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***Evaluation Study on Soil  
Conservation in Kerala  
2004-05***

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**DEPARTMENT OF ECONOMICS & STATISTICS  
THIRUVANANTHAPURAM  
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## PREFACE

*The geographical peculiarity of Kerala with its ghats section in the East sloping towards the West with its extensive sea coast and heavy monsoon causes tremendous erosion of its surface soil and fertility. This loss of fertility and moisture content of the earth surface result in diminishing rate of agricultural production. Hence Government is implementing various Soil Conservation measures through Soil Conservation Department and local self governments in order to maintain the fertility and moisture content of the surface soil. Every year crores of rupees have been spent to implement various schemes*

*The Evaluation study of these schemes has been done by the Directorate of Economics and Statistics for all districts except Wayanad where the direct implementation and evaluation of the schemes are done by the Central Agency.*

*This report relates to the survey results of 59 schemes completed by the Soil Conservation Department and various agencies. The field survey was conducted during the agricultural year 2004-05. The schemes implemented and completed before five years are taken up for study so that full benefit of the scheme could be evaluated and assessed. This evaluation study results may be much of use to Administrators, Statisticians, Research Scholars and Agricultural Geologists and others interested in the subject.*

*The tabulation and consolidation of data were done in the Evaluation Division of this Directorate. The Report of the survey has been prepared by Dr. T Bhavana, Deputy Director, under the guidance of Sri. S. Rajendran, Joint Director and Sri.K. Asokan, Additional Director. In this context I acknowledge my thanks to the staff of Soil Conservation Department for their valuable suggestion and whole hearted co-operation in the successful conduct of the survey. The computer support extended by Sri. S. Saseendran, U.D. Typist is also acknowledged*

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## Chapter – I

### 1.1 Introduction

Land is one of the basic resources of a nation. Productive land is the source of human sustenance and security. The future of the country and its teeming millions depend to a large extent on the conservation of its fertile soil through the proper land use and scientific agricultural practices.

Soil conservation means applying of all necessary practices to maintain the capability of land for which it is suited and to improve the productivity of agricultural land. Considering the importance of Soil conservation, it is aimed in our national policy on the First Plan to optimize the use of land resources on a sustained basis in the interest of the present and future generation. The subsequent plans carried forward the same policy defines the context of the programme in greater detail and enhanced plan provisions.

### 1.2 Objectives and Methodology of the Survey:-

The main objectives of the evaluation study are:

1. To assess the benefit of the programme particularly in relation to the cultivation of seasonal and perennial crops.
2. To throw light on various aspects like cost benefit analysis, production potential etc
3. To estimate the extent of additional area brought under cultivation consequent on the implementation of the programme.
4. To study the effects of the work carried out by the Soil Conservation Department in this direction

For this, 59 schemes were selected which were executed 5 years back in the State by the Soil Conservation Department. The study covered all the districts of the state except Wayanad where the same is directly done by the Central Government. The list of beneficiaries under each scheme is obtained from the Soil Conservation Department. The beneficiaries are selected by stratified random sampling method on the basis of the area of the holding. The holdings are stratified in to four viz.

Holdings with less than 1 acre	-	Stratum I
Holdings with 1 acre or more but less than 3 acres	-	Stratum II
Holdings with 3 acre or more but less than 5 acres	-	Stratum III
Holdings with 5 acres and above	-	Stratum IV

## Selection of Beneficiaries

Selection of beneficiaries is done by the District Level Officers from the list of beneficiaries collected from Soil Conservation Department. A total number of 25 beneficiaries are selected from each scheme by simple random sampling covering all the above 4 stratum with at least 6 from each stratum. If in any stratum, the total number of beneficiaries in the frame is less than the number to be selected the shortfall is compensated from another stratum with the nearest area of the holding. If the beneficiaries in a scheme are less than 25, all of them are selected. For the purpose of comparison 5 control plots are also selected from the scheme area, where the soil conservation works are not carried out under any scheme. The district wise selection details of beneficiary plots and control plots are given in the table 1 & 1 (a).

