



# Restructuring of homestead farms for sustainable income and employment opportunities

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**Diversification of activities in the restructured homestead farms enabled the farmers to acquire more knowledge and skills in farming system production. Need based integration of various enterprises in a single unit resulted in cost reduction, higher production, larger profits, more employment generation and availability of better food.**

## Introduction

Cultivation of crops in small and fragmented land holdings makes the agricultural scenario of Kerala State altogether different from other states. Homestead farms of Kerala are typical that they surround the farmer's home, mainly managed by the members of the farm family and are generally cultivated by a large number of crops and other plants along with or without a component of livestock and other subsidiary income generating activities for sustenance and for generation of additional income (Nair and Sreedharan, 1986). Thus the structural and functional diversity of this farming system make it a unique one (Salam *et al.*, 1991).

Jose and Shanmugaratnam (1993) opined that the recent trends in agrarian structure and the high market orientation exert pressures on the home garden and its sustainability is in question. In spite of rich resource endowments and high intensity of cropping, the productivity of most of the crops grown in homesteads is much lower as it could be noticed that no serious attempts are being made by the farmers to adopt scientific management practices in cultivation of various crops. Most often high intensity of shade does not allow the different crops to yield to their

maximum potential (John and Nair, 1999b). Taking all these into consideration and to understand the structure of homestead farms prevalent in northern Kerala as well as to evolve location specific farm models for resource use efficiency and sustainable productivity through interventions in technology and farm management, a project on "Analysis and Development of Homestead farms of Kerala and Andaman and Nicobar Islands - A farmer participatory approach" funded by the National Agricultural Technology Project was co-implemented by the Central Plantation Crops Research Institute, Kasaragod from 2001 to 2004 with the objectives to

- a) develop database including yield levels of the homestead farms of northern zone of Kerala.
- b) restructure identified homestead farms by appropriate interventions and study their impact on socio-economic status of the farm families including employment generation.

## Materials and Methods

Kasaragod, Kannur, Kozhikode and Malappuram districts constitute the Northern Zone of Kerala. To develop the database on the existing homestead farms of these districts, out



of the total 304 panchayats, 83 were randomly identified (Table 1) in consultation with the respective district Joint Directors of Agriculture and from each panchayat, about ten homestead farms were further randomly selected for the detailed survey. The system inventory on land holding and use pattern, cropping system adopted, agro-management practices followed, labour use pattern, integration of animals in the homestead farms as well as marketing structure was prepared by interviewing the farmers with the help of a pre-tested interview schedule.

During the preliminary survey, it was found that almost all the farmers were following a piece meal approach in the management of homestead farms, which was neither sustainable nor scientific. In order to restructure and develop selected homestead

base of farmers (including land, water, capital), preferences of the farmer, market potential, labour availability and biomass availability in the farms, various interventions in technology and management were suggested. Accordingly the suggested interventions concentrated the following aspects.

1. Correcting defects in the traditional farming practices with respect to resource utilization, nutrient management and plant protection methods etc.
2. Maximizing productivity per unit area through increasing cropping intensity by reorienting existing cropping system and by introducing suitable intercrops wherever possible.
3. Integrated production approach by enterprise diversification for

*Table 1. Details of districts and number of panchayats selected*

Name of district	No. of panchayats selected		No. of farmers surveyed
	Total		
D1-Kasaragod	39	19	185
D2-Kannur	87	21	205
D3-Kozhikode	99	24	185
D4- Malappuram	79	19	240
<b>Total</b>	<b>304</b>	<b>83</b>	<b>815</b>

farms to serve as models, based on the basic data collected, five homestead farms in each district were further identified representing different areas of the district.

A multidisciplinary scientific team of experts from Central Plantation Crops Research Institute, Kasaragod and Indian Institute of Spices Research, Kozhikode visited all the selected homestead farms during early part of 2002 and had detailed analyses and discussions with farmers. Considering the resource

subsidiary source of income, employment generation, nutritional security to the farm family and effective utilization of available resources within the farm.

4. Recycling of farm wastes through vermicomposting, which is otherwise being wasted without proper utilization.

The details of interventions implemented are presented in Table 2.

