

INTER AND MIXED CROPPING IN ARECA GARDENS

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Areca-cacao mixed cropping

INTERCROPPING, multiple cropping, mixed cropping, and relay cropping are some of the terms that are being more widely used in recent years. All these in reality mean an intensive land use to take two, three or even more crops either simultaneously or successively each year. These systems of farming not only increase the productivity per unit area and per unit time but also provide additional work to the agricultural labour.

The practice of intercropping or mixed cropping in arecanut gardens has been in vogue even in early times. But the objective in those days was not intensive cropping. The long pre-bearing age of 5-8 years, the low income in the early years of bearing, the fluctuation in the yield of the crop due to pests and diseases and seasonal conditions forced the planter to take up intercropping. The intercrops when raised can provide additional in-

come during the off seasons. The venetian and orientation of arecanut leaves permit 40 to 60 per cent of solar radiation reaching the crown to penetrate to the crops grown underneath. Rooting pattern of areca palms also suggest that there is considerable scope to exploit the ground surface by growing inter and mixed crops in areca gardens as the total soil mass is not effectively utilised.

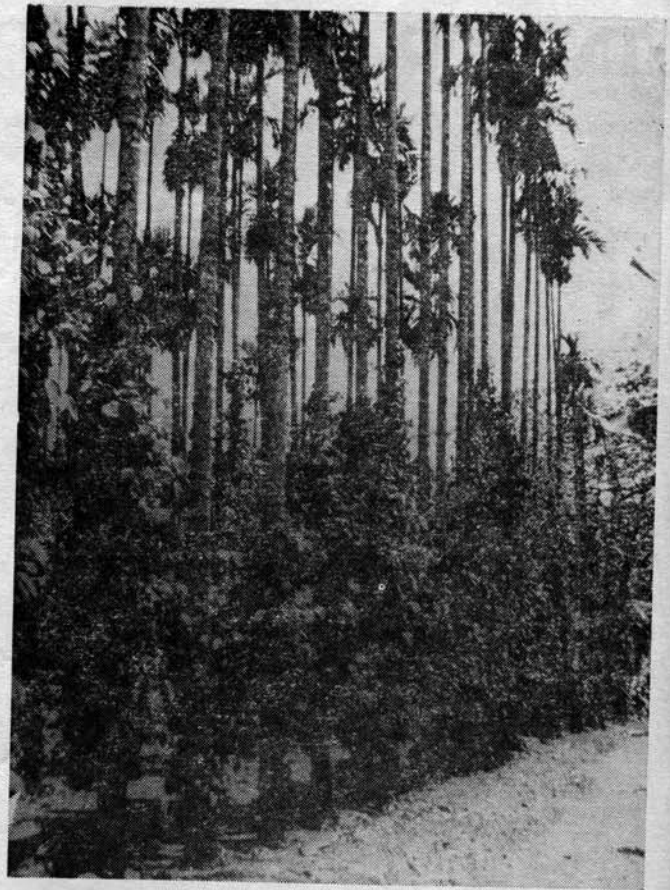
Though several crops are grown in arecanut gardens, it is necessary that some selection is made since all crops are not found to come up well under the eco-climates prevailing in the gardens. The crop or crops for intercropping are to be chosen more carefully, especially when one of the partners is a perennial crop like arecanut. The intercrops chosen should not have any problems of soil exhaustion, and pest build-up and at the same time should have maximum production or maxi-



An arecanut plantation in Mysore. Banana is also grown in it

imum returns per unit input to the farmers. Crops which love shade or those which can withstand the canopy of arecanut palms and the heavy drip during the monsoon are to be preferred. They should be able to utilise the filtered light to the maximum. It is also necessary that the crops which go with areca do not have similar requirements of plant nutrients as far as possible. It will also be an advantage if the root systems of the crops are confined to different zones so that competition for moisture and nutrients is minimised. The crops chosen as intercrop or mixed crop also vary from tract to tract, though a crop like banana may be more universally grown. If growers of Sirisi (Karnataka) prefer cardamom and pepper as intercrops, the planters at Dakshina Kannada of Karnataka, select pepper, banana and yam as best suited to the locality. The areca growers of Assam prefer citrus while the growers of Kerala grow *Dioscorea*, yams and tapioca. Thus the kind of intercrop chosen will vary depending upon several factors like the agroclimatic conditions of the region, the demands and preference of the local market and the personal likings and needs of the farmer.

A large number of annuals and perennials have been tried for feasibility studies to evolve different crop combinations with arecanut at the CPCRI, Regional Station, Vittal and in the Research Centres spread over in the States of Karnataka, Kerala, West Bengal and Assam.