**Table – 1 Statement showing stratum wise distribution of selected beneficiaries**

Sl. No.	Districts	No. of schemes selected	(Area in Acres)								Total	
			Stratum – I		Stratum – II		Stratum – III		Stratum – IV		No.	Area in acre
			No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre		
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	1	110	41.19	15	17.99	-	-	-	-	125	59.18
2	Kollam	5	100	28.91	26	39.27	-	-	-	-	126	68.18
3	Pathanamthitta	8	103	39.70	18	23.07	1.4	3.08	3	49.00	125	114.85
4	Alappuzha	8	109	16.09	14	21.67	11	15.90	4	31.00	131	84.66
5	Kottayam	5	61	25.72	53	86.05	8	36.91	-	-	125	148.68
6	Idukki	5	38	31.97	61	106.75	-	32.75	18	164.66	125	336.13
7	Eranakulam	2	117	58.40	8	8.45	-	-	-	-	125	66.85
8	Thrissur	2	125	27.49	-	-	13	-	-	-	125	27.49
9	Palakkad	5	68	29.14	38	54.29	14	46.76	6	34.80	125	164.99
10	Malappuram	4	62	26.20	41	50.05	-	52.38	8	72.72	125	201.35
11	Kozhikode	8	114	35.01	11	16.51	-	-	-	-	125	51.52
12	Kannur	4	42	21.21	41	60.08	-	-	-	-	83	81.29
13	Kasaragod	2	44	24.64	79	125.11	-	-	2	34.26	125	184.01
<b>Total</b>		<b>59</b>	<b>1093</b>	<b>405.67</b>	<b>405</b>	<b>609.29</b>	<b>51</b>	<b>187.78</b>	<b>41</b>	<b>386.44</b>	<b>1590</b>	<b>1589.18</b>

**Table I (a) Statement showing stratum wise distribution of selected Control Plots**

Sl. No.	Districts	No. of control plots selected	(Area in acres)									
			Stratum - I		Stratum - II		Stratum - III		Stratum - IV		Total	
			No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	1	22	7.65	3	5.25	-	-	-	-	25	12.90
2	Kollam	5	20	7.95	5	8.01	-	-	-	-	25	15.96
3	Pathanamthitta	8	40	11.85	-	-	-	-	-	-	40	11.85
4	Alappuzha	8	36	4.53	3	5.42	-	-	-	-	39	9.95
5	Kottayam	5	9	5.07	11	17.67	3	10.54	2	10.10	25	43.38
6	Idukki	5	10	7.54	12	20.30	1	3.70	2	13.60	25	45.14
7	Eranakulam	2	12	3.64	3	4.05	-	-	-	-	15	7.69
8	Thrissur	2	10	2.20	-	-	-	-	-	-	10	2.20
9	Palakkad	5	14	3.91	8	9.98	2	7.85	1	6.20	25	27.94
10	Malappuram	4	13	5.26	8	10.23	4	10.93	-	-	25	26.42
11	Kozhikode	7	23	5.62	2	4.79	-	-	-	-	25	10.41
12	Kannur	4	5	2.03	12	17.80	-	-	-	-	17	19.83
13	Kasaragod	2	10	2.83	12	22.33	-	-	3	21.59	25	46.75
<b>Total</b>		<b>58</b>	<b>224</b>	<b>70.08</b>	<b>79</b>	<b>125.83</b>	<b>10</b>	<b>33.02</b>	<b>8</b>	<b>51.49</b>	<b>321</b>	<b>280.42</b>

Thus from the 13 districts 59 schemes were selected. The total number of beneficiaries comes to 1590. About 69% of the beneficiaries are having holding less than one acre and only 3% of the beneficiaries are having holdings of more than 5 acres. In order to compare the benefits of the implementation of Soil Conservation Programmes, 321 control plots were also selected. Its distribution is 70%, 25%, 3% and 2% respectively under stratum I, II, III and IV.

Following schedules were used for collecting the details from beneficiary plots and control plots.

- |              |   |  |
|--------------|---|--|
| Schedule I   | - | List of selected beneficiaries               |
| Schedule II  | - | Detailed study of the selected beneficiaries |
| Schedule III | - | List of control plots                        |
| Schedule IV  | - | Detailed enumeration of the control plots    |

### **1.3 Problems of Soil Erosion**

Soil erosion means the disappearance of the top soil by the action of wind and water. Ultimately soil erosion leads the desertification of land. It has been estimated that 9.5 lakh hectares of cultivated land in the State is having soil erosion problems. Soil should be productive and conservation programmes are indispensable. Due to erosion, top soil disappeared and it results in deterioration in the fertility of land. To avoid this, various soil conservation schemes have been implemented in the State. Climate, topography, physical and chemical characteristics of soil, etc. are the main factors, which influence the extent of erosion. For sustaining agricultural production in Kerala better preservation of soil assume utmost importance.

