To Succeed in Coconut Cultivation

ADOPT PRACTICES SUITED to SOIL AND CLIMATE

By
M. M. KRISHNA MARAR
Agronomist, Central Coconut Research Station, Kasaragod

IN India the coconut palm is being grown under a variety of soil and climatic conditions. The bulk of the acreage is met with in four soil types, viz., alluvial soils, red soils, laterite soils and coastal sandy soils. Climatic conditions vary from the typical monsoon climate of the West Coast characterised by heavy rainfall to the low rainfall conditions of areas such as Saurahtra and Kutch. On the basis of soil and climatic conditions the coconut regions of India have been roughly classified into seven zones. The varying soil types together with the changing climatic factors present a considerable range of conditions which may have to be treated separately if maximum beneficial results are to accrue. In the following paragraphs an attempt is made to deal with the most important aspects. It is very necessary that coconut growers understand the importance of these and follow practices which are suitable to their conditions. This is *sine-qua-non* for success in coconut cultivation.

Spacing

Spacing at which palms are to be planted has to be decided with reference to the soil types and climatic conditions. It is only reasonable to suppose that depending upon the soil and climatic conditions there exists a definite number of palms per unit area which will give maximum yields. If the stand falls below the optimum, production is diminished owing to the fact that full advantage is not being taken of the available area. On the other hand if the stand is excessive the yield will be diminished owing to overcrowding and consequent intense competition between palms for plant food, moisture, light and air. The cost per unit of production and of unit area will be less the fewer the number of palms there are to produce the maximum possible yield.

In inherently fertile soils and under favourable climatic conditions. there is a tendency for the palms to put on maximum growth, and therefore under these conditions an increased spacing may be desirable. In infertile soils spacing may be reduced to accommodate more number of trees. Again, in areas where intercropping in coconut plantations is done it is better to give more spacing in between rows and reduce spacing somewhat between palms in the rows and between rows. When the palms are planted only in single rows say on paddy field bunds or canal bunds the spacing may be reduced to about 20 ft.

Size and Shape of Pits

The size of seedling pits will depend upon the soil type, lie of the land, depth of water table, possibilities of inundation, etc. In loamy soils with low water table 3ft x 3ft x 3ft (0.9 m. x 0.9m. x 0.9m.) pits are generally recommended. The idea is that the root bearing bole area will be completely under the soil. In laterite soils with rocky stratum underneath, deeper and wider pits say of size 4ft x 4ft x 4ft, have to be taken so that the seedlings will be planted in soft parts of the rock where roots can penetrate more easily. Where hard pans are met with just below the surface soil these have to be broken up in order to ensure satisfactory growth. In sandy soils shallow planting, i.e. planting in pits 1 to 1½ft deep are recommended as the root system is found confined mainly to surface layers.

In low-lying areas where water table is high the seedlings may be planted on the surface itself. Where actual flooding is likely to happen, planting may be done on mounds formed with soil.

Though square shaped pits are the rule, linear and round pits are found adopted under certain conditions. Experiments done at this Research Station have shown that they are not in any way better than square holes when the case of establishment and satisfactory early growth of seedlings are considered.

Time of Digging Pits

In areas where white ant attacks are serious, the seedling pits are better taken a couple of months in advance of the planting season. Rubbish may then be heaped in the pits and burnt on a couple of occasions. This will give some relief from white ant attack. Charring has also been found to invigorate the growth of the seedlings in early stages. In laterite rocky areas, application of a

few handfuls of common salt in the pits, taken much in advance of the planting time and allowed to weather, will make the soil soft and permit quicker establishment of seedlings planted in them. Under all other conditions there is no harm in planting seedlings immediately after the seedlings pits are dug.

Time of Transplanting

Under normal conditions in soils that are deep and where water table is low, seedlings can be transplanted with the beginning of monsoon rains so that maintenance of moisture in seedling pits at a satisfactory level may not be a problem. If, however, satisfactory irrigation facilities are available, transplanting can be done much ahead of the normal period. This will result in the satisfactory establishment of the seedlings by the time the monsoon rains set in and enable them to take advantage of the first monsoon itself for making satisfactory growth. If two distinct monsoon periods are available as in the West Coast, transplanting can also be done during the interval between the two monsoons. In low-lying areas subject to inundation during monsoon periods, seedlings are better transplanted either some time before the onset of floods or after the floods have receded.

Early Attention

Preliminary investigations have shown that in the early stages of growth the requirements of seedlings are more for nitrogen than for phosphoric acid or potash. Therefore, in soils that are deficient in nitrogen every effort should be made to supply this nutrient adequately either in the form of nitrogenous fertilisers or as green leaf manure. Again, as the root system would not have developed fully, fertilisers are to be applied round about the seedlings and preferably in two or three split applications.

