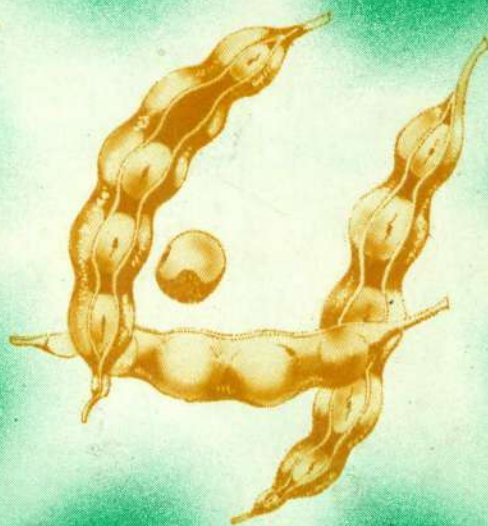


Kengo Agroforestry Training Series

HOW TO COLLECT, HANDLE AND STORE

SEEDS

ARSEN MBONYE AND KIHUKU KIAMBI



Kengo Indigenous Trees Training Series

HOW TO COLLECT, HANDLE AND STORE SEEDS

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The Kengo tree seed project

The Seed Project was started in 1983 as a complimentary effort to reafforestation, afforestation and agroforestry projects, whose objectives could not be fully achieved due to lack of seed and other vital technical aspects pertaining to it.

The Project's initial impact was the production of "A Pocket Directory of Trees and Seeds in Kenya" which served as a springboard to achieving higher ideals and objectives within the project.

Currently, the project has four main components:-

1. Seed Procurement, Processing and Distribution

Seed is procured from the Ministry of Energy and Regional Development, schools, individuals, NGOs and research agencies. The Seed Project technical staff also conduct seed collection field trips to familiarize themselves with on-the-ground seed procurement problems. Procured seed is then processed, packed and distributed free to any requesting research agencies, individuals, schools, NGOs, etc. The project handles about 500 Kgs of seed and distributes it to about 400 destinations annually.

2. Training

Constant procurement of poor quality seed from the various seed sources due to lack of technical skills in seed collection, has necessitated the incorporation of a training component in the Seed Project. One seed collectors training workshop has so far been held. 41 seed collectors from NGOs, prisons, research agencies, Government departments and individuals as well were trained in an effort to set up a KENGO national seed supply network.

3. Curriculum Development

In response to much needed simple, easily digestible and synthesized technical information on seed, the Seed Project has published this pamphlet on "How to Collect and Store Seeds" and is in the process of publishing a "Seed Collectors' Training Manual". These publications were found necessary because the available publications on seed are too technical for the lay seed collector on whom we depend for our seed source.

4. Research

After policy and public sensitization on the need to conserve our indigenous trees for genetic perpetuation, KENGO has been frequently confronted with technical questions pertaining to viability, storability, pre-sowing treatments, propagation techniques, nursery establishment and general tree management of these threatened species.

This has compelled the incorporation of a research component into the KENGO Tree Seed Project which is itself an extension of the much broader Indigenous Trees Development Project.

The two year "Dryland Indigenous Trees Agroforestry Research/Development Project" is a KENGO/JKCAT undertaking, initiated in November 1985.

The major objective of this research project is:—

To establish managed agroforestry systems based on indigenous trees and propagation techniques of these species.

Other objectives include:—

1. Carrying out research on seed germination trials and seed handling.

2. Establishment of a nursery with a production capacity of 200,000 indigenous tree seedlings.
3. To establish a seed stand of about 50 species.
4. Setting up of agroforestry demonstration plots with modules based on indigenous trees.
5. Establishment of an indigenous tree arboretum.

The research component will be conducted in cooperation with University of Nairobi — Botany Department, JKCAT, ICRAF, KARI, and Moi University. This cooperation will be in form of both information exchange and consultancy. Some of the phases of the project have already been implemented, with constant data collection and analysis.

Research findings accruing from the project will be disseminated in form of guidebooks, pamphlets, papers, posters, workshops and symposia.

The beneficiaries of such dissemination include: extension workers, NGOs, research agencies, individuals, and educational institutes.

Introduction

Seed is very delicate and therefore has to be handled with great care to prevent loss of viability. There are some important procedures that have to be carefully followed to ensure effective germination of the seed. These procedures include harvesting from a good mother tree, proper seed collection techniques, careful handling and extraction, good packaging and proper storage facilities. Effective pre-sowing treatment methods and good soil are also important for seed to germinate.