### **Responsibility for prevention of erosion**

After Eighth Five Year Plan, soil conservation activities in the State were rationalized. Decentralised planning process in the state also gave much importance to these programmes. Government used to provide budgetary support for soil conservation in available lands. Soil and water conservation programme on watershed basis was launched in the State with the objectives of prevention of land degradation, improvement of land capability and moisture regime in the watershed, promotion of land use to match land capability, etc.

### **1.4 Methods of Soil Conservation Programme**

Soil Conservation practices are mainly grouped into two categories viz. Agronomical and mechanical. The agronomic practices are such as crop rotation for protecting the fertility of the soil and the mechanical practices includes various engineering aspects that supplement the effect of agronomic measures. Recently watershed programme is of great significance. It reduces the flow of surface water and allow surplus run off to flow. The various mechanical practices are contour bunding, contour cultivation, terracing, etc.

### **1.5 Land Use Particulars of the State**

The total geographical area of the state is 3885497 hectares, of which forest occupies 1081509 hectares and land put on non-agricultural uses comes to 376751 hectares and the remaining area is under current fallow, fallow other than current fallow, cultivable waste, etc. The remaining area only is available for cultivation.



## Chapter - II

### 2.1 Impact of Soil Conservation Programme on Land use and Crop Pattern

The following table gives the district wise details regarding area, cost, the total number of beneficiaries and number of selected beneficiaries.

**Table - 2**

**District wise details of area, cost and number of beneficiaries**

Sl No.	District	Area (Acres)	Cost (Rs.)	Number of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1	Thiruvananthapuram	59.18	650672	125	125
2	Kollam	68.18	520213	145	126
3	Pathanamthitta	114.85	2092774	125	125
4	Alappuzha	84.66	1083598	131	131
5	Kottayam	148.68	1663156	125	125
6	Idukki	336.13	2285684	143	125
7	Eranakulam	66.85	1466312	125	125
8	Thrissur	27.49	328525	210	125
9	Palakkad	164.99	2640714	645	125
10	Malappuram	201.35	1965176	1279	125
11	Kozhikode	51.52	998825	125	125
12	Kannur	81.29	463150	83	83
13	Kasargod	184.01	1675815	125	125
<b>Total</b>		<b>1589.18</b>	<b>17834614</b>	<b>3386</b>	<b>1590</b>

#### Land Use particulars of Beneficiary plots

Table Numbers 3 and 3a given below show the land use particulars of beneficiary plots and control plots respectively. Land use particulars of beneficiary plots gives us certain positive trends while comparing with the area before and after the soil conservation programme. Area under cultivation before soil conservation measures has increased from 1320.75 acres to 1357.05 acre after the soil conservation programme. An addition area of 36.30 acre of land has brought under cultivation which was not cultivated earlier. Hence it can be stated that 3% of area over the area cultivated before soil conservation programme is due to the implementation of soil conservation measures. In other words area under cultivation has increased from 83.11% to 85.39% by the soil conservation measures. The area under cultivation has increased from 0.00% to 6.66% to the total area of the scheme.

On examine the district wise data a remarkable increase is noted in the area additionally brought under cultivation in Idukki district. In this district the area under cultivation has increased from 243.08 acres to 271.03 after the programme.

In control plots also the land use is more or less same as in the area of beneficiary plots before soil conservation programme. Hence it is suited for a comparison with the beneficiary plots.

