

# Domesticating and Conserving sandalwood for farmers

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POTENTIAL: Giathi Gitehi shows a sandalwood seedling beside a host plant. Inset above, Sandalwood seeds preserved with pesticide.



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When the presidential ban on sandalwood is lifted, a farmer in Kitui hopes to mint millions of shillings by exploiting the plant. Ngovi Mutunga, a farmer at Wikililye location in Kitui County has a farm which boasts of about 250 plants of sandalwood. Mutunga says the plants are all indigenous but he did not realize their value until researchers from the Kenya Forestry Research Institute (KEFRI) visited his farm three years ago. KEFRI has now started a drive to educate farmers like Mutunga how to domesticate the highly valued tree, mainly for preservation and continued future use.

Muguga and Kitui regional research centres have kicked off the drive to educate farmers in arid and semi arid regions on the importance of domesticating sandalwood. Until the presidential ban was imposed in 2007, the plant was on the verge of extinction due to its high demand that cuts across national and international markets.

Giathi Gitehi is a KEFRI science researcher who is leading the domestication research of sandalwood to farmers in Lower Eastern province. "Our aim is to have the farmers know the value of the tree and teach them how to domesticate it to prevent it from being extinct," says Gitehi, adding that the plant is a threatened species due to the high rate of exploitation and low rate of regeneration in the natural habitat. The trade in sandalwood is still illegal in Kenya. The ban followed recommendations by scientists and forestry experts to give the tree protection under the presidential decree until a sustainable way of utilising it is found.

However Gitehi says domestication of the plant, scientifically known as *Osyris lanceolata* could lead to lifting of the ban, opening doors to its sustainable harvesting. "The ban was due to the high rate of exploitation of the plant without proper conservation methods. We are training the farmers on how to domesticate the plant for conservation purposes and continued future use," said Gitehi.

Gitehi said *Osyris* grows better in arid lands and dry forests in highlands, noting that there is need to domesticate the plant because of the increased local and international demand. Sandalwood trees are valuable because of their highly priced aromatic oil and durable wood. Internationally, the sandalwood oil, which is mainly found in its roots and stems is used in the perfume industry. Perfumes from this oil are some of the highly priced in the world. The wood is also used for carving and making souvenirs.

The oil is extracted by steam distillation whereby billets of the wood are chipped and then reduced to powder. The super heated steam is passed through powdered wood to help release the essential oil that is locked in the cellular structure of the wood. The steam is then cooled and the result is sandalwood hydrosol and sandalwood essential oil. This oil is then used in perfume industry and is also widely used in skin care for dry and cracked skin, rashes and acne.

In Ukambani, the plant locally known as Munyunga mai used to grow in the wild where it was reduced to near extinction. Gitehi, the KEFRI researcher says they collect the seeds from forests, and from farmers like Mutunga which are then treated with pesticides in readiness to be given to farmers. The seeds are sorted in a process called floatation to determine the good ones. "The seeds are immersed in a bowl of water (floatation) to isolate empty, damaged and pest infested seeds. Empty seeds will float and should be discarded while the good ones will sink," explains the researcher. They are considering vegetative propagation of the tree in its conservation.

The seeds are then grown in a nursery alongside other primary host plants. The Osyris seeds start germinating 21 days after sowing. They then stay in the nursery for a period of eight months to one year when they can then be transferred to the field. The concept of domesticating sandalwood was driven by the fact that the rate of germination of the seeds in their natural habitat was very low. He says the tree is semi-parasitic and requires a nurse plant to survive. It attaches its roots to those of other plants absorbing nutrients from the host plants.

During the field day, 30 seedlings of the plant were added to Mutunga's farm. Mutunga said that his mother used the stems of the plant to ferment traditional milk noting that there was nothing much known about the tree. "However sometimes we would wake up in the morning only to find several plants uprooted by thieves but we did not bother since nobody knew their real value, I think when the presidential ban is lifted, I will be one of the richest farmers around" he said. Mutunga who has signed an agreement with KEFRI for them to take care of the plants said some of the plants are as old as 80 years.

Osyris, an endangered tree species was found in the Arid and Semi Arid areas of East Africa. However the tree has been completely depleted in both Uganda and Tanzania due to uncontrolled harvesting, leaving Kenya the only country with small populations of the trees in a few regions. The illegal poaching of the tree has led to killings of forestry officials and other crimes indicative of the black market. However the KEFRI's move to domesticate the tree might be the panacea to all these problems and propel sandalwood to being a viable cash crop to farmers.