

COCOA – A PERFECT COMPANION WITH COCONUT

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Coconut is a versatile tree crop- growing in the cocoa growing states of our country. It is grown in an area of 19.40lakh ha. with a production of 15840 million nuts per year. Cocoa is cultivated in 56,515 ha in the states of Kerala, Andhra Pradesh, Tamil Nadu and Karnataka. Ninety percent of area under coconut is concentrated in these four states. It is one of the most compatible inter crops suitable for cultivation in the partially shaded inter spaces of coconut gardens. Low productivity and rise in cost of cultivation are the major constraint faced by coconut farmers. Cocoa can be cultivated in coconut gardens with less cost and high income. Studies conducted at CPCRI and KAU reveal it that this is a good combination and it is generally considered that any area suitable for cultivation of coconut is suitable for cocoa also.

If we analyse the demand and supply of cocoa in the county, the demand for cocoa beans and cocoa products has been growing at a rapid rate of 15% to 20% per annum. At present there are 10 multi-national companies in the field of cocoa industry with a capacity to process 30,000 MT of dry cocoa beans per year. The current domestic production of cocoa beans is 14,436 MT only which is not sufficient to meet even 50% of the requirement. Thus, there exists a wide gap in the demand and supply of cocoa in our country. India had to import nearly 15,000 MT of cocoa beans along with cocoa products to make up the short fall. Cocoa is also an export oriented commodity. India has gained foreign exchange of more than Rs.223.29 crores during 2007-08 to 2009-10 by way of export of cocoa products. Due to the high demand for cocoa in the market, now farmers are

getting remunerative price on sustainable basis for the last ten years. All these show that there is an immense scope for expansion of cultivation of this crop in our country especially as an inter crop in the coconut gardens.

Why coconut gardens are suitable for cocoa cultivation

Coconut as a mono crop does not fully utilize the basic resources such as soil and sunlight available in the garden. In scientifically planted coconut garden with a spacing of 7.5 m, 75 per cent of the planted area is left unutilized owing to the specific distribution pattern of the root system. Coconut palm, like other monocots, has a typical adventitious root system. Under favorable conditions, as many as 4,000 to 7,000 roots are found in the middle aged palms. About 74 per cent of the roots produced by a palm under good management do not spread beyond 2m lateral distance and 82 per cent of the roots are confined to 30 to 120 cm depth of soil. Thus, the active root zone of coconut is confined to 25 per cent of the available land area and the remaining area could be profitably exploited for raising cocoa. The feeding roots of cocoa grows laterally from the tap root up to 1.2-1.5 meter around the plant at a depth of 15-20 cm. in the soil surface. Hence there will not be any competition for nutrients by roots, if cocoa is planted in the inter spaces of bearing coconut garden.

The space utilization of coconut is very low and plenty of sunlight infiltrates and fall on the ground which remain unutilized.

The venation structure of the coconut crown and the orientation of leaves allow part of the

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incident solar radiation to pass through the canopy and fall on the ground. As much as 56 per cent of the sunlight is transmitted through the canopy during the peak hours (10.00-16.00 hrs) in palms aged around 15 years. The diffused sunlight is ideal for growing cocoa in the interspaces.

In India coconut is predominantly cultivated in small and marginal holdings. Cocoa also produces pods throughout the year enabling the farmers to earn regular income like coconut palm. As per the experience of farmers, the average regular income per acre per year of cocoa tree is around Rs.30,000/-. This can be increased from Rs.80,000 - Rs.1,00,000 by adopting scientific management practices.

Cocoa tree produces large number of leaves and shed it on regular intervals. Besides, pruning is an essential operation in cocoa and this helps to increase the availability of organic waste in the garden. This helps to increase the organic matter content in the coconut garden and thus improving the health and nutrient status of soils of coconut gardens. A study conducted at the Cadbury-KAU Co-operative Research Project (CCRP) revealed that total annual litter fall from cocoa in partially shaded conditions will be 5.3 tones per hectare, which will add essential plant nutrients like 66.72 Kg. N₂, 4.97 Kg. P₂O₅, 59.72 Kg. K₂O and 40.27 Kg. MgO to the soil. In the light of the commonly noticed deficiency of Potassium and Magnesium in most of the coconut gardens especially in the root wilt affected areas, introduction of cocoa as a companion crop not only improves the health of the soil but also increases the productivity of coconut by supplying these essential nutrients on sustainable basis in coconut gardens.

Cultivation of cocoa in coconut gardens help to reduce the weed growth in garden which is one of the serious problems faced by the coconut growers due to the high labour cost and non availability of labourers. When cocoa is grown as

an inter crop the canopy of cocoa spreads in a span of about three years, after which the extend of sun light reaching the ground is reduced considerably. This will provide a micro climate in the coconut garden with maximum conservation of water in the soil.

