

# Problems and prospects of coconut cultivation in Kerala

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Coconut is the most popular crop to the people of Kerala and the crop plays a very important role in the socio-economic development of the state. Among the leading coconut producing states in India, Kerala rank first both in area and production of coconut. Presently coconut is cultivated in the state in an area of 7.88 lakh hectares with an annual production of 3992 million nuts (2010-11). Coconut sector contributes to around 21 percent of total agricultural GDP of Kerala, thus inextricably linked to the agricultural economy of the state. However it is paradoxical to note that the average yield of this crop in the state is very low (32 nuts per tree) and a declining trend in area and production of coconut is noticed. As in the case of other crops, the yield realized by the farmers from coconut is only 30 to 40% of the potential yield reported under ideal management conditions. Kerala's share in the total production of copra in the country has declined to 46% from the 90% which was existing fifteen years ago. The area under coconut has been shrinking continuously since 2000 due to various factors. It has declined from 898 thousand ha to 788 thousand ha in Kerala during the period from 2005-06 to 2010-11 (Table 1). Similarly the production in the state has come down to 3992 million nuts in 2010-11 from 6326 million nuts in 2005-06 with a negative average growth rate of -7.9%.

Shift in cultivation to other more remunerative crops like rubber, high cost of cultivation and low return from coconut, prevalence of pests and diseases like root wilt, bud rot, etc could be the reasons for the negative growth rate in area and production of coconut in Kerala. It is also noteworthy that, being a land scarce economy with high land prices, Kerala faces the danger of diversion of land resources for other profitable ventures notably real estate and other developmental initiatives. Rapid urbanization is undergoing in the state which causes conversion of coconut area for housing and construction of commercial building, roads etc. Hence the magnitude of shortfall in production in Kerala, the major coconut producing state is much higher than the earlier estimates because of reduction in area. Besides the depressed price

prevailed in the last few years, shortage of labour, high wages and incidence of diseases have caused negligence of this crop by the farmers and resulted in decline in production. The change in climate pattern and shortage of labour also affect the crop management in the state. Rain fed nature of the crop is considered as one of the major reasons for low productivity of coconut in major coconut growing states. There is ample scope for wider adoption of irrigation system in the country especially in areas where rain fall is scanty and water is the limiting factor and thereby enhances the production and productivity of coconut.

## Constraints in profitable coconut farming

Coconut in Kerala is essentially a homestead crop and forms the main component of various crops

**Table 1. Area, production and growth rate of coconut in Kerala**

Year	Area (000' ha)	Production (million nuts)
2005-06	898	6326
2006-07	873	6054
2007-08	819	5641
2008-09	788	5802
2009-10	788	3992
2010-11	788	3992
<b>Average Growth Rate</b>	<b>-4.24</b>	<b>-7.9</b>



*Coconut garden intercropped with pepper, nutmeg and banana*



*Chowgat Green Dwarf - a variety with high resistance to rootwilt*

grown by the farmers. Small size of holdings is the characteristic feature of land holdings in Kerala. Most of the holdings are less than 0.1 ha. and only few farmers possess holdings of size above 0.40 ha. Since the size of holdings is small and most of these are homestead gardens it could not generate adequate income to support the dependant families. Shortage of farm workers and high labour charges also force the farmers to ignore the timely adoption of agronomic practices and regular harvesting. This results in the neglect of adoption of management practices especially in small holdings leading to low productivity and high cost of production.

High density of over 200 plants per hectare is common in small holdings of Kerala. The crowded plant population coupled with poor adoption of management practices causes low productivity. The potential of coconut palm to provide yield without any management inputs prompt the farmers to leave the farm under neglected conditions. Another reason for the low productivity in coconut is the prevalence of old, senile and unproductive palms. It is estimated

that more than 10% of the palm population is over aged. Apart from these, coconut small holdings are facing the problem of overcrowding with perennial trees which cast shade on the palms.

