Social benefits and costs of interventions in coconut based homesteads of central Kerala

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Abstract

A research project on 'possible diversifications and restructuring of coconut based homesteads' was implemented in six agro-ecosystems of Central Zone of Kerala covering three districts namely Palakkad, Thrissur and Eranakulam from the year 2005 to 2008 in a holistic approach with the participation of all the stakeholders. The interventions were selected by the farmers on participatory basis. Analysis of social and monitory benefits consequent to the adoption of interventions showed that all the six dimensions of Social Cost Index Value were found as the lowest in High Elevation-Medium Rainfall situation. Among all the dimensions, exploitation by middlemen was rated as the maximum Social Cost Index Value in almost all the situations and, therefore this dimension requires the attention of policy makers to ensure suitable price for the farm produce. Among the six dimensions in the Social Benefit Index Value, family labour utilisation and self confidence contributed maximum to this attribute. Benefit Index Value. It indicated that, the interventions made in the homesteads fully utilized family labour and enhanced the self confidence of the participating farmers. Social Benefit Cost Ratio was computed as the highest with 2.04 at High Elevation-Medium Rainfall situation and the lowest with 1.07 at Medium Elevation-Low Rainfall situation after three years of adoption of interventions. The interventions on restructuring of coconut based homesteads were found to be economically viable and socially desirable.

Keywords: Coconut based homesteads, farmers' participation, preferences and performance, social benefit cost ratio

Introduction

The predominant crop in majority of the small homesteads of Kerala is coconut along with other seasonal, annual and perennial crops, cattle rearing and allied enterprises. Low productivity in the coconut based homesteads is of utmost concern to the farmers. The poor small and marginal farmers who depend on their tiny holdings for sustenance are the worst affected. Fall in price of the farm commodities of the state has aggravated the situation making livelihood of these farmers very difficult. The age old popular practice of integrating diversified enterprises in homestead farming in Kerala is declining because of various socio-economic reasons. The younger generation abstains from farming because of low income and low status. Under such situation, it was felt that the interventions on appropriate combinations of enterprises based on the preferences of participating farmers would help or facilitate to restore the viable integration of coconut based homesteads. Mahesh (2000) reported that the number of agricultural holdings in Kerala State has nearly doubled over a period of twenty years. The sub-division of holdings has led to a phenomenal increase in the number of marginal holdings that is less than 0.5 ha.

In the Integrated Farming Systems (IFS), a judicious mix of one or more enterprises along with cropping has a complimentary effect through effective recycling of wastes and crop residues facilitating additional source of income to the farmers. Integrated Farming Situation is a rich source of species diversity, helps in soil building, preserve and improve ecological condition essential to long-term sustainability. It also enhances soil nutrient cycling and prevents proliferation of pests. In all the eco-systems, IFS approach with location specific models offer gainful employment and are highly profitable and sustainable (Kuruvilla and Thomas, 2009).

Materials and Methods

The ICAR *adhoc* scheme on 'possible diversifications and restructuring of coconut based homesteads' was implemented in six agro-ecosystems of

central zone of Kerala covering three districts namely Palakkad, Thrissur and Eranakulam from 2005 to 2008 with the holistic approach in coconut based homesteads with the participation of all the stakeholders. It was aimed to generate additional income for the sustenance of the families depending on coconut based homesteads with the major thrust on conserving natural resources apart from meeting the basic needs of a family. The gradual shift in the socio-economic development in Kerala forces many families to shift from traditional conservation practices to earning money at a faster rate from non-farm vocations. To prevent non-judicious use of resources, encourage conservation practices, increase employment opportunities and thereby enhancing income of families, it was intended to take up interventions based on the resources available with the farmer based on the interests and the preferences of farmers.

Representing each of the six agro-ecological situations, a panchayat was selected on the basis of discussion with the extension personnel of the respective blocks. Two wards from each selected panchayat were chosen based on the discussions with respective agricultural officers, panchayat presidents, chair persons of the Agricultural Development Council and Board Members, with the criteria of intensive coconut based homestead farming in the panchayat. Sixty farmers, mainly involved in coconut based homestead farming, representing the selected two wards, were invited for PRA sessions. The household surveys were also conducted. Learning from the PRA sessions and based on farmers' interest and preferences, ten farm families from each of the six agro-ecological situations constituting sixty farm families were selected randomly for practicing the possibily viable models in their homesteads.

