain uses or purposes. But the highest quality as far as genetic base is concerned can only be achieved from seeds collected in natural environments.
- Q: In Kenya, have we reached the point where we can say that a species can grow best in a certain environment, and this especially so for exotic species?
- A: Maybe for some species; for most we have not! This means you have your questions about site adaptability of a species. Reduce the potential error to the acceptable one; seed zonification can be a tool to help in this. But it should not be seen as a bible.
- Q: How valid are the quite large seed zones if you consider pockets of different micro-climates within these zones and the fact that soil information has not been used to delineate the seed zones?
- A: The seed zoning is a "best attempt" to create a useful tool to avoid disasters in forestry. Soil classification was not used because of the extreme variability in soils in East Africa.
- C: Here we see clearly some contrasts between conventional production forestry and what is referred to as social forestry, or farm forestry, or agroforestry. Pockets of micro-climates or different soil types are of importance to farmers or groups of farmers, for instance, for a catchment, i.e. the level some NGO's are working. For production forests they do not have great impact. Furthermore, the wrong seed base (species, variety, or provenance) could have big implications when used for big commercial plantations. But in the case of farmers, "bad behaving trees" are not necessarily a disaster and can be removed from the farm.



# CASE STUDIES OF TREE SEED PROCUREMENT AND DISTRIBUTION.

## 2.1 Ministry of Energy: The Tree Seed Acquisition and Distribution Programme

By Faith Khamala

### Introduction

The tree seed acquisition and distribution programme in the Ministry of Energy is handled by the Biomass Energies Division. The programme was started in order to address the wood energy policy whose objective is to ensure adequate supplies of wood energy through sustained yields while protecting the environment. The 1980 Beijer Institute surveys also indicated a 46% deficit in the supply of wood and through projections predicted a worsening situation by the year 2000 based on the existing supply and replenishing efforts. Wood energy provides 93% of the rural sector's and 71% of the urban sector's energy requirements and is therefore an important issue that requires a great deal of attention.

### Initiation

The tree seed programme started as a component of the six Agroforestry/Energy centres programme that were started in 1982/83 as the Kenya Renewable Energy Development Project (KREDP), funded in part by the United States Agency for International Development. Coupled with other programme components the objective of the seed programme was to reduce deforestation and environmental degradation through increased tree planting efforts particularly through the promotion of agroforestry techniques. The major end product emphasized in this programme is woodfuel but the multiple products and services that can be obtained from trees are not ignored as evidenced by the wide range of species available in the centre nurseries.

### Seed Acquisition

Most of the seed collected by the centres was through local collection by the centre seed collectors, purchases from local vendors and Ministry of Environment and Natural Resources. The seeds which were difficult to get were obtained from KEFRI. The amount of seed handled by the centres used to be quite high until the project ended and the Government took over in 1986. Currently the centres still use the same avenues but more seed is bought from vendors than is collected by centre collectors.

In addition each centre has got established seed stands consisting of a wide range of species (30 and above) spaced at 4x2 m in blocks of 16 x 14 m separated by an alley of 8 m. These are used as seed stands, as well as screening and evaluation trials and as such they are replicated. They were referred to as seed orchards until correction from KEFRI stated that they do not qualify to be orchards since the origin of the mother trees is not known. All of them are producing seed and serve as a seed source for the centres. The seed sources used to be intercropped when the trees were still young but this is no longer done because the trees are too big for it.

### **Seed Storage**

Each centre processes and stores the seed they collect. In the KREDP days an arrangement for sending excess seed to the Central seed services unit at Jamhuri was conceived. This unit was equipped with drying, scarifying, cleaning, fumigating, inoculating and bagging equipment plus a cold storage. The activities of this unit were to be closely co-ordinated with the Forest Department, KEFRI, and KENGO. The arrangement never took off as it hit a snag just before construction of the building was started and since then there has been no follow-up to revive the idea of the unit. The construction blocks and equipment are still lying unutilized except for the cold storage which is functioning at KEFRI, Muguga.

In 1991 during a Centre Managers' workshop in Mombasa it was found that all the centres lacked proper storage facilities in form of buildings, plastic containers, testing kits, and packaging equipment. As a result of this a lot of seed goes to waste through loss of viability and damage by rats. Trained personnel in seed storage and processing were and are still lacking.

### **Seed distribution**

During the project days seedling distribution was given more emphasis than seed distribution. Given the large area covered by each centre it was later found more effective to distribute seed and phase out seedling production. The nurseries had been set up with an annual production capacity ranging from 500,000 - 2,000,000 each but currently the production is way below this level. The results of this approach are yet to be evaluated. Logically speaking if one is covering a large area consisting of four or more districts it is easier to distribute seed than seedlings but whether the seed is planted and grows into trees is another question. A good amount of tree seed and seedlings used to be given free of charge until the realisation that these free issues were not valued at all by the recipients and a small charge, highly subsidised was effected. The selling is not very strict as the price is still highly subsidised and some quantity of seed and seedlings still goes out free of charge. These centres are a source of seedlings during the national tree planting day and these are issued out free. By 1985 the central seed unit had collected 8000 kg of seed with a considerable amount distributed all over Kenya and abroad.

In the past three years the ministry through its field stations has distributed a total of 1600 kg of tree seed as follows: 602 kg, 603 kg, and 395 kg for 1991, 1992, and 1993 respectively.

The Ministry projects a distribution of 680 kg during the year 1994 due to the change in strategy adopted to include industrial and urban wood energy production and conservation. Past activity has been concentrated in the rural areas. The distribution levels have gone down from figures as high as 3000 kg of seed during the project days.

Through 1992 the Women and Energy Project (WEP) of the Ministry of Energy was able to distribute 1103.6 kg of seed as follows:-

Province	Quantity (kg)
Eastern	213.6
Nyanza	141.6
Rift Valley	238.8
Western	102.6
Coast	81.0 <sup>2</sup>
Northeastern	90.0
Central	215.0
Nairobi	21.0
TOTAL	1103.6

*Leucaena leucocephala* ranked highest taking 15% of the total distribution followed by *Grevillea robusta* with 10.6% and *Sesbania sesban* with 8.4%. *Grevillea robusta* and *Calliandra calothyrsus* are in very high demand but this demand cannot be satisfied by the Ministry of Energy.

About 90% of the seed distributed by the WEP in 1992 was from KEFRI and 10% from other sources, e.g. private collectors. In December 1993 a total of 208 kg of seed was ordered from KEFRI by the WEP. Of this amount 56 kg of *Grevillea robusta* and 15 kg of *Calliandra calothyrsus* was purchased from private collectors. The rest of the seed was supplied by KEFRI already packed and distributed in 1994 with very good results. 99% of the recipients of this seed are farmers while 1% are academic institutions or colleges.

### Collaboration

The following have been active collaborators in the Ministry programmes:

- . Ministry of Agriculture,
- . Ministry of Environment and Natural Resources,
- . Ministry of Culture and Social Services,
- . Kenya Energy Non-Governmental Organisations,
- . and other NGO's.

The main channel for distribution has been through agricultural extension officers but the ministry is still trying to identify other avenues. The field stations use other channels like schools, women groups, field days, GK nurseries etc. In these stations the seeds are packed in small medicine packets and the weight estimated using spoons (tea or table spoons).

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<sup>2</sup> + 300 cuttings of *Gliricidia sepium*

### **Pricing**

The seed is bought from the vendors at the KEFRI selling price but the selling price from the centres is just arbitrarily decided and the ministry does not make any profit. The seed is therefore sold at highly subsidised prices. At one time in one of the centres, pricing according to germination percentage was tried but later discarded because of the long periods taken by some of the seeds to germinate. At present the only inspection done is for the presence of foreign matter and visual appearance of the seed.

Problems encountered during distribution were:-

- . inadequate technical information for distributors,
- . poor seed viability ,
- . poor timing,
- . inappropriate species,
- . and free seed given out by other organisations renders the selling efforts useless.

### **A change in strategy: distribution through stockists**

This is a very new channel. The stockists are identified by divisional home economics officers of the Ministry of Agriculture and Livestock Development. To date stockists have been selected in 4 provinces and 20 districts. The stockists were selected on regional, district or divisional basis - 1 stockist at the region or district and 2 stockists at the division. The district and regional stockists are supposed to replenish the divisional stocks when exhausted to save on the time and expense of travelling to KEFRI all the time. The packed seed is supplied free by KEFRI as their contribution to the seed distribution programme. It is then given to the stockists free to sell and use the money to restock. The amount of seed to be stocked by the stockists is as follows: 600 packets for the regional stockist, 300 packets for the district stockist, and 50 packets for the divisional stockist. Though the various districts asked for a variety of seeds, WEP decided to deal with a maximum of 3 species for the regional and district stockist and 2 species for divisional stockists.

The seeds are packed in packs of various sizes and the quantity is indicated by the number of seedlings expected per pack after taking into consideration factors like viability, purity, etc. The packaging material is paper on the inside and polythene on the outside. The price and the officially accepted commission for the various levels of stockists are indicated to ease distribution.

### **Conclusion**

The seed acquisition and distribution programme in the ministry lost much vigour which had been built up during the donor funded period. There however exists a lot of potential for improvement and with some seriousness and commitment on the part of the ministry staff a lot can be done. Revival of the central seed storage unit is of vital importance and is not impossible. Wood energy being of such vital importance to life should be given the attention it deserves so as to make use of the renewability of biomass energy. The success of the seed programme has never been evaluated and put in quantitative terms but it is worthwhile to do so in order to rate our achievements in the last twelve years.