Therefore, the massive replanting and rejuvenation programme implementing in three districts on pilot scale should be extended to other districts also for encouraging farmers to cut and remove the over aged palms and regulating the palm density and to undertake replanting. The budget provision for extending this programme to all the districts of Kerala is a positive step. This would definitely pave the way for higher production and productivity of coconut.

Root (wilt) is considered as the largest single factor which contributes to low productivity of coconut in Kerala. The experiments conducted at farmers' field have shown that disease-advanced palms never respond to any kind of management practices. Juvenile palms that contract the disease before the onset of flowering seldom give yield. There are no proven measures to control the

disease. These observations necessitate the removal of all infected juvenile palms and bearing palms in advanced stages of disease which are yielding less than 10 nuts per year. Massive programme for cutting and removal of affected trees and adoption of better management practices to the diseased trees in the initial and middle stage in a time bound manner is the only solution to contain this malady.

Rain fed nature of the crop is considered as one of the major reasons for low productivity of coconut in major coconut growing states. There is ample scope for wider adoption of irrigation system in the state which enhances the production and productivity of coconut. Even though the state receives abundant rainfall to the extent of about 3000mm/annum, its distribution is not uniform throughout the year. From December to May the state receives very little or no rain. As a result, the state experiences severe water scarcity. This very often results in the reduction of yield during the lean periods. Out of various methods of irrigation for

coconut, the drip irrigation system along with fertigation is found to be best suited with maximum water saving and fertilizer use efficiency. Under drip irrigation, water saving up to 36% and fertilizer use efficiency can be increased compared to basin irrigation. Scarcity of on-farm water sources and capital with the farmers for developing such sources and irrigation system are constraints experienced by farmers in practicing summer irrigation.

Though organic manure application is practiced by majority of farmers, the application of inorganic fertilizers to the recommended level is practiced only by few farmers. Most of the holdings follow traditional cultural practices. Severe infestation of this lethal pest, red palm weevil is noticed in coconut gardens which is a major problem faced by the farmers in growing new palms for reviving coconut gardens. Massive plant protection campaign to suppress this pest attack is essential. Plant protection and fertilizer application are yet to be adopted on a wider scale. One of the reasons for this low level of adoption is high cost of fertilizers and difficulty in getting the trained persons for applying plant protection measures. The limitations in the areas of plant protection and fertilizer application should be removed by providing financial assistance through development programmes. Difficulty in getting the services of trained climbers to plant protection measures in time and high cost of labour is also unaffordable. As per the estimation of CPCRI (2011-12) the cost of production of coconut

**Table 2. Cost of production of coconut**

Inputs	Input quantity per ha	Rainfed (Rs)	Irrigated (Rs)
Labour charges*	120 days	39000	39000
Labour cost for Irrigation*	20 mandays	0	6500
Fertilizer cost	Package of practice recommendation	6793	6793
Organic Manure cost	Package recommendation	13200	13200
Plant protection cost	Approximate	2100	2100
Miscellaneous expenses	Approximate	1800	2700
Overhead charges	10% of sum of above costs	6289	7029
Total cost per ha		69182	77322
Average Yield (nuts/Ha)**		12250	15750
Cost of Production(Rs/Nut)		5.64	4.91

**Source:** CPCRI, Kasaragod.

\* Wage rate used for the above calculation is Rs.325/day

\*\*Calculated @70 and 90 nuts per palm per year for rainfed and irrigated coconut respectively. Number of palms per ha is 175.

in Kerala from a well-managed coconut garden under rain-fed condition is Rs 5.64 per nut and in the case of irrigated coconut it is Rs 4.91 per nut. It is estimated that the cost of cultivation in holding of size of one ha. is Rs.69,182/- under rain-fed and Rs.77,332/- under irrigated conditions. About 58 percent of the total cost is incurred due to labour charges. Similarly the share of labour cost in total cost of cultivation in the case of rain fed coconut is 56 percent. This shows the higher per unit labour charges prevailing in Kerala, which can be attributed to higher labour demand and higher cost of labour in the state. Currently, wage rate prevailing in Kerala is around Rs.500 per day, which is one of the highest costs prevailing for agricultural labour in

India. Around 28 and 30 percent of the total cost is for purchasing manures and fertilizers and for plant protection chemicals for rain fed and irrigated coconut. The data shows that high cost of production and low profitability especially from small holding is the main problem experienced in the state. Besides, the fall in price prevailed during the last few years had also affected the crop management in the sector.