Details of interventions made in the coconut based homesteads of the project area are given in the Table1. Based on the preferences of the participating farmers, interventions were made with fifty per cent contribution from them and rest from the project. For adopting each intervention, farmers were trained and exposed to various technologies developed by the Kerala Agricultural University. Most of the critical inputs required to try the interventions were also made available through the university. Field visits were made to diagnose the field problems. The mode and extent of adoption of technologies by the farmers was monitored. The performance of the preferred enterprises and their combinations were assessed in terms of social benefit- cost ratio of the interventions.

Table 1. Details of interventions made in the coconut based homesteads

Agro-ecological situations	Selected Panchayats	Interventions made based on the individual preference of farmers	Number of components	Number of farm families involved
High Elevation-High Rainfall (HEHR)	Pananchery	Goats-Malabari	14	6
		Heifers-Cross breeds	4	4
		Fodder- Co-1	450 slips	9
		Turmeric- Sona and Kanthi	10 kg of rhizomes	2
		Vegetables		10
Medium Elevation - High Rainfall (MEHR)	Karukutty	Goats- Malabari	16	8
		Chicks- Gramapriya	55	7
		Turmeric- Sona and Kanthi	40 kg	8
		Fruit tree seedlings	4	1
		Vegetables		10
Low coastal area, Low Elevation-High Rainfall (LEHR)	Thalikulam	Goats- Malabari	6	3
		Heifers- Cross breeds	2	2
		Chicks- Gramapriya	45	2
		Banana- Njalipoovan	75	4
		Turmeric- - Sona and Kanthi	50kg	9
		Fodder- Co-1	250 slips	5
		Vegetables		10
High Elevation-Medium Rainfall (HEMR)	Kizhakkenchery	Goats- Malabari	20	10
		Chicks- Gramapriya	20	4
		Fodder- Co-1	300 slips	6
		Vegetables		10
High Elevation-Low Rainfall (HELR)	Muthalamada	Chicks- Gramapriya	140	9
		Biocontrol agents for vegetables	1	1
		Vegetables		10
Medium elevation- black soil- Low Rainfall (MELR)	Eruthenpathy	Heifers- Cross breeds	10	10
		Vegetables		10

Social Benefit - Cost Ratio of the interventions

The Social Benefit - Cost Ratio (SBCR) of the interventions was found out based on the SCIV and SBIV calculated for each agro-ecological situation. The formula used Sadhanandhan (2003) was as follows:

$$\text{Social Benefit - Cost Ratio (SBCR))} = \frac{\text{Total SBIV}}{\text{Total SCIV}}$$

where, SBIV - Social Benefit Index Value

SCIV - Social Cost Index Value

Generally, cost - benefit analysis is done to find out the feasibility and profitability of the interventions in terms of monitory benefits. Social costs and development benefits are not taken into account in most of the projects. Despite the development efforts, intended results are not achieved since social aspects of the society play a major part in the development process. Therefore, in this research project, Social Cost Benefit Analysis (SCBA) was worked out including the likely social costs and social benefits realised by the participating farmers.

Computation of Social Cost Index Value (SCIV)

Total social cost of the interventions made in the research project was measured by computing and comparing the Social Cost Index Value (SCIV) of each participating farmer. In this study, social cost met after adopting the preferred interventions was measured by using the SCIV developed for the purpose. The six dimensions used to compute Social Cost Index Value were: perishability of the farm produce, conversion of any crop or shift to other crops, displacement of agricultural labourers, exploitation by middlemen, time constraint and involvement at the cost of education. The SCIV of each participating farmer was worked out by considering the social cost score, the maximum possible score and weightage used for each dimensions. The formula used for this purpose is given below:

where

$$\text{SCIV} = \frac{\Sigma \left[\dfrac{Sc_i}{Ci} \right] wi}{\Sigma wi}$$

$$= \frac{\left[\dfrac{Sc_1}{C_1}\right] w_1 + \left[\dfrac{Sc_2}{C_2}\right] w_2 + \text{-------------} + \left[\dfrac{Sc_6}{C_6}\right] w_6}{w_1 + w_2 + \text{-------------------} + w_6}$$

$w1, w2 \text{-------} w6$, are the weightage of six dimensions.