*Table 2. Interventions suggested by the expert team*

<i>Types of interventions suggested/implemented</i>
Adopt appropriate shade regulation measures wherever needed and carry out balanced fertilizer and organic manure application
Raise intercrops such as tissue culture banana (Grand Naine), spices (ginger and turmeric), vegetables, tuber crops (tapioca, yam and colocasia), pine apple, fodder as well as mixed crops such as pepper, nut meg, clove and vanilla
Introduction of Gramalakshmi breed of poultry birds, fish culture and coconut dryer wherever necessary depending on farmers interest
Planting of perennial crops such as hybrid coconut (WCT x COD) seedlings, mango grafts (H 87) and sapota grafts
Organic matter recycling through vermicomposting

As per the recommendations of the expert team and based on farmer's preferences, planting materials of various crops (vanilla, tissue culture banana, nutmeg grafts, pepper rooted cuttings (Sreekara), coconut (WCT x COD), mango grafts, sapota grafts and vegetable seeds) were supplied to grow as inter/ mixed crop to various homestead farms. Farmers used their own planting materials in case of different tuber crops, pineapple, fodder, ginger and turmeric wherever available. Coconut palms in each farm were serially numbered for regular monitoring of yield. Gramalakshmi breed of poultry birds were introduced in one farm at Kozhikode district. Soil and water conservation measures were adopted wherever soil erosion was a problem and vetiver slips (*Vetiveria zizanioides*) and pineapple suckers were planted to reduce runoff loss of soil and water. Financial assistance was provided for construction/strengthening of bunds. Vermicompost unit was constructed in 17 units and a financial support of Rs. 2000/unit was provided.



Necessary earthworm culture for production of compost was also supplied. Coconut dryer was distributed to five farmers (1 in Kasaragod, 2 in Kannur and 2 in Kozhikode districts) at a subsidized cost for preparing copra during rainy period for increasing farm income. Out of the initial 20 homestead farms identified, one homestead each in Kasaragod and Malappuram could not continue with implementation of the project till the completion due to financial problems experienced by the farmers. Pre and post project data on cropping intensity, productivity and profitability, recycling of organic biomass through vermicomposting as well as employment generation were collected. Two way factorial analysis of total productivity of coconut, gross and net income (before and after the implementation of project) was carried out.

### Results and Discussion

The average size of holding varied from 0.2 to 1.0 ha in the districts surveyed. The total number of cultivated and other species of plants in the homesteads varied mainly depending up on the holding size and the intensity of management adopted. Coconut based farming system was the most common cultivation system occupying more than 95 per cent of the homestead farms surveyed. Arecanut and spices based homesteads were also prevalent in a few of the areas surveyed.

The interventions were implemented from August, 2002 to November, 2004. The results of restructured homestead farms were analyzed in terms of increase in cropping intensity and productivity, increased profitability and sustainable income, employment generation,

residue recycling through vermicomposting, balanced food production, value addition through better post harvest processing especially of coconut etc., compared with the baseline data. The level of adoption of technology as well as the improvement in farmers' knowledge and skills was also analyzed through an impact study on conclusion of the project.

#### Increase in cropping intensity

During the pre-project period, the cropping intensity was around 96 per cent in Kasaragod to 149 per cent in Kannur. Wherein the former presented a situation of gross under utilization of space and solar energy resources, the latter most often was because of over crowding. This ultimately resulted in low productivity of all the components and the system as a whole (Regeena *et al.*, 2004). However, in both the types of homesteads, farm resource use efficiency could be enhanced through proper scientific planning, planting and crop management.

Regulation of excess shade by removal of unwanted trees, pruning branches of other trees and planting inter/mixed crops as well as introduction of new interventions in technology and scientific management by adoption of package of practices were carried out. These operations resulted in increasing cropping intensity per unit area. The details on the net cropped area, total area cultivated, and cropping intensity of all homestead farms before and after the implementation of the project are presented in Table 3.

