

TEA RESEARCH INSTITUTE OF SRI LANKA

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GUIDELINES FOR ESTABLISHMENT OF ENERGY PLANTATIONS WITH GLIRICIDIA SEPIUM AND CALLIANDRA CALOTHRYBUS

Introduction

Tea processing requires a large quantity of fuelwood. Usually, it is estimated that 1-1.5 kg of fuelwood is required to process 1 kg of made tea. Additionally, plantation workers also need fuelwood for their domestic use. Often, the total demand of fuelwood cannot be met within the plantation. In addition to use of fuelwood for tea processing, it can be used as an energy source for generating electricity (Dendro power). As a result, there is a growing demand for fuelwood in Sri Lanka. In order to ensure regular and assured supply of fuelwood for industry requirement, marginal tea fields (low yielding) and those abandoned owing to land suitability limitations (poor soil conditions, rocky lands, excessive slopes, *etc.*) and scarcity of labour, can be converted to fuelwood plantations with *Gliricidia sepium* and *Calliandra calothyrsus*. Calorific value of both the above trees varies from 4,500 - 4,900 kcal per kg. While *Gliricidia* can be successfully established in the low, mid and Uva regions (up to 900 m elevation), *Calliandra* is most suitable for mid and up country regions within the elevation range 300 - 1300 m.

In addition to the use of woody part as fuelwood, the leaves and topmost parts of the branches can be applied to tea fields as a green manure and mulch, adding nutrients to the soil and to conserve soil moisture. In addition to this, these leaves can also be easily used for producing compost. Nitrogen fixation ability of these leguminous trees helps to improve soil fertility. Further, these two species are well adapted to varying soil and climatic conditions, require less intensive agronomic inputs and labour, and withstand regular lopping.

Based on the field observations done by TRI at different locations, the following agronomic practices need to be adopted when *Gliricidia* and *Calliandra* are used for establishment of fuelwood or energy plantations.

- Land should be prepared by levelling adequately to locate rows of energy crops and all soil conservation measures *i.e.* preparation of drains and stone terraces *etc.* should be adopted as necessary.
- The ideal spacing for planting of *Gliricidia* and *Calliandra* as fuelwood is 1 m x 1 m, having a plant density of about 10,000 plants per hectare. Adequate amount of healthy planting materials (stumps or nursery plants) should be kept ready accordingly.

Establishment of *Gliricidia*

- The diameter and depth of hole should be 30 cm and 45 - 60 cm respectively.
- While filling hole, soil should be mixed with dolomite at the rate of 200 – 225 g per hole. It is preferable to add 1 kg of compost per planting hole.
- Select 6 - 8 months old mature stumps of about 1.5 m in length and 5 - 7.5 cm in girth.
- When planting 30 - 40 cm of the basal end of the stump should be buried in soil.
- To prevent desiccation and encourage bud break, the stump can be white-washed using 20% hydrated lime. Top end of the pole should be covered with a ball of mud or piece of polythene.
- Stumps should ideally be planted during wet weather within 48 hrs from lopping.
- Care should be taken not to damage the bark of the planting end. For this purpose, the stump can be inserted into an alavango hole prepared before.

Establishment of *Calliandra*

- *Calliandra* can be established directly by sowing 3 - 4 seeds per planting hole and leaving one vigorous plant while removing other seedlings.
- Alternatively, plants can be raised in poly bags in the nursery and 4 - 6 month old plants can be established in the field.

Lopping and aftercare

- First lopping of branches can be done about 12 - 18 months after planting.
- Branches can be lopped at 8 - 12 month intervals before flowering.
- In order to produce a well spread frame with sturdy branches, the other branches should be cut keeping a stump of about 30 cm (1 foot) above the previous cut.
- Soft and leafy portion of the branches should be removed and fuelwood can be cut to a length of about 1 m for easy storage and use.
- Moisture content of the fuelwood should be reduced to 20% or below, by staking them under rain cover for about 2 weeks before use.

- A well-managed *Gliricidia* plantation produces about 25 - 30 tons of fuelwood per hectare per year and *Calliandra* produce about 10 - 15 tons per hectare per year in dry weight basis (20% moisture).
- Cost benefit analysis have shown that management of energy plantations with *Gliricidia* and *Calliandra* is an economically viable venture and the pay-back period varies from 5 - 6 years.

Therefore, tea growers, stakeholders and entrepreneurs are encouraged to establish fuelwood or energy plantations, converting marginal and un-productive lands into economic use to ensure assured fuelwood supply. It will assist to conserve environment and bio-diversity.

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