

# Scientific Management Practices for Arecanut Soils in India

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The major arecanut growing areas in India are located in comparatively high rainfall belts. Thus most of the crop is grown on the west coast of India extending from Bombay to Trivandrum, in Mettupalayam area of Coimbatore district, parts of *Maidan* areas in Karnataka State, in the sub-Himalayan regions of West Bengal and in Assam. The climate and soils of important arecanut growing regions of India are given in the Table.

Though the arecanut palm can grow in a variety of soil types there are certain basic requirements for proper growth and yield of this crop. Laterite loamy soils with an admixture of pebbles is ideal. The soil should be sufficiently porous to permit drainage of excess water and facilitate root growth. The crop needs irrigation during summer months. The lowest temperature the crop can withstand is around 7°C. For

instance, a cold spell of temperature of about 5°C to 6°C in 1970-71 in parts of Shimoga and North Kanara districts of Karnataka State caused extensive cold injury to arecanut crop. The highest temperature that the crop can withstand is not precisely known but it may be about 39°C. The optimum range for this crop is 15°C to 38°C. Soil reaction is not very critical. When physical conditions are favourable, soils with pH 4.5 to 7.5 have supported good arecanut crop.

High humidity and areas free of cyclonic winds and scorching sun, are congenial for this crop. Such areas are often met with in the foot hills of mountains and in valleys. These locations may have in addition a perennial water source so that the water can be used for irrigating the crop in summer. The slopy nature of the terrain will also permit good drainage.

Table. Climate and soils of important arecanut growing regions of India.

State	Region	Topography	Soil type	Average rainfall. mm.	Temperature in °C	
					Minimum range.	Maximum range.
Kerala.	Entire State.	Undulating.	Lateritic.	2800	22.3 to 25.3	28.4 to 32.2
Karnataka.	South Kanara North Kanara.	Undulating.	Red and lateritic.	3260	20.6 to 26.0	28.5 to 34.4
Karnataka.	Southern maidan.	Plain.	Red sandy loam.	1244	15.3 to 21.4	26.6 to 34.7
Tamilnadu.	Mettupalayam.	Foot hill fairly level.	Red loam.	1010	20.1 to 27.3	29.3 to 36.8
West Bengal.	Plain areas.	Undulating.	Alluvial.	3200	10.3 to 25.0	23.6 to 34.1
Assam.	Valley areas.	—	—	—	—	—

### **Irrigation and drainage.**

Stagnant water at the base of palms even for a week deranges the entire metabolism of the plant making the crown turn sickly yellow from healthy green colour.



Drain in between rows of arecanut palms

Proper drainage of the garden in high rainfall areas is very important. When seedlings are young a drain may be given for every two rows and these should be at least 15 cm. deeper than the depth at which the seedlings are planted. In the first year of planting the soil around the seedlings gets compacted during planting. In such pits chances for water to stagnate are higher so it may be better to connect individual pits to the drain.

The crop needs irrigation during summer months. Most of the roots of areca palms are concentrated within the top 50 cm. of the soil. Studies have shown that irrigation once in four or five days is about the optimum. Sprinkler irrigation or splash irrigation are desirable. The former requires high initial investment. So the latter can be adopted. This had also been found suitable by long usage and experience. Cement-lined irrigation channels will prevent seepage loss and also save the mainte-

nance cost. Inside the garden, water is led in shallow channels in between alternate rows of palms and with the help of folded areca leaf-sheath water is splashed into the basins of the palms.

### **Intercultivation and weeding.**

Intercultivation by digging with mamatty forks is generally practised. This is done sometime in October–November after the heavy monsoon rains. This opens the soil by breaking the surface crust and facilitates irrigation water to seep into the soil. By breaking the surface roots, root system penetrates to lower layers. Most of the weeds get uprooted and dry up and weeding becomes simpler.

### **Controlling soil erosion.**

Soil erosion can cause heavy damage to arecanut plantations. It removes the nutrient-rich surface soil and causes the root systems to get exposed. These roots get dried causing considerable damage to root system and plant growth. Mulching the soil or growing cover crops in the plantation prevents soil erosion. This can be



Splash irrigation in arecanut garden

done with arecanut leaves, coconut leaves and banana leaves which are both inexpensive and locally available.

As cover crops, *Pueraria Javanica*, *Mimosa invisa* and *Calopogonium muconoides* are very good. They fix atmospheric nitrogen in the soil and also serve as mulch and provide green matter to the soil.