Sufficient attention will also have to be given against water stagnation which will be a real problem in stiff soils and in soils overlying hard rocks or hard pans. Proper drainage facilities should, therefore, be created. In heavily drained soils such as sand it will be beneficial if dry husks are buried round the base of the seedling as these will absorb and retain moisture for the use of the seedlings during summer season.

Under climatic conditions characterised by long drought conditions, the seedlings in the earlier years should be irrigated properly.

Diseases such as shoot rot and bud rot break out in the rainy season. Proper watch should be kept for their appearance and immediate prophylactic and curative action initiated as soon as disease incidence is noticed.

Care and Attention of Adult Palms

There is definite evidence that proper attention to regular cultivation and manuring of coconut palm is very essential to step up and maintain the production at a high level. But the need for intensity of and methods of intercultivation and manuring will be considerably influenced by soil and climatic conditions.

In sandy soils which are generally of low fertility and do not support much of weed growth, the need for regular intercultivation may not be great; but in other soil types which permit rank

growth of weeds, intercultivation is very necessary to keep the weeds under control and create soil mulch. While intercultivation can be done in sandy soils under a wide range of soil moisture conditions, in clayey soil cultivation has to be done at the optimum moisture content in order to avoid possible injury to soil structure. In loose soils piling up of mounds has been found to be the most effective and economic intercultivation practice. The hard soils may have to be dug with mommotty and in some cases even with crow bars.

Frequency of intercultivation will have to be varied depending upon the soil and climatic conditions. In fertile soils and under favourable rainfall conditions intercultivation may have to be done more number of times to control weed growth than in less fertile soils. However since cultivation tends to deplete the organic matter content of the soil especially under tropical conditions, it is necessary to limit it to the barest minimum consistent with needs.

Depth of intercultivation will have to take into account the depth of soil, level of water table, etc. Where soil is deep, deep interculativation will promote deeper rooting which is beneficial to the palm particularly in times of drought. Under shallow soil conditions or conditions of high water table shallow intercultivation will be more beneficial.

Fertilizer Application

Fertilizer application is greatly influenced by soil types and climatic conditions. Experiments have shown that the need for fertilizers is greatest in infertile than in fertile soils. Therefore a higher dosage of manure is indicated in inherently infertile soils than in more fertile soils. Among the important soil types in which coconuts are raised, sandy soils and laterite soils require relatively more fertilizers than loamy or alluvial soils.

In selecting fertilizers the soil reaction and the physiological behaviour of the fertilizers in the soil are to be taken into consideration. The continued use of physiologically acid fertilisers such as ammonium sulphate will aggravate the acidity condition of the soil, if the soil is already acidic. For such soils Chilean nitrate, calcium ammonium nitrate, etc., may be preferable to ammonium sulphate. On the other hand in soils, showing alkaline reaction ammonium sulphate may be more useful. Again, in acidic soils containing free soluble iron and alumina, fertilsers having water soluble phosphoric acid are not quite suitable as the phosphorus will get fixed up in an unavailable form. Under these soil conditions fertilisers such as bonemeal or dicalcium phosphate will be better.

Method of application of fertiliser has also got to be varied according to soil types. In soils not having proper nutrient retaining capacity, fertilisers may well be applied in two or three split doses to avoid loss of nutrients by leaching. When there is no fear of such loss, fertilisers can be applied in one dose. In soils where fixation of applied phosphoric acid and potash is likely, placement method of application such as in basins has to be adopted.

Soil types will also influence the type of green manure crops that can be raised with success and also methods of incorporation.

Irrigation

Provision of summer irrigation to coconut palms growing under purely rainfed conditions has been seen to be very beneficial to the coconut palms. The frequency and intensity of irrigation will depend upon the nature of the soil. In sandy soils light irrigation at frequent intervals is indicated while in moisture retentive clayey soils, heavy irrigation at longer intervals will be sufficient. Again, in sandy soils along the sea coast even sea water can be used for irrigation without any ill effects on the palm. In retentive soils some care may have to be exercised.

Conclusion

In the previous paragraphs an attempt has been made to briefly indicate how the various aspects of coconut cultivation are influenced by soil and climatic factors and to impress on the need to adopt practices suitable to the soil and climate to obtain maximum benefits. Coconut growers confronted with any special problem not referred to here or who may require more specific advice on any aspect may write to the Joint Director, Central Coconut Research Station, Kasaragod, who already having an advisory service at the Station.