



Coconut Research Institute of Sri Lanka



Advisory Circular No A 3

PLANTING OF COCONUT

Coconut is a long-term crop and if properly cared it is expected to be productive for over 60 years. Therefore, taking appropriate decisions at the time of establishing a new plantation is very crucial. Adhering to an optimally suited planting density with distances fitting to either mono or multiple cropping, selection of planting material adapted to the soil and the climate, appropriate planting and care after planting are essential factors requiring the attention of the grower at the time of establishment. Most coconut growers, especially small holders are often not thoughtful about these crucial factors that determine the establishment of a uniform and a highly productive plantation.

A. Recommended planting material

In view of the long life span, the coconut growers are advised to use the best planting material for planting. The Coconut Research Institute currently recommends the following planting materials.

1. Tall x Tall (CRIC 60)

CRIC 60 is an improved cultivar developed by crossing within selected tall palms. This flowers in 5-6 years or even earlier under good management. This is suitable for planting in all coconut-growing areas of the country with a production capacity of 12,000 nuts/ha/year or 3.5 Mt of copra/ha/year under average management.

2. Dwarf x Tall (CRIC 65)

This is a hybrid developed by crossing between selected dwarf and tall forms and flowers early, in 3-4 years under good management. CRIC 65 is recommended for planting especially in home gardens and in any coconut growing soil with optimum inputs of fertilizer and management and with more emphasis on irrigation for maximizing the productivity and profitability. The production capacity of CRIC 65 even exceed 20,000 nuts/ha/year or 5 Mt of copra/ha/year depending on the level of management.

3. Tall x San ramon (CRISL 98)

CRISL 98 is a cross between selected tall form and San ramon. CRISL 98, the most recent release, is similar to CRIC 60 in its ability to fit into a range of environments and capacity to produce nuts. The specialty of CRISL 98 is its high copra productivity due to large sized nuts with high meat content. This cultivar is currently produced in small quantities by artificial pollination at CRI.

4. Moorock tall

Moorock tall is an ordinary tall, estate selection for high production and is recommended for planting in the wet zone. Seed nuts of Moorock tall are collected from an estate at Mawathagama.

5. Plus palm seedlings

The existing coconut seed gardens in Sri Lanka can produce approximately 50 % of the annual national demand for seed nuts. The deficit is collected from ordinary tall palms with high yield potential in high yielding estates. Seedlings obtained from these selected palms are called plus palms.

Both CRIC 60 and CRIC 65 are mass-produced at the Isolated Seed Garden, Ambakelle under well-controlled conditions to ensure high seed quality. Seedlings of these recommended cultivars are currently raised only at nurseries of the Coconut Cultivation Board (CCB) and growers can obtain their seedling requirements by contacting the nearest regional office of the CCB. It is also advisable to reserve the seedlings well in advance to avoid last moment disappointments.

B. Planting densities

An optimum density ranging from 158-183 palms/ha (64-76 palms/ac) is recommended for planting coconut. The higher extreme of 183 palms/ha is more suitable for planting in the wet and wet intermediate zones. Much lower densities are recommended for multiple cropping systems.

The following densities could be obtained by using equilateral triangular, rectangular or square systems depending on the requirement i.e. monoculture or intercropping.

1. Monoculture

a) Square system

Spacing		No. of seedlings	
Meters	Feet	Per ha	Per ac
8.0 x 8.0	26 x 26	158	64

b) Triangular system

Spacing		No. of seedlings	
Meters	Feet	Per ha	Per ac
8.0 x 8.0 x 8.0	26 x 26 x 26	183	76
8.3 x 8.3 x 8.3	27 x 27 x 27	170	69
8.5 x 8.5 x 8.5	28 x 28 x 28	158	64

c) Rectangular system

Spacing		No. of seedlings	
Meters	Feet	Per ha	Per ac
7.3 x 8.5	24 x 28	164	65

2. Inter-cropping with coconut

Spacing		No. of seedlings	
Meters	Feet	Per ha	Per ac
7.3 x 9.2	24 x 30	149	61
7.3 x 11.1	24 x 32	140	57