The average net cropped area under the selected homestead farms ranged from 0.29 ha in Kannur to 0.34 ha in Kasaragod district. The average total

area cultivated during the pre-project period varied from 0.45 ha in Kannur to 0.48 ha in Kozhikode district. The highest percentage increase in total cropped area after the restructuring was recorded in Malappuram district (86) followed by Kasaragod/Kannur (62). The increase in cropping intensity was to the extent of 56 per cent in Kannur, 62 per cent in Kozhikode, 63 per cent in Kasaragod and 86 per cent in Malappuram district. Regeena (2005) also reported similar increase in cropping intensity of homestead farms of Kollam district in Kerala after restructuring.

#### Increase in productivity and profitability

Integration of various enterprises and introduction of new crops has resulted in higher income than pre-intervention. It was revealed that the productivity of the main crop (coconut) and other short duration intercrops improved when compared to the base year yield. However, perennial mixed crops such as vanilla, pepper, clove etc. are yet to come to the bearing stage. Adoption of integrated nutrient management practices including use of more organic manure viz., vermicompost and growing green manure crops in the base of coconut is expected to increase the yield in subsequent years. The productivity of different components integrated in each farm was converted into coconut nut equivalent to form total productivity based on the prevailing unit cost of the produce of each component. The restructured system as a whole provided opportunity to make use of the waste materials of one component as input for another enterprise and thus helped cost reduction and realize higher profitability. Similar report of increase in income due to farmer



Table 3. Change in net cropped area, total area cultivated and cropping intensity of homestead farms

Homestead farm		Net cropped area (ha)	Total area cultivated /yr (ha)		Cropping intensity (%)	
			Before	After	Before	After
<b>D1- Kasaragod</b>						
F1	Mubarak Ahmed, Daru Salam, Moggral Puthur	0.31	0.35	0.64	110.77	203.71
F2	Yatheesha, Kajor house, Kadampar, Manjeswaram	0.40	0.60	0.89	149.50	221.80
F3	Easwaran Namboothiri, Patena, Neeleswaram	0.36	0.61	0.96	169.33	266.77
F4	Raghavan Master, Pattamma Nivas, Chandra, Pilicode	0.28	0.32	0.56	115.58	198.42
<b>D2-Kannur</b>						
F1	K.V.Nanu, Kannadichal, Kadampur	0.32	0.51	0.74	160.52	230.80
F2	Y.Balakrishnan, Nandanam, Karivellur-P.O	0.30	0.47	0.72	155.33	239.69
F3	Cheriyar, Thakadiyel, Alakode P.O	0.30	0.48	0.73	158.89	243.09
F4	M.K.Krishnan Nair, Madathil, Anjarakandy P.O	0.12	0.13	0.21	109.20	174.30
F5	Easwaran Embranthiri, Madamana Illom, Mayyil P.O	0.42	0.67	1.13	160.09	270.10
<b>D3-Kozhikode</b>						
F1	Varkey. C.T., Chandran Kunnel, Chakkittappara P.O	0.44	0.69	1.12	157.80	255.42
F2	Ramachandran Nair, Kuzhikandathil, Pantheerankavu, Peruvanna P.O	0.32	0.34	0.57	105.01	179.00
F3	Ramla Karaimbapoyil, Elettill P.O, Koduvelli	0.34	0.56	0.89	164.40	261.29
F4	Sebastian P.C., Puthusserikunnel, Adivaram P.O	0.37	0.63	1.00	170.30	274.09
F5	Muhammad Koya, Musharakandy house, Kizhakkoth P.O,	0.16	0.20	0.32	125.00	202.30
<b>D4-Malappuram</b>						
F1	Moideen Kutty. P.P., Pazhayaputhenveedu, Pachathiri P.O	0.36	0.54	0.97	150.70	269.40
F2	Moideen.V.K., Varikkodan, Marutha P.O,	0.36	0.53	1.01	148.30	282.30
F3	Sankunni Varier, P.S.R Variam, Poolamanna P.O, Pandikkad.	0.36	0.52	1.01	145.70	280.60
F4	Khalid. K.V.M, Lalsalam, Puliangadi, Anakkayam P.O	0.24	0.28	0.50	114.85	208.30

participatory management of homestead farms was made by Regeena (2005). The increase in base crop yield i.e. coconut ranged from 35 to 60 per cent in Kasaragod; 23 to 55 per cent in Kannur; 25 to 65 per cent in Kozhikode and 11 to 49 per cent in Malappuram districts by the implementation of the project period. The change in total productivity, gross income, net income and Benefit Cost ratio of homestead farms are presented in Table 4.