$Sc1, Sc2 \text{------} Sc6$ are the scores of the six dimensions of social cost.

$C1, C2 \text{-------} C6$ are the maximum possible scores of the six dimensions of social cost.

Computation of Social Benefit Index Value (SBIV)

Social benefits derived out of the interventions preferred by the farmers were measured by computing Computation of Social Benefit Index Value (SBIV) of each participating farmer and compared. The six dimensions used to assess the SBIV were: utilisation of family labour, increased living standard, gain in self confidence, dignity of farmers, equity and satisfaction. It was computed for each participating farmer by applying the method similar to that of Social Cost Index Value (SCIV). Extent of social benefit score, the maximum possible score and the weightage of each dimension were applied in the following formula to find out SBIV of each participating farmer:

$$\text{SCIV} = \frac{\Sigma \left[\dfrac{Sb_i}{Bi} \right] wi}{\Sigma wi}$$

$$= \frac{\left[\dfrac{Sb_1}{B_1}\right] w_1 + \left[\dfrac{Sb_2}{B_2}\right] w_2 + \text{-------------} + \left[\dfrac{Sb_6}{B_6}\right] w_6}{w_1 + w_2 + \text{-------------------} + w_6}$$

where

$w_1, w_2 \text{---------} w_6$ are the weightage of six dimensions of social benefit.

$Sb_1, Sb_2 \text{-------} Sb_6$ are the scores of six dimensions of social benefit.

$B_1, B_2 \text{---------} B_6$ are the maximum possible scores of six dimensions of social benefit.

Results and Discussion

Agro ecosystem-wise Social Cost Index Values rated by the participating farmers after three years of interventions

Social Cost Index Values rated by the participating farmers after three years of interventions are presented in Table 2. Perishability of farm produce was reported as

Table 2. Agro-ecosystem wise Social Cost Index Values rated by the participating farmers after three years of interventions

Dimensions	Agro eco systems and Panchayats					
	HEHR-Pananchery	MEHR-Karukutty	LEHR-Thalikulam	HEMR-Kizhekkanchery	HELR -Muthalamada	MELR-Eruthenpathy
Perishability of farm produce	0.22	0.39	0.56	0.17	0.73	0.79
Conversion of crops	0.52	0.65	0.26	0.22	0.26	0.73
Displacement of agricultural labourers	0.90	1.07	0.70	0.73	0.86	0.85
Exploitation by middlemen	1.22	1.24	1.15	1.15	1.35	1.24
Time constraint	1.04	1.16	1.06	0.98	1.14	1.27
Involvement of family members at the cost of education	1.09	1.11	1.16	0.40	1.05	0.88
Total	4.91	5.62	5.28	3.65	5.39	5.76
Mean	0.82	0.94	0.88	0.61	0.90	0.96

the lowest in HEMR (High Elevation-Medium Rainfall) situation (Kizhakkanchery Panchayat) with the Social Cost Index Value (SCIV) of 0.17 followed by HEHR (High Elevation-High Rainfall situation) (Pananchery) with the SCIV of 0.22. The reason for this might be that these two situations are situated near towns so that they could dispose the produce at the earliest. The highest magnitude of perishability of the farm produce was observed in MELR (Medium elevation- black soil- Low Rainfall) situation (Eruthempathy) with SCIV of 0.79 followed by in HELR (High Elevation- Low Rainfall) situation (Muthalamada) with the SCIV of 0.73. Since these two situations are located far away from towns and therefore, the chances of decaying the farm produce, the cost of transportation and the time required to transport the produce to the market were high. Conversion of crops was noted as the lowest in HEMR situation (Kizhakkanchery) with SCIV of 0.22 and the highest in MELR (Eruthempathy) situation with SCIV of 0.73. It was found that farmers in the HEMR situation (Kizhakkanchery) were stable in maintaining their crops since they had assured irrigation from the nearby dam, even if rainfall fails, whereas, farmers from MELR situation (Eruthempathy) were highly depending on the vagaries of monsoon and slowly converting rainfed crops to irrigated crops by digging wells with pump sets. All the six dimensions of SCIV were found the lowest in HEMR situation (Kizhakkanchery).

