



Good Practice No. 9

Casuarina equisetifolia Woodlot Development on farms for Livelihood Improvement in Kwale County, Kenya

A Guide for Farmers and Extension Agents



Casuarina equisetifolia tree



A casuarina woodlot

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1.0 Introduction

Casuarina equisetifolia is an evergreen tree that grows in a wide range of ecological conditions, from lowlands to midlands, at an altitude of 0-1400 meters above sea level (m.a.s.l.). The species does well in a rainfall range of 200 to 3500 mm. The species tolerates salty and sandy soils and its extensive root system enables it to grow in poor soils. *Casuarina* is exotic to Kenya, and is mainly grown along the country's coastal region including Kwale County.

Kwale experiences average temperature of about 24°C and receives average annual rainfall range of between 400 mm to 1600 mm. The County suffers from heat stress, dry spells, frequent drought and poor soils which contribute to low land productivity, food insecurity and high poverty levels. The County is also timber and pole deficient due to low forestry development.

Livelihood options in Kwale County are limited, with the majority of the population depending on subsistence rain-fed agriculture. To optimize incomes for farmers in Kwale County, low-risk farming options such as growing of suitable high value trees was prioritized. *Casuarina equisetifolia* (whistling pine-English; Mvinje-Swahili) was selected for woodlot development on farms as it is suited to climatic and soil conditions of the County. The species is also fast growing providing many products such as poles, posts, dhow masts and fuelwood. Poles have high demand in the coastal region of Kenya for local construction industry especially hotels, villas and homes.

2.0 Objectives of growing *Casuarina*

- To provide alternative livelihood options for farmers through sale of *Casuarina* wood products
- To improve land productivity

3.0 Approach

The Kenya Coastal Development Project (KCDP) was implemented in coastal Kenya with an objective of improving livelihoods of local communities. Among the key activities promoted by the Project was commercial tree growing through woodlot development. Woodlots, including those of *Casuarina*, were established in various counties including Kwale. Technical support such as; tree establishment, management, and harvesting was provided by Kenya Forestry Research Institute (KEFRI) and Kenya Forest Service (KFS).

To establish *Casuarina* land should be prepared by clearing all bushes and then ploughing. Planting holes measuring 30cm x 30cm to 45cm x 45cm width and depth are then dug. A planting spacing of 2.5m x 2.5m and 3m x 3m for wider diameter poles, is recommended. Planting by use of seedlings is then undertaken at the on-set of rains. Management includes weeding and protection from browsing animals. Poles are then harvested at 4-6 years of age when they attain marketable size of 4-6 inches (10-15cm) diameter at ground level.



Casuarina Poles



Casuarina poles for roof construction

4.0 Impact

- Improved income for small-holder farmers from sale of Casuarina poles. Poles are sold to the local wood merchants at a farm gate price of about KES 800-1200 per pole. Income can be ploughed back for other farm activities such as purchase of livestock, further diversifying income sources
- Growing of Casuarina has improved land productivity
- Improved soil fertility and reduced soil erosion

5.0 Innovation

- Farmers adopt different, but closer tree spacing resulting in trees attaining marketable size at different ages which allows farmers to undertake selective harvesting, spreading income over time.
- Farmers prefer a close spacing of 1.5m x 1.5m and 2.0m x 2.0m which promote faster tree height growth, early income generation, and increased income as more tree are grown per given acreage e.g. spacing at 1.5m x 1.5m gives 4444 trees/ha

while 2m x 2m spacing has 2500 trees/ha.

- Where Casuarina trees were harvested, the model farmer planted *Melia volkensii* trees intercropped with agricultural crops to further maximize land productivity.

6.0 Constraints

- Wildlife damage to agricultural and tree crops
- Low awareness and adoption of tree growing
- Poaching
- Diseases; especially Black Blister disease

7.0 Lessons Learnt

- Casuarina is a low maintenance crop and has high demand in the construction industry, therefore has high potential for adoption
- Farmer modification on reducing tree spacing maximizes land usage and produces cylindrical shaped poles suitable for different local market segments

8.0 Conclusion and Recommendations

- Casuarina is a fast growing tree and can yield high returns to small-holder farmers improving their livelihoods, making it a viable enterprise
- In Kwale County farmers should be encouraged to integrate Casuarina trees with suitable food crops to promote income diversification and food security
- Casuarina being a pioneer species, can be used to reclaim degraded land sites

- Formation of producer associations should be encouraged to promote marketing through structured channels

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