Pepper in arecanut

Crops like banana, pepper, elephant foot yam, pineapple, cacao, guinea grass, etc. are found to be best suited for inter and mixed cropping. Elephant foot yam which was grown at the Research Centre, Kannara (Central Kerala) has shown that the same has no adverse effect on the performance of main crop of arecanut. Similarly, growing of banana as an intercrop with arecanut at the CPCRI, Regional Station, Vittal had no adverse effect on the performance of arecanut. In the initial years the shade of banana helped to protect the delicate palm from sunscorching during the summer months. A net return of about Rs 4000/ ha/year was obtained from banana. Guinea grass was found to come up well under the shade of areca. The advantage of growing this fodder is that due to the moisture available in arecanut gardens, a continuous supply of the fodder becomes available. The observations made till now at Vittal indicated that cacao is a profitable mixed crop. Pepper was also found to be another crop suited for the areca gardens. All the intercropping systems increased the job potential in addition to the subsidiary income.

Cultural Requirements

Whatever the crop chosen it is very important that the subsidiary crop is given adequate attention and met with its specific requirements lest the main crop may

suffer. The following cultivation programme for the individual crops may be followed.

Banana. Banana needs a rich, deep soil with plenty of organic matter. Sword suckers of 75 to 100 cm height are planted in pits of 30 to 60 cm cube filled with 10 to 12 kg of cattle manure. Pits are dug at a distance of $2.7 \times 3 \times 4$ metres (when the spacing of arecanut is 2.7×2.7 m) in the same row as arecanut palm. The population of banana will thus be at the rate of one plant to every two areca palms. 250 gm of superphosphate may be applied per plant as a basal dose prior to planting banana, followed by 100 gm of N and 140 gm of K_2O each applied in two equal doses, the first application being done about two to three weeks after planting and the second application four or five months of planting. Other operations like earthing up and providing supports when the plants throw bunches are to be attended to. Another important operation to be attended to is desuckering, only one good sucker should be allowed to grow. Besides the main crop two ratoon crops can be harvested in a three year period at the end of which the entire crop will have to be replanted in pits dug at changed sites.

Elephant foot-yam. The crop prefers loamy soils rich in organic matter. Good and healthy tubers from the previous harvest are cut into bits, each bit having a small portion of ring or bud. Any ordinary sized yam gives six to eight bits and each bit should have a minimum weight of three-fourth to one kg. It is usual to dip these bits in cattle dung slurry to prevent rapid drying of the tuber. Such pieces are planted in pits of 50 cm cube applied with 8-10 kg of cattle manure or compost. It would be preferable to apply 50 gm of superphosphate in each of these pits before the planting of seed material. Three to four pits can be accommodated in the inter spaces between four arecanut palms planted with the normal spacing of 2.7×2.7 m. Planting is usually done in February-March and the crop comes to harvest in October-November. An average of 12,178 kg tuber per hectare fetching a net profit of Rs 4 to 5 thousand per ha can be obtained from this crop.

Pineapple. Pineapple grows in almost any type of soil provided there is adequate drainage. Suckers which arise from underground parts are commonly used as planting material since these produce fruits earlier. Trenches of 60 cm width and depth and about 125 cm length are dug in between two areca palms and filled with 50 gm of cattle manure. In each trench three

suckers are planted. Fertilizers to supply 100 kg N, 100 kg P_2O_5 and 150 kg K_2O per hectare may be applied in two equal doses, once at the time of planting and again six months after planting. As an intercrop in arecanut garden pineapple is estimated to give 8000 kg of fruit per hectare fetching a net profit of Rs three to four thousand per hectare.

Guinea grass (*Panicum maximum*). It is grown under varied conditions of soil and climate and comes up well in drained loamy soils. The grass is propagated by slips. As an intercrop in arecanut gardens it can be planted in two rows about 50 cm apart in the interspaces between rows of areca trees or on the edge of drains. The area to be planted has to be applied with about 10 times of cattle manure per hectare as basal dose, followed by top-dressing with 100 cm of urea in two equal doses at an interval of 6 months. The crop gives 5 or 6 cuttings per year with a total yield of 18 to 22 tonnes/hectare.

Cacao. Cacao is a perennial crop. Seedlings 4 to 6 months old may be planted with a spacing of 2.7×5.4 m when arecanut is spaced at 2.7×2.7 m in the same row of areca palms. The population of cacao should be half to that of areca palms. Cacao plants commence bearing two to three years after planting. A fertilizer application of 100 gm N, 40 gm P_2O_5 and 140 gm K_2O per tree in two equal doses is recommended cacao, when planted as a mixed crop. From a full bearing tree on an average 50 pods may be harvested. Ten to twelve thousand rupees per hectare may be obtained as a net income.

Pepper. Using arecanut palm as a standard pepper may be grown successfully as an intercrop. About 800 to 1000 palms may be used for growing pepper in a hectare. Research results at Vittal have indicated that 'Panniyur-1' and 'Karimunda' varieties are more suitable for growing in areca gardens. A fertiliser dose, equal to the dose recommended to areca palms (100:40:140 gms of N, P_2O and K_2O /palm) may be applied to pepper in addition to 12 kg of green leaf and 12 kg of cattle manure per vine. A grower can get an income of 8 to 10 thousand rupees/ha as net income by pepper alone by growing as an intercrop.

Though several crops, annual and perennial, can go well with arecanut, it is very important that the selection of inter or mixed crop should be based on the moisture availability, soil depth and nutrient status of the soil besides market preference and needs of the farmer.

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