How to select a good mother tree

It is important to collect seed from healthy trees which are already good seed producers. Avoid isolated, poorly shaped, low seed producing trees. The best trees for seed collection are those growing in the midst of a healthy stand of the same species.

The quality of a mother tree depends on how you wish to use the tree.

Timber.

Trees intended for timber are best when they grow very straight, with few branches and are fast growing.



A good timber mother tree



A bad timber mother tree

Fodder:

Trees intended for fodder should be fast growing, profuse branchers, multi-stemmed, evergreen and able to coppice easily. The multi-stems and profuse branches ensure ample availability of green leaves all the year round. Fast production of leaf matter, pods and the ability of the tree to recover after the cutting of branches are the most important factors.

Fruit:

If you intend to grow fruit trees, collect seed from those trees producing good quantities of sweet, healthy fruits of marketable size. Trees with early branching are preferable since it is easy to pick fruits from low branches. For fruit trees it is preferable to have budded or grafted stock. To obtain the best budded and grafted stock, contact centres that deal with professional grafting and budding.



A good fodder mother tree



A healthy fruit mother tree

How to collect seeds

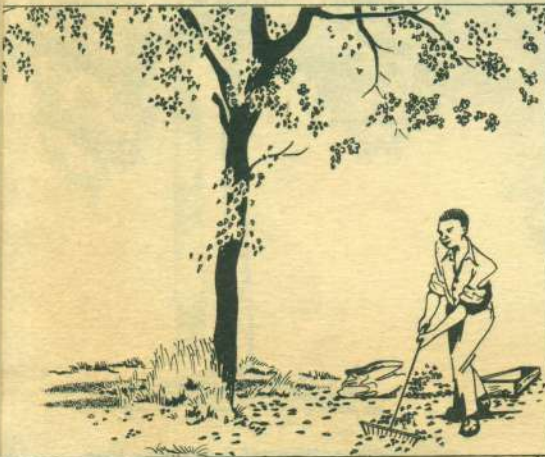
There are several methods that can be employed for seed collection:

Collection from natural seed fall or after shaking the tree

This is the simplest method since it does not involve any skilled labour. A rake, sieve and seed container are the only equipments required.



Seed collection from natural seed fall



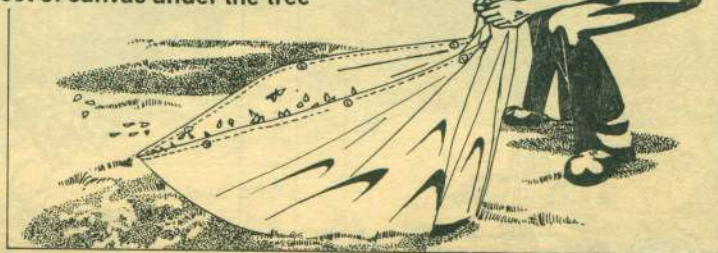
Gathering the seed with a rake

Large plastic sheets or canvas can also be spread under the tree for seeds to fall on. The sheet is then folded and seeds collected daily to avoid chances of insect attack and fungal infection.

Where plastic sheets are not available, clean the ground of leaves, branches and under-growth to facilitate seed collection.



Spread the sheet of canvas under the tree



Fold the sheet of canvas to gather the seed

However, this method of collecting from the ground has some disadvantages, since seeds may have fallen from the tree immaturely. There is also a high probability of insect attack and fungal infection. Seeds may also have stayed on the ground for a long time, therefore losing viability.

Collecting from standing trees:

This is the manual method normally employed. It is usually fairly easy to collect from standing dry zone trees as they are of open form and relatively small. Several methods can be used when collecting seed from standing trees.

Collecting in the crown: Climb into the crown of the tree and with the use of a saw, panga or similar implement remove seed-bearing branches.

Portable ladders, if well designed provide a quick and safe means of reaching the live crowns of trees up to about 15m tall. For small trees, a light wooden or aluminium ladder of 6-8m long is appropriate.



Vehicles with strong roof carriers often provide a quick and easy means of gaining access to the crowns and fruits of small trees.



Climbing into the crown of the tree

Collecting from the ground:

Manual Collection: This can be very effective especially where trees are small and branches droop low enough for collectors to reach them easily from the ground.