**Table - 3 Land use particulars of Beneficiary Plots**

Sl. No	Districts	Area cultivated						Current fallow					
		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10				
1	Thiruvananthapuram	50.06	84.59	50.79	85.82	15.70	26.53	10.64	17.98				
2	Kollam	58.83	86.29	58.90	86.39	1.66	2.43	1.01	1.48				
3	Pathanamthitta	83.82	72.98	85.29	74.26	0.41	0.36	0.30	0.26				
4	Alappuzha	74.51	88.01	74.55	88.06	0.31	0.37	0.24	0.28				
5	Kottayam	137.46	92.45	138.30	93.02	-	-	-	-				
6	Idukki	243.08	72.32	271.03	80.63	18.33	5.45	14.24	4.24				
7	Eranakulam	66.41	99.34	66.85	100.00	-	-	-	-				
8	Thrissur	24.12	87.74	24.23	88.14	0.15	0.55	0.11	0.40				
9	Palakkad	132.37	80.23	132.49	80.30	4.47	2.71	3.96	2.40				
10	Malappuram	172.34	85.59	172.72	85.78	22.54	11.19	16.84	8.36				
11	Kozhikode	40.96	79.50	41.20	79.97	-	-	-	-				
12	Kannur	72.39	89.05	73.16	90.00	2.00	2.46	1.35	1.66				
13	Kasaragod	164.40	89.34	167.54	91.05	9.22	5.01	6.18	3.39				
	<b>Total</b>	<b>1320.75</b>	<b>83.11</b>	<b>1357.05</b>	<b>85.39</b>	<b>74.79</b>	<b>4.71</b>	<b>54.87</b>	<b>3.45</b>				

Table - 3 Contd..

Sl. No	Districts	Other use				Area not cultivated				Total			
		Before SC Work Area	After SC Work Area	%		Before SC Work Area	After SC Work Area	%		Before SC Work Area	After SC Work Area	%	
1	2	11	13	14	15	16	17	18	19	20	21	22	
1	Thiruvananthapuram	5.89	6.16	10.41	3.23	5.46	2.23	3.77	59.18	100	59.18	100	
2	Kollam	6.51	6.80	9.97	2.84	4.17	2.48	3.64	68.18	100	68.18	100	
3	Pathanamthitta	13.48	13.87	12.08	17.55	15.28	15.69	13.66	114.85	100	114.85	100	
4	Alappuzha	7.00	7.07	8.35	3.15	3.72	3.04	3.59	84.66	100	84.66	100	
5	Kottayam	8.59	8.68	5.84	2.63	1.77	1.70	1.14	148.68	100	148.68	100	
6	Idukki	4.06	4.23	1.26	88.99	26.47	60.87	18.11	336.13	100	336.13	100	
7	Eranakulam	-	-	-	0.44	0.66	-	-	66.85	100	66.85	100	
8	Thrissur	3.07	3.16	11.50	0.30	1.09	0.10	0.36	27.49	100	27.49	100	
9	Palakkad	31.00	31.72	19.23	1.62	0.98	0.78	0.47	164.99	100	164.99	100	
10	Malappuram	25.01	25.03	12.43	4.00	1.99	3.60	1.79	201.35	100	201.35	100	
11	Kozhikode	7.32	7.36	14.29	3.24	6.29	2.96	5.74	51.52	100	51.52	100	
12	Kannur	2.97	3.06	3.76	5.93	7.30	5.07	6.24	81.29	100	81.29	100	
13	Kasaragod	9.10	9.19	4.99	10.51	5.71	7.28	3.9	184.01	100	184.01	100	
	<b>Total</b>	<b>124.00</b>	<b>126.33</b>	<b>7.95</b>	<b>144.43</b>	<b>9.09</b>	<b>105.80</b>	<b>6.66</b>	<b>1589.18</b>	<b>100</b>	<b>1589.18</b>	<b>100</b>	

Table 3(a) Land Use particulars (Control Plots)

Sl. No	Districts	Area cultivated		Current follow		Other use		Area not cultivated		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	11.31	87.67	1.80	13.95	1.13	8.76	0.46	3.57	12.90	100
2	Kollam	10.80	67.67	0.50	3.13	3.06	19.17	2.10	13.16	15.96	100
3	Pathanamthitta	8.66	73.08	0.11	0.93	2.15	18.14	1.04	8.78	11.85	100
4	Alappuzha	8.01	80.50	0.05	0.50	1.47	14.77	0.47	4.73	9.95	100
5	Kottayam	37.31	86.01	-	-	3.70	8.53	2.37	5.46	43.38	100
6	Idukki	32.80	72.66	2.40	5.32	1.04	2.31	11.30	25.03	45.14	100
7	Eranakulam	7.19	93.50	-	-	-	-	0.50	6.50	7.69	100
8	Thrissur	1.80	81.82	-	-	0.40	18.18	-	-	2.20	100
9	Palakkad	22.16	79.31	0.62	2.22	3.99	14.28	1.79	6.41	27.94	100
10	Malappuram	21.74	82.29	0.60	2.27	3.45	13.06	1.23	4.65	26.42	100
11	Kozhikode	8.26	79.35	-	-	1.64	15.75	0.51	4.90	10.41	100
12	Kannur	16.93	85.38	1.94	9.78	0.52	2.62	2.38	12.00	19.83	100
13	Kasaragod	41.37	88.49	1.90	4.06	2.54	5.43	2.84	6.08	46.75	100
	<b>Total</b>	<b>228.34</b>	<b>81.43</b>	<b>9.92</b>	<b>3.54</b>	<b>25.09</b>	<b>8.95</b>	<b>26.99</b>	<b>9.62</b>	<b>280.42</b>	<b>100</b>