Timely harvesting is another difficult task because of shortage of trained climbers. In many gardens where the harvesting frequency was 8-9 trees a year, has now come down to six times or even less. This problem is more serious in small holdings where farmers have to pay higher wages because of limited number of trees. The

harvesting charges go up and presently it varies from Rs. 20 to 25 per tree per harvest. The initiatives of the Board in conducting massive training programme in palm climbing using mechanical device is useful to solve the problem to a certain extent.

Even though a number of high yielding hybrid and early bearing dwarf varieties are recommended in the state for commercial cultivation, the farmers does not prefer them in place of local tall cultivars for planting on large scale. Non availability of sufficient quantity of planting materials of these varieties to meet the demand of farmers, undesirable traits of few hybrids like alternate bearing and instances of declining trend in productivity after a few years of initial yield discourage farmers for wider adoption.

### **Opportunities for enhancing productivity**

Since the land holdings of coconut farmers are very small, the only way for enhancing on -farm income is by promoting coconut based farming system. Integrate coconut farming with inter/ mixture cropping with high value crops like cocoa, nut mug, pepper, tuber crops and vegetables. Livestock rearing, homestead fisheries, floricultural crops, pollination support through bee keeping etc. are additional income generating activities which need to be promoted. Mushroom cultivation using coconut waste, copra making, coconut based homemade products, farmer participatory group marketing of tender coconut and coconut based food products etc. are some of the

potential enterprises. It is suggested that coconut based farming system as a strategy is to be strengthened and popularized to make coconut farming especially in small holdings economically viable. Financial assistance extended under NHM can be made available to the farmers for adopting coconut based farming system by integrating the implementation of suitable NHM and CDB schemes.

Among the hybrids released for commercial cultivation, Kalpa Sankara (CGDxWCT) is relatively tolerant to root (wilt) disease and is recommended for cultivation in the root (wilt) affected tracts. Kalparaksha (MDG) and Kalpasaree are the other tolerant varieties, recommended by CPCRI for root wilt affected areas. In order to promote replanting/ under planting with quality seedlings the nursery programmes in the state both private and public sector may be linked with the replanting programmes to make available seedlings to farmers for replanting. The nursery programme should be targeted to produce and supply only high yielding hybrids or selected ecotypes which are suitable for cultivation under different agro climatic conditions. Planting of dwarf varieties in new locations as well as in existing gardens where space is available should be encouraged for ensuring regular supply of tender nuts. Several exotic varieties MGD, Philippines ordinary, Jawa, Figi and Cochin China are found best suitable for cultivation in Kerala. Commercial production of planting materials of these varieties is also need to be promoted.

The technologies developed by research for effective control of leaf rot, a major disease affecting root (wilt) affected coconut gardens and disease management practices is yet to be adopted on a wider scale. Massive plant protection campaign on cluster basis need to be taken up at the severe stages of its infestation at least twice in a year to check the disease and enhance the productivity of root wilt affected palms. Bud rot and red palm weevil are another lethal disease and pest affecting the coconut garden. Timely adoption of plant protection measures at the peak stage of its infestation in endemic areas is very essential to protect palms. Crop surveillance and timely forecast of disease incidence should be carried out by the research and development agencies in endemic areas. Difficulty in getting the service of skilled climbers to apply the chemicals in time and general reluctance of farmers to use chemicals are the reasons for low level of adoption of plant protection measures. Efficient bio control measurers of leaf rot and bud rot is yet to be developed. Pheromone traps developed for the management of the pest, red palm weevil could be utilized on community basis for suppressing the outbreak of the pest in endemic areas. Installation of pheromone trap @1 trap/ha. in coconut trunk at a height of 2 meter from the ground is very effective to mass trap and destroy the weevils. This technology should be taken up on community basis especially in the areas where cutting and removal palms are being taken up where the pest infestation is severely noticed. Initiatives taken by the Board in conducting massive training programme "Friends of Coconut

tree “is found successful to meet the demand of skilled labourers to a certain extent. This programme should be continued to generate adequate skilled climbers to carry out timely plant protection measures.

