

II. PROSPECTS OF MULTIPLE CROPPING

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Coconut, in India, is essentially a crop of small and marginal farmers. It is grown in about 5 million holdings in the country. The average size of a coconut holding is as low as 0.22 ha and 98% of the holdings are below 2 ha (Thampan, 1976). Consequently, the income derived from most of the coconut holdings is insufficient to sustain the dependent families. In addition, the sole crop of coconut does not provide an adequate on-farm employment even for family labour.

To achieve increased production of coconut, the emphasis in the past was on adoption of appropriate management practices like fertiliser application, tillage, and plant protection measures. These recommendations did not receive ready acceptance of the small and marginal farmers as it did not provide an immediate increased net return, nor did it generate adequate employment opportunities. One of the feasible ways of increasing the farm level income and employment opportunities on such small holdings is to adopt good management practices for coconut in combination with growing compatible annual or perennial crops in the interspaces (Anonymous, 1977).

The crown shape and the growth habits of coconut necessitate its planting at a distance of about 7.5 m apart or allocating 50-52 m² of land area per palm. This would accommodate nearly 175-200 palms per ha, although in cultivators' garden, the density may range between 200-250 palms or more.

The studies conducted at CPCRI, Kasaragod and elsewhere have shown that the natural resources of crop production, viz., solar energy and soil are not fully utilised by a sole crop of coconut.

Kushwah et al. (1973) studied the rooting pattern of coconut palms growing in three situations, viz., regular tillage and manuring, regular tillage alone, and under neglect. The palms receiving regular cultivation and manuring produced the highest number of roots. About 74% of the roots produced did not have a lateral spread beyond 2 m from the bole. Regular tillage reduced root proliferation to the top 30 cm of soil and vertical distribution of roots was confined mostly to 30-120 cm depth. They found that over 75% of the soil mass in a coconut stand was not being fully utilised by the roots of coconut and that there were possibilities for developing suitable cropping systems for more efficient utilisation of the soil resources in the interspaces of coconut.

Bavappa and Murthy (1961) while describing the morphology of arecanut palm reported that its roots were concentrated within 60-90 cm around the base of the palm. Bhat and Leela (1969) reported that 61-67% of the roots of arecanut palm were found within 50 cm radius of the palm, and only few roots extended beyond 100 cm.

An important requirement for intensive cropping systems is water. The water requirements of crops depend on the evaporative demand of the climate of the area.

Hence the quantity of water required to facilitate growth and yield of a single crop or a number of crops growing in a given area would remain almost the same irrespective of the number of crops grown in that area.

The venetian structure and orientation of coconut and arecanut leaves permit sizable amount of solar radiation incident on the crown to penetrate to lower levels. The extent of this transmission varies with the age of palm, the number of functional leaves on the crown, distance between palms, and system of planting. In a juvenile stand, considerable amount of sunlight reaches the ground. The light incident on the interspaces in coconut stands decreases with the increase in the age of the plantation, and very little light reaches the ground when the palms are about 8 to 10 years old. This intense shaded situation lasts up to the age of 20 years. Thereafter, increasing amount of slant light and filtered light reaches the lower profile of the coconut canopy and at

about 30 years of age about 30% of the total light incident in the area reaches the ground (Nair and Balakrishnan, 1976). The amount of light penetrating the canopy, thereafter, increases with the age of the palms (Figure 1). After attaining maturity there is little change in the spread of the coconut crown although a slight reduction in the size of the fronds may occur. The canopy coverage of the ground progressively decreases with the increase in the height of palm and the resulting increase in the amount of sunlight from the slant rays.

The analysis of the above characteristic features of coconut and arecanut palms suggest the scope for taking up intensive cropping in the interspaces of these palms with compatible crops.

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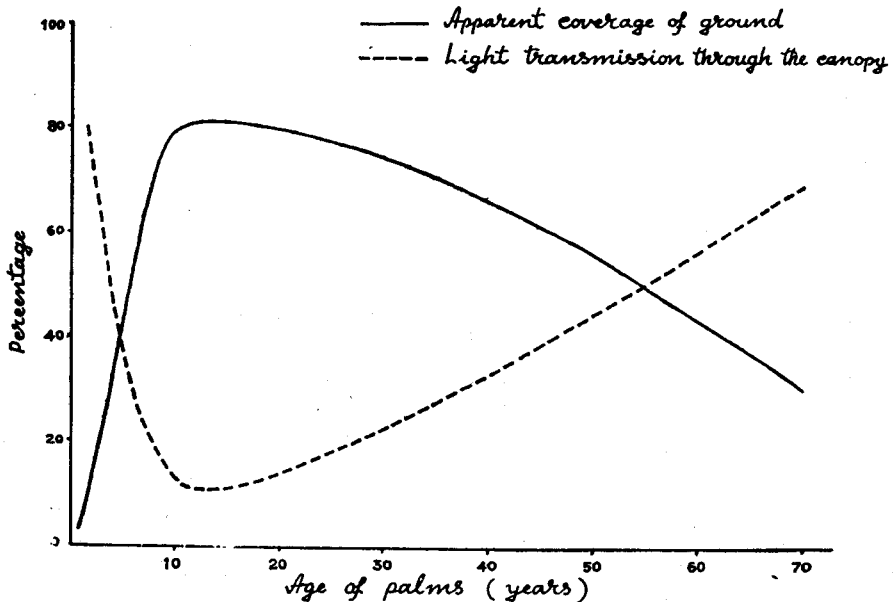


Figure 1. Apparent coverage of ground by coconut canopies of various age groups
Source: Nelliath et al., 1974

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