The results indicate that there is significant over all increase in total productivity, gross and net incomes of participating farmers due to restructuring of homestead farms. The diversification of farming with new interventions like poultry and fish rearing and growing short duration crops as intercrops broadened the

income base of farmers and reduced the risk of complete failure of any particular crop and resulted in sustainable income. Due to the difference in maturity periods of various crop combinations, income could be generated 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., already existing in certain farms) in the restructured homestead farms also resulted in production of different sources of nutrition for farm families.

#### Organic recycling through vermicomposting

Integration of vermicompost production helped effectively recycle the farm wastes from different

enterprises like coconut leaves, banana stems, vegetable waste, weeds and household wastes into the system as organic manure. This approach not only reduced the dependence on organic manure from outside source, which ultimately reduced the cost of production of system, but also prevented environmental pollution and made a clean environment in the homestead farm. The frequency of composting varied with availability of waste materials and size of the farm. In addition to compost, vermishash was also collected at the rate of around 10-15 litres/week in each homestead, which was used for spraying on vegetables, vanilla, pepper and other crops as bio-growth regulator. A few of the farmers were able to sell earthworms to nearby farmers and earn some additional

Table 4. Change in productivity and profitability of the homesteads

Homestead farm	Total productivity of coconut (nut basis*)		Gross income (Rs./ha)		Net income (Rs./ha)		BC ratio	
	Before	After	Before	After	Before	After	Before	After
<b>D1-Kasaragod</b>								
F1	4,942	8,300	19,765	49,800	7,785	30,300	1.65	2.55
F2	7,015	12,064	28,060	72,384	12,890	45,765	1.85	2.72
F3	5,900	9,894	23,600	59,365	9,400	37,615	1.66	2.73
F4	2,532	4,290	10,128	25,740	4,650	16,990	1.85	2.94
Mean	<b>5,097</b>	<b>8,637</b>	<b>20,388</b>	<b>51,822</b>	<b>8,681</b>	<b>32,667</b>		
<b>D2-Kannur</b>								
F1	3,115	5,918	12,460	35,500	3,960	17,570	1.46	1.99
F2	6,098	9,475	24,392	56,850	8,650	31,100	1.55	2.20
F3	2,275	4,200	9,100	25,200	2,825	13,750	1.45	2.20
F4	2,896	5,098	11,584	30,588	4,964	18,750	1.75	2.58
F5	4,750	7,992	19,000	47,950	10,360	32,850	2.20	3.18
Mean	<b>3,827</b>	<b>6,537</b>	<b>15,308</b>	<b>39,218</b>	<b>6,152</b>	<b>22,084</b>		
<b>D3-Kozhikode</b>								
F1	6,095	10,125	24,380	60,750	10,430	40,550	1.75	3.01
F2	4,015	7,024	16,060	42,145	7,470	27,345	1.87	2.85
F3	5,900	9,339	23,600	56,100	11,180	36,100	1.90	2.80
F4	7,605	13,400	30,420	80,400	15,210	55,800	2.00	3.27
F5	3,127	5,998	12,508	35,975	6,250	22,950	2.00	2.77
Mean	<b>5,348</b>	<b>7,497</b>	<b>21,394</b>	<b>55,074</b>	<b>10,108</b>	<b>36,549</b>		
<b>D4-Malappuram</b>								
F1	13,590	19,912	54,360	1,19,470	28,505	79,910	2.10	3.02
F2	9,080	14,637	36,320	87,825	16,670	57,970	1.85	2.94
F3	2,600	4,730	10,400	28,380	4,100	17,880	1.65	2.70
F4	7,047	9,580	28,188	57,480	11,898	35,480	1.73	2.61
Mean	<b>8,079</b>	<b>12,214</b>	<b>32,317</b>	<b>73,289</b>	<b>14,043</b>	<b>47,810</b>		
<b>Overall mean</b>	<b>5,588</b>	<b>8,721</b>	<b>22,352</b>	<b>54,851</b>	<b>9,746</b>	<b>34,778</b>		

