



Good planting depth for coconut

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Coconut palm (*Cocos nucifera* L) is a perennial tree crop with a life-span of 100 years. It is a versatile palm, capable of providing more products of use to mankind than any other tree crop. It is rightly eulogised as the Kalpavriksha – the wish fulfilling 'Tree of Heaven'. Coconut palm provides food and livelihood security to 12 million people in India.

Coconut palm, being a perennial crop and committed to the land for decades, utmost care and attention should be taken at the time of establishment of new coconut gardens. Any mistake / omission committed at the initial stage of garden establishment would continue for ever, throughout the life-span of

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the coconut palm, causing considerable economic losses to the growers. Hence site selection, seedling selection, plant spacing, pit preparation, planting depth and the care of young palms should be carried out meticulously. Any compromise / laxity in these operations is not at all admissible.

Preparation of Planting pits for coconut

1m x 1m x 1m size pits for planting coconut seedlings are dug 2 to 3 months ahead of actual planting and are allowed to weather by exposing to the hot rays of the sun which kill the harmful microbes in the soil.

When the pits are dug, top soil of 40 cm depth is kept separately on one side of the pit, to be used later to fill up the pit. The sub-soil of 60 cm depth is dug out and is used to form small bund all around the pit to prevent rain water flowing into the pit and stagnating. The bottom of the pit is loosened by crow-barring. Dry leaves and twigs are burnt in the pits once or twice to char the soil borne pathogens and termites to death thereby preventing their attack of coconut seedlings. In hard laterite areas 2 kg common salt per pit may be applied six months prior to planting to soften the laterite bed thereby facilitate better penetration of the tender roots.

In sandy soils and in areas where drought conditions prevail, it is beneficial to lay two layers of coconut husks with their concave side facing upwards, at the bottom of the pits. These husks will absorb water six times their weight during the rainy season and will release the water to the young palms during the dry periods. Pits are filled up to a height of 40 cm with a soil mix of equal proportion of top soil, river

sand and vermicompost, leaving top 60 cm of the pit as empty. Addition of river sand is helpful to prevent termite attack. Pits are copiously watered twice at 3 days interval and the soil mix is allowed to set for a week.

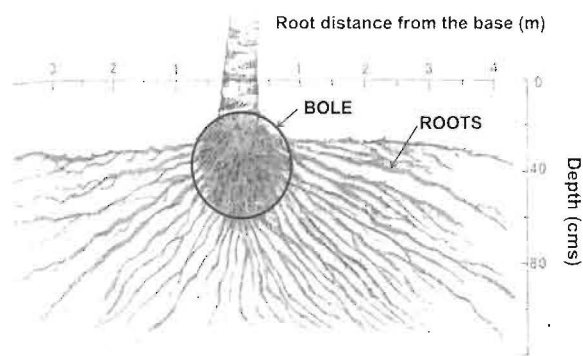
A small hole is dug in the soil mix, just sufficient to accommodate the seednut and the seedling is planted in the hole with the seednut buried in such a way that the top of the husk of the seednut is just visible outside. The soil around the seedling is well pressed and compacted to keep the seedling firmly in position. Thus coconut seedling is planted at a depth of 60 cm in the planting pit of 1mx1mx1m size. Vide picture 2. Planting pits are filled up gradually as the seedlings grow up and form the stem.

Size of the Planting pits

Size of the pits for planting coconut seedlings, normally depends upon the soil texture and the depth of ground water table. One metre cube (m³) pits are considered suitable for most localities. In light soils, where water table goes down very deep during summer, planting pits of 1m x 1m x 1m size are recommended. In hard laterite soils and in soils where ground water is very deep, it is advantageous to dig deeper pits. Generally the harder or heavier the soil, the bigger should be the pits. On hard laterite soils bigger pits of 1.2 m x 1.2 m x 1.2 m (length, breadth and depth) are necessary.

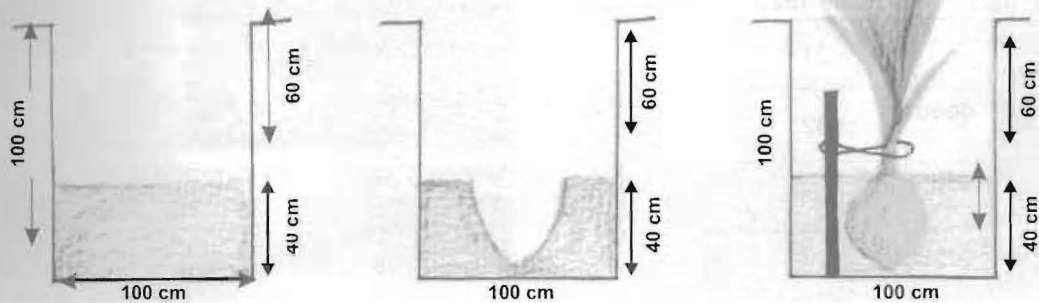
Depth of planting of coconut seedlings

The depth at which coconut seedlings are planted is very important. Planting depth depends upon the soil texture, soil depth and height of water table and other environmental factors. As a general rule, coconut seedlings should be planted at such a depth that the full-grown bole (the root forming region of



Bole and Roots of Coconut palm

Preparation of Planting pit for coconut



the coconut palm) remains wholly buried in the soil. Bole area increased with the depth of planting and the increases were 123% at 60 cm depth of planting and 129% at 90 cm depth of planting over the surface planting.