Since coconut is a traditional crop in Kerala, the continuous cultivation without adequate plough back resulted in poor fertility status of soil. This situation could be retrieved only through adoption of integrated nutrient management practices. Fertilizer application should be based on soil/foliar analysis and applied at the right time during the end or at the beginning of heavy rains along with application of sufficient quantity of organic manures. CPCRI has recommended standard of NPK+Mg and other micro nutrients like Boron, taking into account the different agro climatic conditions. Labour intensive method of application by opening circular basins around the tree in every year may be replaced with equally effective method of application of fertilizers in a circle of about 1.75 meter radius around the palm, lightly digging in and mulching with husk, coconut leaves and fertilizer application associated with weeding will reduce the cost. Carrying out the management practices in farmer groups also help to reduce the cost of production as experienced by farmers' collectives. The financial assistance extended under MGNREG scheme could be made available to the farmers to reduce the high cost of labour in the state.

Water is the most important input-factor for enhancing the nutrient uptake capacity of the tree. Majority of the coconut gardens in

the country are rain fed. In order to maintain steady yield and a congenial micro climate condition in the garden, it is necessary to mitigate the water stress conditions with proper irrigation. It has been established that drip irrigation with fertigation unit will go a long way in increasing production and productivity. Fertigation is an efficient method of fertilizer application through irrigation system. Soluble fertilizers like urea, ammonium phosphate and muriate of potash recommended for coconut can be applied through fertigation. Studies conducted at CPCRI indicated that 50% of the recommended dose of fertilizer is sufficient, if it is applied through drip system. There is need to provide assistance to the coconut sector and hence the scheme proposed under national micro irrigation mission needs to be implemented in coconut gardens by converging with coconut development programmes. Coconut economy is presently depending on the price of coconut oil, which is highly unstable. Such dependence on a single product should be minimized through the promotion of farm level and community level processing of diversified products and by-products obtained from coconut palm. Tender coconut marketing is one of the profitable activities which need to be promoted in the state. Farmer's collectives as well as enterprising youths are to be supported in organizing marketing outlets in potential areas for tender coconut. Another profitable area yet to be utilized in the state is production of neera and palm sugar. Tapping of coconut for toddy is practiced in many households in selected palms. Technologies are now available for preserving and

packing coconut sap as 'neera' or sweet toddy as non-alcoholic healthy drink. As in the case of other coconut growing countries like Indonesia and Thailand tapping could be permitted in the state and farmers organizations could be encouraged for producing coconut sugar in attractive packing and can explore the domestic and international markets. This not only improves the farm level economy of farmers but also create opportunities for employment to the rural youth in the state. Another critical component noticed in promoting coconut production is guaranteed procurement of coconut and copra at remunerative price. The growth of production must be supplemented with guaranteed procurement and remunerative price for the farmers.

Though coconut farming is so popular in the state, it does not attract the attention of farmers, as a result of the prevailing socioeconomic constraints to profitable production. Increasing productivity of coconut in the state is one of the main strategies for enhancing coconut production in the country to meet the increasing demand. The constraints in enhancing productivity are poor cultural management, slow spread of high yielding hybrid and dwarf varieties, lack of diversity in product utilization, high cost of production, low profitability and declining interest in farming. The technologies developed by research viz; new cultivars, profitable production system and integrated pest and disease management requires wider adoption in the field. Several limiting factors could be tackled successfully to make coconut farming attractive and profitable in Kerala.