

# Nurturing the seed

KEFRI's Tree Seed Programme promotes tree planting through provision of high quality seeds

By WILLIAM OMONDI

The Kenya Forestry Seed Centre was established in 1985 with support from the German Agency for Technical Cooperation (GTZ). The centre has since been upgraded into a Programme within the Kenya Forestry Research Institute (KEFRI). It is mandated to provide certified, site appropriate, high quality tree seeds in sufficient quantities to meet the national demand; and to undertake research and policy formulation to guide tree seed production and use.

KEFRI puts an emphasis on best practices throughout its seed production chain to ensure provision of high quality seeds to its clients. This involves adherence to the principles of source-identified and quality-declared seeds in accordance with the Organisation for Economic Co-operation and Development (OECD) schemes. These attributes are important in terms of site matching and information on the quality of each seed-lot. Tests for both physiological (germination) and physical (purity) quality are mandatory and are done in accordance with the International Seed Testing Association (ISTA) rules.

## Seed production and distribution

Seeds are critical to production of seedlings. The success of government policies on afforestation depends heavily on the supply of sufficient quantity and quality seeds of the species in demand for planting programmes. Over 10 years, KEFRI increased its production capacity from 2 tonnes in 2000 to 5.6 tonnes in 2005 and 9.7 tonnes in 2010. Most of the seeds are collected from selected, established and marked sources located in protected areas, trust lands and private land.

During the last 20 years, KEFRI established 14.6 ha of seed stands and 33.1 ha of seed orchards. It is from these sources that the institute collects improved seeds of high genetic quality as compared to those from natural forests. Improvement activities are a continuous process and work on additional indigenous species is in progress. KEFRI has responded to the increased national demand for seeds and seedlings by decentralising distribution to its regional centres,



An established seed stand of *Melia volkensii* in Kitui (Photo: KEFRI)

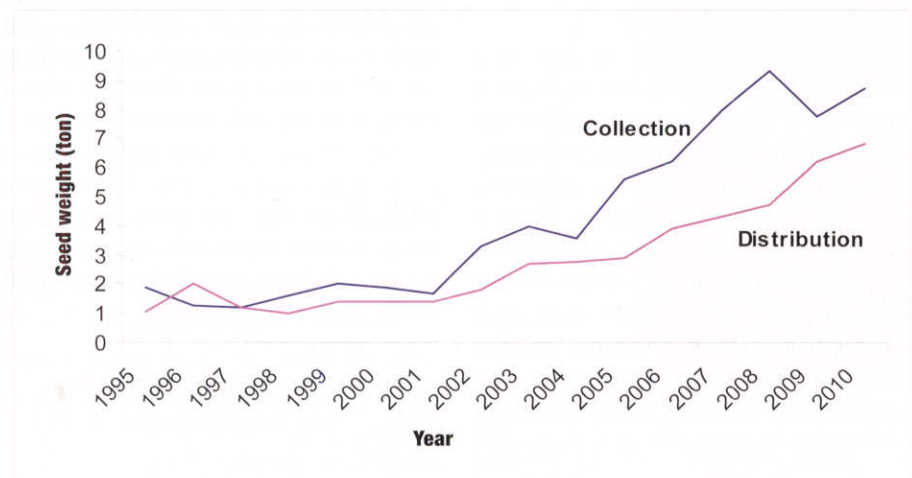
agents and stockists. This exercise also involves packaging seeds in different quantities to meet the demands of different clients.

To improve its seed production capacity, the institute has embraced the informal seed sector in the production and distribution of seeds. KEFRI trains the private seed sources in basic seed handling before they are registered and recognised as sources of seeds. The institute will thus focus its resources on production of seeds from superior sources, i.e. orchards and established stands, and also capitalise on species in which it has a technological advantage in terms of handling.

