Conservation Horticulture for Dipterocarpaceae

Section 4: Seedling selection, site preparation and planting

Adapted from presentations by: Tropical Rainforest Conservation & Research Centre & Mr. Randi Agusti

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Tropical Rainforest Conservation & Research Centre (TRCRC) has established conservation sites, known as Tropical Rainforest Living Collections (TRLCs), to safeguard tropical plant species across Malaysia. At the TRLCs, seeds from threatened plants are collected, germinated and planted on established sites to produce seeds and planting material for restoration projects. See more: www.trcrc.org. The following section is guidance primarily based on TRCRC's experience in creating the TRLCs.
Site preparation

- Site established according to the given coordinate point boundaries of the plot.
- Within 3-5 meters of the line boundary, undesirable existing vegetation (shrubs and grasses) with diameter breast height (dbh) < 10 cm will be removed and all vines and climbers will be cut.
- Along the cleared line, all trees that existing in the boundary and poles will be marked in colored yellow as acknowledging there is a planting plot boundary established.
• It is important to acknowledge the availability and capacity of land area for planting
• Survey and record forest composition such as canopy gaps (classified in canopy class), slope, watercourse, rocks etc.

**Table 1:** A guideline to characterize the canopy class and level of degradation in restoration area.

<table>
<thead>
<tr>
<th>Class</th>
<th>Level of degradation</th>
<th>Descriptions</th>
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<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>High canopy cover and tall emergent trees</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>Moderate or less canopy cover and short trees</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>Lack of tree cover and dominated by shrubs</td>
</tr>
<tr>
<td>4</td>
<td>Extreme</td>
<td>No existing trees and dominated by grasses and herbs</td>
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</table>
Shade Tree Establishment

- The areas that require restoration based on the level of degradation, or canopy class classified are **Class 3-4**.
- Cluster planting will be carried out (refer to Figure below).
- The nursing canopy will be established with native (to Malaysia) fast-growing or fruit species such as Binuang / *Octomeles sumatrana*, Laran / *Anthocepalus sp.*., and Talisai paya / *Terminalia copelandii*.

Why establish shade trees?

To rehabilitate the degraded area and enhance diversity in the ecosystem by adding trees to create canopy cover.

Consider the existing environment by minimizing the removal of trees that damages watersheds through erosion and further impact on the carbon cycle.
• Tree spacing is very important in forest restoration because it is correlated to the success of the forest plantation regarding maintenance, stand stability, and growth performance (Camirand, R. 2002).

• **Silviculture treatment** - Within the line, 2 meters (6.6 feet) removal of undesired existing vegetation (shrubs and grasses) and shade adjustment (climber cutting).

• Ensure light penetrates to the forest floor – enhanced light requirement of the planted seedlings and to attain rapid growth.
1. Compassing and lining activity

2. Bark and poles are marked with bright color paint

3. Silviculture treatment

4. Completed line
Seedling Selection

Assessment of desired seedlings

- Identify seedlings of suitable height for planting site
- Choose healthy seedling for planting: good trunk size, height, number of branches
- Choose suitable size of polybag suit for the planting location
Aged approximately 18-24 months (2 year old), hardened and healthy (not infected by any disease).

3 different sizes of polybag “S, M and L”
Planting

Transferring process from the quarantine spot

Correct position of the seedling and seedling roots in planting hole (source from Camirand, R. 2002).

Appropriate way to removing polybag

Aluminium tag for planted seedling
Post Planting Treatment

• If possible, flush 1-2 times a day for the first 1-2 months, fertilizer can be added
• Always clear weeds surrounding of plants at least for first year
Post Planting Treatment

- Prune old twigs/leaves to accelerate upward growth
- Pile up litters at the base of the stem for the possibility of developing mycorrhizae that are good for growth
**Maintenance and Census**

**Maintenance** including:
- a) Circle weeding.
- b) Cutting and removal climber.
- c) Clearing line.
- d) Replanting.

**Table 2**: Recommended schedule for maintenance & Census round (retrieved from SFD-USM-SOP, 2010)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of rounds</th>
<th>Interval between round</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>3 months</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3 months</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>4 months</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>6 months</td>
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</table>
**Census** – can be carried out once in a year to monitor growth performance, to keep a record survival and for evaluation purposes.

Measuring DBH of the planted seedling (taken at the collar section).

Measuring height of the seedling (Credit: OFI)
• Maintain good records for future planting
• Intensive treatment is usually only done in the first year or when the seedling has reached 2 m high
• Then, let them grow naturally!

Global Trees Campaign, 2014. How to plant and establish threatened trees in the wild.

End of Section 4

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