

# Restructuring Coconut Based Homestead Farms for Sustained Productivity

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## Introduction

**L**imitation of land resources and ecological imperatives have led to the evolution of the characteristic homestead farming system of Kerala, wherein farming is concentrated in and around the farmers' home. Cultivation of various kinds of crops in small and fragmented land holdings makes the agricultural scenario of Kerala state altogether different when compared to other states, where some kind of commercial cultivation is being practised. In Kerala, more than 80 per cent of the cultivated area comes under homestead farming and majority of the homesteads are small in size (more or less 0.5 ha) and traditionally coconut-based. Since coconut is the predominant crop in the homestead farms, its low productivity is continuing to be one of the most serious problems faced by the farmers. This is aggravated by the incidence of various pests and diseases and the presence of senile and unproductive palms.

Various studies on the structure of homestead farms have indicated that they generally follow a multilayered canopy arrangement. The first layer consisted of plants under 2 m height, such as vegetables, tuber crops, rhizomatous spices,

grasses, medicinal plants and ornamentals. The second layer consisted of crops such as banana, papaya and trees such as short varieties of arecanut palms, mango and cacao between 2 and 10 m in height. The uppermost layer constituted trees over 10 m in height, such as coconut palms, jackfruit, breadfruit, rubber and other miscellaneous trees. However, the spatial arrangement of crops was found to be highly irregular and appeared very haphazard with trees/shrubs and food crops intimately mixed. Though it is possible to identify vertically many relatively distinct zones, high amount of shade inflicted by tree species affected the growth and yield of most of the crops including coconut. Farmers are also seen growing coconut trees at plant densities more than the recommended numbers. The optimum area that a yielding palm should get is around 60 m<sup>2</sup> at 7.5 x 7.5m spacing, but the general practice is to plant coconut seedlings wherever possible without giving adequate space for plants to grow unhindered from shade of nearby plants. Very closer spacing will also lead to competition and reduce the opportunity for effective adoption of inter/mixed cropping practices. In spite of high intensity of cropping,

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the productivity of most of the crops is much lower than their potential since the farmers are not adopting any scientific agro management practices and hence, they are not able to realize the optimum production potential. Quite often only a piece meal approach is followed in the management of homestead farms, which is neither sustainable nor scientific.

### **Restructuring of Homestead Farms-the need**

Due to government policies and various socio-economic factors, homestead farming which has a long tradition in Kerala, and which is capable of providing multiple opportunities for income and employment generation is gradually being replaced by monocropping system with predominance for perennial crops. An increasing preference to cash crops has also been observed among farmers due to reasons like increased cash income, low productivity of the base crop of coconut coupled with unfavourable market and high cost as well as scarcity of labour.

Studies done by different researchers have found that the cropping intensity of homesteads ranged from very low to very high (around 96 per cent in Kasaragod to 149 per cent in Kannur in northern Kerala). While the former situation presents a case of gross under utilization of land, solar energy and other on farm resources, the latter often results in overcrowding of plants leading to very little infiltration of solar energy and unhealthy competition for nutrients and space ultimately resulting in low economic returns from the system as a whole. Both these types of homesteads can benefit greatly from

proper scientific planning, planting of crops and management of resources. In order to maximise income and employment opportunities from a unit area as well as to realize sustainable income and livelihood security to farmers, intensification of cropping and diversification of enterprises in homestead farms are very much essential. This becomes possible only through a scientific restructuring of various homestead farms.

Some of the approaches suggested for restructuring homestead farms to attain self reliance and sustainability are as follows:

- Maximizing productivity per unit area through increasing cropping intensity by reorienting existing cropping system to ensure adequate light availability (through pruning of canopy of tall shading trees) and by introducing suitable high value inter/mixed crops wherever possible.
- Enterprise diversification (fisheries/ poultry/quail/piggery/ rabbit/goat rearing/ cow rearing/ apiary/mushroom production/ production of organic manure / bio agents) for subsidiary income and employment generation, nutritional security to the farm family and effective utilization of available resources within the farm.
- Soil testing to identify nutrient supplying capacity of soil and to serve as basis for need based nutrient supply for crop plants. Recycling of farm wastes through vermicomposting or other appropriate methods. Soil and

water conservation by adopting agronomic and engineering measures, either individually or through watershed approach.

- Adoption of community approach in pest and disease management, especially in production and utilization of bio agents.

### **Inter/Multiple Cropping for Sustained Income Generation**

In spite of the fact that various cropping/farming systems can increase income generation, due to non-scientific farming, the resource use efficiency as well as income generation per unit area is far below the potential level. In the project area of CPCRI at Karunagappally panchayat of Kollam district, Kerala appropriate restructuring and interventions resulted in almost two to four fold increase in the area under cultivation. The economic analysis indicated the scope for improving the income from coconut based homestead farms by adopting intercrops/enterprises despite the holding size. It was observed that maximum income could be realized by those farmers having land holdings of more than 0.4 ha size. Earning a livelihood through proper combination of diversification/intensification could be achieved by farmers with 0.4 ha or above, whereas, those below 0.4 ha could earn additional income and meet the family consumption/nutritional needs.

