

Plantation crops research makes headway

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PLANTATION crops, though occupying barely two per cent of the total area cultivated in the country, brings in an export earning of about 250 crores of rupees every year to the National Exchequer. While production of crops such as tea, coffee, cashew, pepper and cardamom is highly export-oriented, crops like coconut, arecanut, rubber, cacao and oil palm are grown to substitute imports. The main achievements in the field of plantation crops research and problems awaiting solution are given below :

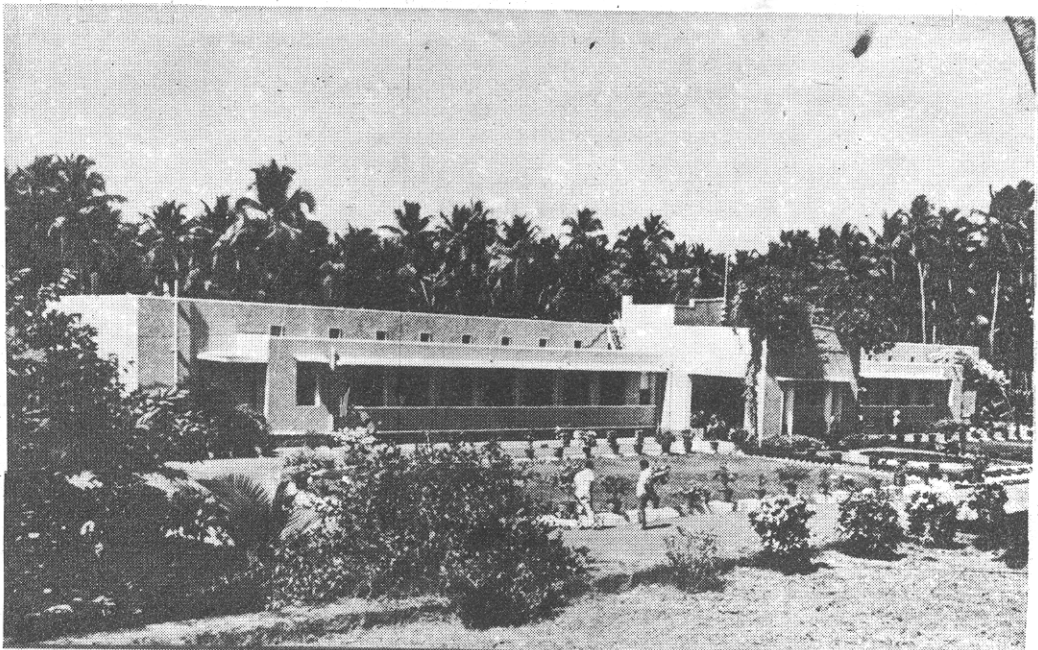
Arecanut

Large quantities of arecanut

were being imported into India to meet the country's requirement. During 1956-57, 39,903 tonnes of nuts valued at 5.45 crores of rupees were imported. Research on arecanut commenced from 1956 has had its impact on overall production as well as production per unit area. The overall production increased from 74,750 tonnes in 1956-57 to 1,39,100 in the year 1968-69. The combined effect of improved agronomic practices and plant protection measures increased the per hectare production by 16 per cent from the base year of 1956-57.

Intensive work on the evolution of high yielding varieties of arecanut taken up from 1960 has yielded a new variety 'Mangala' which is under release. This is precocious and semi-tall in habit producing nuts of good market quality and in pest and disease tolerance comparable with the local. It has recorded 71 per cent more yield successively over a period of six years. The variety which is under release is expected to increase the per acre yield of arecanut substantially. A few other high yielding varieties are also in different stages of field testing.

A view of the Central Plantation Crops Research Institute





The Mangala variety of arecanut

Coconut

In the evolution of high yielding varieties of coconut, work done so far has shown that a few varieties and hybrids are superior to the local. Their relative performance is given in the following columns.