## Discussion

- Q: The text on the seed packages is in English. Did MOE consider Kiswahili or other local languages?  
A: Not yet.
- C: One experience (Miti Mingi Mashambani) is that people want the instructions to be in English; farmers ask their children to read it to them.
- Q: Do you have any idea what species people are buying?  
A: The seeds are not yet despatched so there are no reactions from the field yet.
- Q: How does KEFRI get to the selling price of tree seeds and is this price not too high for farmers?  
A: It reflects the "production price": expenses for collection and handling.
- Q: How did the MOE decide on the number of packets to be distributed to the different levels?  
A: There was an indication from people involved on how much they can despatch or what the demand is.
- Q: You do not fear the "recycling" of seeds between projects; seeds are bought for cheap prices and sold somewhere else for a higher price?  
A: We do not have experience with that, though I cannot rule out that it happens. Most of our seeds are coming from KEFRI so that way we avoid this problem.
- C: Potassium permanganate could be used to colour seeds if these problems are existing.
- Q: You think that free seeds will not work?  
A: Some people are desperate for tree seeds but cannot afford to pay for them. But at the same time we feel that free seeds are not valued enough.
- Q: How were the species chosen?  
A: Depending on the ecological area 3 species were chosen
- Q: What type of training did the stockists receive?  
A: The Home Economists of the MOALD trained them a bit.
- Q: No Forest Extension Officers were/are involved?  
A: The Women and Energy Project had already good relations with Home Economists from the time when improved cooking stoves were being introduced. And it was felt that the work of FEO's goes a bit further than only the household.
- Q: So, how will stockists know how to handle seeds or give information about the seeds or species?  
A: The stockist is not involved in tree seed handling and the most important information is written on the package.
- Q: Does the Project receive the remittance of the sale of seeds or are there many defaulters?  
A: There is no experience with the sale of tree seeds yet but with the sale of energy saving stoves the Project encountered problems with receiving the remittance.
- C: Instead of giving the seeds to the stockists and receiving the remittance at later stage seeds could be sold to the stockists. That is the normal practice anyway for any product sold by these shop keepers.
- Q: How will people know who is a seed stockist?  
A: There will be some signs placed outside their shops.
- C: Some projects such as Miti Mingi and VI give out free seeds; so in their areas of operation nobody will be interested in buying seeds from the stockists. This makes the planned discussion on seed pricing even more important.

## 2.2 Kenya Woodfuel and Agroforestry Programme.

By Simon Kimwe, District Project Manager, KWAP-Kericho

### Introduction.

The mandate of KWAP was to develop viable agroforestry and extension methods which on application would help to alleviate the fuelwood problem in high potential areas of Kenya. This meant that the programme had to create awareness on the fuelwood problems and define possible solutions to the problem. Baseline surveys done showed that the fuelwood problem was not imaginary. Women who are charged with the responsibility of collecting firewood continued to toil in search of this commodity. *Eucalyptus* trees growing on farms were never used for firewood. Firewood came as a by product of the management of these trees.

### Trees selected by KWAP.

The first task of the programme therefore, was to select woody species which farmers would plant and use for firewood. Farmers in the southern parts of Kakamega were already using *Sesbania sesban* for this commodity. Women were allowed to plant and cut it freely for firewood. KWAP saw this as a good starting point in tree selection for firewood. The programme realised that if a few "sesbania like" species could be selected farmers would perhaps equate them to the sesbania and use them specifically for firewood. A few fast growing tree species were selected as a starting point: *Sesbania sesban*, *Leucaena leucocephala*, *Mimosa scabrella*, *Gliricidia sepium*, and *Calliandra calothyrsus*. Later a few more species were added to cater for the farmers needs in timber and construction material: *Acacia mearnsii*, *Grevillea robusta*, and *Markhamia lutea*.

As KWAP (phase 2) moved to new districts, Migori, Uasin Gishu, Busia and Kericho, again some species were added like *Casuarina*, *Dombeya goetzenii*, and the neem tree (*Azadirachta indica*). At the same time, the focus of KWAP has widened to include the promotion of trees and shrubs within the farming system to cater for firewood, fodder, fruits, soil erosion control, and soil fertility improvement.

### Where to get seeds for selected tree species?

Generally, the availability of tree seeds of the right species and at the right time is not secured and this constitutes a big hinderance to successful tree planting on farms in Kenya. Many tree planting projects have to import required seeds, either from outside their working areas, or from outside the country.

Importation of tree seeds from outside the country is expensive and constitutes a loss in foreign exchange. Prohibitive, one is also not assured of the quality of imported seeds. Importation from another area within the same country could introduce pests and diseases. Besides, most projects are not aware of what seeds are available outside their project area.

What about seed procurement from local sources? The rest of this paper looks at possibilities of exploiting local seed sources. It is based on the experiences of KWAP in procurement of seeds of trees for agroforestry purposes within Kakamega and Kisii, and, later, in the four new districts.

### **Seed procurement within KWAP.**

Most tree species that KWAP embarked on were new to the districts and their seeds were therefore locally unavailable. During the period from 1984 to 1987, the bulk of seeds of *Calliandra calothyrsus*, *Mimosa scabrella*, and *Gliricidia sepium* came from overseas sources. *Leucaena leucocephala* seeds were imported from the coastal region of Kenya.

The purchase of seeds from outside the country caused serious problems as far as timely availability, and cost and quality of seeds was concerned. The programme had to lay out strategies for local seed procurement.

The first strategy involved the promotion of local seed production. This was done by encouraging farmers to plant a large number of trees, some of which they could use for firewood, and some as a future source of seeds for the programme. The second strategy involved the setting up of seed production units at strategic locations. It was hoped that by doing this the farmers would collect seeds and establish their own trees without further involvement of the programme.

### **Did the two strategies work ?**

The first approach worked well. Many farmers established the new tree species, and by the end of the second season many of them were self sufficient in tree seeds and some started selling seeds to KWAP. The seed production units, however, were not all that successful. After establishment it was often not clear who should manage the plots and who had the rights to collect seeds. Farmers saw the unit as KWAP property while those established on private land were monopolised by the owners. Furthermore, the spacing of planting (1 x 1 m) turned out to be too close for good seed production.

Meanwhile, mass awareness programmes on fuelwood problems increased the demand for seeds from new villages. KWAP had to expand their tactics on seed procurement and included schools, markets, individual farmers and vendors as seed sources. After a few years it is clear that there is a lot of potential for seed procurement from local sources. And the purchasing of seeds from local sources can act as a good incentive to tree planting while large quantities of seeds can be produced in short time.

However, this method has a few constraints mainly:

- control of seed quality is often difficult. One tries to sell as much seeds as possible, hence good seeds are mixed with the bad.
- "easy seeds" are collected in bulk, and the collectors feel frustrated if KWAP refuses to buy it.
- once you establish yourself as a seed purchaser it is difficult to say no when you do not need the seeds.

The success of this method depends very much on promptness. The purchaser should inform the community his interest in buying seeds and he should pay promptly for seeds purchased. KWAP's strategy for buying "difficult seeds" such as from *Calliandra calothyrsus* and *Grevillea robusta* is to ask people to collect seeds that will be bought from them on certain days, at their place and with cash money.

KWAP's experience with schools as sources of seeds is good. For the students the collection, handling and even storage of seeds provide a nice learning experience. Hitches are the flow of interested pupils and teachers from the schools and the destruction of trees during holidays by grazing animals.

More interesting though are vendors or middlemen as a source of tree seeds. KWAP's experience with middlemen started in 1988 when a lot of seeds were bought by the programme, prompting some enterprising individuals to become middlemen. To date there are quite a few vendors who sell seeds to KWAP on a regular basis. Some come from the KWAP districts while others come from as far as Nyeri and Nakuru. Seed purchase through vendors is a viable option as long as a market for seeds is assured. It creates a kind of sustainability, it eliminates the problem of KWAP going for the seeds, and it is an opportunity for the entrepreneur to earn a living. The (only) problem with vendors is, again, that it is difficult to control the quality of seeds they sell. They have to be guided on how to judge the quality of seeds required. And quality standards have to be set by the purchaser. It should be mentioned here, that it is also difficult to verify the history of seeds brought in by vendors. With so many players in the seed market on the demand side, this loophole may encourage some to collude with project workers and sell out seeds from one project to other projects.

#### **Seed distribution.**

KWAP opted to follow the seed distribution line rather than the traditional seedling distribution. The factors influencing this change were:

- surveys done by the programme had shown that farmers had already a wealth of knowledge on tree propagation,
- the extension strategy followed was to reach as many farmers as possible, and to influence them on tree planting. To effect this, mass awareness strategies were used and this resulted in an enormous demand for planting material.



The first distribution of tree seeds was to a small group of farmers in 1985. Each farmer was given a few grams of seed as well as an instruction manual on how to establish and manage an on-farm nursery. From then on large quantities of seeds of tree species favoured in agroforestry continued to be distributed to farmers within the districts.

Quantity of seeds (kg) distributed by KWDP.

YEAR	TREE SPECIES	QUANTITY OF SEEDS	
		FREE	SOLD
1985	Calliandra	30	
	Leucaena	30	
	Sesbania	30	
	Gliricidia	15	
1986	Calliandra	93	
	Leucaena	371	
	Sesbania	371	
	Gliricidia	46.5	
1987	Calliandra	176	
	Leucaena	280	
	Sesbania	280	
	Gliricidia	43	
	Black wattle	175	
	Markhamia	45	
	Grevillea	1.8	
1990	Calliandra		17.5
	Leucaena		9.3
	Sesbania		1.2
	Black wattle		2.6
	Markhamia		0.3
	Grevillea		8.5

Although all seeds were distributed for free at first, monitoring done by the programme showed that a lot of this was never planted. Many farmers viewed these seeds with suspicion and thought the programme would return for the seeds. Others thought that whatever was given for free could not be of importance.

This experience made the programme to start experimenting on tree seed selling. The main idea was that farmers would value the trees more if they have to purchase the seeds, and that they will time their interest in seeds better. Since 1988 seeds are offered at a token price of 1 or 2 shilling per packet of 3 to 10 grams. The objective is to get tree seeds to the farmers at a price that is affordable and to make them appreciate their investment.

#### **Tree seed distribution channels.**

A number of seed distribution channels have so far been tried. These include schools, extension agents, local leaders, church groups, and vendors.

KWAP's experience here is that:

- . Before the actual seed distribution is initiated, there is a need to extensively advertise the commodity. Farmers should be clear on what they are about to buy while vendors should have an indication of what they are selling and what they can expect from the sales.
- . The selling of seeds of trees favoured in agroforestry is likely to terminate itself in one locality within one year. Most of the tree species used are prolific seeders and farmers would not be interested in buying seeds after the first year.