Adoption of integrated nutrient management practices by using more organic manure viz., vermicompost and growing green manure crops (especially in the basins of coconut trees and their incorporation) can also increase the yield of various



crops. Application of manures and fertilizers based on analysis of soil fertility status of individual homestead farms (and preparation of soil health cards) will definitely help meeting the nutritional requirement of crops in an efficient manner. This will reduce cost of production and enhance profitability. Restructuring of representative homestead farms in four northern districts of Kerala through a combination of interventions mentioned earlier was found to increase the base crop yield of coconut ranging from 35 to 60 % in Kasaragod; 23 to 55 % in Kannur; 25 to 65 % in Kozhikkode and 11 to 49 % in Malappuram districts. A notable change in total productivity, gross and net income as well as Benefit Cost ratio was also observed. Due to the difference in maturity periods of various crop combinations, it is possible to generate income at regular and shorter intervals. Multiplicity of crops by way of incorporation of vegetables, tuber crops and fruit crops as well as integration of other enterprises (livestock, poultry, pisciculture etc.) in the restructured homestead farms will result in production of multiple sources of food for the farm family and also provide more employment opportunities for family members.

### **Community Based Group Approach in Farming System**

One of the major reasons for low production and productivity of coconut in regions like Kerala is the fragmentation of holdings with little or limited resource with farmers for efficient management of these units. The fragmented and very small holdings also do not render themselves viable for the optimum utilization of resources and the

adoption of improved technologies by the cultivators. To augment the income from such homestead farms, it is suggested to have consolidation of farms (clustering) and group management of resources to overcome the inherent weaknesses of the fragmented holdings. Such an approach will also provide opportunities for better social integration among the participating farmers. Farmers are found to experience difficulties in sourcing planting materials, especially of various inter/mixed crops for the homestead farms. This problem could be solved to a considerable extent by raising community nurseries by identifying interested groups of farmers. This will ensure timely availability of good quality planting materials which will be more appropriate to local soil and climatic conditions.

Lack of availability of quality organic manures and their high cost are other problems adversely affecting the sustainability of the farming system. Coconut based homestead farms can offer considerable scope for recycling organic biomass produced within the system. Integration of vermicompost production helps to effectively recycle the farm wastes like coconut leaves, banana stems, vegetable waste, weeds and household wastes into the system as organic manure. A coconut community based approach can be followed in this case as well. This approach not only reduces the dependence on organic manure from outside source, which ultimately reduces the cost of production of the system, but also prevents environmental pollution and provides a clean environment in the homestead farms. In addition to compost, vermiwash could also be

collected @ 10-15 litres/week in each homestead, which is very ideal for use both as bio pesticide spray and bio- growth regulator for vegetables and other crops.

### **Capacity Building of Farmers through Training**

It has been found from various studies that the extent of adoption of available technologies by coconut farmers is not at a satisfactory level. Many a times it has been observed that majority of farmers do not possess sufficient knowledge regarding cost effective and appropriate techniques for enhancing the production and productivity of coconut. A comparison between the productivity of the best managed coconut gardens and average productivity of coconut at national level will reveal the fact that there still exists a wide gap between the technologies developed in research stations and their utilization by the farmers, especially in small holdings. One of the constraints to productivity improvement in the coconut sector is the slow adoption of technologies by the farmer. The widely dispersed and fragmented nature of coconut cultivation also makes technology dissemination and adoption rather difficult.

The low level of technology adoption by farmers warrants formulating effective extension strategies adapted to the heterogeneous farming situations in coconut cultivation. In the farmer participatory technology generation and evaluation efforts, on farm trials and studies are to be planned and conducted on the farmers' fields and the farmers be given the responsibility of managing the trials



by themselves in collaboration with researchers and extension agencies.

In the present scenario farmers are facing the pressure of competitiveness and for India to be a significant player in the international market, our farmers require capacity building for making right choices of technology adoption, efficient utilization of inputs and better resource management. Undertaking regular field visits by scientists to study the field problems, interacting with farmers and suggesting appropriate solutions will also be useful in building confidence in farmers to take up farming seriously. Interface programme for coconut is an innovative approach aimed to strengthen the transfer of technology efforts for the development of coconut sector in Kerala state. In this approach, the research and extension personnel and farmers are brought together in a common platform to discuss field problems in detail and streamline activities for the sustainable development of coconut.

#### **Value Addition and By-product Utilization**

The efforts of the government aimed at ensuring a remunerative price for coconut products often fail to achieve the desired results. This is mainly because coconut is generally sold in the market with very little value addition. Formation of groups of farmers for product diversification and value addition with a common brand (if possible) and meeting high quality standards will definitely help in better price realization for coconut. While forming such groups, sufficient initial support for infrastructure and financial assistance may become necessary. The demand for tender

coconut is on the increase due to its health benefits and hence, it will be worthwhile considering inclusion of tender coconut varieties for large scale planting while replanting of old, senile and disease affected palms.