## Crop Pattern

Consequent on the introduction of the soil conservation programme, significant changes in the cropping pattern were taken place, this phenomenon shows an increasing trend towards the cultivation of perennial crops. The area under perennial crops has increased after the soil conservation programme by decreasing the area under seasonal crops. The area under perennial crops has increased from 1223.37 acre to 1374.02 acres in the scheme area after the implementation of the programme. From this we can arrive at the conclusion that the farmer have shown a tendency to cultivate perennial crops in sloppy regions where the soil conservation measures are carried out. The cultivation of seasonal crops in such regions is likely to increase soil erosion. More over farmers are reluctant to cultivate seasonal crops due to the recurring expenditure.

In the district wise figures Kollam, Pathanamthitta, Idukki, Palakkad, etc. show high degree of change in the cropping pattern. The study revealed that 9% of gross area is increased under perennial crops even though there are changes in the area among the crops.

**Table - 4**

### Crop Pattern (Area wise)

Sl. No.	Districts	Perennial crops				Seasonal Crops			
		Before SC work	%	After SC work	%	Before SC work	%	After SC work	%
1	2	3	4	5	6	7	8	9	10
1	Thiruvananthapuram	41.31	94.81	53.53	93.24	2.26	5.19	3.88	6.76
2	Kollam	51.23	83.60	60.90	85.53	10.05	16.40	10.30	14.47
3	Pathanamthitta	91.84	77.75	100.80	83.65	26.28	22.25	19.70	16.35
4	Alappuzha	12.25	8.31	14.71	9.95	135.21	91.69	133.17	90.05
5	Kottayam	159.85	98.28	167.89	98.25	2.80	1.72	2.99	1.75
6	Idukki	232.34	92.24	283.93	92.14	19.56	7.76	24.22	7.86
7	Ernakulam	1.35	1.06	1.80	1.39	125.49	98.94	127.88	98.61
8	Thrissur	27.76	99.89	28.90	99.83	0.03	0.11	0.05	0.17
9	Palakkad	118.99	86.23	124.61	86.88	19.00	13.77	18.81	13.12
10	Malappuram	165.91	99.95	186.55	99.95	0.08	0.05	0.09	0.05
11	Kozhikode	47.85	99.13	52.68	98.52	0.42	0.87	0.79	1.48
12	Kannur	71.73	88.19	78.41	89.79	9.61	11.81	8.92	10.21
13	Kasaragod	200.96	99.88	219.31	99.79	0.24	0.12	0.47	0.21
<b>Total</b>		<b>1223.37</b>	<b>77.70</b>	<b>1374.02</b>	<b>79.64</b>	<b>351.03</b>	<b>22.30</b>	<b>351.27</b>	<b>20.36</b>

Table - 4 Contd..

Sl. No	Districts	Total Gross area cropped			
		Before SC work	%	After SC work	%
1	2	11	12	13	14
1	Thiruvananthapuram	43.57	100	57.41	100
2	Kollam	61.28	100	71.20	100
3	Pathanamthitta	118.12	100	120.50	100
4	Alappuzha	147.46	100	147.88	100
5	Kottayam	162.65	100	170.88	100
6	Idukki	251.90	100	308.15	100
7	Eranakulam	126.84	100	129.68	100
8	Thrissur	27.79	100	28.95	100
9	Palakkad	137.99	100	143.42	100
10	Malappuram	165.99	100	186.64	100
11	Kozhikode	48.27	100	53.47	100
12	Kannur	81.34	100	87.33	100
13	Kasaragod	201.20	100	219.78	100
<b>Total</b>		<b>1574.40</b>	<b>100</b>	<b>1725.29</b>	<b>100</b>

Table No.5 reveals that after the introduction of soil conservation programmes, cashew has occupied the largest area under perennial crops; the percentage of increase is 34.79%. Pepper comes next with an increase of 31.77%. Areacanut and rubber showed an increase of 20.44% and 10.46% respectively. The area under Coconut has increased to 9.29% after the SC programmes.