Displacement of agricultural labour was found to be the highest in LEHR (Thalikulam) situation with SCIV of 0.92 and the lowest in MEHR (Karukutty) situation with SCIV of 0.70. Implementation of interventions created additional employment opportunities for the members in the participating families. Also adoption of interventions did not affect the employment opportunities

of agricultural labourers whose livelihood depend on the farming practices in homestead situations.

Exploitation by middlemen was experienced as the highest with the SCIV of 1.35 by the farmers of HELR situation (Muthalamada). Farmers of this situation complained that the middlemen rated their produce as low quality and hence paid fewer prices. The farmers were also forced to sell the produce to middlemen since they had no other alternatives. They also did not have better facilities to transport their produce to nearby markets. Sreedaya (2000) indicated that similar social costs in vegetable production were met by self- help groups of Thiruvananthapuram district.

Time constraint was reported as the highest by the farmers of Medium elevation- black soil- Low Rainfall situation (MELR- Euthenpathy) with the Social Cost Index Value of 1.27. In this situation farmers preferred to rear heifers and experienced that it required intensive care and labour from the whole family and thereby they could not participate in any other activities.

Involvement of family members at the cost of education of children was observed to be the highest among the farmers of LEHR situation (Thalikulam) with the SCIV of 1.16. It was noted that majority of the children voluntarily attended farm work after school hours out of their own interest in farm activities and their contribution to the welfare of the family. Very few families were observed not enrolling their children for higher studies so as to get assistance from them in farm activities.

Among all the dimensions, 'exploitation by middlemen' was rated as the maximum SCIV in almost all the situations and therefore, this dimension required the attention of policy makers to ensure suitable price

for the farm produce as well as marketing facilities must be improved in the village itself, creating a network of marketing centers. A study conducted in Central Kerala by Narayanan and Latha (2004) revealed that the producers' share in consumers' rupee was 61 % of the price paid by the final consumer and the price spread accounted for a sizeable 39 % produce. However, they suggested that farmers might adopt value addition technologies either at the individual level or on a collective/co-operative basis to reduce the role of intermediaries and thereby reduce the price spread.

Agro ecosystem-wise Social Benefit Index Values rated by the participating farmers after three years of interventions

Among the six dimensions in assessing the Social Benefit Index Value (SBIV), 'family labour utilisation' and 'self confidence' were the dimensions which contributed maximum to the SBIV. It indicated that the interventions made in the homesteads utilized family labour very well which was felt as otherwise wasted and enhanced the self confidence of the participating farmers. Increased living standard was the lowest dimension contributing to SBIV. The reason might be that the participating farmers just started realizing the profit. During the project period, time was not adequate enough to realise the enhanced living standard with the profit obtained from the interventions.

In utilizing family labour after the intervention, farmers from the MEHR situation (Karukutty) stood first with the SBIV of 1.67 and the lowest from the farmers of HEHR situation (Pananchery). Family labour was utilized well in MEHR situation where enterprises like, goatry, poultry rearing and vegetable cultivation were taken up by the farm families. Especially the women members of these families previously looking after the household activities alone contributed their labour in managing these micro enterprises. Nagesh (2001) reported similar results of contribution of labour by women in vegetable production in Thiruvananthapuram district.

Increased living standard was rated as the highest in MEHR situation (Karukutty) with the SBIV of 0.99 and the lowest in HEMR situation (Kizhakkenchery). Farmers from both situations preferred rearing goats and poultry. The MEHR situation (Karukutty) is near the town Angamali, and hence enjoying better market accessibility which might have possibly resulted in higher income and thereby increased living standard.

The dimension self confidence was reported to be the highest among the farmers of HEMR situation (Kizhakkenchery) with SBIV of 1.51. Farmers were confident of their own abilities and available facilities to achieve higher results in farming.

The highest 'dignity' was perceived by the farmers of HEHR situation (Pananchery) with SBIV of 1.27 and the lowest was 0.85 among the farmers of MELR situation (Eruthenpathy). Farmers of HEHR situation (Pananchery) reported that they gained recognition in the society and felt that they were involving in a respectable profession, which contributes the self reliance in food security, feeding hungry mouths in the country and depending on their own ability.