#### **Linkages for Technical and Financial Support**

In order to disseminate technologies, it is very much essential that proper linkage between farmers and research institutes as well as developmental agencies is developed and continued. Often farmers are not in a position to undertake timely agro management practices either due to lack of adequate financial resource or non availability of inputs on time. Under such circumstances, financial institutions and cooperative organizations should come forward for the help of farmers. A very commendable approach in this direction is the launching of "Kera suraksha Insurance scheme" for coconut tree climbers formulated by Coconut Development Board in association with the United India Insurance Company Limited, which is in operation since March 2009. This will be highly beneficial especially when skilled coconut climbers are becoming very scarce.

#### **Research and Developmental Programmes for coconut**

Central Plantation Crops Research Institute has undertaken studies on the basic structure and characteristics of homestead farms and successfully implemented various programmes on their restructuring. Under the ADB and IFAD/COGENT International Projects, implementation of strategies envisaged was routed through Community Based

Organizations (CBO) of coconut farmers in the selected communities. Financial assistance in the form of micro-credit (with very low interest rate of 1%) was extended to the farmers for introducing various innovations. Participatory analysis of the coconut farming scenario in the homestead farms of each community was undertaken by the team of scientists and farmers under the CBO to design technological interventions to be implemented. Arrangements for procuring and supplying planting materials and other inputs as well as capacity building through organizing training programmes on CBO management and relevant technologies were done through the CBOs with the active support of CPCRI and other agencies. Linkages with other financial and technical institutions were established for the smooth functioning of the projects. Results from various studies indicated that a proper restructuring of homestead farms, introduction of inter/mixed cropping, enterprise diversification (by inclusion of animal husbandry components) and value addition through product diversification considerably benefited the farmers.

Under the National Agricultural Technology Project, a farmer participatory programme for improving productivity and income from small and marginal coconut based homesteads in the root (wilt) affected coconut area was implemented for three years. The farm family members of 25 hectare area were clustered together for deciding the farm strategies; both individual and group ventures for improving productivity and income. Through various interventions, the average yield of coconut could be



doubled after technology package implementation for three years.

Encouraged by the success of this project, the cluster approach is being up scaled by Coconut Development Board (CDB) among coconut farming communities through their development schemes from 2005-'06. The efficacy of scientific management of coconut gardens for productivity improvement and promotion of coconut based farming system for enhancing farm level income has been demonstrated by implementing the Coconut Cluster Programme in larger areas. Under this programme, farmers in contiguous areas of 25-50 ha are motivated to come together on a common platform to take up productivity improvement programmes with the intension of reducing cost of production and creating marketable surplus.

Support for procuring critical inputs and taking up plant protection measures on a community basis is now available. The clusters are envisaged as a measure to overcome the problems associated with farming in fragmented small and marginal holdings. These clusters are to be gradually developed into integrated units for production, processing and marketing. Primary processing is also being done by the farmers of various clusters. Reports by CDB indicate that this programme is presently being implemented in about 13,000 ha (2009-'10) and nearly 50,000 farmers from seven states are directly participating.

While most of the perennial plantation crops like rubber or coffee or tea, which have the advantage of systematic replanting programme,

coconut being a small holder's crop and mostly cultivated in home stead farms, there has been no support in this direction. Hence CDB has formulated a "Comprehensive project for Replanting and Rejuvenation" of coconut gardens with the objective of removing the disease advanced senile and unproductive palms and replanting with quality planting materials as well as rejuvenating the gardens by adopting proper and scientific management practices and thereby achieving productivity improvement. Technical and financial support will be given to farmers under this programme, which will be implemented through a high level of farmer participation and involvement of State department of Agriculture and Local Self Government Institutions. The farmers in the districts of Thiruvananthapuram, Kollam and Thrissur in Kerala as well as Andaman and Nicobar Islands will be the beneficiaries of this pilot scheme irrespective of the holding size or income.

#### **Future Strategies**

- Lack of awareness and knowledge about technologies for effective maintenance of coconut based homestead farms is one of the major constraints in the adoption of various recommended practices. More farmer participatory technology dissemination and demonstration programmes related to the recommended practices for management of homestead farms appropriate to a particular locality are to be organized.
- Soil and water conservation programmes such as drip fertigation system, use of

agronomic and bio-engineering measures for moisture and soil conservation etc. on water shed basis are to be formulated and implemented for proper management of most of the homestead farms of Kerala. Restructuring of homestead farms should be done through adoption of intensive production programmes rather than mere area expansion activities. Greater emphasis should be given for organic farming and diversified agriculture in the homestead farms.

- Potential clusters of homestead farms for agricultural production and market oriented development are to be identified and all the required forward and backward linkages established through financial and infrastructure support. Focussed attention should be given on infrastructure development for quality seedling production involving public-private partnership in production and distribution of planting materials.
- In order to ensure sustained farm productivity and remunerative income to farmers through restructuring of homestead farms, various approaches such as shifting of focus from individual or scattered farmer to contiguous area (consolidation of fragmented holdings through clustering), raising market demand oriented crops with multiple utility (aiming especially for farm family nutritional security), value addition of crop produces through product diversification and by product utilization as well as effective recycling of bio resources should be focussed.