When pods are closed, bend the branches over collection sheets. Tarpaulins canvas, sacks or polythene sheets can be spread on the ground. Strip the pods by hand. Use thick leather home made skin or canvas gloves when branches are thorny.

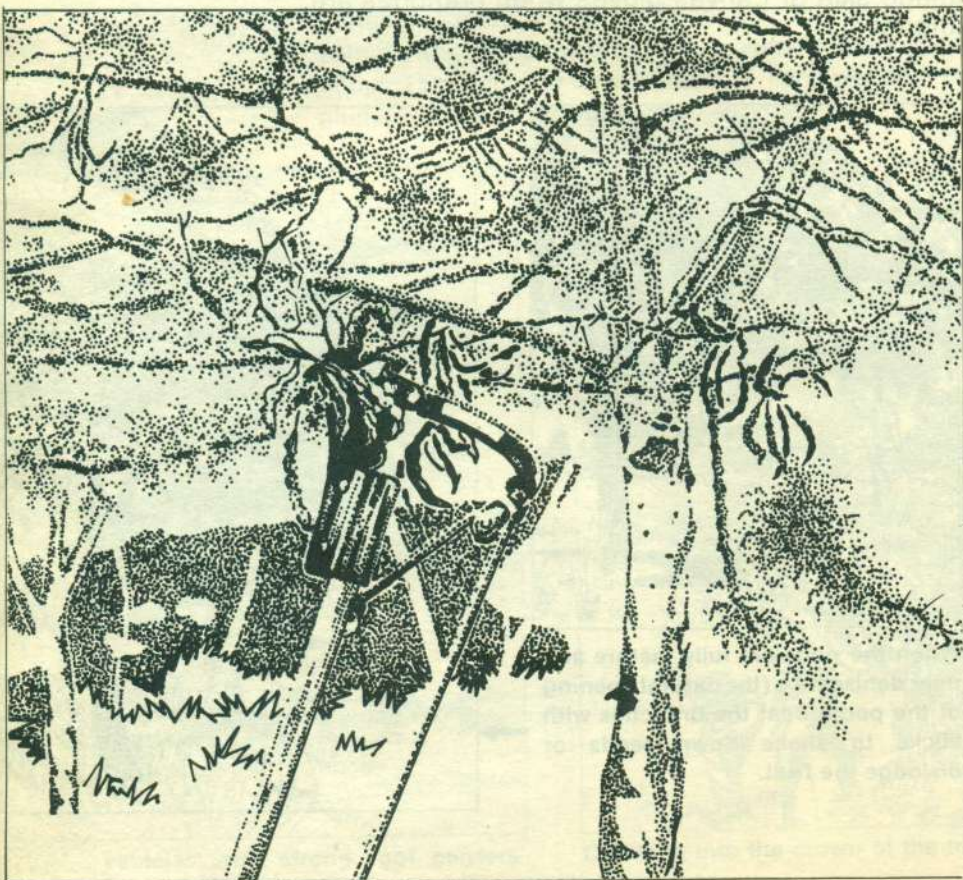


When the pods are fully mature and near dehiscence (the natural opening of the pods) beat the branches with sticks to shake down seeds or dislodge the fruit.



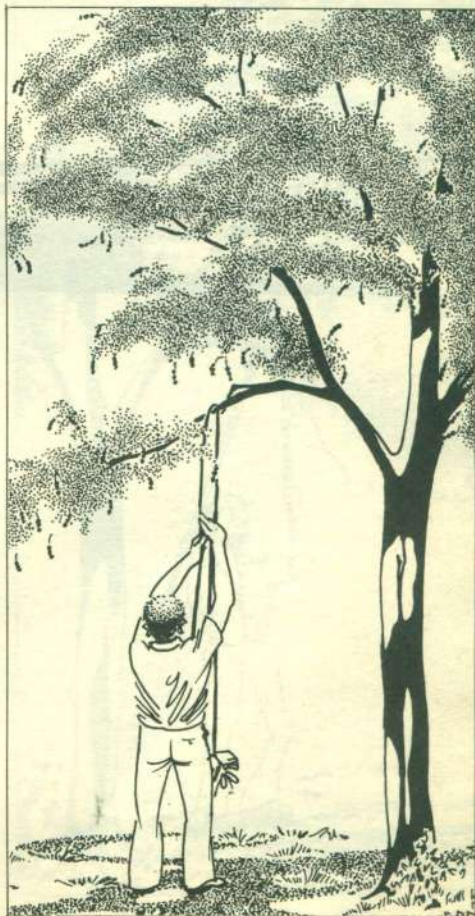
The use of pruning shears for cutting off thin and out of reach branches is effective in gaining additional seed. For fruit trees, a basket could be tied near the pruning shears for seed to collect in, since fruit quality may be reduced if it falls on the ground.