The cost of production of cocoa is very less, compared to coconut. A farmer from Idukki district, Kerala made a comparison of labor cost of coconut with cocoa. According to him an amount of Rs.2000/- should be spent as labour charge for getting an income of Rs.10,000/- from a coconut garden while by incurring an amount of Rs.1000/- towards labour cost, an amount of Rs.60,000/- can be earned from cocoa crop. Besides integrating cocoa in coconut holdings will provide gainful employment opportunities for the family labour throughout the year and generate sufficient income to meet the family requirement. The highly fluctuating price of coconut is one of the serious problems faced by coconut growers even though they are getting an ever recorded higher price since the last nine months. Mixed cropping with cocoa is an alternative to protect farmers from price instability in coconut and make coconut farming viable and sustainable.

Planting cocoa in coconut gardens

In a coconut garden planted at 7.5m x 7.5m, spacing with an age of above ten years cocoa can be planted at a spacing of 3m between plants in a single row system in the middle of two rows of coconut palms. Besides, in between each coconut plant in a row one cocoa plant can also be planted. Thus about 500 cocoa plants can be accommodated in a hectare of coconut garden. Six month old F1 hybrid seedlings or grafts of recommended variety are generally advised for planting. The best season for planting is during the monsoon season (June-July). But in places where irrigation facilities are available planting can be done throughout the year. Pits of size 50cmx50cmx50cm should be prepared for

planting at the onset of monsoon. The pits should be filled with mixture of top soil, compost/ farm yard manure just before planting and a small planting hole should be made at the centre of the pit. The planting hole should be at least the same size as to hold the basket or polythene bag in which seedlings are raised. While planting care should be taken to plant the seedlings on the soil surface rather than in deep pits since the feeding roots of cocoa confine to the surface irrespective of the zone at which seedlings are initially planted.

Care and management of cocoa plants in coconut garden

Application of organic manures will be useful in the early establishment period. It is not necessary after about three to five years as cocoa litter will be a rich source of organic matter. An annual application of 100g N, (216g urea) 40g P₂O₅ (195g rock phosphate) and 140g K₂O (228g Muriate of potash) per plant per year in two equal split doses is recommended. During the first year of planting the plants may be given $\frac{1}{3}$ rd of the above dose, while the second and third year $\frac{2}{3}$ rd and full dose of fertilizers can be applied. While applying manures and fertilizers, care should be taken to open only shallow basins around the plants (radius of 1.5m for adult cocoa) to avoid serious damage to the surface feeding root system. The radius of the basins should



A Coconut garden intercropped with cocoa

be proportionately smaller for young cocoa. Providing adequate irrigation helps in increasing the yield by about 30 % both in mono as well as an inter crop. The garden should be

irrigated once in a week in dry months.

Pruning is an important continuous operation in cocoa. The chupon or vertical branch of the seedlings terminates at the



Bearing Cocoa plants. A farmers garden, from West Godavari A.P.

jourquette when four or five branches develop. Further chupon develops just below the jourquette and continues its vertical growth till another jourquette develops and so on. When the first jourquette develops at a height of 1.5m, the canopy will form at a height convenient for harvesting and other operations. It is desirable to limit the tree at that level by periodical removal of chupon growth when it is planted as inter crop in coconut garden. Operations like harvesting, spraying etc. will be easier if the height of the tree is kept at the first story level. Generally three to five branches develop at each jourquette. When more branches develop one or two weaker ones have to be removed. Similarly overlapping branches also have to be removed for facilitating uniform light. In coconut gardens, where cocoa is planted as stated above, the climate and soil, allow a continuous growth of the cocoa trees and will form a jourquette within 6-9 months of planting. The canopies will meet at a spacing of 3 x 3m within 18 months and the 1st crop may be obtained towards the end of 2nd year or by the beginning of the 3rd year.

Economic Analysis

On an average minimum 30 fresh pods per tree are obtained every year from a cocoa tree. Ten pods will give 1 kg wet beans and 3 kg of wet beans give 1 kg of dry beans. The potential yield that can be obtained by adoption of scientific management practices will be 100-200 pods per tree. The average production per tree according to the cocoa farmers from Idukki district of Kerala is 3 kg. Dry beans or 90 pods per tree and trees producing up to 150 pods per year are also available. As per the present price the farmers will get Rs. 40/- per Kg for wet beans and Rs. 150/-per Kg. for dry beans. The minimum average additional income per acre of coconut garden 4-5 years after planting of cocoa will be Rs. 30,000/-.

There is immense potential of cocoa cultivation in the coconut growing areas of our country especially in the irrigated coconut gardens. Such areas are available in the states of Kerala, Tamil Nadu, Pondicherry, Andhra Pradesh, Orissa and West Bengal. The present production of Cocoa



Coconut based cropping system with banana and cocoa as intercrops.

in our country as per 2010-11 estimates is 14436 MT only. Ten multi-national companies engaged in cocoa industry in our country requires 30,000 MT of dry cocoa bean per year. We have 19.40 lakh ha. of coconut garden. If the cultivation of cocoa is taken up in 10% of coconut garden we can produce our requirement here itself. This will ultimately increase the income of coconut farming too.