The above mentioned increase in production has been accompanied by a steady rise in distribution from 1.1 tonnes to 6.8 tonnes over the same period. An analysis of the quantity of seeds of 22 priority species produced and distributed during a five-year period (2006 to 2010) in relation to the size of land planted, using the seedlings raised, reaches a theoretical 1.1 million hectares. This translates to 2.6 per cent of Kenyan land cover. This signifies the increased recognition of KEFRI as a source of high quality seeds. Table 1 shows these trends.

The overall impact of this is the promotion of tree planting, hence contributing to the

Table 1: Seed collection and distribution from 1995 to 2010







Extraction of acacia seeds from pods.



Testing for seed germination potential in the glasshouse.



Cold room seed store at Muguga.



Samples of seed and packages for distribution and sale.

achievement of Vision 2030 that requires the country to achieve 4 per cent forest cover by 2012. It is also in line with the Constitution, Article 69 Cap (1b), which requires the state to work towards achieving and maintaining a tree cover of at least 10 per cent of the Kenyan land area.

### Development of seed policy and regulations

KEFRI is registered as a seed merchant and is in the process of developing seed regulations to streamline its operations to be in line with both the Forestry Act (2005) and Seeds and Plant Varieties Act (2001). The institute has established a Seed Advisory Committee, which will formulate best policies and practices with respect to seed production and use in Kenya; to review emerging issues on production and related issues and to make appropriate recommendations. The policy frameworks have enhanced and promoted the production and use of high quality seeds by establishing appropriate guidelines and protocols.

### Advancement of *ex-situ* conservation<sup>1</sup> through seed storage

The prevailing rate of environmental degradation does not guarantee the continued survival of some plants and habitats, making it necessary to resort to *ex-situ* conservation measures.

In domesticating some of the national obligations to the CBD<sup>2</sup> and to mitigate the loss of plant diversity, seed banking is one of the most efficient and inexpensive ways of ensuring that seeds of many wild plant species are maintained alive for hundreds of years. Stored seed offers a source of planting material whenever required.

The process of seed banking entails collecting representative seed samples from a species population, followed by cleaning and drying the seeds to low water content normally to 5 per cent, before hermetically packaging and storing at sub-zero temperatures.

<sup>1</sup>Ex-situ is Latin and means "not on the site", so *ex-situ* conservation generally means planting seedlings from seeds collected on a particular place from a particular species, in another place. But it also can mean conservation by other means, like storing in a controlled environment (cold room).

<sup>2</sup> Convention on Biological Diversity

The seeds are stored at the National Genebank of Kenya. Since 2000, the Kenya Forestry Seed Centre has, in collaboration with its partners in the Seeds for Life project, collected, documented, and stored seeds of 600 plant species, representing 120 families, 359 genera and 554 species indigenous to various regions of Kenya.

These collections form part of Kenya's heritage of plant genetic resources that are available for use in research, re-introduction for multiplication and specialised use.

### Development and application of seed handling protocols

Basic research to support production and handling of seeds is a pre-requisite, to ensure continuous provision of appropriate technologies and protocols.

The focus of seed research is on storage and dormancy release. For example, not all seeds will germinate when sown, even with appropriate conditions. In nature, seed remains



dormant until the conditions are favourable; this is an adaptation strategy that ensures species survival. Treating (germination pre-treatment) the seed before sowing eliminates this "resting period."

Research findings have narrowed the knowledge gap, while enhancing the important role of germplasm use and conservation. Further, the results from the studies have enhanced our understanding of storage and germination behaviour of the challenging indigenous species, namely, *Melia volkensii*, *Polyscias fulva*, *Moringa stenopetala*, *Zanthoxylum gillettii*, *Terminalia brownii* and *Osyris lanceolata*, among others.

Another area where research progress has been made is the determination of seed desiccation tolerance which aims at assessing seed storage potential at low temperatures and moisture content, both of which are pre-requisites for long-term seed storage. It is not possible to determine seed storage potential based on either fruit or seed morphological characteristics.

Through these studies, we have been able to identify plant bearing species whose seeds are non-storable under conventional cold stores. The results of these studies have been compiled and published in the *Tree Seed Handbook of Kenya* and tree seed information leaflets.

