



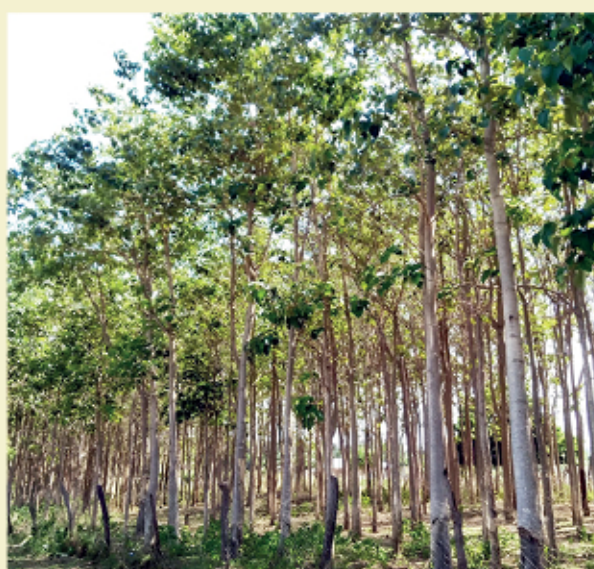
Good Practice No. 11

Adoption of *Gmelina arborea* among Smallholder Farmers in Semi-Arid Lands of Tot, Elgeyo Marakwet County for Improved Livelihood

A Guide for Farmers and Extension Agents



Pollarded trees in *Gmelina arborea* woodlot



Non-pollarded trees in *Gmelina arborea* woodlot

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1.0 Introduction

Gmelina arborea is a deciduous tree (sheds leaves), exotic to Kenya and native to South Asia. The tree is fast growing and can attain a height of 30 m and diameter at breast height (dbh) of 80 - 120 cm. The species does well at an

altitude ranging from 0 to 1400 meters above sea level (asl) with annual rainfall of 750 to 1800 mm and on fertile, well drained soils. The tree can be harvested for timber at an age of between 10 - 15 years after establishment.

In Kenya, *Gmelina arborea* (Gmelina) is mainly grown in coastal region but has been introduced in other areas including; Eastern region lowlands, Lake Victoria region, Kerio Valley and Elgeyo Marakwet County with Tot having a good stand. Tot area is classified as semi-arid receiving an annual average rainfall of about 500 mm. The temperatures range from 25°C-30°C. The soils are; volcanic, sandy, shallow, slightly acidic and of medium fertility.

The local communities in Tot previously relied on indigenous Acacia trees for diverse forest products. This overreliance led to overharvesting of the species leading to natural forests and landscape degradation. The area was characterized by bare lands, soil erosion, high wind intensities and rapid desertification. *Gmelina arborea* was therefore introduced to address these challenges. The species was selected as it offers; quality timber used in furniture making and construction industry, and fodder [leaves] for livestock during dry season. Gmelina also offer bee forage and acts as a windbreak.

2.0 Objectives of growing Gmelina

1. Diversify and intensify tree production on-farm
2. Halt forest degradation by reducing dependence on natural forests

3. Diversify farmers income through sale of tree/timber
4. Diversify livestock fodder

3.0 Approach

Though *Gmelina arborea* was first introduced in Tot in 1984 by Kerio Valley Development Authority (KVDA), wide scale adoption was realized in 2006 after an early adopter sold trees at Ksh. 30,000 per standing tree. KEFRI and KVDA intensified promotion of the species and raised seedlings of the species for distribution.

In Tot, Gmelina is commonly planted by agro-pastoralists who establish the tree in communal lands. The tree is planted on boundaries, as strip planting or woodlots.

To establish the trees, the planting site is cleared of all bushes. Planting holes are then dug at a spacing of 2 m by 2 m. Planting is done at the onset of the rains. At early stages of development, the out-planted seedlings are watered and protected from animal browsing using dead fence of Acacia and *Zyziphus* branches. Pruning is done to enhance better stem form and faster growth.

When the trees near maturity they are pollarded to enhance multi-branching and to reduce



Strip planting of *Gmelina arborea*



Boundary planting of *Gmelina arborea*

shading effect on associated crops. The leaves from pollarded materials provide fodder for livestock during dry season. The trees are harvested for timber at the age of 10-15 years.

4.0 Impact

Growing *Gmelina* has several socio-economic, cultural and ecological impacts that include:

- Improved income for farmers through sale of trees and timber, leading to improved livelihoods. At farm gate price a single tree can produce timber worth Ksh 15,000 to 20,000
- Provision of fodder for livestock during dry season thereby, reducing dependence and conflicts over natural pasture; ensuring health and productivity of the livestock
- Fuel wood provision reducing pressure on natural forests and woodlands
- Access to affordable timber leading to the rapid rise in construction of permanent houses in the area
- Improved honey production as *Gmelina arborea* flowers are an importance source of bee forage
- The tree has created local employment for youth through *Gmelina* seedlings production, tree planting and timber processing
- Improved landscape scenery and created habitable micro-climate

- Acts as windbreak and provides shade
- Enhanced knowledge of beneficiaries on tree growing and sustainable land management
- Enhanced social bonding, where farmers with trees support those without with wood for construction purpose
- Environmental conservation through: reduced soil erosion, increasing biodiversity and improved vegetation cover.

5.0 Innovations and Success Factors

- The farmers have increased tree spacing from 2 m by 2 m to 3 m by 3 m to enhance tree volume growth and productivity
- More farmers establishing *Gmelina arborea* trees in woodlots as opposed to boundary/strip planting, to avoid competition with intercrops, such as mangoes
- Collection of seed from mature trees and undertaking direct seed sowing, hence reducing the cost of tree establishment

6.0 Constraints

Some constraints faced by the farmers include:

- Most of the farmers in the area are involved in Mango production as a main source of livelihood. Shading of mango crop by trees negatively affect mango production



Debarked stem of *Gmelina arborea*



Protected out-planted seedlings of *Gmelina arborea*



- Livestock damage through browsing of planted seedlings and debarking of trees. At establishment, farmers need to fence the planted sites to prevent browsing.
- The trees are established through irrigation and require regular watering at early stages of establishment. This increases the cost of establishment.

7.0 Lessons learnt

- Growing of *Gmelina* has enhanced wood self-sufficiency and reduced dependence on indigenous trees
- Tree growing in drylands is possible and is a worth investment
- Tree growing can help reduce conflicts in semi-arid areas and improve livelihoods

8.0 Conclusion

Due to the diverse uses of *Gmelina arborea* trees, its fast growth and ease of propagation, the farmers in Tot have adopted the species for on-farm growing. Through sale of quality timber, farmers have realized improved income and livelihood. Planting of *Gmelina* has resulted in increase in tree cover in Tot reducing dependency on woodlands, conflicts over pasture and has contributed to landscape rehabilitation.

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