- . Many vendors have been observed to keep the seed to themselves and use them to set up own tree nurseries and sell seedlings instead.
- . Monitoring of seed sales is not a difficult exercise if records are well kept. It is the number of farmers setting up nurseries which may be difficult to follow.

### **Concluding remarks.**

I see the future of seed procurement for trees used in agroforestry as being held by local entrepreneurs. If such people are provided with a market for the seeds, the types of seeds required would be made available. It is important to establish a network for tree seed dealers to keep prices reasonable, seeds available and of a high quality, and to prevent seed entrepreneurs from malversations.

Established institutions like KEFRI should be much more involved in designing local seed procurement procedures. They should also encourage the exchange of tree seeds between programmes within and outside the country. This may be a good way of creating a demand for seeds. Furthermore, they should explore the possibilities of building up local entrepreneurs by market establishment.

### **Discussion**

- C: Now that KWAP is working in soil and water conservation catchments, it is very useful to go through the catchment committee as far as seed distribution is concerned. They get some training on tree seed handling and record keeping.
- Q: In the old KWAP districts, is there some sustainability in seed distribution?
- A: Yes, through trained seed vendors. After being identified and trained, these vendors buy seeds from KWAP and sell it at any price they wish. This gives sometimes the complaint that seeds are sold for different prices to different people. The first vendors were selected by extension staff, so they are people with a private nurseries. These vendors choose often to use the seeds in their nursery and, subsequently, to sell seedlings with a higher profit margin.
- Q: Does KWAP still work with Seed Production Units in the new districts?
- A: Yes, the SPU's are still an important part of KWAP's strategy as are the other approaches such as procurement of seeds from farmers and schools.
- C: It was hoped that within the old KWAP districts cooperatives would be formed to produce seeds for the new districts.
- Q: Does KWAP experience problems with low turn over and thus long storage time?
- A: Not too much. A well planned seed procurement is necessary. In the beginning, KWAP went full blast for *Leucaena* seeds and collected 2 tonnes. After one year most of these seeds had to be thrown away. It was tried to compost them but too many seeds germinated and it was a nuisance.

## **2.3 Kenya Grain Growers Cooperative Union.**

By Peter K. Kosgei, Marketing Officer KGGCU Limited

### **INTRODUCTION AND HISTORICAL BACKGROUND**

The Kenya Grain Growers Cooperative Union Limited (KGGCU) is a fully pledged country wide cooperative union which draws its membership from individual farmers, farming parastatals, cooperative unions and primary cooperative societies all over the country. It was registered on 31st December, 1984 following a merger of the now defunct Kenya Farmers Association (Cooperative) limited - KFA. The aforesaid merger was effected at an extra-ordinary joint annual general meeting of the two bodies held at Nakuru on 5th December 1984.

The KGGCU began its formal operations on 1st March 1985. The 61 year old Kenya Farmers Association (Cooperation) limited was subsequently ce-registered by the Commissioner of Cooperatives.

### **KGGCU LIMITED**

#### **Objectives**

The main objectives of KGGCU is to contribute to the economic well being of its members by ensuring that the right farm input, i.e.,

- i) certified seeds
- ii) fertilizers
- iii) agricultural machinery and farm implements
- iv) agro-chemicals
- v) hardware and building materials
- vi) animal health products and

other services are available to the Kenyan farmer at the right time, place and price, and by having sufficiently favourable returns to distribute an attractive dividend and an attractive bonus.

#### **Branch and Distribution Network**

KGGCU limited has a country wide network of 22 branches and 48 sub-branches and depots.

Meanwhile, the Union has a centralized purchasing system charged with the role of all merchandise for re-sale as well as consumable items. For this purpose the Union maintains a Warehouse in Nairobi and Transits stores in Nakuru and Kericho. In an endeavour to bring services closer to the farmers the Union operates seasonal Selling Centres during peak planting seasons. As a back-up service in farm in-puts distribution especially on certified seeds the Union in close collaboration with Kenya Seed Company Ltd, the District Agricultural Committees, and the Seed Quality Control Team appoints Stockists and Sub-agents country wide who serve the farmers in areas where the Union is not able to extend its services. For the purpose of this workshop I will deal mainly on seed distribution.

### **Distribution of Certified Seeds**

The Union, using its network of branches through its operations department supplies all types of seeds at reasonable prices and has secondary outlets through about 2,600 Stockists and Sub-agents (including Cooperative Societies) so that even the farmer in the most remote agricultural areas of Kenya is reached conveniently. These seeds have been developed and quality controlled by Kenya Seed Company Ltd and Kenya Agricultural Research Institute (KARI) Seed Quality Control to suit the various ecological zones of the country. The seeds which are readily available and distributed by KGGCU limited as follows:

- (a) Hybrid seed maize packed in 25 kg, 10 kg, and 2 kg packets,
- (b) Certified seed wheat packed in 50 kg bags,
- (c) Horticultural seeds, e.g. vegetable seeds, seed beans, flower seeds,
- (d) Pasture seeds, e.g. grass seeds, sorghum and lucern seeds,
- (e) Hybrid sunflower seeds packed in 1 kg, 2 kg, 4 kg and 20 kg packets,
- (f) Potato seeds especially the popular varieties like Anett, B53 packed in 50 kg bags,
- (g) Miscellaneous seeds, e.g. finger millet seeds, oat seeds,
- (h) Law grass seeds, e.g. Bermuda are available only on demand.

### **Sources of Seeds**

Most of the seeds marketed and distributed by KGGCU Ltd are produced and processed by Kenya Seed Company Ltd apart from potato seeds which are produced by Agricultural Development Cooperation (ADC).

### **Pricing**

Pricing is mainly done by Kenya Seed Company Ltd especially on hybrid seed maize, certified seed wheat, sunflower seeds, pasture seeds, etc. Potato seeds pricing is done by ADC. Pricing is divided into the following categories:

- i) Main distributors price (KGGCU Ltd price)
- ii) Agents price
- iii) Sub-agents price
- iv) Stockists price
- v) Retail price

### **Storage**

The union's large stores and go-downs which are always kept clean, well ventilated and free from pests and rodents are equipped with tonnages for the purpose of stacking the seeds. Seed stores are always separate from the stores of the other merchandise especially fertilizers which are hydroscopic in nature. Pests and rodents are always controlled using cats or rodenticide. Fumigation is done immediately weevil infestation is noticed.

### **Stockists and sub-agents appointments**

As reported earlier the Union appoints Stockists and Sub-agents in close collaboration with Kenya Seed Company Ltd, district agricultural committees and some of the requirements are as follows:

- i) The applicant must have a store or shop to store the seeds which must meet the required standards of Seed Quality Control inspectors.
- ii) Must be known to the Ministry of Agriculture extension staff or local administration as a straight forward businessman to avoid unscrupulous agents being appointed.
- iii) Must be ready to sell the seeds for farmers at the required price, etc.

KGGCU Ltd requires that every applicant pays Kshs 200/- being application fee. Every applicant who meets the above requirement is appointed a Stockist or Sub-agent and issued with a card with a serial number which he/she is required to produce at any time of making purchases of seeds either at KGGCU Ltd branch or Kenya Seed Company Ltd Depots.

### **Training**

The Union is quite aware of the fact that the seed should be handled in the best way if its viability is to be maintained, and therefore in collaboration with the Ministry of Agriculture (District Farm Input Committee), Kenya Seed Company Ltd, and Seed Quality Control Division, the Union trains its members of staff and Stockists/Sub-agents on how to handle the seeds. The same knowledge is passed to the Union's customers by the Union's counter staff and field staff.

### **Problems**

Despite the experience the Union is having in distribution of the seeds the Union occasionally faces the following problems:

- i) Shortage of hybrid seed maize especially of varieties like 614 and 625 which are highly required in the high potential areas.
- ii) Unscrupulous businessmen who try to market uncertified seeds
- iii) Low germination percentages especially on vegetable and pasture seeds. Customers report after planting and therefore the Union find it a problem especially in identifying the source of the problem.

**NB** For all seeds, especially hybrid seed maize carried over to the next season, germination percentage test is carried out by Seed Quality Division and the Union advised accordingly.

### **Discussion**

Q: How does KGGCU select their stockists?

A: KGGCU advertises and selects from interested parties; MOALD staff helps often to choose the best dealers from a Centre; only one stockist per Centre.

Q: Has KGGCU any experience with selling tree seeds?

A: No, but would be very interested! Since liberalisation of agricultural market KGGCU is looking for new markets: for instance starting with A.I. semen.

Q: What happens with seeds not used during one season?

A: If viability of seeds in the stores decreases to less than 95% than seeds are destroyed. It is not clear what stockists do with left over seeds.

## DISCUSSION AND RECOMMENDATIONS OF WORKING GROUPS.

### 3.1 Implications of Legal Regulations for Agroforestry Extension Organizations

#### Objectives of the discussions

- . To examine tree seed and plant varieties act and identify difficulties that may arise from the application of these regulations.
- . To suggest ways to overcome the identified problems.
- . To specify areas of networking.

In the interpretation of the Seeds and Plant Varieties Act (Appendix 9), the following terms in the respective sections are ambiguous and need clarification:

**Seed dealer** Any person registered by NFTSC to produce, collect, distribute or sell forest reproductive material.

**Observation** Definition is person centred, not clear as to whether organizations, companies or any interested groups are included, if so, there is need to expand the definition.

**Status** No dealers exist until they are duly registered, we only have potential dealers.

**Recommendation** KEFRI should finalise registration forms, identify suitable fee (not prohibitive) and have interested persons, groups of persons registered as soon as possible.  
Forest Department is appropriate to handle the inspection of necessary minimum requirements in possession by dealer for registration. The applicants should apply to NFTSC through respective DFOs.

**Seed Collector** Person registered to collect forestry reproductive material.

**Observation** Definition does not say the designated authority to register. If the authority is NFTSC then the dealers will be numerous.

**Recommendation** Office of DFO is better placed to register seed collectors since the office is mandated to handle forestry development in the district. The office should then notify NFTSC of such persons. A small fee can be required for registration.