Of the above, the hybrids are not only high yielders, but are also early bearers which is an important characteristic in a crop like coconut which has a long pre-bearing age of 6 to 8 years. Reducing the pre-bearing age of coconut has far-reaching effects in establishing the economy of coconut cultivators. Research

Relative performance of a few coconut varieties and hybrids

Cultivar/hybrid	Yield of nuts/palm	Copra content nut (gms)	Out-turn of copra/palm (kg.)
West Coast Tall	80.15	134.32	10.65
Laccadive ordinary	140.77	159.75	22.39
Laccadive micro	204.75	113.27	21.80
Philippines ordinary	106.85	213.50	22.79
San Ramon	47.2	352.00	16.79
Tall X Dwarf orange	101.79	177.86	18.76
Dwarf X Tall	130.17	209.76	26.98
Tall X Gangabondam	89.50	193.46	17.76

Field tolerance of hybrids to root wilt disease

Name of variety	Total no. of palms studied	Mean disease incidence (per cent)	Average yield of nuts per palm	
			Healthy	Diseased
1.	2.	3.	4.	5.
Dwarf X Tall	241	4.6	111.6	46.4
Tall X Dwarf	263	8.4	89.8	24.1
Dwarf orange	771	18.9	44.6	24.8
Dwarf green	150	7.3	38.4	11.3
West Coast Tall	2964	48.5	26.2	9.1

work taken up recently at the Central Plantation Crops Research Institute has indicated the possibility of bringing down the pre-bearing age of West Coast Tall variety of coconut to about two years. Further work is in progress on this aspect.

Hybrids-more disease tolerant

Coconut and arecanut are prone to the attack of a large number of pests and diseases. Of all the diseases, the root (wilt) disease of coconut which has spread over an area of about 2.5 lakh ha in Central and South Kerala causing an estimated loss of rupees 150 million per annum has shaken completely the economy of the small holders depending largely on the income from their few coconut trees for their daily bread. The disease is of a complex nature and a rod shaped virus, a bacterium and fungi have been found to be associated with it. On the basis of preliminary indications about the field tolerance of one of the coconut hybrids to this disease, a survey was undertaken by the Institute towards the close of 1971 in Trivandrum, Quilon, Alleppey, Kottayam, Ernakulam and Idikki Districts of Kerala state. The results are given below.

The coconut and arecanut planters are well aware of the superiority of these hybrids and varieties, but the extremely limited availability of planting material has set a limit on their widespread use. At this Institute, programmes are now under way to produce superior hybrids and varieties of these crops in adequate numbers using modern methods of seed production.

Mixed cropping and farming

Root studies taken up in coconut have shown that in a unit area of the plantation, only 23 percent of soil on area basis is being effectively utilised by the coconut roots. Seventy four per cent of the roots do not extend beyond two metres from the base. On depth basis 80 per cent of the roots are confined to 31 cm to 120 cm layer of the soil. These indicate that the soil in a coconut plantation is in a position to support a number of other crops provided they are compatible.

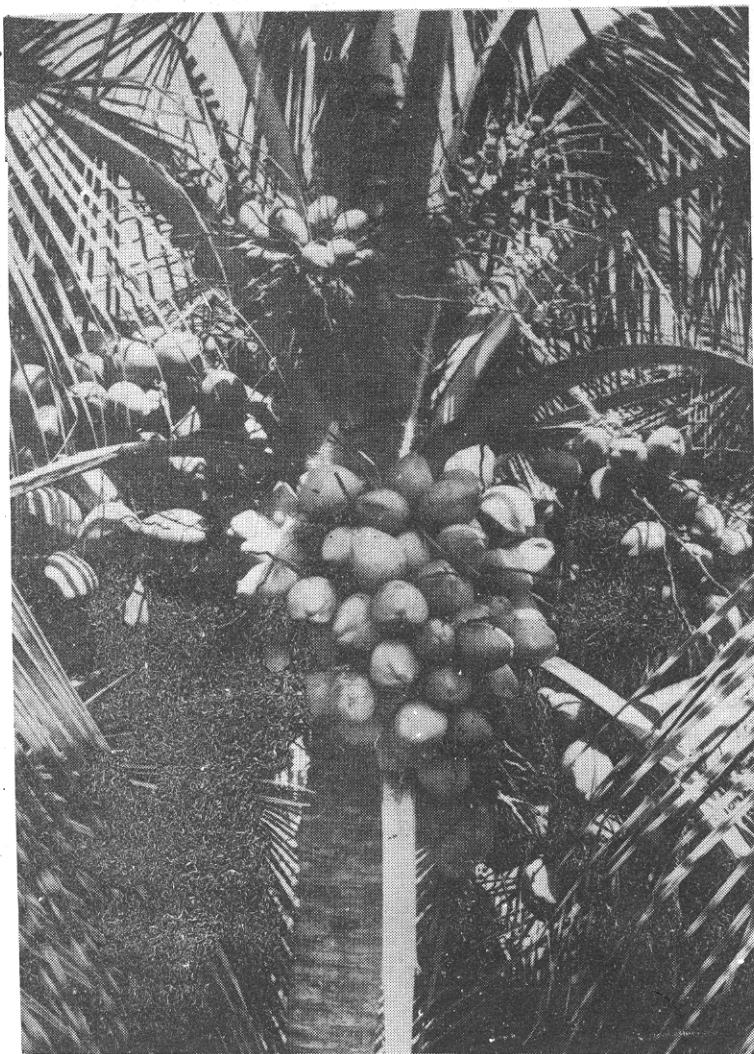
The West Coast Tall variety which requires a manurial input of 0.5 kg. of nitrogen, 0.32 kg. of phosphoric acid and 1.2 kg. of potash per palm per year has been observed to produce a total of 12.67 tons dry matter (moisture free basis) per hectare annually. Of the different crop combinations of coconut and cacao; coconut, cacao and pineapple; and coconut, cacao, pineapple and pepper, the last combination can produce 19.3 tonnes of dry matter per hectare. The surface soil which is not being used by coconut plants also offers favourable situation for raising grass and legumes for rearing milch animals. A project on mixed farming in progress at the Kayangulam Regional Station of this Institute gave an additional net profit of Rs. 2,850 from a hectare of coconut garden during its initial year of operation. There was also a five per cent increase in the standing crop of coconut. The total dry matter production per hectare per year was 26.26 tonnes. With the substantial reduction in the cost of cultivation of coconut in this method

