Tending the melia volkensii tree. This fast maturing hardwood tree, dubbed the mahogany of dry lands, has multiple uses and its timber is in high demand. KEFRI.ORG

Maize inter cropped with melia volkensii trees. KEFRI.ORG

Semi-arid lands wonder tree provides new income streams for impoverished households

ENVIRONMENT

Kefri works with farmers to grow the drought tolerant melia volkensii tree and reap its many benefits

BY JAMES KARUGA

In Kenya's semi-arid regions grappling with climate change, rural communities are turning their attention to growing the drought tolerant melia volkensii (mukau) tree.

This fast maturing hardwood tree — dubbed the mahogany of the dry lands — has multiple uses and its timber is in high demand and lucrative.

Currently, a foot of melia volkensii wood costs about Sh60 to Sh70, which is double the price of wood from other species.

A recent survey carried out in Kitui town by researchers from the Kenya Forestry Research Institute (Kefri) showed wood products made from melia volkensii timber cost 40 to 50 per cent more than those from cypress and pine wood.

The wood is durable, termite and decay resistant, can be used in interior panelling, and to make floor tiles, rafters, and frames.

According to Albert Luvanda, a Principal Research Officer with Kefri in Kitui, melia volkensii's wood is comparable to Elgon teak or camphor.

That has made the tree be over-exploited in forests, and created the need to replenish it, in its indigenous ecologies.

Kitui, Tharaka Nithi, Embu, Meru, Taita Taveta, Makueni, Marsabit, Kibwezi, Isiolo and Mandera are some ecological regions the tree is suited to grow.

These regions are at altitudes of between 350 and 1,700 meters, and receive 300 to 800mm of annual rains which can sustain melia volkensii growth, according to Kefri studies. "It requires very little water to grow, and if you plant it at the onset of the rainy season, you don't need to water it," said Luvanda. Melia volkensii is also suited to growing in soils that drain water properly, like the sandy loam soil.

In Kitui, where Kefri is working with local communities interested in planting the melia volkensii tree, drought frequency has intensified in recent years.

The region experiences a drought every two years while in the 1990 it occurred after about five years, said Luvanda.

For Kefri, melia volkensii is proving economically and environmentally viable as it cushions against climate change and provides profitable timber.

Jonathan Kituku, a Kibwezi farmer, has benefited from planting melia volkensii on his 300 acre farm. He started growing the tree after being trained by Kefri in 2006. As his trees continued to mature, grass grew beneath the over 7,000 melia volkensii trees.

The grass, which matures in three months, has become a secondary income source for him. He harvests 90 to 100 bales of grass per acre during the rains, earning him at least Sh27,000.

"This grass makes me more money than maize and indigenous cows," he said.

Weapon against drought

Kituku also sells melia volkensii seeds and trains farmers on planting and tending the tree. He sells a kilogramme of the seeds at between Sh6,000 to Sh7,000.

Skills gained from Kefri training have made Kituku one of Kenya's most sought after trainers on melia volkensii propagation.

He charges Sh24,000 per person for a 21-day course and has trained farmers from as far away as Tanzania.

Kenyan farmers are rapidly embracing growing of the melia volkensii tree. Along the Seven Forks Dam belt, on the border of Embu and Machakos counties, 2,000 farmers with support from Better Globe Forestry (BGF) have each set aside two acres for the tree. Jan Vandenabeele of BGF said melia volkensii is one of humanity's best weapons to fight drought in Africa.

BGF is providing farmers with technical advice and seedlings. "With melia volkensii you can create some wealth sustainably in dry rural areas, and also protect the environment," said Vandenabeele. Experts' recommend that new farmers of the tree should seek advice as the seeds have to be cracked and nipped to break their germination dormancy.

Kefri conducts trainings on breaking the melia volkensii seed dormancy and tree management such as pruning and de-budding in order to grow straight trees suited for timber.

In recent years, with support from Japan International Co-operation Agency (Jica), Kefri has begun propagating melia volkensii seedlings faster and in large quantities to meet farmers' demand.

The seeds from Kefri orchards, where trees with the best genetic characteristics are grown, are improved and have superior traits.

In ideal weather conditions selective harvesting of melia volkensii timber can begin when the tree is about 12 years, according to Kituku. The trees can be inter-cropped with maize in first three years of growth.

When well spaced, the species can also be inter-cropped with cereals like peas, green grams, and cow peas for up to six years without interfering with their yields, according to Luvanda.

The trees also serve as fodder for livestock, green leaf manure, mulch, wind breakers and can help prevent soil erosion, according to Vandenabeele.

» Benefits of mukau tree

- Used for furniture and building.
- A foot of melia volkensii wood costs about Sh60 to Sh70, which is double the price of wood from other species.
- A recent survey carried out in Kitui town by researchers from Kefri shows that wood products made from melia volkensii timber cost 40 to 50 per cent more than those from cypress and pine wood.
- The trees also serve as fodder for livestock.
- It is a source of green leaf manure, can be used for mulching, as wind breakers and can help prevent soil erosion.
- The trees provide shade for grass which farmers use as fodder for their livestock.
- The grass is also sold to generate income.
- They improve the soil and can be inter-cropped with cereals like peas, green grams, and cow peas.

ENVIRONMENT ■ **CONVERSATION**

Your parents were wrong: Money does grow on trees after all

Cities routinely rake up tens of millions of dollars from their urban forests annually in ways that are not always obvious.

Leafy canopies lower summer air conditioning bills, but more shade also means less blade to maintain thousands of acres of grass. Health-wise, trees contribute to lower asthma rates and birth defects by removing air pollutants.