### Identification of Seed Zones

Area with uniform or similar ecological conditions within which specified tree species have developed uniform genetic character.

**Observation** the idea of zonation is to come up with specific recommendation domains for users. The idea is good, however, these seed zones disregard the role soils play in the growth of trees. KEFRI should have the possibility to integrate this.

### National Forestry Tree Seed Committee (NFTSC)

**Members** this committee is well represented except that NGOs need to be considered as members. These are many and need consideration.

**Observation** there may be need for the committee to inventorize the activities of NGOs, identify seed training needs, and recommend them for training at KEFRI Seed Centre.

### Quality Control Unit

The functions of this unit are good. The section should make available to seed dealers those minimum standards, and assist the dealers to meet these standards through awareness creation initially. If these functions are applied disregarding the above, then dealers who rely mainly on general collection may be aggrieved.

**Recommendation** This unit should be decentralised in the short run. KEFRI should then enforce the activities of this unit in the long run.  
NB Long run: Point in time when dealers have acquired sufficient skills and necessary infrastructure.

### Registration as Seed Dealer

**Observation** Conditions set are appropriate for commercially, profit oriented seed dealers. Most of the NGOs are service oriented. KEFRI should consider this distinction and develop different minimum standards for them. Most of NGOs have short life cycles with most of their budgets directed to extension and not development of high investment infrastructure. These rules need to be applied gradually for long term growth.

It may be difficult to find seed orchards, or specially managed trees for seed of shrubs which most agroforestry organizations promote. Farmers are not growing and managing trees for seed but are growing them for various purposes. KEFRI should assist farmers to establish seed stands and guarantee them of a sustainable market for their seeds.

KEFRI should consider to provide training to seed dealers on such topics as:

- . Identification of good mother trees
- . Planning of seed collection
- . Seed collection methods
- . Seed handling and processing
- . Storage
- . Packaging
- . Pretreatment

**Records to be kept** Seed dealers to keep necessary records.

**Observation** This is a welcome idea since through appropriate documentation one is able to trace the origin of seed.

**Recommendation** All registered seed dealers should consider this section as enhancing their collections. They may consider to keep records of:

- . Seed sources
- . Seed lots
- . Batch numbers
- . Quality aspects - purity, germination capacity
- . Distribution channels.

Seed dealers may have to consider specifying their species range during registration.



### Other Recommendations

1. KEFRI should regularly inspect dealers and seed sources with a view to identifying technical gaps and assisting them accordingly.
2. All potential seed dealers should convene a meeting in which to discuss possible areas of collaboration on seed procurement and distribution. Meeting to be district based. Tentative dates - September 94. DFO to chair meeting.
3. KEFRI takes lead as a link between seed dealers to facilitate information sharing.
4. KEFRI to see possibility of initiating monthly seed bulletin and NGOs to send articles to this network.<sup>3</sup>

### Conclusion

1. The regulations is a good start.
2. Dealers should not be alarmed since these rules are there to create order and bring about stability in the tree seed industry.
3. KEFRI requires the support of NGOs in pursuing this noble goal.
4. Training should be given maximum attention for dealers to be competent in seed collection, handling, storage and distribution.

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<sup>3</sup>This was however superseded by the recommendation that the articles be sent to the Rural Forestry Newsletter, see working group's 3 recommendations. KEFRI role is to create the format for reporting

### **3.2 Tree seed pricing and distribution.**

#### **Objectives of the discussions**

- . To examine if tree seeds should be distributed free to clients of organizations and, if not, what the price of seed should be.
- . Suggest how availability of tree seeds could be improved.
- . Suggest channels for distribution of tree seeds.

#### **Should tree seed be given free?**

All agreed that in the long run free issue of tree and shrub seeds is not sustainable. The reasons given for on-going free issues include:

- \* Donor pressure
- \* Problem of lack of awareness and appreciation for some tree species and for on-farm tree planting
- \* Priorities - in some places it is easier to sell, e.g. in high potential places than in the drier areas.  
Giving free is taken as an incentive to plant.

#### **Strategies identified to address the above were:**

1. Extension and training to be increased and coordinated
2. Organisation should in their activities address felt needs of the farmers
3. The participants in attendance should discuss with respective donor agencies on implications of free issues with special attention for sustainability.

#### **The discussion on this topic raised the following points:**

- Farmers buy sugar and salt. Are trees less important?
- A simple calculation learns that it should be possible for a buyer of seeds to produce 50 up to 80 seedlings one shilling investment if seeds are sold at current "market" rates.
- Can anybody give an example of a project that had impact through issuing seeds for free?
- The value of tree seeds is too low; seed vendors in Kakamega prefer to plant the seeds in nurseries and to sell the seedlings.  
A survey should be carried out in the Districts to find out if people are willing to pay for seeds.

## **Recommendations**

1. Tree seeds should be sold. Information/circulars to this effect should be sent to all concerned. And the same should adhere for seedlings.

2. Tree planting activities extension and training should be coordinated at district level. A committee was proposed, chaired by the DC and attended by all involved in tree planting.

**Action:** Directors, Forestry and KEFRI

**Time frame:** Information received by 30th September 1994.

**Action:** Selling should be effective from 1st January 1995.

## **What should tree seed cost?**

Buying prices are influenced by:

- Cost of production
- Seed quality
- Processing needed
- Profit margins expected
- The species in question
- Supply/demand situation

Buying price for tree seed should be such that it does not kill the seeds collection/production enterprise but should be limited within a price range to avoid over-pricing.

## **Recommendations**

### **Seed buying prices**

- \* Existing KEFRI price list forms a baseline price (BLP). The BLP should reflect the actual production cost of seeds for KEFRI. The actual production cost for farmers was thought to be lower than the BLP, thus
- \* Buying price from farmers = BLP minus 30%
- \* Buying price from vendors = BLP minus 20%

**NB** KEFRI's seed price list should be reassessed. Generally, KEFRI prices are too cheap. One should bare in mind that these prices are selling prices and not buying prices. Real production prices are sometimes three times higher. Maybe KFSC should inform itself of the prevalent price of seeds in the districts to come to a more realistic BLP.

## Seed selling prices

Should take into account:

- standardization of packaging
- maintenance of seed quality
- number of seeds in packet
- value of the seed.

**NB** Subsidy can not be avoided; level of subsidy should at least not be less than the price of packaging material.

Prices for three tree and shrub categories were proposed:

- 1) high value seed of, for instance, *Grevillea robusta* and *Calliandra calothyrsus* to be priced at cost of packing material + 25% of buying price.
- 2) indigenous tree seed at cost of packing material + 25% of buying price.
- 3) other common seed at cost of packing material + 10% of buying price.

### **Action**

KEFRI Production of packing material by end of September 1994. A paper-polythene combination was agreed on but with a smaller KEFRI logo.

Projects Decision on price of the seed packets and quantity of packets required.

### **How can seed availability be improved?**

- 1) Networking and information sharing; quarterly reporting was proposed covering:
  - physical seed stocks
  - expected additional seed acquisition
  - seed requirements for project use
  - seed exchange (or movement) between agencies/projects
  - surplus seeds available to othersA form for this reporting should be designed by KEFRI.
- 2) Emphasise training on local seed collection and use.
- 3) Employ KFSC manpower and facilities to collect seed that is desired but found difficult to collect.
- 4) Establish seed stands on private land in consultation with KEFRI.
- 5) Importation should be done through KFSC (as per Regulations).

### **Tree seed distribution.**

- 1) KEFRI should use the out-stations for selling packed seed.
- 2) Identify distribution agents such as:
  - KGGCU (modalities to be worked out since KGGCU is profit making organization)
  - MOE stockists
  - existing channels to remain (e.g., front line staff)
- 3) First carry out an evaluation of distribution mechanisms taking into account:
  - pricing
  - networking
  - seed availability

It was suggested to have an evaluation in June 1995 followed by a second in December 1995.
- 4) Consider including horticultural tree and shrub species to make the range more comprehensive.

### 3.3 Tree seed quality and training needs.

#### Objectives of the discussions

- . What are the important seed quality aspects and training needs at different levels for KEFRI, NGOs, seed vendors and farmers and how should these be organised.
- . Inventory of how projects handle seeds upto now and how this can be improved.

#### Seed quality aspects

#### Recommendations

Seed collectors should consider quality when collecting seed. The following activities that contribute to seed Quality aspects must be correctly observed:

##### 1. **Sampling of seed trees**

Minimum 30 trees (mother trees) whose distance in between is 50 m.

NGOs should insist on their seed collectors getting seed from good quality trees.

For genetic diversity seed from vendors/farmers should be mixed for one ecozone region but a lot of care must be exercised to avoid seeds from different provenances being mixed

NGOs, and other organization should set up orchards in their localities on Farmers or Government (and/Municipal/and/County Councils) for future use. This will lead to getting the control required in future. NGOs interested in starting seed production units in schools should adhere to the standards required of setting up the orchards.

##### 2. **Seed collection techniques**

Organizations experiencing particular seed shortage are at liberty to use the Seed Collection Centres of KEFRI in the country to ensure quality seed collection. Vendors should be trained in seed collection.

##### 3. **Extraction techniques/cleaning**

Cleaning must be done to ensure quality. The seed should not be distributed before its properly extracted, dried, cleaned and properly packed. NGOs should facilitate training of their staff on proper use of the equipment, and all array of seed handling.

##### 4. **Testing**

KEFRI (Seed Quality Control Unit) should set standards and publish the minimum tree seed quality standards. The organizations collecting seed for use in their activities should attempt to carry out the seed tests like moisture content purity, and viability tests. More complicated tests like Tetrazolium test and X-ray tests should be done by KEFRI. KEFRI regional seed collection centres should be enabled to carry out some quality control in their areas operation. The Seed Centre should present to Donors and NGO's proposals to enable it purchase the necessary facilities.

5. **Storage**

Each organization handling bulk seed should have stores and the necessary equipment for storage. KEFRI should be in charge of ensuring standard construction of stores. For quality control, there should be quarterly inspection of the seed storage facilities and handling of the various players by KEFRI Seed Centre staff. The Director KEFRI should request the JICA-SFTP programme to transfer the Kitui Cold storage to Kitale Seed Centre where it can be put to proper use to serve the western part of the country.