of farming and the higher yield due to the improved management conditions, the net profits from this project will be much higher in due course.

The data indicated that the D & T and the T & D hybrids are tolerant to the disease, the incidence ranging from 4.6 to 8.4 per cent as compared to 48.5 per cent in the common West Coast Tall variety. Another interesting observation is that the few D & T hybrids which are susceptible to the disease get infected mostly after the age of 15 years and therefore the reduction in yield is much low as compared to that of the West Coast Tall which is prone to the disease right from the beginning. It has also been observed that the decline of West Coast Tall palms affected in the early stages of bearing is much rapid as compared to late infection. While the average yield of the diseased D & T palms is 46.4 nuts, the yield of West Coast Tall is as low as nine. It is interesting to record here that in Jamaica, more or less similar results have been obtained by using Malayan Dwarf as one of the parents in the crossing programme against lethal yellowing.

Spices and Cashewnut

In the case of cashewnut and spices such as black pepper and cardamom, India was having a virtual monopoly in the world trade. Of late there has been keen competition from other countries in the production and marketing of these commodities in the international market. An All India Coordinated Research Scheme on Spices and Cashewnut has been functioning and work on solving these has been commenced.



A DxT coconut, hybrid between tall and dwarf

Outlook for the morrow

A concentrated multi-disciplinary research approach now being organised in the plantation crops is expected to remove many barriers that stand in the way of higher production soon. Side by side, the problem of plenty due to higher production, as has happened in the case of arecanut, also needs to be solved. The stabilisation of plantation crop industry under such circumstances will depend upon the cost of production of the commodity so that even at lower prices the cultivator is able to make a reasonable profit.

Development of post-harvest technology for the full utilisation of all the products of the crop including quality standards as required by the international market is essential so that the commodity gets a good price in the market. Adequate market research should also be conducted to have first hand information on market trends, possible ways of price stabilisation and related handling problems. The Central Plantation Crops Research Institute has reckoned with these problems and efforts are being made in this direction.

FERTILISERS AND SEEDS

Fertilisers

In 1947, India's consumption of chemical fertilisers, in terms of nutrient content, was only 7,000 metric tons less than a half pound per acre of gross sown area. From 1951-53 to 1971-72, fertiliser consumption increased from 65,700 tons to 2.6 million (estimated) the latter comprising 1.8 million tons of N, 565,000 of P_2O_5 and 303000 of K_2O . It is estimated that about two-thirds of the fertiliser is used on foodgrains and remaining third on other crops.

Improved Seeds

The high-yielding varieties programme (HYVP), initiated in 1965, has been one of the more successful programmes for increasing foodgrain production. The total area planted to high-yielding varieties increased from 4.7 million acres in 1966-67 to 44.2 million in 1971-72, rising from nearly 2 to 17 per cent of the total area planted to grains. The share of grain production provided by high-yielding varieties is estimated to have increased from about 5 per cent in 1966-67 to between 25 and 30 per cent in 1971-72. Encouraged by the results of the new wheat and rice varieties, Indian scientists now are searching for improved varieties of pulses, oilseeds, and cotton.