C. Replanting and under planting

When the plantation is senile and nut production becomes low, growers should decide to replant and rejuvenate their plantation without delaying. An aggregate of several factors mainly age, yield, height and the number of palms per acre needs to be considered when rejuvenation is undertaken. If the age of the majority of palms is more than 60 years and the yield is less than 1000 nuts/ac/yr despite average management, then the plantation is due for replanting.

The following general procedures are followed for establishing a new plantation in a senile coconut plantation.

1. Replanting: Planting seedlings after complete removal of the old plantation (Picture 1).

2. Under-planting: Planting seedlings in between existing rows of old plantation and gradual removal of them within a 5-6 year period after planting of seedlings (Picture 2).



Picture 1: A replanted block of land

Based on experimental data replanting has proved superior to under planting in terms of early bearing, growth and production.

Replanting is recommended for large-scale plantations with high level of management. But for small holders, under planting is allowed due to financial constraints. Yet a large proportion of the capital investment incurred in establishment could be obtained at the initial stage itself by the sale of coconut trunks, when complete removal is undertaken.



Picture 2: Under planting of coconut

Replanting

- Old plantation should be removed completely. If the removal of root bole is difficult, cut stems at the surface level and cover with soil sufficiently or apply coal tar on the cut surface to prevent the breeding of Black Beetle.
- Select the appropriate planting system and the number of seedlings per unit area and mark the planting holes.

Under planting

Gradual removal of the old plantation with a 5-6 year period is preferred by most growers due to the advantage of obtaining the yield from the remaining old palms.

- Line the area and mark the planting holes. The new line should be based along the middle of the existing coconut square in order to minimize interactions of new planting with the old stand. Mark the planting point in the center of the old square. For that select the same spacing of the old plantation for the under plantation.
- Remove weak and all palms falling within a minimum distance of 8 feet from the newly marked planting points (20% generally).

Remove the remaining old stand gradually in stages based on the distance from the seedling to ensure adequate sunlight availability, as indicated below.

1 st year after planting	-15%
2 nd year after planting	-15%
3 rd year after planting	-20%
4 th year after planting	-20%
5 th year after planting	- remaining palms

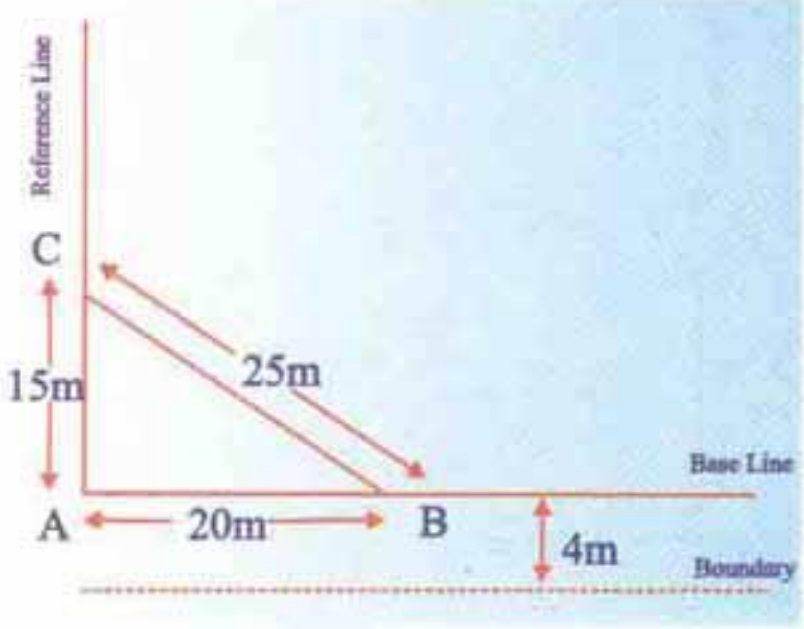
If annual removal is difficult, thinning can be carried out in the following manner.

