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MIXED FARMING IN COCONUT GARDENS

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Soil and climatic features of coconut-growing areas of India are suitable for the cultivation of high value crops. Sparing such land for fodder cultivation alone may not, therefore, be a profitable proposition. However, in the case of forages the economic produce is constituted by the vegetative tissue, and as vegetative growth of crops under shade is reasonably good, there is scope for cultivating fodders along with coconut.

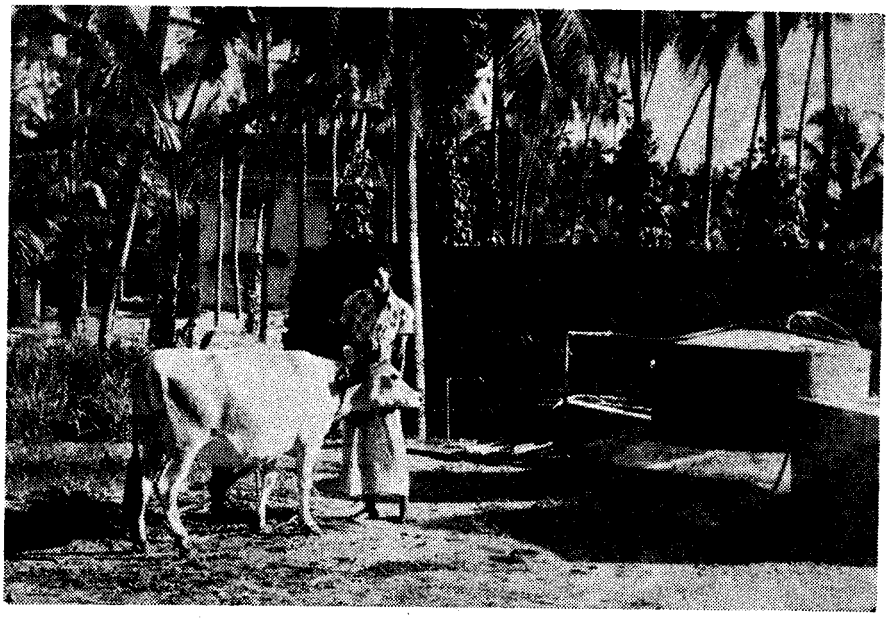
Root studies reveal that both horizontally and vertically, a major part of surface soil in a coconut plantation is left only partially exploited. Studies have also indicated that about 30 per cent of light filters through the coconut canopy at the age of about 30 years. The amount of light increases with further growth of the coconut palm. Fodder crops grown in the interspaces come up well after the 30th year of planting. Because the fodders are mostly surface feeders, there is practically no competition with the root system of the coconut palm.

Mixed farming programme in coconut garden involves fodder cultivation in the interspaces and maintenance of milch animals. The high employment potential that can be generated by adopting this practice is an advantageous factor. Estimates show that the labour requirement of plantation with coconut alone, in a year is around 150 man days per hectare. In a mixed farm it goes up to about 1,000 man days per hectare.

The economics of such a mixed farming unit managed by a farmer family with a holding size of one hectare has been studied in detail. Results show that after accounting for the cost of animals, interest on capital and depreciation, a net family income of around Rs 250 per month is obtainable from the dairy alone. Further, as the intercultural operations are common for both coconut and the intercrop, there is a further saving of about Rs 500 per hectare in a year.

Experiments conducted at the Central Plantation Crops Research Institute show that the fodder grasses, guatemala *(Tripsacum laxum)* hybrid napier, var. NB 21 and guinea grass *(Panicum maximum)* give a yield of 50 to 60 tonnes/ha of green fodder in a year under coconut shade and the legumes, Brazilian lucerne *(Stylosanthes gracilis)* and cowpea *(Vigna unguiculata)*, about 30 tonnes. At a feeding rate of 30 to 35 kg of green fodder to one animal per day, four milch animals can be maintained in one hectare of coconut plantation.

The fodder grasses are planted in rows 50 cm apart and at a spacing of 30 cm within the rows. A fertilizer dose of 50 kg/ha of phosphate and 100 kg of potash is to be given for the grasses at the time of planting. Nitrogenous fertilizers are applied at the rate of 20 kg/ha once at planting and again at the same rate after every cutting. Normally, the grasses are ready for cutting in 45 to 60 days after planting. The best stage of cutting is judged by crop coverage over the area. At any rate, the grasses should be cut before flowering. Once planted, the crop may be retained in the field for a period of three years. Before subsequent planting, the soil may be given a thorough digging to prevent root matting. The legumes are to be planted in rows of 30 cm. The same doses of phosphatic and potassic fertilizers are required for the legumes as in the case of grasses. At initial



The cow — in the scheme of mixed farming

Under coconut trees, hybrid napier 'Gajraj'

sowing, a nitrogen dose of 20 kg/ha is to be given as a starter. Application of nitrogenous fertilizers for legumes is not necessary after subsequent cutting. Brazilian lucerne is a perennial and stands cutting. Fresh sowing is necessary only after a period of three years. In the case of cowpea, harvesting is done at about the flowering stage and the crop allowed to ratoon twice. Harvesting is adjusted for a steady supply of grasses and legumes in the ratio, 3:1 all round the year.

To prevent loss of nutrients, the daily collection of cattle manure should be put back to the soil. Providing summer irrigation is necessary to ensure steady growth of forages.

Effect on Yield of Coconut

There are several agronomic advantages of maintaining a mixed farming unit.

1. There is very little loss of nutrients from the field as those removed by fodder crops are returned in the form of cattle manure.

2. Roots of perennial grasses prevent loss of nutrients by leaching.

3. Fodder legumes add nitrogen to the soil by symbiotic nitrogen fixation.

4. Irrigation water is utilized more efficiently than when the interspace is left fallow.

The combined effect of all these results in increase in yield of coconut also. It has been observed that a minimum of 25 per cent increase in yield can be obtained by such a management practice. Similar yield increase was noted even in the case of palms affected by root (wilt) disease which normally do not respond to application of fertilizers alone.

Biogas from Cattle Manure

About 40 per cent of the dry weight of cattle waste is constituted by carbon. Leaving the manure in the open results in aerobic decomposition of most of this element to carbon dioxide. By storing it under anaerobic conditions, this element is converted to methane. The Gobar gas plant is fabricated to allow anaerobic decomposition of cattle waste and store the resulting fuel gas. Manure from four animals can generate fuel gas enough for a family. Though the cost of installation of the plant is a bit high it requires no running expenditure and the gas is safe and innocuous.

The mixed farming programme in coconut garden is, thus, labour-intensive and ensures steady income for small farmers. By following the management practice involving conservation of nutrients, the yield of associated coconut crop also goes up substantially. This assumes special significance in areas affected by root (wilt) disease in that the affected palms normally do not respond to application of inorganic fertilizer alone.