6. **Documentation**

All people involved in seed collection should keep records on:

- species
- date of collection
- area seed collected from.

7. **Distribution**

There should be a standard way of packaging and labelling, i.e., name of species, germination percentage, date of expiring, users, etc. KFSC should work out a standard format for packets based on its current models. The proto-types should be forwarded to the projects for verification and subsequent ordering from the printers

**Training needs**

**Recommendations**

All organizations involved in handling seed should (including those not attending the workshop) ensure that all their staff are trained. KEFRI Seed Centre must circulate the proceedings of the workshop and the Training Curriculum to all organizations involved in seed related activities.

KEFRI scientist not working directly at the seed centre should be trained on seed collection and handling

Each organisation will sponsor its course participants

KFSC will be flexible to conduct tailor made courses outside the scheduled courses.

**Networking:**

- The Rural Forestry newsletter of the FESD will function as the medium for networking. Each organisation will be sending monthly seed returns detailing the species in stock, species available for exchange/sale, and other seed demands for the month etc. To harmonise reporting to a certain degree, KFSC shall design a reporting form for the minimum details to be included and circulate it to all organisations with the proceedings.
- NGOs will look at the possibility of supporting production of the newsletter for their particular audience.

**Appendix 1:** Typical division of responsibilities in seed industry.  
This introduces order in a Tree Seed Industry.

Activity	Organization		
	Government	NGOs	Private
Improvement	X		
Production		X	X
Processing		X	X
Storage		X	X
Distribution		X	X
Sales			
Quality	X		
Extension Service	X	X	
Research	X		

**Appendix 2:** The National Forestry Tree Seed Committee, Mandate and Membership

Mandate: To formulate a National Tree Seed Policy

Members: Permanent members of the National Committee are:

- . The Chief of Forest Extension Service Seed Division or his/her deputy
- . Head; Nurseries and seeds branch in the Forestry Department or his/her deputy
- . The Head of Seed Centre (KEFRI), or his/her deputy
- . The Seed Collection Officer of the Seed Centre (KEFRI)
- . Forestry Specialist in the Permanent Presidential Commission on soil Conservation and Afforestation
- . Chief of Industrial Plantation in the Forest Department

Non-members can be co-opted in the committee



**Appendix 3: Exercise on seed distribution using the zoning system**  
(use map on page 6 for the exercise)

<b>SEED COLLECTION AREA</b>	<b>DESTINATION</b>	<b>REMARKS ON TRANSFER-ABILITY</b>
Seed zone 05.1 in Nyeri region	Seed zone in Nyeri region	Unrestricted transferability, the safest use as the seed is being collected and used in the same place
Seed zone 05.1 in Nyeri region	Seed zone 05.1 in Londiani region that extends continuously from Nyeri to Londiani	Unrestricted transferability, the safest use. This actually is same seed zone and the Londiani boundary is just an administrative boundary
Seed zone 05.1 in Nyeri region	Seed zone 05.2 in Nyeri region	Restricted transferability but relatively safe. The decimal shows that the zones are physically separated and therefore subjected to different breeding system which make populations of the same species in this areas to a certain degree different
Seed zone 05.1 in Nyeri	Seed zone 05.1 in Kitale	Restricted transferability but relatively safe, the zones are physically separated and therefore subjected to different breeding system which make populations of the same species in this areas to a certain degree different
Seed zone 05.1 in Nyeri	Seed zone 22 anywhere in the country	Restricted transferability most unwise transfers. The wider the range between the zone numbering the worse. Such transfers to be done if there is evidence for adaptability which is most unlikely for this particular case.

**Appendix 4** Programme of the workshop.

<b>SUNDAY 17 July</b>	
4.00 - 6.00 pm	Arrival and registration
7.30 pm	Welcome dinner
<b>MONDAY 18 July</b>	
9.00 - 10.00 am	Opening remarks
10.00 - 10.30 am	<b>T E A B R E A K</b>
10.30 - 11.30 am	Legal regulations for forestry reproductive material with emphasis on requirements over production, distribution and marketing of seed
11.30 - 12.30 pm	Tree seed zones: Its application in seed documentation and distribution
12.00 - 2.00 pm	<b>L U N C H B R E A K</b>
2.00 - 3.00 pm	Seed distribution through stockists (MOE)
3.00 - 3.30 pm	<b>T E A B R E A K</b>
3.30 - 4.30 pm	KWAP Position Paper on seed distribution and marketing
4.30 - 6.00 pm	Status report on participating organizations
<b>TUESDAY 19 July</b>	
9.00 - 9.45 am	KGGCU Ltd's experience with seed marketing
9.45 - 10.30 am	Introduction to the topics of the Working Groups
10.30 - 11.00 am	<b>T E A B R E A K</b>
11.00 - 5.00 am	Working Groups deliberations
<b>WEDNESDAY 20 July</b>	
8.30 - 12.30 pm	Presentation of the working groups recommendations
12.30 - 1.00 pm	Conclusions and closure of the workshop
1.00 - 2.00 pm	<b>L U N C H A N D D E P A R T U R E</b>

**Appendix 5** Information on the participating organisations

Agency	Seed Acquisition	Handling	Packaging	Distribution	Pricing
KEFRI	Own collection through their regional Seed Collection centre	Elaborates drying, processing viability testing	Small quantity packaging in being tried 25-50 g in combined polythene & paper packets	Normally through' DFOs who should forward the total district seed demand	FD gets the seed free. Other consumers buy
Ministry of Energy	From KEFRI & some from vendors local collection	Physical exam. on purity	Medicine packets used earlier. Current packaging by KEFRI	Through' FTC, M.o. ALDM, Field days & stockists being tried	Arbitrary, most - 3/-, Kei apple -7/- Terminalia -10/-
Forest Department	From KEFRI local collection	Normal handling of locally collected seed	Own use, no packaging	Own use for plantation seedlings and FESD nurseries	No seed selling to farmers. Seedlings are sold form field
Miti Mingi Mashambani	From farmers, local collection	Checks on purity and quality	Packing for own use and to farmers	Through' FD, M.o. ALDM, TAs, Extension agents & contact farmers, schools, groups	Buying price determined by coordinator and influenced by the market
SNAP	From KEFRI through' FD, Local collection. Buying from local vendors	Simple checks on purity, store in sacks & bins	None, but clear polythene bags intended for future	Distribution is free of charge	Buying price influenced by KEFRI price list
VI Tree Planting Project	Local collection from farmers through' Women groups	Cleaning, sorting processing, viability testing done	Stored in air-tight containers, recent small scale packaging, in	Free of charge to their project nurseries, to farmers for	Buying price determined by project based on market forces
KIDP	Own collection through' casuals, local collection by farmers through' FD	Simple processing, drying	Small quantities not needed because most seed is used by groups & FD central nurseries	Through' Foresters and M.o. ALDM, free of charge	
CARE	Locally by farmers and project staff	Facilitates seed exchange amongst farmers	Do not pack but supplies Seed Centres with air tight containers for storage	Facilitates seed selection for purity	While buying, determined by the Project manager we do no sales
KWAP	From vendors, KEFRI, other projects, e.g. Vi-TPP, local collection	Simple physical examination for purity and viability, germination testing, temporary, storage in bins & fringes	Packing in small quantities is a main activity, 5 g-10 g-25 g to ease distribution	Highly subsidised, distribution through' extension agents of M.o. ALDM, FD Social services officers, farmer motivators. Also from KWAP at the office & during field days	Not free but highly subsidized ceiting buying prices for key species has been set, otherwise influenced by KEFRI price list and market forces

**The objectives of the organizations/projects participating in the workshop.**

Objectives	Number of organizations/Projects
. Education and Training	2
. Tree seed supply	2
. Research in tree seed	1
. Promotion of Forestry	
. Extension services	3
. Provision of woodfuel and energy conservation	3
. Environmental protection/enhancement	3
. Increased incomes and food production of the rural population	2

**Activities of the organizations/projects participating in the workshop.**

Activities	Number of organizations/Projects
. Tree seed collection and Distribution	4
. Raising tree seedlings	7
. Education, training and dissemination of information	2
. Institutional building and logistical support	4
. Seed processing and testing	1
	7

**Quantities of seeds in kg procured (in the last three years and the projection for 1994) by the organizations/Projects participating in the workshop.**

Year	1991	1992	1993	1994 (projection)
Quantity of seed in kg.	18557	11271	10861	

The tree species whose seeds are most commonly collected by the organizations/Projects are *Leucaena leucocephala*, *Aberia caffra*, *Grevillea robusta*, *Sesbania sesban*, *Casuarina spp*, *Cassia spp*, *Calliandra calothyrsus*, *Mimosa scabrella*, *Markhamia spp*, *Parkinsonia aculeata*, *Azadirachta indica* and *Eucalyptus spp*. The Seed Centre accounted for over 70% of the tree seeds procured in the four years reported. However records from of the organizations /projects were not submitted.

**Tree species whose seeds are in high demand but not available in sufficient quantities.**

Tree species	Number of reporting organisations	Reasons given
<i>Grevillea robusta</i>	7	Few seed sources False demand Difficulty in timing seed collection Difficulties in seed processing
<i>Hagenia abyssinica</i>	1	Difficulties in determining seed maturity and in seed collection
<i>Dombeya goetzennii</i>	2	Poor seed timing
<i>Casuarina spp</i>	2	Few seed sources
<i>Calliandra calothyrsus</i>	4	Seed testing problem Few seed sources Poor seeding Difficulties in timing collection Competition with other buyers
<i>Aberia caffra</i>	2	Few seed sources Seed collection and processing is difficult
<i>Eucalyptus spp</i>	1	Difficult in timing seed collection
<i>Azadirachta indica</i>	1	Few seed sources

The workshop brainstormed during the first day on ways of improving the availability of certain seeds. The major points were:

- The group of species commonly used in projects is narrow. It will be important to look for alternative species to relief the pressure on species such as *Grevillea robusta* and *Calliandra calothyrsus*. Furthermore, diversification could prevent catastrophes caused by pests and diseases. It was agreed upon that knowledge of tree and shrub species is not extensive in most projects. Problems have to be solved through the use of trees and the

projects rely mostly on the well documented small group of multipurpose miracle trees. More knowledge on local tree species is necessary and could result in new uses or better production of these species while propagative material is available.