- 2nd year after planting - 30%
- 4th year after planting - 40%
- 6th year after planting - rest

Systematic removal of the old stand is of utmost importance for the growth and flowering of the new planting.

Lining

To mark the planting holes at the correct distance and density one of the following methods could be adopted.

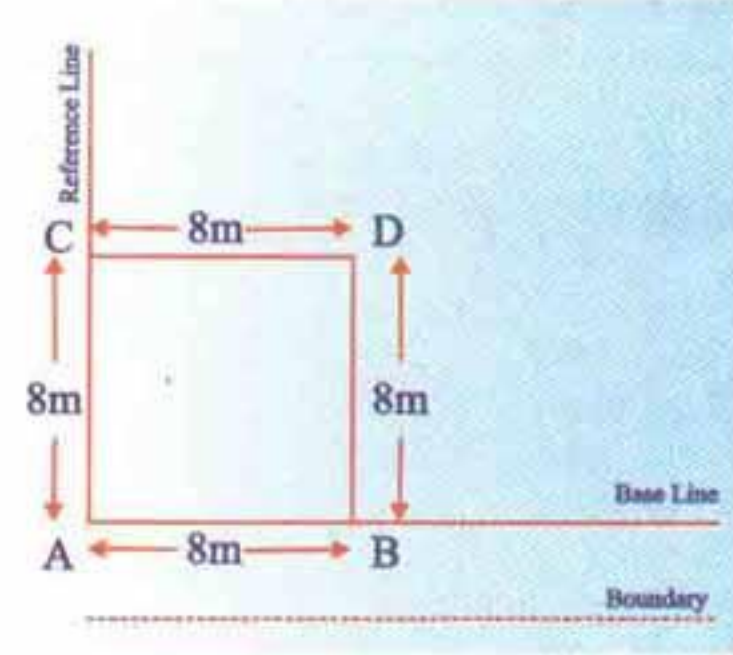


Picture 3: Making perpendicular line

Material Required

- Tape and a rope (30 m)
- (Three persons can line about 2ha/day)

1. Example 1: Square Planting (8 m spacing)



Picture 4: Square planting

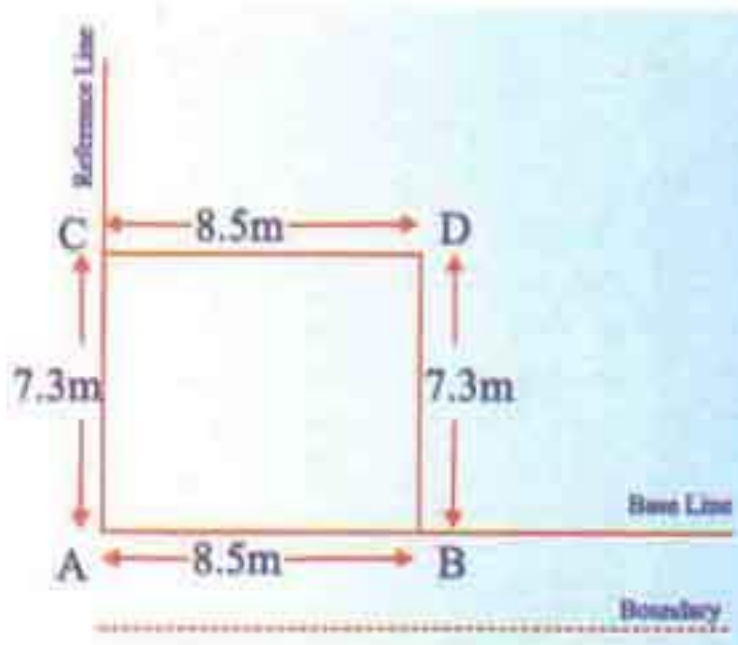
Step 01: Mark the base line with a rope about 4 m from the boundary of the land.