This method requires careful location of the ground sheets, so that pods and seeds are not lost on impact or get entangled on to the tree branches.



Throwing rope with weighted end:

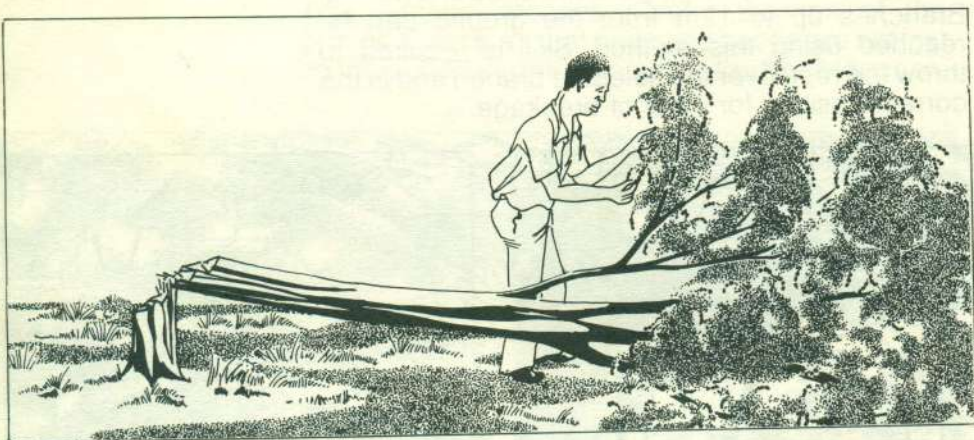
A 5mm diameter rope, about 25 metres in length with a 400 grammes weighted ordinary stone at one end (a small bag of sand or soil can also be used) is thrown over small branches which are then broken off by holding the two ends and pulling. Branches up to 12m from the ground can be reached using this method. Skill is required to throw the rope over the selected branch and in the correct position for ease of breakage.



Seed harvesting by use of weighted rope

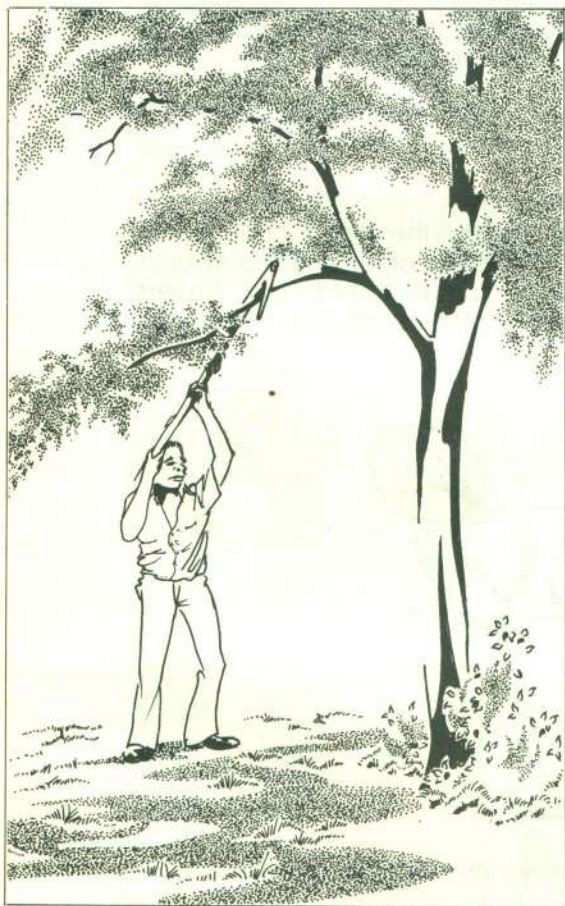
Collecting seed from felled trees:

This method is cheap and easy when collecting large quantities of seed but it is not advisable to fell trees just for seed collection, especially in dry areas where regeneration is very slow.

