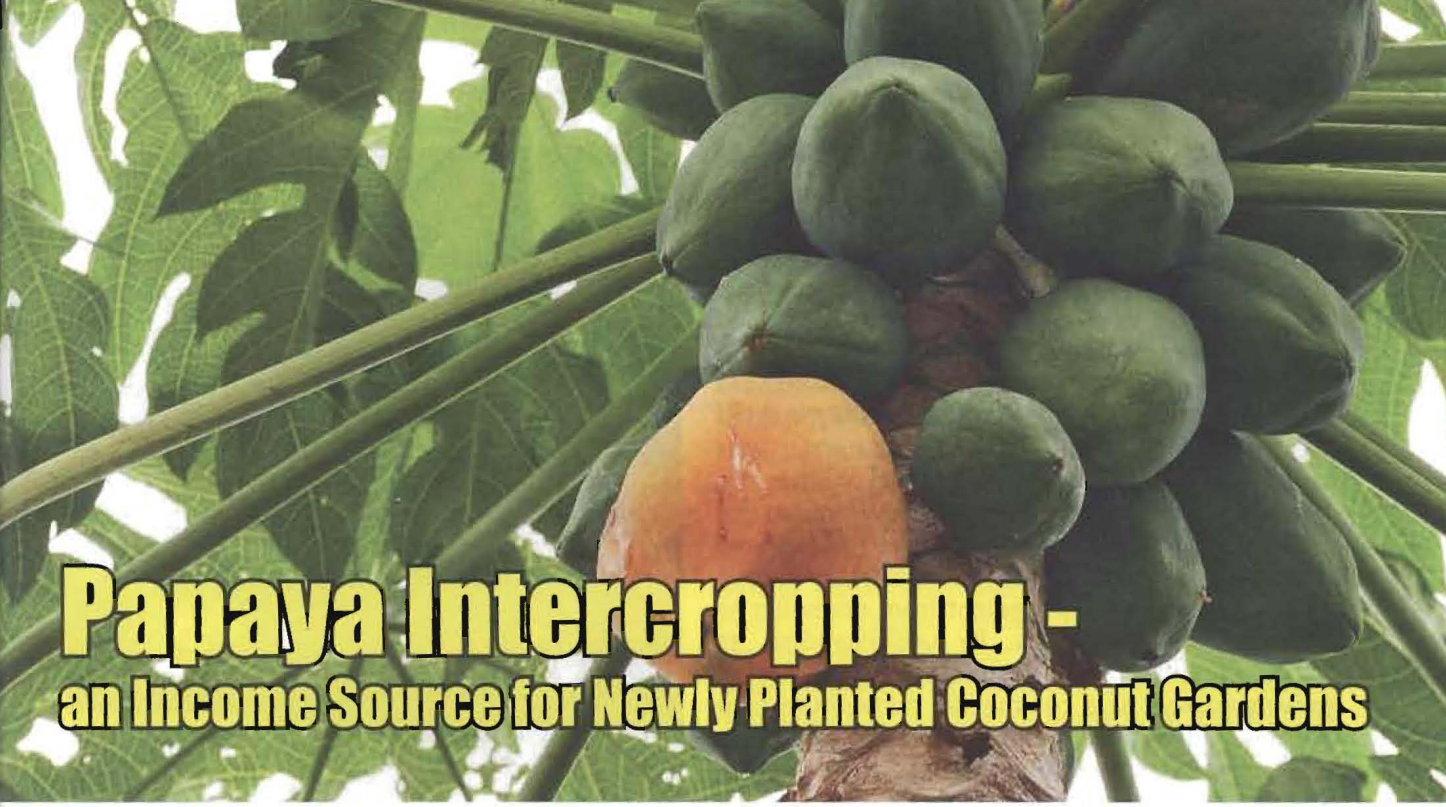

# Papaya Intercropping - an Income Source for Newly Planted Coconut Gardens

**K.Nihad[1], V.Krishnakumar[2] ,M. Rajkumar[3], A.Abdul Haris[4], and Ravi Bhat[5]**

[1,3,4] ICAR-Central Plantation Crops Research Institute, Regional station, Kayamkulam, Kerala,India

[3,5] ICAR-Central Plantation Crops Research Institute, Kasaragod, Kerala,India

Coconut is the main plantation crop in coastal India and coconut based cropping system is the major integrated farming method where the families depend on the base crop and other subsequent enterprises for their nutrition and livelihood security. Large number of senile and old palms, lack of proper spacing and non adoption of scientific management practices are some of the major reasons for the low productivity of the palms. Unlike other plantation crops, the unique canopy structure and root distribution of coconut palms provide ample scope for accommodating other crops in the interspaces. During its initial growth phase light is not a limiting factor in the coconut gardens where we can include light demanding crops as well. Coconut plantations as a sole crop are not remunerative during their initial growth phases. Depending on the varieties cultivated, it has a longer juvenile phase of three to six years where planting suitable intercrops is the only way for income generation, food and nutritional security. In this regard, papaya (*Carica papaya L.*) is an ideal fruit crop that can be intercropped which can generate sufficient income to the farmer from