Step 02 (Marking perpendicular line): Select point A on the first peg of the base line (Picture 3). Mark a distance (B) 20 m away from A on the base line. Select point C exactly 15 m away from A and 25 m away from B. Mark the perpendicular line by joining A and C. This is the reference line to adjust the planting points.

Step 03: Mark planting points at 8 m intervals on the base line and reference line (rope). Use a 16 m rope with a peg at the center. Place two free ends of the rope at points B and C on base and reference line respectively (Picture 4). The point at the peg D is the fourth planting point of the Square system. This has to be repeated for pegging other planting points.

Step 04: At every fifth row check and adjust the planting points with the reference line.

2. Example 2: Rectangular Planting (7.3 m x 8.5 m)



Picture 5: Rectangular planting

Mark the base and reference line as described above.

Step 01: On the base line mark planting points at 8.5 m intervals and on the reference line at 7.3 m intervals.

Step 02: Use a 15.8 m rope with a peg at 7.3 m away from one end. Place two free ends of the rope at points B and C on base and reference line respectively. The point at the peg (D) is the fourth planting point of the rectangular system. This has to be repeated for pegging other planting points (Picture 5).

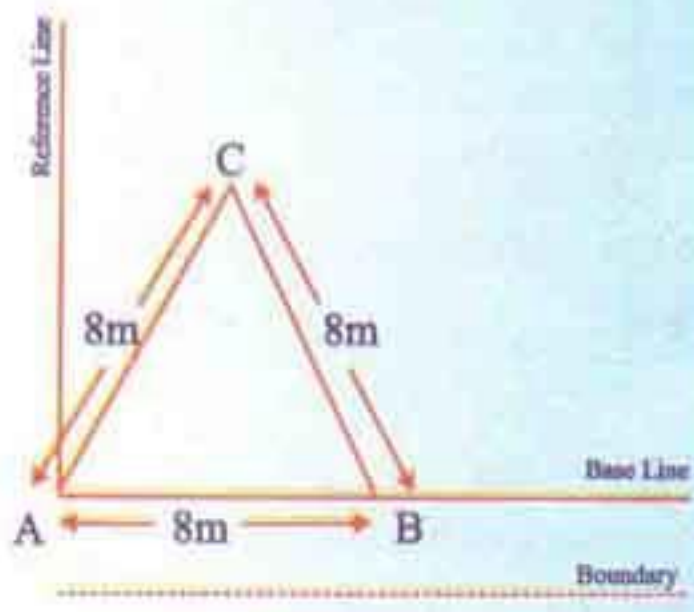
Step 03: At every fifth row check lines with the reference line.

If intercropping is expected the broader side of the inter-row should face the east-west direction to receive maximum sunlight.

3. Example 3: Triangular Planting (8 m x 8 m x 8 m)

Mark the base and reference line as described above.

Step 01: On the base line mark planting points at 8 m intervals. Place two free ends of a 16 m long rope at two adjacent points on the base line. The point at the peg in the center of the 16 m long rope (C) is the third planting point of the triangle. This is repeated to select other planting positions (Picture 6).



Picture 6: Triangular planting

Step 02: At every fifth row check and adjust the planting points with the reference line.

Planting holes

The soil type influences the size of planting hole

- Sandy and Loamy soils - 3ft x 3ft x 3ft
- Gravelly, Cabooky, Quartzitic soils - 4ft x 4ft x 4ft

In gravel and hard soils larger holes are required for better initial growth of seedlings. The use of back-hoe machine is more economical for cutting larger planting holes in hard soils.