#### Soil amendment.

Most of the arecanut soils are acidic. Though low pH *per se* has not been found to be harmful to the crop, the availability of plant nutrients is increased when the soil is near neutral (pH 6 to 7).

Phosphorus nutrition is a problem in acid laterite soils. The water-soluble phosphates when applied get converted to the sparingly soluble aluminium and iron phosphates and their availability to plants is then very much reduced. Liming can reduce acidity. It also suppresses harmful soil fungi in the acid soils. Dolomitic lime stone can supply both lime and magnesium. Soil can be got tested in soil testing labora-



A cover crop of *Pueraria javanica*

tory and amount of lime required determined.

Alkalinity is also a problem in low rainfall areas like *Maidan* parts of Karnataka. Incorporating gypsum in the soil and providing good drainage will improve such soils. In these areas particular attention should be given to irrigation water which should be free from injurious salts.

#### Manuring.

The arecanut crop is in the field throughout the year and for many decades. Continuous and adequate supply of plant nutrients is, therefore, a basic need. The cultivated soils in high rainfall areas are generally poor in most of the plant nutrients. Because of the coarse texture of soil, poor cation exchange capacity of their clay minerals and low organic matter content, the water-soluble nutrients are easily leached out. Application of water-soluble forms of fertilizers in two or three split doses may reduce loss due to leaching. For a bearing palm, a dosage of 100 g. nitrogen (N), 40 g. phosphorus ( $P_2O_5$ ) and 140 g. potash ( $K_2O$ ) is recommended annually in addition to a basal application of 12 kg. of compost or cattle manure and 12 kg. of green leaf. In acid soils, nitrogen can be supplied in the form of calcium ammonium nitrate since it does not create any acidity in the soil. The water-soluble forms of phosphorus as found in superphosphate and certain compound fertilizers get combined with free iron and aluminium found in acid laterite soils and become sparingly soluble products. In such soils, ultrafos, dicalcium phosphate, thermophosphate or bonemeal are to be preferred. Potash can be supplied either as Muriate of potash or as wood ash. Fertilizer nitrogen and potash may be supplied in split doses as these are easily leached out from the soil. The full dose of organic manures and phosphate fertilizer

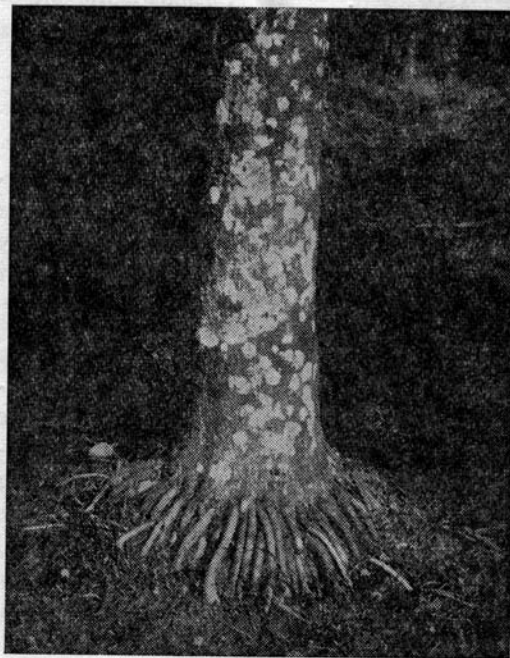
and half the doses each of nitrogen and potash are to be applied in about October, soon after the heavy south west monsoon recedes. The second split application of fertilizers should be done in February-March. The garden should be irrigated soon after the fertilizers are applied.

Shallow basins are opened around the palms about a radius of one metre if space permits or as wide as possible depending on the nearness to drain and organic manures and fertilizers applied and the whole lot covered with thin layer of soil. The covering keeps the applied manures moist, facilitates easy decomposition and helps to absorb and retain moisture.

#### **Application of fresh soil.**

The root system of arecanut is fibrous. As the seedling grows into adult palm lower nodes bulge and roots are produced. So the tendency is for roots to develop above the level at which seedlings are planted. When seedlings are planted shallow within few years roots are found very near to the surface or in some cases they are produced above the ground level. This condition is not conducive to good crop production. In such cases, fresh soil may be spread over the surface of the garden to a thickness of 8 to 10 cm. For this, a mixture of pebbles

and red soil will be good. When bulky organic manures are available these can



An areca palm showing exposed roots

also be applied before spreading the soil in the garden.

Scientific management of the soil is one of the surest means of maintaining and improving crop yields. It is also an insurance against future crop failure.