On going through the district wise data, it is noted that the cropping area under different crops are interchanged according to the suitability of land. In the case of Idukki district rubber and cashew area increased. In Alappuzha district there is no cultivation of rubber.

The trend in the cropping pattern of seasonal crop is also analysed. In the case of seasonal crops increase is not seen as much as perennial crops. The analysis reveals that paddy area reflected a decrease of 3% after the implementation of soil conservation works. Ginger also showed a decreasing trend. 12.1%

Table 5 -- Area under selected perennial crops

Sl. No	Districts	Coconut			Areca nut			Cashew			(Area in acres)
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	
1	2	3	4	5	6	7	8	9	10	11	
1	Thiruvananthapuram	8.58	11.05	28.79	0.32	0.40	25.00	0.06	0.15	150.00	
2	Kollam	9.53	10.32	8.29	0.94	1.13	20.21	0.44	0.58	31.82	
3	Pathanamthitta	9.46	14.63	54.65	0.96	1.23	28.13	0.10	0.11	10.00	
4	Alappuzha	11.76	13.81	17.43	0.23	0.44	91.30	0.05	0.10	100.00	
5	Kottayam	37.18	43.92	18.13	0.26	0.33	26.92	0.08	0.10	25.00	
6	Idukki	48.02	49.15	2.35	9.17	9.89	7.85	0.46	0.95	106.52	
7	Eranakulam	0.64	0.89	39.06	0.09	0.29	222.22	0.06	0.06	0.00	
8	Thrissur	25.41	25.98	2.24	1.44	1.78	23.61	0.04	0.05	25.00	
9	Palakkad	65.23	66.76	2.35	10.10	11.64	15.25	0.76	1.15	51.32	
10	Malappuram	98.13	110.73	12.84	8.54	10.97	28.45	0.80	0.92	15.00	
11	Kozhikode	37.20	37.62	1.13	4.87	7.57	55.44	0.33	0.42	27.27	
12	Kannur	27.74	30.44	9.73	10.38	11.98	15.41	1.55	1.76	13.55	
13	Kasaragod	32.36	34.16	5.56	5.78	6.28	8.65	0.53	0.74	39.62	
	<b>Total</b>	411.24	449.46	9.29	53.08	63.93	20.44	5.26	7.09	34.79	

Table - 5 (contd.)

Sl. No	Districts	Rubber			Pepper			Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17	18	19	20	21	22	23
1	Thiruvananthapuram	30.90	37.97	22.88	0.43	0.78	81.40	1.02	3.18	211.76	41.31	53.53	29.58
2	Kollam	36.06	40.86	13.31	0.68	1.20	76.47	3.58	6.81	90.22	51.23	60.90	18.88
3	Pathanamthitta	80.36	83.80	4.29	0.69	0.73	5.80	0.28	0.30	7.14	91.84	100.80	9.76
4	Alappuzha	--	---	----	0.01	0.02	100.00	0.20	0.34	70.00	12.25	14.71	20.08
5	Kottayam	118.32	119.42	0.93	2.27	2.33	2.64	1.74	1.79	2.87	59.85	167.89	5.03
6	Idukki	147.85	180.46	22.06	19.44	28.49	46.55	7.40	14.99	102.57	232.34	283.93	22.20
7	Eranakulam	0.50	0.50	0.00	----	----	----	0.06	0.06	0.00	1.35	1.80	33.33
8	Thrissur	0.01	0.01	0.00	0.64	0.75	17.19	0.22	0.33	50.00	27.76	28.90	4.11
9	Palakkad	39.42	40.16	1.88	2.05	2.55	24.39	1.43	2.35	64.34	118.99	124.61	4.72
10	Malappuram	57.25	62.38	8.96	1.07	1.37	28.04	0.12	0.18	50.00	165.91	186.55	12.44
11	Kozhikode	2.45	2.95	20.41	1.68	1.78	5.95	1.32	2.34	77.27	47.85	52.68	10.09
12	Kannur	27.17	29.39	8.17	4.75	4.62	(--) 2.74	0.14	0.22	57.14	71.73	78.41	9.31
13	Kasaragod	161.47	177.24	9.77	0.76	0.80	5.26	0.06	0.09	50.00	200.96	219.31	9.13
	<b>Total</b>	<b>701.75</b>	<b>775.14</b>	<b>10.46</b>	<b>34.47</b>	<b>45.42</b>	<b>31.77</b>	<b>17.57</b>	<b>32.98</b>	<b>87.71</b>	<b>1223.37</b>	<b>1374.02</b>	<b>12.31</b>