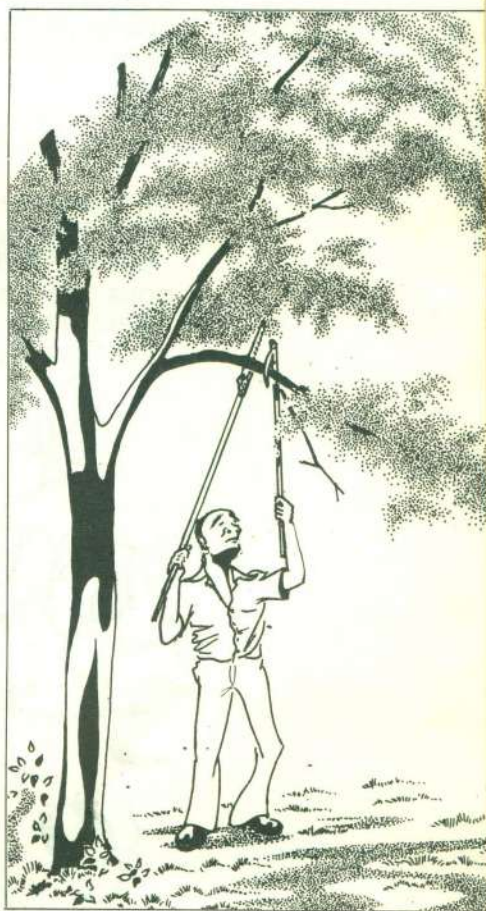


Pole Implements:

Where the seed is out of reach for hand picking, various pole implements may be used for example poles with shears, saws or hooks of varying designs attached to one end. Light and rigid bamboo, aluminium or plastic poles 4-6m in length can also be used. Hooked branches can be used where aluminium and plastic poles are not available.



Use of hooked branch



Use of pole with saw

Timing of seed collection:

The optimum time for seed collection is as soon as the seed is mature and ready for harvest. Some type of seed will not germinate if they stay on the tree for too long. Seeds of dehiscent fruits have to be carefully timed since collection of the seed is difficult. Such seeds are light and easily blown away by the wind e.g. *Grevillea robusta*.

The seed of *Combretum spp.* and *Terminalia spp.* appear brown even when unripe. Careful observation must be done to ensure that the seeds are mature before harvesting.

Other types of seeds appear cracked and attain a dark-brown colour when mature e.g. *Acacia spp.*

In *Acacia senegal*, seed is viable before they have fully matured i.e. when the seed coat is still relatively soft and pale in colour and the swollen pods are just beginning to turn brown. Severe insect attack is thus minimised and pre-sowing treatment is avoided.



Combretum spp.

How to prepare seed for storage:

You should always aim to sow or dispatch your seed as soon as you have acquired it. But sometimes for different reasons you may need to store the seed for future use. Remember that the longer the seed is stored, the greater the probability that it will lose its germination capacity.

Seed extraction:

In most cases seed is collected while embedded in ripe fleshy fruits, dried fruits, in pods or as single seeds. Proper extraction and cleaning of seed is of vital importance in seed handling. Most seed extraction requires pre-drying of the fruit. Others may require pre-soaking in order to be able to extract the seed easily. Those that require soaking are generally those borne in fleshy pulpy fruits or pods that have dried and are indehiscent. For pods that split on maturity, extraction is best done when pods are dry.



Use a pestle and mortar to thresh seeds which are strongly attached to the pods.



Fill sack with dry pods and beat it like they do with beans. (The threshing method).

Seed cleaning:

Always remove the damaged seed and all the immature light seeds. Remember that mature seed stores longer.



Winnowing of seeds



Using hands (manual)

Seed drying:

There are many methods of seed drying but sun drying is the most common method used. Do not expose the seed directly to naked flames.



Seed storage:

Always remember that your seed will last longer when stored in a cool dry place. Seed that has dried and is kept in a cool dry place is usually not attacked by fungi and insects.