- Who creates the demand for seeds of certain species? An example is Kitale, where farmers were growing some species and *Dombeya rotundifolia* was introduced by a project. Maybe we should improve on the existing species and, for instance, increase the genetic base of these species.
- Own collection of seeds should get more attention. It should not be necessary to request for Neem seeds from the KFSC when the project is based at the Coast.
- Other reproductive materials should be used. Especially cuttings and wildings could be used as long as one respects the rules for a broad genetic base. Micro-propagation or tissue culture is another alternative that should be explored though these methods are more expensive and specialized.

**The proportion of tree seeds procured by the organizations and projects from various sources.**

<u>Sources</u>	<u>Proportions</u>
. Own seed collection	32%
. Seed Centre	16%
. Local sources (Farmers)	49%
. Imports	0%
. Others	3%

**The number of organizations that carry-out tree seed testing.**

<u>Quality Tests</u>	<u>Number of organizations/Projects</u>
. Germination tests	3
. Cutting tests	2
. Purity tests	4
. Weight tests	3
. Moisture content tests	1
. X-ray tests	1
. Others (T.T. tests, Flootation etc)	2

## Seed Distribution

The proportion of the seeds distributed to each group of the recipients.

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Recipient	Proportion
. Farmers	24%
. Educational institutions	10%
. NGOs	8%
. Own use	5%
. Forest Department	52%
. Research organizations	0.3%
. Export	0.3%
. Seed dealers	0.2%
. Others	0.2%

## Tree Seed Distribution Systems

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Distribution Channels	Proportion of the seeds distributed
. Contact Farmers	5.4%
. Shop Stockists	1.9%
. School & Churches	0.9%
. Forestry Extension Services (Forest Department)	55.4%
. Agricultural Extension Services (Ministry of Agriculture)	9.2%
. Own distribution mechanisms	7.2%

### **Packaging technique for seed distribution.**

Packaging technique	Number of organizations
. Polythene paper (air-tight)	5
. Plastic drums (airtight)	1
. Paper (envelopes)	3
. No packaging	1

### **Reported bottlenecks to tree seed distribution.**

- . Short shelf-life of some seeds especially the recalcitrant type.
- . Difficulties in determining optimum seed harvesting time of some tree species.
- . High seed demand for a limited range of tree species
- . Seed requests by Forest Department on short notice.
- . Forest Department not following the protocols laid down for collecting seeds from Seed Centre.
- . Unreliability of public means of transport for seed distribution.
- . Difficulties in determining the viability seeds being distributed.



## Seed Pricing

### Seed Pricing by the participating organizations/projects

Number of organizations/projects buying tree seeds	5
Number of organizations/projects selling tree seeds	4
Number of organizations determining seed prices by weight	4
Number of organizations determining seed prices by the prevailing demand	3
Number of organisations determining seed rises by the seed quality	2

Some of the organizations/projects use a combination of the above methods of pricing seeds. But a few determine seed prices by trial and error. Others use the prices established the Seed Centre.

Four of the seven organizations/projects being reported on, review the prices of the seeds at an interval of six months to one year. According to the report, none of them aims at making profits.

#### Effects of pricing by other tree seed dealers on the activities of the organizations/projects.

- i) Unavailability of highly demanded tree species such as *Grevillea. robusta*, *Terminalia mentalis* and *Aberia caffra*.
- ii) Free issuing of tree seeds in some areas by certain organizations/projects make commercialization of the seed activities in those areas difficult.

#### Seed import and export.

Only one of the participating organizations/projects imports and exports tree seeds. But the quantities of seed involved is small.

**Appendix 6** List of participants.

NAME	ORGANISATION	ADDRESS
QUREISH NOORDIN	KWAP-BUSIA	BOX 421 BUSIA (K)
P.N KINYANJUI	SNAP-DANIDA/MENR	BOX 46 HOMA BAY
CHRISTOPH LANGENKAMP	SNAP-DANIDA/MENR	BOX 46 HOMA BAY
E.E. ISAAC	KWAP-MIGORI	BOX 168 RONGO
JOSEPH AGUNDA	CARE	BOX 606 SLAYA
MARY MWANGI	KWAP-KERICHO	BOX 1959 KERICHO
SIMON KIMWE	KWAP-KERICHO	BOX 1959 KERICHO
JACINTA N. GATHUO	DANIDA	BOX 642 KITUI
FRANCIS KANJA	KEFRI-MUGUGA	BOX 20412 NAIROBI
PAUL N. MBUTHI	MINISTRY OF ENERGY	BOX 30582 NAIROBI
FAITH W. HAMALA	MINISTRY OF ENERGY	BOX 30582 NAIROBI
FRANCIS MUNENE	VI Tree planting project	BOX 2006 KITALE
CHARITY MURIUKI	VI Tree planting project	BOX 2006 KITALE
D.N.MUIGAI	MITI MINGI	BOX 281 NAKURU
MAHIUHA	MITI MINGI	BOX 281 NAKURU
P.N. KAIGAI	FOREST EXT. SERVICES DIVISION	BOX 30513 NAIROBI
JOSEPH AHENDA	KEFRI	BOX 20412 NAIROBI
M.W WANYIRI	KENYA FORESTRY MASTER PLAN	BOX 39282 NAIROBI
D.G. NDIRITU	FOREST DEPARTMENT	30513 NAIROBI
LUBANGA MAKANJI	KEFRI	BOX 20412 NAIROBI
RIK THUSSEN	KWAP	BOX 9050 ELDORET
PETER K. KOSGEI	KGGCU LTD	BOX 35 NAKURU
JOSEPH M. MIHIU	KIDP	BOX 642 KITUI
WILLIAM OMONDI	KEFRI	BOX 20412 NAIROBI
B.M KAMONDO	KEFRI	BOX 20412 NAIROBI
LUCY MATHENGE	KENGO	BOX 48197 NAIROBI
JULIUS ITHAGU	FOREST DEPT.	BOX 30241 NAIROBI

**Appendix 7** List of publications on display.

Albrecht, J. (ed.), 1993. Tree seed handbook of Kenya. GTZ - Forestry Seed Centre Muguga, 268 p.

Albrecht, J., 1993. Forest seed handling. In: Tropical forestry handbook, L. Paneel (ed.), Springer-Verlag, Berlin, p. 381-462.

Gachathi, F.N., 1989. Kikuyu botanical dictionary of plant names and uses. GTZ, 246 p.

Kenya Forestry Seed Centre, 1991. Proceedings 1st National Tree Seed Workshop. 1-5 July 1991, Nairobi, 227 p.

Kenya Forestry Seed Centre. Tree seed information pamphlets on Neem tree, Grevillea, kei apple, etc

Wolf, H. (ed.), 1993. Seed procurement and legal regulations for forest reproductive material in tropical and subtropical countries. Proceedings of an International Symposium, GTZ - For. Seed Centre Muguga, 561 p.

## Appendix 8 The Forest Seed Zones of Kenya

(Forest Ecological Zones of Kenya)

H. Braun, J. Albrecht, B.M. Kamondo

### 1. Introduction

Since the middle of last century, the then vast forests of Kenya have been heavily exploited and degraded. Today, the forestry sector is characterised by a low percentage of forests, continued exploitation and damages by abiotic (mainly fire) and biotic damages (predominantly in plantations of exotic tree species). As a result of the fast growing population, the shortage of fuelwood and other tree and forest products increases steadily (Kenya Forestry Master Plan 1992).

The ecological problems which are going alongside with deforestation and degradation (erosion, desertification, loss of watershed areas, loss of soil fertility etc.) set Kenya a difficult task to resolve. Several hundred million trees have to be planted annually to meet the countries requirements and necessities.

Technical knowledge is necessary even before sowing of tree seed and planting of seedlings starts e.g. the technical knowledge where, how and when to select seed trees and collect seeds. A lot of knowledge and experience in this field has been gathered and disseminated by the Kenya Forestry Seed Centre and other organizations (projects and NGOs). The Tree Seed Handbook of Kenya (Albrecht [ed.] 1993) for example describes seed collection, handling and storage in detail.

**Where** to select seed sources and **where** to use its seeds in a genetical-ecological oriented silviculture, e.g. the use of the right planting material at the right sites, under the ecological conditions corresponding to the requirements of the species and provenance is decisive for the success of a plantation. In this field, little research work has been done in the past. The Forest Seed Zones of Kenya (Forest Ecological Zones) are meant to be an important expedient for these decisions.

### 2. The importance of a seed zoning system in Kenya

#### 2.1 Genetic variation

Seeds and plants contain **genetic information** inherited from their parent trees. This genetic information is a result of the evolution and formed over hundreds and thousands of years. It allows the trees to adapt to a site, to reproduce and to produce offsprings which on their part adapt, reproduce and produce. The broader the genetic information of a population of trees

(genetic variation) is, the more flexible the population as such can react on changing environmental conditions. The genetic information and variation is thus the basis for adaptability and productivity of trees.

Naturally changing environmental conditions are part of the evolution. However, artificial environmental changes for tree populations occur frequently since regular forestry began: The transport of seeds over big distances, even over continents, as is happening with most of the exotic tree species, brings seeds abruptly into a new environment. The success of a plantation with suchlike plant material will to a big extent depend on how the ecological conditions of the planting site meet those of the site where the genetic constitution of the plant material has been formed.

## 2.2 Populations and provenances

**Populations** of trees in their natural habitat are characterised by their genetical constitutions. This constitution is the result of the evolution influenced by the environment and formed by the reproductive processes (pollination and fertilization). Populations occupying different areas, consequently show, in most cases, different genetical characteristics. Generally, a species in its area of natural distribution is composed of several to many different populations.

