

# Nutritional Requirement of Coconut Palm

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Coconut is a perennial oil yielding crop contributing 6 per cent of the total edible oil production of the country. It is grown in humid tropical conditions. Nearly 90 per cent of the total area under coconut lies in the four southern states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. The national productivity per palm is only 43 nuts, whereas it is capable of yielding 60-80 nuts per palm per year under rainfed and 90-120 nuts per palm per year under irrigated conditions. This yield gap can be reduced by using high yielding cultivars, timely pest and disease management and balanced fertilization.

Regular manuring from the first year of planting is essential to ensure good vegetative growth, early flowering and bearing and high yields. Damage caused by the nutrient deficiency in the pre-bearing stage has a persisting influence on the later productivity of the palms. Especially in the case of potassium, it has been observed that manuring from younger age led to more yield than those which were supplied potassium only from maturity. The deficit persisted and stabilized around 15-20 per cent (Fremond and Ouvrier, 1971). In a fertilizer experiment conducted at CPCRI,

Kasaragod under rainfed condition, all the COD x WCT palms receiving fertilizers had attained potential bearing by the 9th year, while the palms which did not receive fertilizers took four more years. The manured high yielding tall palms attained full bearing in the 11th year, by which time only 24 per cent of the unfertilized palms had started yielding.

The first dose of fertilizer (50g N + 40 g P<sub>2</sub>O<sub>5</sub> + 135g K<sub>2</sub>O per palm) should be applied in the third month after planting when the South-West monsoon ends on the west coast if the seedlings are planted before the rains in May-June (Table - 1). During the second year, 160g N + 120g P<sub>2</sub>O<sub>5</sub> + 405g K<sub>2</sub>O per seedling may be applied in two split doses in May and September- October. This dosage may be doubled during the third year. From the fourth year onwards fertilizers may be applied at the rate of 500g N + 320g P<sub>2</sub>O<sub>5</sub> + 1200 g K<sub>2</sub>O per palm. To supply the above quantity of nutrients for an adult palm it is required to apply about 1.1 kg urea, 1.5 kg mussoorie phos in

acidic soil or 2 kg of super phosphate in other soils and 2 kg of muriate of potash in two splits, of one third in May-June and two third in Sept-Oct. months. If coconut mixture (10:5:20) is used, it is required to apply 5 kg of the same in two split doses. In addition, it is also recommended to apply 30 kg green manure per palm along with second split dose.

Till now, magnesium was not considered inevitable for coconut. Inevitability of magnesium application stems from the fact the magnesium tends to get concentrated in kernel and hence cannot be recycled. Secondly, application of high quantity of potassium may lead to relative deficiency of magnesium because of K-Mg antagonism. So, the only solution is application of magnesium sulphate at the rate of 500g Mg per palm per year along with second split of fertilizer application (Cecil, 1988).

Studies on the rooting pattern of the coconut palm have shown that under regular cultivation and manuring, 80 per cent of the roots produced did not have a lateral

**Table 1. Fertilizer Recommendation for Coconut (g/tree)**

	May-June			Sept. Oct.		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
First year	Planting in May-June			50	40	135
Second year	50	40	135	110	80	270
Third year	110	80	270	220	160	540
Fourth year onwards	170	120	400	330	200	800

Source : Coconut package of practices, CPCRI, Pamphlet No. 1E.

spread beyond 2m from the bole and the top 30 cm of the soil showed the presence of only a few roots (Kushwah *et al.*, 1973). Hence, for obtaining the high efficiency in uptake of applied nutrients, fertilizers should be applied in the circular basins of about 1.8m radius and 20-25cm deep.

Long term studies at CPCRI, Kasaragod showed that highest yield of 89.7 nuts per palm per year was recorded in plot receiving cultivation + organic + inorganic fertilizers followed by 79.6 nuts per palm per year under rainfed conditions (Table 2). Application of organic manure alone contributed for a yield increase of 10.1 nuts per palm whereas inorganic manure alone resulted in yield increase of 30.2 nuts per palm. Economic analysis of the data revealed that highest net returns of Rs. 49,340 per ha was realised with cultivation + organic + inorganic manuring. However, net returns decreased by Rs. 5320 per ha when organic manure was not applied.

Therefore, application of organic per green manure in the coconut basin is beneficial in the long run. Growing green manure crops like cowpea, sunhemp, calopogonium, crotolaria, mimosa etc., in the basin adds 15 to 20g nitrogen per palm (Jothimani, 1994). According to him, growing green manure crops in interspaces will add 3-4 tonnes of green matter thereby supplying 20-111 kg N, 4-21 kg P<sub>2</sub>O<sub>5</sub> and 15-67 kg K<sub>2</sub>O

per hectare. In addition growing of cover crops helps reduce weed growth and protects the soil from erosion. Coconut also produces large quantities of by-products viz., leaves, flower stalks, spathes and petioles besides husk and pith. By systematically recycling these materials, it is possible to plough back 20.7kg N, 10.5 kg P<sub>2</sub>O<sub>5</sub> and 30.8 kg K<sub>2</sub>O per hectare annually thereby reducing inorganic fertilizers besides its other advantages like increasing water holding capacity, CEC and improvement in bulk density.

Hence, balanced nutrition of coconut palm is essential for achieving the high and sustained yields. The quantity of fertilizer applied is largely dependent on the inherent soil fertility status and the productivity of the plantation. In general, the adult palm must be supplied with 500g, N,

320g P<sub>2</sub>O<sub>5</sub> and 1200 g K<sub>2</sub>O per palm per year in two split doses during pre-monsoon and post-monsoon periods.

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**Table 2 : Effect of Management of the Yield of Coconut Palms under Rainfed Condition**

Treatments	Nuts/palm/year	Net returns Rs/ha
Cultivation + organic + inorganic fertilizer	89.7	49,340
Cultivation + inorganic fertilizer	79.6	44,020
Inorganic fertilizer + forking basins	66.6	36,420
Cultivation alone	36.4	23,180
Weed control using herbicides	25.6	16,420
No cultivation and no manuring	4.9	3,430

Source : CPCRI Annual Report, 1993 - 94 p. 62

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