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very early stage of coconut cultivation. Around fourty percent of the area in juvenile plantations can be utilized for planting papaya. It has a rapid vegetative growth and starts bearing fruits within three to four months of its growth with an economic life span of two to three years. The fruit has gained higher commercial value due to its high nutritive and medicinal properties. The ripe fruits are rich sources of vitamin A and C. Papain extracted from the dried latex of immature fruits has many industrial uses such as meat tenderiser, chewing gum additive, for degumming natural silk and to give shrink resistance to wool. Unripe fruits are also processed and canned for bakery products such as tuti-fruti. Papaya fruits are a preferred ingredient from cosmetics to pharmaceutical industries. By understanding its market potential, many farmers have now started growing papaya as a commercial horticulture crop which is evident from the substantial increase in the area under the crop during the past decade with a compound annual growth rate of 6.2%.It is an ideal intercrop in juvenile coconut plantation because of its early and continuous fruiting till the coconut palms come to bearing stage.


Var. CO.8

## Selection of varieties

Papaya, native of Central and South America belongs to Caricaceae family in which the plants are either dioecious (male and female flowers produced in different plants)or gyneocious (female plants) or gynodioecious (both male and female flowers produced in same plants). Since many papaya varieties are dioecious in nature, selection of a variety is the most important step in starting its commercial cultivation as gyneocious and gynodioecious varieties alone produce fruits. Red Lady (Taiwan 786) is a suitable gynodioecious variety for starting commercial cultivation of papaya in juvenile coconut plantations. The variety Co 8 (variety released from TNAU) also has preferred fruit qualities and comes up well in the interspaces of coconut gardens, but its dioecious nature makes it a less profit crop as its bearing nature will be exhibited only during its fruit bearing stage.

## Planting

Around one month old healthy seedlings are used as planting material. For this quality seeds from approved agencies are procured and sown in polybags (15cm x 20cm size) or protrays filled with potting mixture (soil, sand and dried compost or cowdung in 1:1:1 ratio). It can also be sown in raised seedbeds of 2m x 1m and 15 cm height. Seeds start germinating in two weeks time. Soaking of seeds for 8 to 10 hours in 100ppm giberrelic acid solution (100mg in 1 litre water) ensures better germination. Vegetative propagation by mound layering can also be adopted in papaya for multiplication of planting materials from productive plants.

Single row of papaya seedlings can be planted in pits taken at a distance of 3.5m away from the basin of coconut palms. It can be planted in pits (30 cm x 30 cm x 30 cm) which are taken 2 m apart. Pits are filled with top soil along with vermicompost (2.5 kg) and neemcake (0.5kg) and seedlings are planted. For dioecious varieties such as CO 8, three to four seedlings are planted in a pit and once starts flowering, all the plants except a single healthy female plant is retained in the pit. Retention of male plants in 1:10 ratio is recommended for higher fruit yield in dioecious varieties.

## Manuring

Papaya can be grown with organic inputs or integrated nutrient management practices. Under integrated nutrient management, apart from basal inputs, inorganic fertilizers such as urea (90g), rock phosphate (200g) and MOP (130g) can be given per plant at bimonthly interval. Additional dose of

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*Var Red Lady*

10 to 15 kg/plant dried cowdung can be given after one year of planting. Under organic cultivation, in addition to basal dose of organics, vermicompost (2.5 kg/plant), bone meal (100g/plant) and sulphate of potash (150 g/plant) can be supplied at bimonthly interval. Growing papaya plants in the interspaces through organics enhances the soil organic matter content thus helping in better soil aeration, root development and establishment of the coconut garden.

## Disease management

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## Organic nutrient management for Nematodes- a major threat for papaya intercropping

Plant-parasitic nematodes of Meloidogyne species (root knot nematode) are the most economically damaging pests of horticultural crops causing an estimated loss of US$100 billion globally on an annual basis. Root-knot nematode (Meloidogyne incognita) causes serious damage to the crop growth affecting vigour and premature death of plant. Nematode attacked plants are vulnerable to secondary infections by soil borne fungi and bacteria. It also results in the breakdown of resistance against plant pathogenic fungi. During the experiment conducted at Regional Station of Indian Council of Agricultural Research- - CPCRI, Kayamkulam, Kerala, it was observed that the plants grown under organic nutrient management showed lower disease incidence of root knot nematodes (25-40%) with lesser gall index (1.8). The plants supplied with only chemical fertilizers recorded higher incidence (35 -80%) of root knot nematode infestation with more gall index (3.5). The reduction in disease incidence of Meloidogyne incognita in organic papaya may be due to the presence of higher number of free living nematodes and nematicidal properties of organic matter.

## Economics of cultivation

In one hectare of juvenile coconut plantation, approximately one acre area can be utilized for intercropping papaya. This will accommodate on an average of thousand plants. Papaya starts flowering in three months and harvesting of fruits can be commenced from four to five months after planting. We could harvest a minimum of 22 fruits per plant in the first year of fruiting. The total cost of cultivation in the first year includes cost of seeds, sowing, nursery management, land preparation, application of inputs and planting of seedlings in the interspaces of coconut gardens. These activities incurred Rs.1,26,000/- . Total fruit yield from 1000 plants was about 30,000 kg per year. At an average price of Rs.12/kg, the gross income from the system comes to Rs.3,60,000/- . The net return was about Rs. 2,34,000/- per hectare basis. ■