Bigger the bole, better is the rooting

Coconut, being a monocot, has no tap root but has a thick growth of string-like adventitious roots, emanating from the swollen base of the stem called the bole. The growth of the bole is completed when the coconut seedling is 3 to 4 years old. The bole acquires the shape of inverted cone and is invariably buried in the soil. In deep planted palms, the bole shall be 80 cm to 100 cm in height but in shallow planted palms it shall be 30 cm or less. Generally speaking the bigger the bole, the better is the rooting with more number of roots. A well grown coconut palm can produce 4000 to 7000 roots from the bole. It is desirable to dig 1m x 1m x 1m size pits, which can accommodate the full-grown bole and the bole can be wholly buried in the soil. One cubic metre pits are considered suitable for most localities.

An innovative coconut farmer Shri. Dominic from Kozhikode used mechanised digging pits of 3 m diameter and 1 m deep. Though higher cost was incurred, such big pits enabled coconut seedlings to establish faster and start yielding early.

Deep planting is good for coconut

Being a perennial and tall growing palm, coconut seedlings should be planted at appropriate depth so as to ensure proper development of the bole and good

development of root system, which in turn provide firm anchorage and the capacity to withstand drought. The depth of planting of coconut seedlings is as much important as its quality. The deeper the planting, the better is the growth performance of the palms, solely because of better development of root system in deep planting.

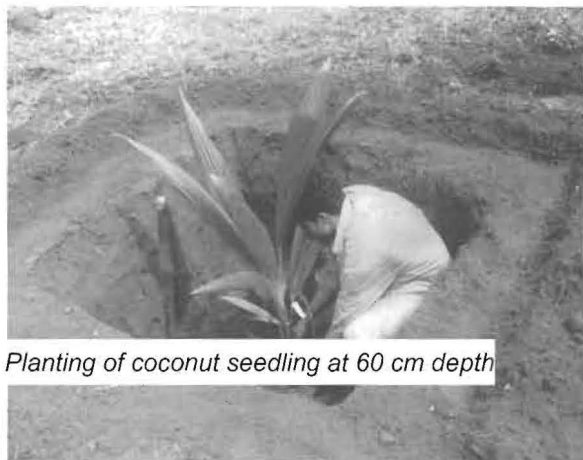
Experiments were conducted in Nileswar-I Coconut Research Station at Pilicode in Kerala as early as in 1923 and in the Regional Coconut Research Station at Veppankulam in Tamilnadu in 1961 to study the comparative efficiency of different depths of planting of coconut seedlings.

In the experiment conducted at Nileswar I Coconut Research Station, there were four planting depths viz., 0 cm, (surface planting), 30 cm, 60 cm and 90 cm. Each treatment has 3 rows of 12 palms. In all the treatments 90 cubic centimetre pits were dug and filled to the required depths before planting the coconut seedlings. The test coconut variety was West Coast Tall was soil type and the Laterite.

Surface planting resulted in reduced bole area and shallow root system, which ramified only in the surface layer of soil. Such roots easily dried up during the summer months. The growth performance of surface planted coconut seedlings were poor and the mortality rate was high. Seedlings planted at the depth of 60 cm, developed bigger bole and better root system with more number of roots, which helped the seedlings to withstand drought better and the seedling mortality was low. The results of this experiment are given in Table 1.

Table 1 : Role of depth of planting on survival of coconut seedlings

	Depth of planting from surface level	No. of seedlings planted in June 1923	No. of seedlings died upto April 1925
1.	Surface planting	31	12
2.	30 cm deep planting	32	9
3.	60 cm deep planting	31	1
4.	90 cm deep planting	32	4



Planting of coconut seedling at 60 cm depth

Table 2
Effect of planting depths on the growth parameters of the palms

	Depth of planting	Bole area m ²	No. of roots on the bole	Pre flowering age (Months)	Nut yield per Palm	Percentage of palms affected by cyclone	
						Uprooted	Tilted
1.	Surface	0.400	3055	76	50	10	5
2.	30 cm	0.560	3840	70	55	10	5
3.	60 cm	0.892	6142	66	62	NIL	NIL
4.	90 cm	0.916	7427	66	62	NIL	NIL

Similar experiment was conducted in 1961 at the Regional Coconut Research Station at Veppankulam in Tamilnadu to find out the appropriate depth at which coconut seedlings should be planted. In this experiment the effects of four different depths of planting, viz., 0 cm, (surface planting), 30 cm, 60 cm and 90 cm were compared. The depth of planting was reckoned as the distance from ground level to the collar of the seedling. Results of this experiment are given in Table 2.

The results of Veppankulam experiment has very well proved the importance and necessity of deep planting of coconut seedlings and the unsuitability of surface planting. In this experiment, palms planted at the depth of 60 cm, yielded 23.90 percent increased nut yield over the surface planted palms and these palms came to flowering earlier by 10 months.

Deep planting of coconut seedlings at a depth of 60 cm in one cubic metre pits is highly beneficial as it ensures big bole, wholly buried in the soil and good root system with more number of roots. Such a good root system ensures higher uptake of water and nutrients from the soil thereby enabling the palms to

produce good growth and high yield. Such a good root system puts forth firm anchorage thereby enabling the palms to withstand the onslaught of cyclonic storms. Both in surface planting and 30 cm deep planting the percentage of palms uprooted and tilted by the cyclone were ten and five respectively, whereas none of the deeper planted palms was affected by cyclone.

Uprooting and tilting of palms by cyclone are caused by the poor root anchorage which in turn is caused by reduced number of roots, emanated from the reduced area of the bole, which are invariably occur in shallow planted palms. Poor root anchorage had been attributed as the sole cause for the uprooting and devastation of thousands of surface planted coconut palms in the East Coast of Tamilnadu by cyclonic storms in 1952 and 1955.

Planting at 90 cm depth has not conferred any substantial advantage over 60 cm planting depth with regard to root production, flowering age and nut yield. As such planting depth of 60 cm is found optimum for coconut under normal situations and hence the same is recommended for adoption by the coconut farmers. ■