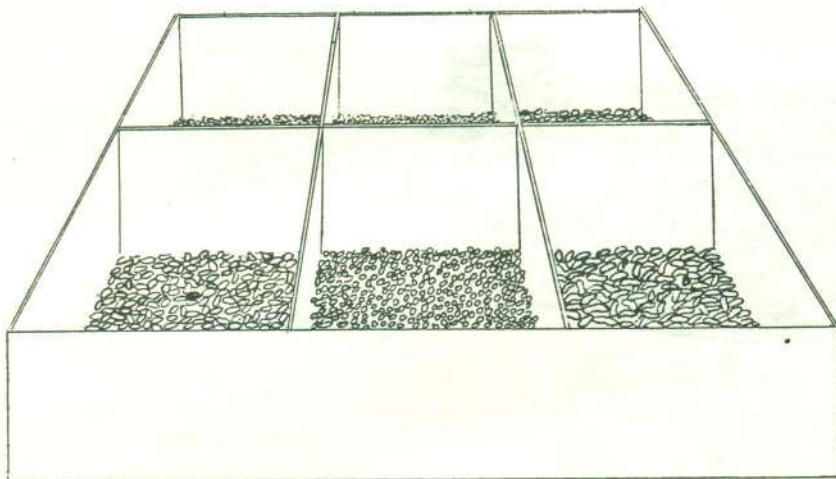
Protection:

Protecting your seed from external agents of destruction is of paramount importance. Always store your seed in a secure place, that is burglar proof, out of reach of insects, rodents and birds. If possible, paint the inner walls with residual insecticides.

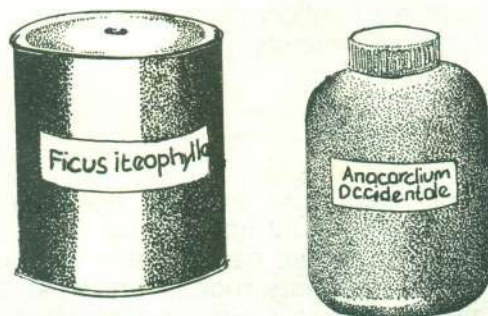
Whenever you receive extra seed, always make sure it is properly cleaned before putting it into the store, otherwise, insects and fungi could easily appear in the store.

Seed storage containers:

Sealed containers: When seed has been dried properly it can then be put into a tin with a lid or into a plastic container that can be sealed.



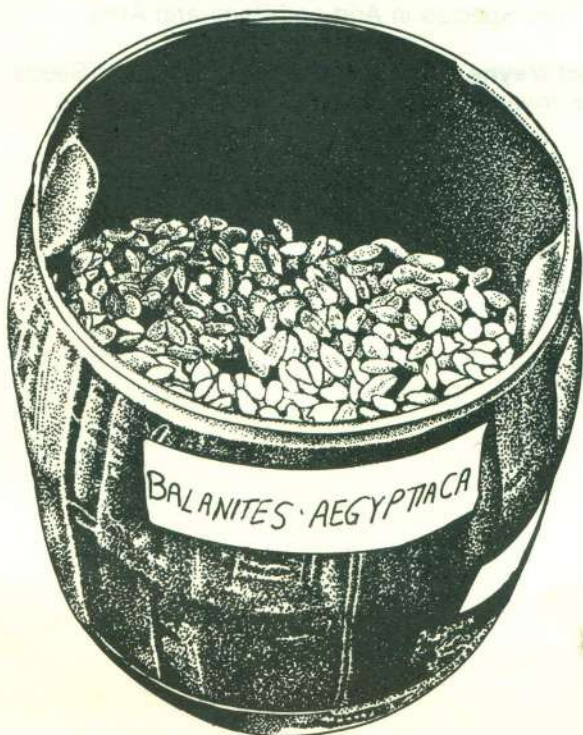
Metal boxes



Plastic container

Points to remember when using sealed containers:

- a) Never seal-in moist seed.
- b) Use air tight containers
- c) Make sure that your container is clean.
- d) Open the seed containers only when necessary.
- e) It is advisable to fill the container with seed.



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**KENGO Publications on
Agroforestry and Indigenous Trees**

Why Indigenous Trees? (Booklet)
How to Collect, Handle and Store Seeds. (Booklet)
How to Plant and Care for Your Trees. (Pamphlet)
An Introduction to Agroforestry. (Booklet)
A Pocket Directory of Trees and Seeds in Kenya.
(Book)
How to Establish a Tree Nursery. (Pamphlet)
How to Plant and Care for Trees in Dry Areas.
(Poster)
Sesbania sesban (Booklet)

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