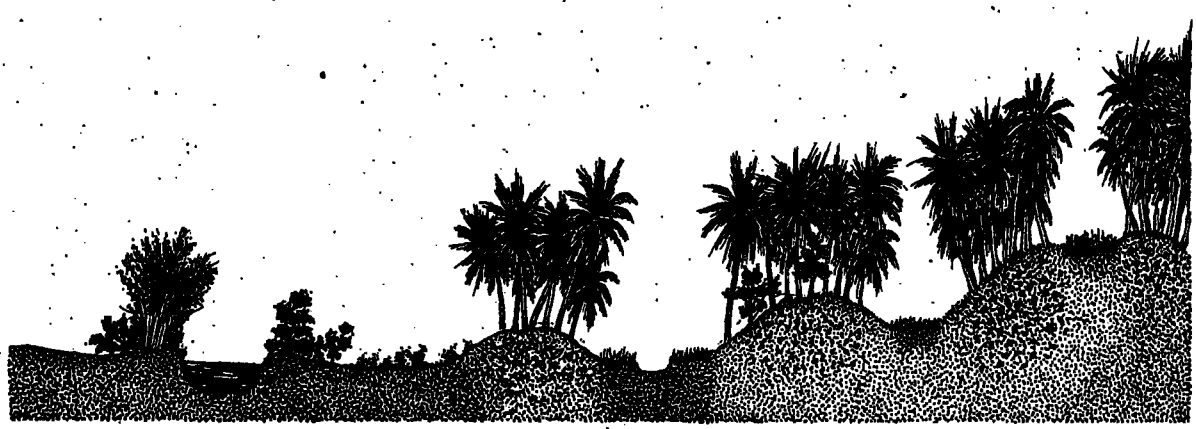
THE PROPER SOIL MOISTURE - AIR STATUS FOR COCONUT



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All coconut growing soils are not equally productive; some are high productive and some are low productive. Generally the most common cause for low productivity is the unsatisfactory moisture-air status in the soil. This may mean either deficiency of moisture or deficiency of air. Such conditions render roots activity inefficient and therefore palms indicate nutrient deficiencies irrespective of the soil's nutrient status. The nutrient status in the soil really matters only if a satisfactory moisture-air status exists in the soil.

In a landscape, one may come across gradations of soil moisture status ranging from excessive moisture in low land area (water logged) to deficiency of moisture in upland area. Excessive moisture is not itself a harmful factor, but rather the deficiency of air that is associated with it, when the pore space of the soil in the vicinity of the root system is completely filled with water, air is completely exluded and the growth of the plant roots becomes impossible. When this condition exists at a shallow depth (less than 75 cm from the surface) for a considerable part of the year, the root zone of the palm would be restricted only to the surface soil layer of which the thickness would be less than 75 cm. Generally, the growth of such palms is retarded and the yield is low. Some exceptions to this condition are also found in certain light textured (loamy sand or sandy loam) alluvial deposits in flooded areas such as Daduru Oya flood basin. Although water table remains at a shallow depth (between 45-75 cm from the surface) for a considerable period of the year, the coconut palms thrive well in these soils giving a high yield. The reason would be the ample supply of air to the light textured surface soil layer.

Generally, moisture deficiency occurs in well drained gravelly soils in high lands during the dry season. The water table in these soils often occur at a depth greater than 2 m, mostly beyond the decomposing rock and therefore inaccessible to coconut roots. The moisture retained by the moderately deep (90 cm) soil layer, over lying the decomposing rock or gravel is not sufficient for the palm to meet its water requirement during the dry season. Very shallow gravelly soils with lateritic hard pan or undecomposed rock at a depth of less than 30 cm is an extreme case where root zone of the coconut palm is very much restricted. Palms grown on such soils are subjected to moisture stress during the dry seasons particularly in the

dry intermediate and wet intermediate agroclimatic zones.

In addition, palms grown on some sandy soils known as cinnamon sands occuring in low land areas within the range of 3-5 km from the sea particularly in the wet and wet intermediate zones may also be subjected to moisture stress during long spells of drought. Generally the water table in these soils is shallow (50-80 cm from the surface) and therefore roots are restricted only to the surface layer. However, the water table would drop to a deeper level (greater than 1 m) rapidly during long dry spells without leaving sufficient moisture in the vicinity of the root system.

Between these two extremes, water logged and well drained conditions, there exists an imperfectly drained condition which occurs at higher elevations than that of water logged soils but at lower elevations than that of well drained soils. In imperfectly drained soils, the water table exists at a depth of 75 cm or slightly below for a significant period of the year.

The most favourable moisture-air status for coconut is found in deep, moderately well drained or imperfectly drained sandy loam soils found mostly in the low land coastal areas in the wet and wet intermediate zones. As such soils are in low land coastal area, the water table is rather shallow and quite stable and it often remains at a depth of 3-6 m from the surface. Coconut roots may go down deeper and deeper upto the water table as the aeration in this soil is satisfactory. Such moisture-air status is also seen in flooded areas where light textured alluvial deposits occurr as in the case of Daduru Oya flood plain. Palms grown under such conditions response favourably to fertilizer application, yielding 95-120 nuts per palm per year.

Where moisture-air status is unfavorable for coconut, one has to adopt corrective measures to obtain a good yield. In water logged soils, surplus water should be drained out by means of a proper drainage system to provide aeration to the root system. Such drains should be more than 75 cm deep. Lands where the surplus water cannot be drainedout and where the water level remains stable and shallow for a considerable period of the year, are not suitable for coconut.

Moisture conservation measures such as establishment of husk or coirdust pits and cover crops and mulching should be adopted in lands that are being subjected to soil moisture stress. Even with these practices it would be difficult to provide favourable moisture-air status for the palm as exactly as in deep sandy loam soils in coastal areas. Nevertheless, with the adption of proper moisture conservation measures and fertilizer application, 40-60 nuts per palm per year can be obtained from plantations in these soils where moisture deficiency is probable in the dry or wet intermediate zones. The yield would be as high as 80 nuts per palm per year on the same type of soil with proper moisture conservation, in the wet zone. Fertilizer application alone would not be sufficient in such soils. If neglected, the annual yield of a palm on such soils would be as low as 15 nuts, particularly in the dry or wet intermediate zone.

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