The area covered by a population of trees is called "**provenance**". Related to seed collection, the term means "where the seeds come from" and it refers to the area where the immediate mother trees stand. Moreover, a provenance is characterised by a certain set of ecological conditions which are uniform enough to lead to a formation of genetically characteristic provenances, e.g. different from others. Trees from the different provenances may differ considerably in growth, performance and reproduction behaviour.

"Provenance" shall not be confused with "**origin**". The latter is the place where the original material was collected in its natural environment. In other words, the origin of *Grevillea robusta* planted in Kenya is Brisbane in Australia, but a seedlot may be collected from a stand of the second or third generation from Kitale/Kenya (provenance).

It is very difficult if not incorrect, to talk of "provenances" in case of species which have been introduced to a country only recently, e.g. in terms of trees, only a few tree generations ago. The time to form a genetical constitution characteristic for the new site will not be long enough. Therefore, exotic tree species and trees in plantations have to be considered carefully and separate from autochthonous ones.

Introductions of new tree species and plantations of indigenous but not autochthonous species must base on the findings of provenances trials, i.e. the comparison of different provenances under the intended site conditions (generally, a range of sites is being tested in order to find the provenance's optima and limits). A forest ecological zoning system, as are the seed zones of Kenya, is a useful guide to find those zones in which a species could be tested. It is never too late to start these kind of comparative trials. Where a species is already common, local

occurrences should be included. By this it could be determined if the formation of a local race has already occurred.

Only recently, the indigenous tree species gained recognition and are increasingly included in planting programmes. Unfortunately, very little is known about seed biology and genetic variation including the formation of different provenances. However, many of the indigenous species used in forestry and agroforestry in Kenya cover vast areas with different ecological conditions. Thus, the occurrence of different provenances can be assumed.

Tree seed should be collected only on a provenance basis. This enables the distributing institution but also the users to estimate whether a seed lot is suitable for a determined planting site or not. The seed zoning system is a suitable tool for these decisions.

### **3. The bases of the Kenyan seed zoning system**

The seed zoning system serves first of all to reduce the risks in man-made forests. It contributes thus to increase the stability and productivity of future plantations. The system and the consequent provenance matching ensure a certain degree of adaptation of the populations to the given ecological conditions.

The seed zones are applicable for the indigenous tree species but exotics could be included in determined zones where sufficient previous silvicultural experience has been gained.

The system bases on ecological considerations and estimations of the genetical differentiation. To be a useful guideline, the zoning must be practicable. The following conditions are met:

- The zoning system covers the whole country.
- The zoning system is based on ecological conditions and is adapted to the organisational structure of the Kenya Forestry Seed Centre as the legal controlling institution.
- The zoning system is independent from species.

#### **3.1 Genetical differentiation**

Due to the fact that no progeny trials with indigenous tree species have been conducted in Kenya, there is nearly no information on the genetic differentiation. The relevant considerations which led to the delineation of the zones have therefore to be considered estimations and are thus preliminary. Only after results of progeny tests and provenance trials and their genetical analysis are available can there be statements on the variation and the availability of different provenances.

### 3.2 Ecological conditions

The zoning used relevant information from:-

- Agro-climatic Zone Map of Kenya (1980)
- Vegetation and Climatic Map of Kenya (1978)
- Farm Management Handbook and Agro-ecological Map of Kenya (1983)
- Meteorological data from the Kenyan Meteorological Stations
- Soil Maps of the Kenya Soil Survey

As the most relevant climatical factors (Temperature and temperature extremes, precipitation and evaporation) are contained in the Agro-climatic Map of Kenya, it was taken as the basis for the seed zone delineation.

Soil characteristics have not been included in the delineation since it would have lead to unpracticable small zones. Aspects of the soil science must be considered in silvicultural recommendations and are tools of each forester. Also, environmental factors created biotically or by humans are not considered.

### 3.3 Organisational incorporation

The presented system considers as well the ecological and thus those conditions which influence the genetical differentiation as the organisational structures of the Kenya Forestry Seed Centre. This is necessary since KFSC is the biggest tree seed handling institution in the country and is furthermore entrusted with the control and supervision of tree seed handling activities of other actors.

The ecological conditions of the country are represented in 23 seed zones plus three zones of the river mines of the Galana, Tana and Turkwell river (Table 1).

The organisatorial division of the country into 11 regional tree seed collection centres of KFSC has been adopted (Fig. 2). The collection Centre's number forms the first two figures of the Seed zone code:

01	Muguga	(central highlands)
02	Gede	(coastal region)
03	Kibwezi	(southern semi-arid regions)
04	Nyeri	(central mountain forests)
05	Londiani	(western central highlands)
06	Kakamega	(western forests)
07	Kitale	(north-western forests)
08	Wamba	(northern forests and semi-arid regions)
09	Hola	(north-eastern semi-arid regions)
10	Lodwar	(north-western semi-arid regions)
11	Kitui	(central semi-arid regions)

The next three figures of the code are the number of the ecological zone and the current number of the zone within the area of a collection centre, in case there is more than one with similar conditions.

xx/xx.x/yyy/y/yy.y

By this coding, it is ensured that the locality where a seed lot derives from is characterised by ecological conditions and administrative structures. For example, a seed lot code starting with the figures 6/6.1 has been collected within the area of the Kakamega Seed Collection Centre (6) from the seed zone 6.1 e.g. the moist forests (6) around Kakamega (.1). Looking for the references, the zone is characterised by an altitude of 1200 - 1850 m, 1100 - 2700 mm average annual rainfall, and mean annual temperatures of 18 - 22 °C. At the same time, the numbering (.1) indicates that there is another zone in the collection area with similar ecological conditions (6/6.2, Kisii). For better handling, the seed zones are furthermore correlated with a characteristic name of a town, locality, mountain or forest.

(By leaving out the first figures of the code, e.g. the seed collection centre number, the forest ecological zone is obtained and can be used independently for silvicultural and ecological purposes).

#### **4. How to use the Forest Seed Zones of Kenya**

##### **4.1 User and interchange zones**

The seed zones can be used as a tool in seed collection and distribution. In order to be in a position to distribute seeds conforming to the ecological conditions of a planting site, the seed collector should try to collect seed from all those zones in which a species occurs. However, as tree planting has been widely promoted and supported by many institutions and organizations, the actual occurrences of tree populations do not always correspond to their ecological requirements. This refers first of all to the exotic species, but also, indigenous tree species have been transferred far beyond its natural distribution. Care is therefore necessary whether an occurrence of trees is autochthonous to the planting site or not. The use of table 6 gives indications on the originality of important indigenous tree species to the seed zones.

The zoning systems defines exactly the provenance of a seed lot. There are no or only preliminary recommendations for provenances of indigenous tree species in Kenya under determined ecological conditions which base on a comprehensive provenance research. It is therefore recommended, to use the seed zoning system as a preliminary expedient. The Legal Regulations for Forest Reproductive Material in Kenya have also adopted the idea of a seed zoning system.



Until the availability of results of the provenance research with indigenous tree species, the following procedure is recommended:

- a) Seed lots collected in a seed zone have to be used preferably in the same zone. This aims at minimizing the risks of non-adaptability to different ecological conditions. Organisational borders( between seed collection centres) which divide a zone artificially (for example: 4/5.2 and 1/5) do not restrict the interchangeability; the zones have to be seen as one. The zones for unrestricted interchange are listed in Table 3.
- b) The Legal Regulations for Forest Reproductive Material in Kenya allow the conditional interchange of seed lots from the same zone but of different regions. For example: Seed lots collected in Zone 1/9 (Aberdares) can be used in zone 4/9.1 (Mount Kenya) and vice versa (table 4). The interchange shall only take place in case there is no seed lot from the same zone available. The more separate two seed zones are, the more reservations against an interchange of seeds is recommended since the probability of different genetic constitution increases with the distance between two populations. In case any negative experiences are gained, the interchange of seed lots of the species in question between those zones should be forbidden by the designated control authority (see: Legal Regulations).
- c) The Legal Regulations for Forest Reproductive Material foresee another case of exchange: In order to promote tree planting in Kenya, the designated authority can allow also the transfer of seed lots into another zone than mentioned in a) and b) if there is enough evidence for adaptability under the new environmental conditions. However, the zone must be ecologically more favourable for the development of the species in question (despite of the big variety of tree species and ecologically different zones in Kenya, the decision requires profound plant-ecological knowledge and should not be handled careless).

#### **4.2 Forest types and tree species related to seed zones**

Comparing the natural forest types within the respective zones gives indications which species are occurring naturally in the zones, thus having a natural potential for adaptation. However, there are some important restrictions:

- There is no reliable countrywide survey on forest types available.
- Due to ample devastations and exploitations and the missing historical data there is no exact reconstruction of the original species distribution possible.

The presented system is a general ecological zoning. The borders of the seed zones are borders along climatical lines. The natural distribution of a determined tree species follows indeed such climatical lines (under the condition that the soil conditions are favourable) but they are not necessarily the ones delineated in the system. A species' distribution can therefore extend over several zones or be limited only to a small fraction of a zone. However, species specific seed

zones should only be developed for the most important indigenous and exotic tree species and on the basis of the existing system, e.g. by deciding if for a certain species the border between two or more seed zones can be eliminated. Only in cases in which provenance trials gave a clear incidence that due to changing climatical (not soil) conditions only parts of a seed zone can be recommended, a species specific user-zone should be delineated.

#### **4.3 How to incorporate exotic tree species**

Exotic tree species have gained importance for the Kenyan timber industry since the beginning of this century. Also in agroforestry, exotics are widespread. Their use was not always successful and setbacks are still occurring (*Cupressus lusitanica*, *Cupressus macrocarpa*, *Eucalyptus globulus*, *Leucaena leucocephala*, *Pinus radiata*). The reasons may be seen in an insufficient genetic variation but also in an insufficient adaptation potential of these species to their new environment. However, the Kenyan forestry and agroforestry sector cannot do without exotic tree species.

The seed zoning system is not directly applicable to exotic tree species. Table 7 lists exotic tree species and seed zones in which they are occurring. The criteria for these lists were the growth performance of existing plantations. It is neither a provenance recommendation nor a recommendation for the use of these species.

