



Selecting quality planting materials for cacao-based agroforestry systems

Sustainable Farming in Tropical Asian Landscapes (SFITAL)



MARS



Selecting quality planting materials



- Good planting materials is the basis for tree planting success. Don't waste your land preparation effort by choosing low-quality seedlings.
- Make sure to buy seedlings from cacao nurseries that are accredited by the Bureau of Plant Industry.

Selecting quality planting materials

Sturdiness of the seedlings

- To assess a seedling's sturdiness, we calculate its sturdiness quotient: the height ratio to root collar diameter.

$$\text{Sturdiness quotient} = \frac{\text{Seedling height (cm)}}{\text{Root collar diameter (mm)}}$$

- A quotient of 6 or less indicates a sturdy seedling, while a value above 6 signifies a "lanky" seedling, which is tall and slender.
- Lanky seedlings are less likely to survive in windy and dry conditions.



➤ Cacao Seedlings Standards

| No. | Characters | Standards |
|-----|--------------------|---|
| 1 | Age of seedling | 5- 6 months |
| 2 | Height of seedling | 45-50 cm |
| 3 | Girth of seedling | 3.5- 4 cm |
| 4 | No. of leaves | 6-8 pairs |
| 5 | Growth | Straight from the middle of the poly bag, without branching or jorquetting. |
| 6 | Foliage | Green, healthy, without crinkling, nutrient deficiency, middle leaves of 15cm length and 6 cm width |

➤ Cacao Seedlings Standards

| No. | Characters | Standards |
|-----|-----------------|--|
| 7 | Root | Tap root spreading without netting |
| 8 | Potting mixture | <ul style="list-style-type: none"> • 10% dried animal manure + 10% organic matter + 80% sieved loam soil. • 20% cocopeat + 20% rice hull + 20% carbonized rice hull + 20% garden soil + 10% fine sand +10% vermicast add about 2 kgs limestone or dolomite. <p>Used poly bag of at least 8" x 10" size and 250-gauge thickness</p> |
| 9 | Precautions | Free from nursery diseases and pests |

Earth in poly bag should be wet loose. No breakage or damage to tap root

Selecting quality planting materials

- Use grafted seedlings
 1. At least 6-8 pair of mature healthy leaves.
 2. No new flushes of leaves
 3. No sign of pest infestation



➤ Cacao Graft Standards

| No. | Characters | Standards |
|-----|--------------------|---|
| 1 | Method | Wedge grafting |
| 2 | Type of root stock | Bulk Forastero, Trinitario and hybrid seedlings |
| 3 | Root stock raising | Poly bag nursery |
| 4 | Age of root stock | At least 6 months |
| 5 | Root stock size | Height 50 cm, 3.5 cm girth with 7 pairs of leaves |
| 6 | Scion size | Thickness same as root stock, soft woods of 12- 15 cm length with 3 active eye buds, defoliated |

➤ Cacao Graft Standards

| No. | Characters | Standards |
|-----|-----------------------------------|---|
| 7 | Graft union | 20 cm above the base/soil, wrap about 3 cm below from the union to the tip of the scion using 3 cm thick grafting tape, should be covered with ice candy cellophane wrapper to avoid drying |
| 8 | Grafted plant without jorquetting | Height 60 cm, 6-8 pairs of healthy leaves, stem straight |
| 9 | Root | Tap root with well spread young roots |
| 10 | Precautions | Remove the polythene pouch or ice candy cellophane wrapper after 15-20 days |

➤ Cacao Graft Standards

Standards

- Remove polythene stripe or grafting tape after 2 months.
- Graft joint should be above ground while planting and no breakage.
- Emerging shoots from root stock should be nipped off.
- Free from nursery diseases, pests, deficiencies, pot bound condition.



Selecting quality cacao planting materials

- Plant at least five National Seed Industry Council (NSIC) approved clones:

Example:

1. **UF 18** - early maturing, Ave, pod index: 20, high-yielding, tolerant to VSD
2. **PBC 123** - self-compatible, Ave, pod index: 23, high-yielding, tolerant to VSD
3. **BR 25** - early maturing, Ave, pod index: 34, high-yielding, tolerant to VSD

4. **K9** -

5. **K10** -

- The following clones also show remarkable performance but have not yet been approved by NSIC:
- **W10** - high yielding
- **EM617** -High yielding, big beans -at least in high elevation area (ex. Maragusan,DdO.)
- **PG610** - Big pods.

Quality planting materials as shade trees for cacao

- Cacao as a forest tree species requires shade. (10%-30% shade)
- Shade can be considered to ameliorate the cacao micro-environment.
- Healthy native tree species
- Preferably nitrogen-fixing trees
- Planted with right spatial arrangement and meticulous selection of morphological structures



Quality planting materials as shade trees for cacao

Example of canopy shapes suitable as shades for cacao trees



Rounded crown dense canopy



Conical crown



Wide conical crown



Light crown



Canopy in layers



Tall bole, small dense crown



Wide columnar crown



Narrow columnar crown

Important consideration in selecting shade trees for cacao-based agroforestry systems

➤ Functional characteristics

1. Economic functions (e.g. coconut, fruit trees, banana, rubber-PB260) - can augment farmers' income.
2. Fertilizer trees - fixes atmospheric nitrogen (e.g., nitrogen-fixing trees)
3. Biodiversity functions (e.g., Ficus species - produce small edible fruits for animals)
4. Sequester Carbon/can provide ecosystem services (e.g. Native tree species - Toog, Lauan, Ipil, etc.





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Thank you!