Planting seedlings

When filling the planting holes arrange two layers of husk or coir dust at the bottom of the planting hole (Picture 7 & 8). Fill the hole with topsoil mixed with 1 kg dolomite, organic manure (5 kg wood ash or 10 kg dry cow dung or 5 kg goat dung) and 1 kg young palm mixture. (Composition is given below)



Picture 7: Required materials for planting

Young Palm Mixture

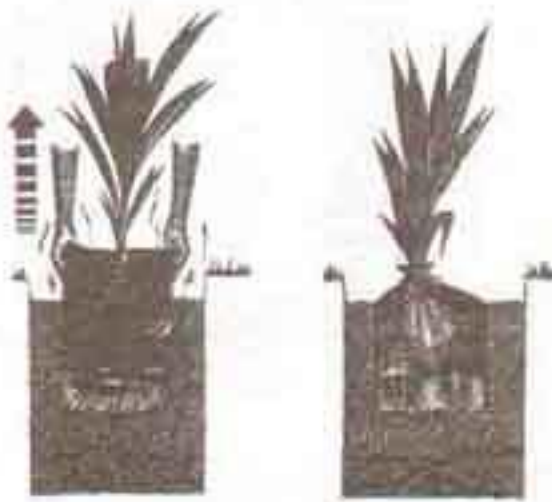
Wet and Intermediate zones		Dry zone	
Fertilizer	Amount (g)	Fertilizer	Amount (g)
Urea	250	Urea	250
Eppawela Rock Phosphate	750	Imported Rock Phosphate	500
Muriate of Potash	250	Muriate of Potash	250

The planting hole should be filled with the above mixtures up to 20 cm below the ground level. But in case of lands with poorly drained soils, the planting hole should be filled up to the ground level with the above mixture. If the soil is frequently under water logged conditions during the rainy season planting holes should be raised a little above the ground level. When seedlings are ransplanted ensure that seed nut of the seedling is not buried deeper in the above soil mixture. Buried collar region of the seedling leads to rotting during heavy rainy days.



Picture 8: Cross section of a planting hole

When poly-bagged seedlings are used for field planting, first cut and remove the bottom of the poly bag with a knife. Then place the bottomless poly-bagged seedling in the center of the above prepared hole after removing the soil to accommodate the poly bag in the soil mixture. Finally lift and remove the poly bag carefully without disturbing the soil in the poly bag and roots of the seedling. In areas where black beetle damage is high poly bag may be lifted half way and tied it up to the base of the seedling to cover the collar region of seedling (picture 9) and made a few holes on the poly bag to facilitate the aeration. This poly bag



Picture 9: planting of poly bagged seedlings

should be removed after 3-4 months from planting. However in poorly drained soils the tying of poly bag around the base may increase the incidents of collar rot during rainy season. In such situations remove the poly bag completely from the collar region to facilitate the direct exposure to sunlight.

It is advisable to carryout preventive treatment against possible termite attack. This is done by immersing the nut of the seedling for a few minutes with one of the following insecticide solutions. (In the case of poly bagged seedlings drench around with 1 liter of below solutions for one seedling after field planting).

- (a) 40 ml of Chlorphyrofos in 10 liters of water
- (b) 20 ml of Admire in 10 liters of water

Mulch the base of seedlings with coconut husks, dried coconut fronds or any organic material available (Picture 10).

Time of planting

Seedlings should be planted with the onset of rains but towards the end of rainy season in excessively water logging areas. Planting with the rains enables the seedling for root development before the dry season. Planting should be planned in Yala season for the wet zone and Maha season for the dry zone. It is advisable to dig the holes and fill them during the inter-monsoonal periods. Rows of the coconut should be in east-west direction when square or rectangular planting is adapted. Irrigating the seedlings during dry season and soil moisture conservation practices will help proper growth of seedlings.



Picture 10: Mulching of seedlings

Infillings

At the end of the 1st year after planting, all weak seedlings should be removed and vacancies should be filled in order to get a uniform plantation. It is recommended that infilling should be completed before the end of 5 years from the date of planting.