\* Crops giving yield only are included]

C.D(P=0.05) for total productivity: 2455.61, for gross income: 12368.01, for net income: 13050.26

income. John and Nair (1999a) were of the opinion that coconut based homestead farms can be a classical example of a sustainable land use system. The average quantity of vermicompost produced/year varied from 2165 kg in Kannur to 3975 kg in Malappuram, which could contribute about 35 to 60 kg N, 3.5 to 6.0 kg P and 6.5 to 12.0 kg K apart from the long range beneficial effect of application of organic manures in the homestead farms.

### Employment generation

Homestead farms, in general are supposed to be managed by all the members of the farm family.

However, in the case of harvesting of coconut, milking of cows, etc., hired labour is also used. The survey results revealed that the percentage of family labour used ranged from 26 in Kozhikode and Kannur to 32 in Kasaragod and Malappuram districts. The percentage of farmers exclusively hiring outside labour for farm operations ranged from 14 in Kasaragod to 26 in Kozhikode district. The percentage of homestead farms using both family and hired labour varied from 36 in Malappuram to 62 in Kasaragod district.

In conventional farming, employment opportunity is seasonal and mostly required only during the

pre and post monsoon season. Farming in restructured homestead involved more labour and generated additional employment especially for family labour because of inclusion of more crops per unit area, integration of allied enterprises and land management practices for soil and water conservation as well as vermicomposting. Due to new interventions, on an average an additional 51 man-days/year was generated not only for the farm family (especially for cultivation of vegetables and tuber crops, production of vermicompost and use of coconut dryer), but also for hired labour (which varied, based on

activities included like land preparation, soil and water conservation measures; cropping intensity and size of the homestead farm). The details of labour utilization are presented in Table 5.

### Conclusion

Diversification of activities in the restructured homestead farms enabled the farmers to acquire more knowledge and skills in farming system production. When once provisions were made at the farm level to generate quality food for the family use apart from commercial purposes through restructured homestead, it has created a feeling of security among the farmers. Need based integration of various enterprises in a single unit resulted in

cost reduction, higher production, larger profits, more employment generation and availability of better food. All these ultimately help in improving the standard of living of the farm family. The success of the project could be attributed to the active involvement of beneficiary farmers in planning, implementing, monitoring and evaluation of various components of the project because of their conviction about the benefit of integration of various crops and enterprises in restructuring homestead farms in improving system performance as a whole.

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Table 5. Labour utilization (man-days / year) (M=Male, F=Female)

Homestead	Before the project			After the project			Additional man-days generated		
	Family		Total	Family		Total			
	M	F		M	F				
<b>D1-Kasaragod</b>									
F1	65	15	40	120	90	20	50	160	40
F2	95	45	60	200	130	60	68	258	58
F3	90	20	50	160	125	30	55	210	50
F4	50	40	40	130	68	55	48	171	41
<b>D2-Kannur</b>									
F1	60	25	40	125	85	35	55	175	50
F2	75	25	60	160	95	40	80	215	55
F3	45	30	25	100	70	35	35	140	40
F4	65	25	30	120	95	30	40	165	45
F5	40	30	70	140	60	30	100	190	50
<b>D3-Kozhikode</b>									
F1	125	30	45	200	155	40	55	250	50
F2	72	30	40	142	92	48	50	190	48
F3	60	52	40	152	80	80	50	210	58
F4	105	55	45	205	144	67	54	265	60
F5	95	30	28	153	117	40	38	195	42
<b>D4-Malappuram</b>									
F1	85	20	90	195	105	30	120	255	60
F2	142	30	30	202	192	40	45	277	75
F3	110	20	32	162	140	26	40	206	44
F4	50	20	88	158	65	25	118	208	50

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