**Appendix 9** The seeds and plant varieties (tree seeds) regulations, 1993

**LEGAL NOTICE NO. ...**

**SEEDS AND PLANT VARIETIES ACT (Cap.326)**

In exercise of the powers conferred by section 3 of the Seeds and Plant Varieties Act, the Minister for Agriculture makes the following Regulations:

**THE SEEDS AND PLANT VARIETIES (TREE SEEDS) REGULATIONS, 1993**

Citation. 1. These Regulations may be cited as the Seeds and Plant Varieties (Tree Seeds) Regulations, 1993.

Interpretation. 2. In these Regulations unless the context otherwise requires:

"basic material" means the propagating material from which the seed is raised, including stands of trees natural regeneration, seed orchards, or clonal banks;

"clone" means the vegetatively derived progenies of a mother tree;

"Committee" means the National Tree Seed Committee established under Regulation 4;

"designated authority" means the authority amend in these regulations;

"Director" means the Director of Kenya Forestry Research Institute;

"forestry management" means the Science of managing the forest stands, and forest ecosystems in such a manner as to produce tree products and tree benefits in a sustainable way;

"forest reproductive material" means that part of a forestry tree plant which is used for propagation either as a seed, fruit or cone in botanical sense which is developed from a fertilized ovule or a seedling also including natural regeneration, or some other parts such as corn, cutting, bulb, root scion, set, split, tuber or stem, which is not a seed in a botanical sense and which is used for vegetative propagation.

"genetic variation" means the amount of different genotypes in a tree population.

"genotype" means an individual characterized by a certain genetic hereditary constitution.

"germination capacity" means the proportion of seed in a seed lot capable of germination into normal seedlings under optimal conditions as determined by germination analysis in the seed laboratory;

"KEFRI" means the Kenya Forestry Research Institute;

"multi-clonal variety" means an artificial composition of clones with prescribed number and parts;

"nursery" means any one plot of ground in one given space on which seedlings from seeds, cuttings or from any other Forest Reproductive Material are being reared for transplanting into the field and is under the management of an individual, a group of individual or such other authority;

"origin" means the geographical location and environment to which the parent trees of a reproductive material are native and within which their genetic constitution has developed through natural selection;

"plantation" means a population of trees of sufficient number of individuals to guarantee genetic diversity and of a size which permits inter-pollination of all trees;

"provenance" means the geographical location and environment of immediate parent trees of the seed lot;

"purity" means the percentage by weight of pure seeds of the species in question as determined by purity analysis in the seed laboratory;

"quality tree seed" means a tree seed lot that has the minimum standards and hence is of sufficient genetic variation, high physical purity, free from noxious weeds, seed borne diseases and pests and has at least the minimum germination capacity;

"records" include any data or information required to be kept under these Regulations;

"selected single trees" means a population of selected individual trees with prescribed characteristics in a sufficient number which represent a provenance and which have been approved and registered by the designated authority;

"sufficient genetic variation" means the amount of genotypes necessary to represent the genetic constitution of a tree population in such a way that the probability of loss of genetic information is minimized;

"tree" means a woody perennial other than agricultural and horticultural;

"tree seed collector" means any person officially recognized and registered to collect forest reproductive material;

"tree seed control unit" means the quality control laboratory of KEFRI, declared by notice in the Gazette to be a seed testing laboratory in accordance with the provision of the Act;

"tree seed dealer" means any person registered by the National Forestry Seed Committee to produce, collect, distribute or sell forest reproductive material;

"tree seed lot" means a specified quantity of seed which measures to prescribed maximum weight and which is represented by one sample in laboratory seed testing or in pest control plots, and is homogeneous and physically identifiable by a unique reference number; "tree seed orchard" means a plantation of forestry trees which has been established in accordance to these regulations in order to produce tree seed and which has been approved and registered by the designated authority;

"tree seed processing" means all those treatments that the seed is subjected to other than testing, between harvesting and sale or distribution;

"tree seed stand" means a selected group of cultivated or naturally occurring trees with the aim to produce tree seed which has been approved and registered by the designated authority;

"tree seed testing" means the examination of a sample of seed with a view to determining its quality;

"tree seed zones" means an area with uniform or similar ecological conditions within which trees of a species can develop a relatively uniform genetic constitution; "tribunal" means the Seeds and Plants Tribunal established under section 28 of the Act. Tree Zones to 3. The Director has cause to be identified be identified. Delineated and registered Tree Seed Zones (forest ecological zones) from where a tree seed dealer may collect:

(a) forest reproductive material,

(b) components of the tree seed orchards which have been identified, delineated and registered

(c) reproductive material of the species listed in the First Schedule.

### **National Tree Seed Committee.**

- (1) There shall be a Committee to be known as the National Tree Seed Committee which shall consist of:
  - (a) Chief of the Forest Extension Services Division of the Forest Department who shall be the Chairman;
  - (b) Head of Kenya Forestry Seed Centre, who shall be the Secretary;
  - (c) a representative from the Ministry of Agriculture, department of soil and water conservation
  - (d) a representative of the Ministry of Energy, division of biomass;
  - (e) the chief of industrial plantation division of the Forest Department;
  - (f) a representative from the Permanent Presidential Commission on Soil and Water Conservation;
  - (g) the Director of Forestry;
  - (h) the Director of KEFRI
- (2) The Committee may Co-opt such number of members not exceeding three to represent such interests as it may from time to time determine.
- (3) The functions of the Committee shall be:
  - (a) to develop a national tree seed policy;
  - (b) to modify or alter certification standards;
  - (c) to make recommendations for the registration or de-registration of a tree seed dealer;
  - (d) to moderate cases of appeal by aggrieved persons;
  - (e) to renew and recommend appropriate tree seed certification.
- (4) The Committee shall meet at least twice in a year to review tree seed Regulations and to make recommendations as may from time to time be appropriate, to the Minister.

### **Quality Control**

A Quality Control Unit within KEFRI Unit monitor and control the quality of forest reproductive material collected from registered seed sources. The quality control unit consists of a quality control officers (laboratory and field) which are appointed by the Director KEFRI. The Quality Control Unit shall:

- (a) ensure proper tree seed collection, processing, storage and distribution of forests reproductive material received from registered tree seed sources;
- (b) inspect and control tree nurseries;
- (c) inspect and recommend to the Director those forestry reproductive materials for import and export;

- (d) test in accordance with the existing international rules all trees seed lots meant for commercial purposes including export, import and distribution;
- (e) issue a 'stop sale and distribution order' for all tree seed lots which do not meet the standards as laid down in these regulations; (schedule 5-9)
- (f) seize and dispose of any unfit forest reproductive material in accordance with this Act, or any regulations made thereunder; (schedule 5-9)

#### **Registration as a tree seed dealer.**

- (1) Every person wishing to be a tree seed dealer shall make an application in writing to the Secretary of the Committee for registration.
- (2) Each application shall be accompanied by the appropriate fee which shall be determined by the Director from time to time and in addition the applicant shall
  - (a) satisfy the Committee that he has available full-time professional supervision of his business;
  - (b) satisfy the Committee that he is in possession of the necessary equipment for the appropriate handling and storage of forestry reproductive material;
  - (c) on request by the agents of the Committee allow for inspection of the origin of any material he is dealing with in order to ascertain whether he satisfies the conditions for the requirements for genetic diversity; (schedule 5-8)

#### **Registration**

- (1) The successful applicant under former regulation shall be eligible for registration as a tree seed dealer on completing the necessary form TSR I in the Second Schedule.
- (2) On registration the Director shall issue the applicant with a certificate of registration in form TSR 2 in the Second schedule.
- (3) The Director shall keep a record of all registered tree seed dealers in the format contained in Form TSR 3 in the Second Schedule.
- (4) Every registered tree seed dealer shall collect his forest reproductive material from tree seed zones or orchards which have been identified, delineated and registered by the Director and as laid down in schedule 5-7.
- (5) exception to this rule shall be granted to specific research institutes for research marketing upon application from the Director KEFRI.

### **Records to be kept.**

- (1) All registered dealers in forestry reproductive material shall keep all the relevant documents showing the serialization of the batches of forestry reproductive material intended for distribution and marketing (schedule 9) and shall in addition adhere to the record keeping rules contained in the fourth schedule.
- (2) Any person who distributes, markets or in any way deals with any forest reproductive material which does not satisfy the standards laid down by the Director in these regulations, commits an offence.

### **Tree Seed Importation**

- (1) No person shall import any tree and export unless:
  - (a) he is a registered tree seed dealer;
  - (b) the tree seed to be imported complies with the minimum standards set out in the Third schedule;
  - (c) he has submitted an application in form TSR 1 in the Second Schedule;
  - (d) and has with approval of the designated authority been issued with a tree seed import permit in form TSR 5 in the Second Schedule.
- (2) Exception to this rule shall be granted to specific research institutions upon application from the Director KEFRI.
- (3) All imported tree seed shall be accompanied by a phytosanitary certificate and shall meet Kenyan quarantine requirements as set out in the Plants Protection Act.

### **Exportation.**

- (4) Where there is surplus tree seed, the designated authority shall on written application in Form TSR6 in the second schedule issue an export permit in the form TSR7 in the Second Schedule.
- (5) All tree seeds for export shall meet the minimum standards laid down by the Director.
- (6) Any person who exports any forest reproductive material contained in the first schedule without the written authority of the Director commits an offence.
- (7) Exception to this rule shall be granted to specific research institutes for research marketing upon application from the Director KEFRI.

### **Appeals.**

- (1) Any person who is aggrieved by the decision of the Tree Seed Committee may appeal to the Tribunal within 14 days after the Committee's decision.



**Offence.**

- (1) Any person who contravenes any of the requirements of these regulations shall be guilty of an offence.
- (2) Any person found guilty of an offence under these regulations shall be liable to a fine not exceeding ten thousand (10,000) shillings or to a term of imprisonment not exceeding six months or both.

**Protection**

- (1) No legal proceedings shall lie liability against any officer for anything done bona fide and without negligence in the exercise of their powers or performance of their functions or duties under these regulations.
- (2) For the purposes of these regulations the term 'officer' includes an employee of the Kenya Government.

Made on the ..... 1993

Minister for Agriculture and Livestock