Equity and satisfaction were experienced the highest by the farmers of HEMR (Kizhakkenchery) and the lowest by the farmers of MELR situation (Eruthenpathy). The farmers of HEMR situation (Kizhakkenchery) felt that they had equal opportunity in decision making and shared profit equally by all the members of the family. They were also satisfied with their working condition and status in the society (Table 3). Similar findings were reported by Sadhanandhan (2002) after implementing vegetable production programmes in Kerala.

Table 3. Agro-ecosystem wise Social Benefit Index Values rated by the participating farmers after three years of interventions

Dimensions	Agro-eco systems and Panchayats					
	HEHR-Pananchery	MEHR-Karukutty	LEHR-Thalikulam	HEMR-Kizhekkanchery	HELR-Muthalamada	MELR-Eruthenpathy
Family labour utilization	1.31	1.67	1.43	1.37	1.49	1.43
Increased living standard	0.89	0.72	0.94	0.99	0.77	0.88
Gain in self confidence	1.46	1.51	1.36	1.41	1.41	1.18
Dignity of farmers	1.27	1.13	1.15	0.88	1.08	0.85
Equity	1.20	1.32	1.24	1.20	1.23	1.07
Satisfaction	1.01	1.08	1.01	1.06	1.00	0.77
Total	7.14	7.42	7.13	6.91	6.98	6.18
Mean	1.19	1.24	1.19	1.20	1.16	1.03

Agro ecosystem-wise Social benefit cost ratio rated by the participating farmers after three years of interventions

Agro ecosystem-wise social benefit cost ratio rated by the participating farmers after three years of interventions is presented in the Table 4. Social benefit cost ratio was computed as the highest with 2.04 at HEMR situation (Kizhakkenchery) and the lowest with 1.07 at MELR situation (Eruthenpathy). The reasons might be that the HEMR situation was blessed with the favourable

through co-operative approach can be explored. Among the six dimensions in the SBIV, family labour utilisation and self confidence contributed maximum to BCIV. It indicated that the interventions made in the homesteads were better utilized by family labour and enhanced the self confidence of the participating farmers. SBCR was computed as the highest with 2.04 at HEMR situation and the lowest with 1.07 at MELR situation. The inherent advantages and deficiencies experienced in each situation were the reasons for variations and disparities in the value

Table 4. Agro-ecosystem wise Social Benefit Cost Ratio rated by the participating farmers after three years of interventions

Index Values	Agro eco-systems and Panchayats					
	HEHR-Pananchery	MEHR-Karukutty	LEHR-Thalikulam	HEMR-Kizhekkanchery	HELR-Muthalamada	MELR-Eruthenpathy
Total Social Benefit Index Value (SBIV)	7.14	6.91	7.13	7.42	6.98	6.18
Total Social Cost Index Value (SCIV)	4.91	5.28	5.11	3.65	5.39	5.76
Social Benefit Cost Ratio (SBCR)	1.45	1.31	1.40	2.04	1.30	1.07

HEHR- High Elevation-High Rainfall

MEHR -Medium Elevation- High Rainfall

LEHR - Low coastal area, Low Elevation- High Rainfall

HEMR - High Elevation- Medium Rainfall

HELR - High Elevation- Low Rainfall

MELR - Medium elevation- black soil- Low Rainfall

climatic conditions; participating farmers were entirely depending on farming alone; access to market was also high and the total Benefit Cost Index value was the highest when compared to rest of the situations. John and Nair (2007) conducted economic analysis in the homesteads of South Kerala and revealed that the system in general was profitable, resulting in an annual net profit of ₹ 28,532 and an average benefit: cost of 2.35.

In the MELR situation, climatic conditions were highly erratic, because of lower income from the farming sector, younger generation turned to off-farm sector and thereby involvement in farming sector came down, total SCIV was the highest. The intervention preferred by the farmers of this situation was rearing heifers and just started to yield and within the project time the incremental income was not felt.

Conclusions

All the six dimensions of SCIV were found as the lowest in HEMR situation. Among all the dimensions, exploitation by middlemen was rated as the maximum SCIV in almost all the situations and therefore this dimension required the attention of policy makers to improve the marketing facilities convenient to farmers so that the intervention of middlemen could be avoided. Another possibility of valued addition of farm produce

of SBCR. The findings of this study revealed that the interventions on restructuring of coconut based homesteads were economically viable and socially desirable.

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