### Publications to support seed policy, production and use

Information generated from the seed handling research and experiences has been packaged into several publications as listed below. About 4,000 copies of the *Tree Seed Handbook* in particular have been distributed widely to both local and international libraries, NGOs and to several academic institutions.

The Kenya Forestry Seed Centre is located at Muguga, in Kiambu County, off Naivasha Road. The contact address is:  
P O Box 20412 - 00200 Nairobi  
Tel 066-32891/2/3  
Email: seed@kefri.org

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### Publications on Kenya's seed policy

1. National Seed Policy 2010 – Ministry of Agriculture
2. The State of Plant Genetic Resources for Food and Agriculture in Kenya – FAO Report, 2009
3. Seed Production and Research Strategy – 2011; KEFRI
4. Seed collection and handling; a Reference Manual – KEFRI 2011
5. Tree Seed Source Re-classification Manual: 2009, ICRAF /KEFRI
6. Tree Seed Quality Guide 2009, ICRAF/KEFRI
7. Promoting tree planting through provision of high quality seeds: Information leaflet; KEFRI 2011
8. Seed Catalogue; KEFRI 2010
9. Evolution of provision of Tree Seed in extension programmes. RELMA Technical note; 1994
10. Tree Seed Handbook of Kenya 2<sup>nd</sup> Edition 2007
11. Tree Seed Information Leaflets
12. Forest Seed Zones of Kenya

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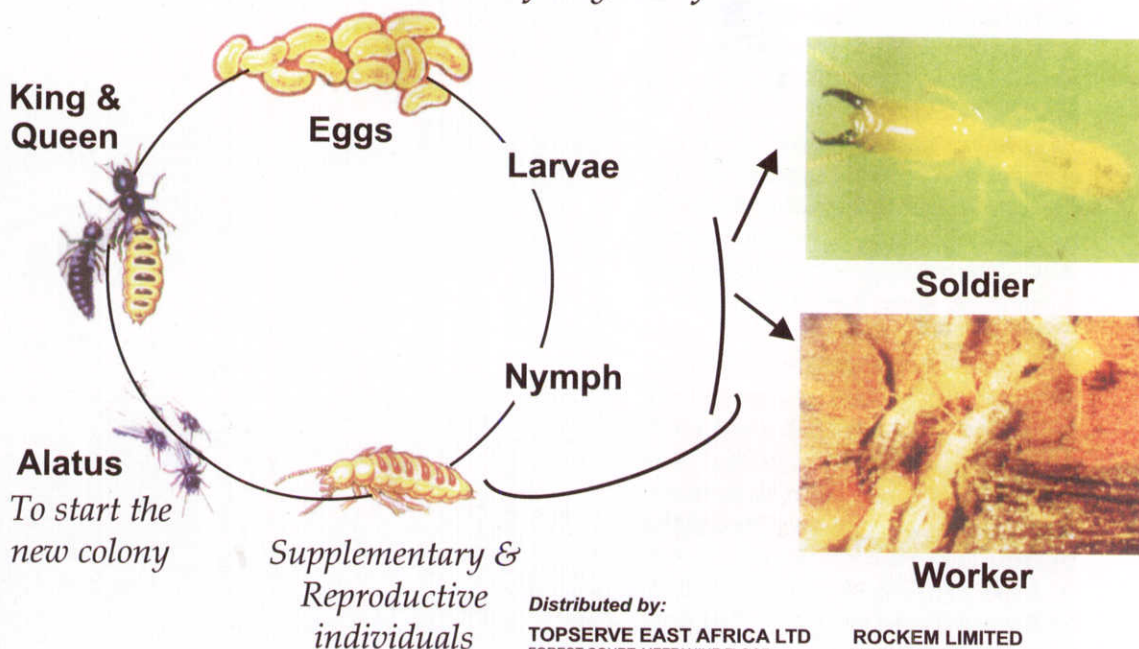
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