In the US, city foresters should celebrate trees (on Arbor Day that comes every April) as economic drivers and get past the false dichotomy of economy versus environment.

Portland, New York City, Milwaukee and Atlanta are among the cities that have quantified the payoff from pines and palms, olives and oaks.

It's part of a breakthrough in thinking among city planners in recent decades who now realise that a city runs not just on engineering, but on biology and ecology as well.

Trees on a Nairobi street. We'll need trees more than ever to create and maintain livable cities. JEFF ANGOTE

What's a tree worth?

Tampa, Florida demonstrated that kind of thinking in moving its leading tree official, Kathy Beck, from the Parks and Recreation Department onto its chief planning team. Tampa approaches trees as part of a green public works system, the living equivalent of roads and bridges. It's a case of what Beck calls "green meets gray."

Part of how Tampa gets it right on trees is that planners can shield themselves from partisanship, protest and profit motives by relying on science to decide on what, where and how many trees to plant. To get the biggest bang for tree planting and maintenance bucks, Tampa turns to University of Florida Institute of Food and Agricultural Sciences urban forester Rob Northrop, for information on which trees provide the greatest shade, which can be planted closest to sidewalks and parking lots without root growth buckling pavement and which species best withstand floods in a city already impacted by sea level rise.

University of Florida scientists Michael Andreu and Andrew Koeser and Paul Monaghan and the USDA Forest Service's Geoff Donovan have also provided valuable expertise.

Northrop and other natural resource scientists see intrinsic value in trees. But he recognises the tremendous economic pressures communities are under, so he and economists collaborate to get at the straight-dollar costs and benefits.

The most recent study of Tampa's trees estimated that they save the city nearly $35 million (Sh3.6 billion) a year in reduced costs for public health, stormwater management, energy savings, prevention of soil erosion and other services.

Coping with urban growth

Drilling down even further, the University of South Florida has begun mapping individual trees. So planners know, for example, that the live oak on the 4,200 block of Willow Drive has a 38-inch diameter and a $453 (Sh46,200) annual payoff.

Through the painstaking work of compiling an inventory of a city's green infrastructure, policymakers can make more informed decisions on where to focus resources. Just as the most decrepit or most used roads get more attention, key trees might get pruned or watered more often. Tampa has assessed the health of trees that line its evacuation routes.

This kind of information would have been valuable to transportation officials in the San Francisco area, for example, before a commuter train was recently derailed when it struck a fallen tree.

Other cities recognise the importance of urban forestry. The Atlanta Tree Conservation Commission, for example, is appointed by the mayor and City Council to oversee urban forestry.

Portland, Oregon, has a Parks and Recreation Urban Forestry Division that manages and regulates 236,000 street trees and 1.2 million park trees. But in general, few cities employ people with deep expertise in urban forestry.

The Society of American Foresters didn't start accrediting university programmes in the discipline until 2005. There's not even consensus on a definition of urban forestry, though Beck, from Tampa, describes it as the science of addressing both people with tree problems and trees with people problems.

In coming years, the nation will continue to grow and urbanise. One study suggests that in the next half-century, seven million acres in Florida alone could convert from rural and natural to urban use.

The push into formerly natural areas will bring with it more impacts on trees. At the same time, we'll need trees more than ever to create and maintain livable cities.

Let's love our trees. More than hugs, they need science.

The quiet efforts of planners and scientists are our best bet for green cities that inspire us to marvel year-round at the natural canopies above us and the ground beneath our feet.

How forensic science is helping combat illegal logging

Forensic science has achieved infamy, thanks to television dramas like CSI. But it isn't just about solving human crimes. Scientists are also using evidence from wood to help solve murders, but in this case the victims are the trees themselves, and the crime is illegal logging.

Illegal logging is a serious environmental and economic threat to forests. The value of the illegal timber trade is hard to calculate, but estimates range from $30 billion to $100 billion, potentially involving 100 million cubic metres of wood.

But new scientific methods, highlighted in a recent study in Bioscience, are helping law enforcers identify tree victims and fight illegal logging. Tropical regions such as Southeast Asia, Central Africa and Central and South America suffer disproportionately. Some 50-90% of timber produced from these regions is thought to be illegal, compared with 15-30% globally. Aside from the environmental destruction, countries that experience illegal logging lose out on tax revenue and have the value of their legitimate timber diminished.

Such large markets attract big players, with organised crime networks at the centre of much of the illegal trade.

Combating illegal logging is the moral responsibility of all countries, be they timber producers or consumers. Along with laws on how local timber can be harvested, an increasing number of laws are targeting the international illegal timber trade. These include Australia's own Illegal Logging Prohibition Act, which prohibits the importation of timber that has been illegally harvested overseas.

At the international level, the CITES Convention provides a mechanism through which trade in certain species can be regulated in order to avoid driving them to extinction.

Smarter forensics

These laws are necessary and are already starting to have a positive effect through improved governance and procurement policies. But they rely on us knowing when a law has been broken. Timber is notoriously hard to identify, even for experts. By looking at the structure of the wood alone, it is usually only possible to identify it to the genus level, rather than the species itself. This is a problem because most timber laws protect individual species, and often only part of the range of that species. This means that law enforcement must rely on the paper trail that accompanies timber shipments, which is open to fraud.

Science can help by focusing on new ways to identify timber. Looking at the anatomy of wood (despite its inability to reveal species or place of origin) still provides the fastest and cheapest way to get an initial identification.

However, new identification techniques including genetic and chemical fingerprinting can provide more detail and could deliver the detection capacity we sorely need.

- CONVERSATION