Table 6 – Area under selected seasonal crops

(Area in Acres)

Sl. No	Districts	Paddy			Tapioca			Plantain		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	----	----	----	1.01	1.41	39.60	0.77	1.08	40.26
2	Kollam	----	----	----	7.90	7.94	0.51	0.11	0.19	72.73
3	Pathanamthitta	24.04	14.20	(-), 40.93	2.07	5.02	42.51	0.10	0.14	40.00
4	Alappuzha	135.12	133.08	(---) 1.51	---	---	---	0.09	0.09	0.00
5	Kottayam	----	----	----	2.02	2.08	2.97	0.76	0.90	18.42
6	Idukki	0.50	0.50	0.00	13.61	18.31	34.53	1.36	1.91	40.44
7	Ernakulam	125.49	127.79	1.83	----	----	----	----	0.09	----
8	Thrissur	----	----	----	----	----	----	0.03	0.05	66.67
9	Palakkad	10.78	10.68	(--) 0.93	1.25	1.21	(---) 3.20	0.33	0.42	27.27
10	Malappuram	----	----	----	0.05	0.05	0.00	0.01	0.03	200.00
11	Kozhikode	----	----	----	0.24	0.55	129.17	0.09	0.10	11.11
12	Kannur	----	----	----	3.63	2.48	(--) 31.68	0.75	0.40	(--) 46.67
13	Kasaragod	----	----	----	0.16	0.31	93.75	0.05	0.14	180.00
	<b>Total</b>	<b>295.93</b>	<b>286.25</b>	<b>(---) 3.27</b>	<b>31.94</b>	<b>39.36</b>	<b>23.23</b>	<b>4.45</b>	<b>5.54</b>	<b>24.49</b>

Table - 6 Contd..

Sl. No	Districts	Ginger			Banana			Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17	18	19	20	21	22	23
1	Thiruvananthapuram	0.01	0.04	300.00	----	----	----	0.47	1.35	187.23	2.26	3.88	71.68
2	Kollam	0.20	0.20	0.00	0.03	0.04	33.33	1.81	1.93	6.63	10.05	10.30	2.49
3	Pathanamthitta	0.04	0.25	500.25	0.01	0.02	100.00	0.02	0.07	250.00	26.28	19.70	(--) 25.04
4	Alappuzha	---	----	----	----	----	----	----	----	----	135.21	133.17	(--) 1.51
5	Kottayam	---	----	----	----	----	----	0.02	0.01	(-)50.00	2.80	2.99	6.79
6	Idukki	3.45	2.05	(--) 40.58	0.01	0.06	500.00	0.63	1.39	120.63	19.56	24.22	23.82
7	Ernakulam	----	----	----	----	----	----	----	----	----	125.49	127.88	1.90
8	Thrissur	----	----	----	----	----	----	----	----	----	0.03	0.05	66.67
9	Palakkad	0.29	0.30	3.45	0.09	0.10	11.11	6.26	6.10	(--) 2.56	19.00	18.81	(--) 1.00
10	Malappuram	----	----	----	----	----	----	0.02	0.01	(--) 50.00	0.08	0.09	12.50
11	Kozhikode	0.01	0.07	600.00	----	----	----	0.08	0.07	(--) 12.50	0.42	0.79	88.10
12	Kannur	1.79	2.15	20.11	0.32	0.36	12.50	3.12	3.53	13.14	9.61	8.92	(--) 7.18
13	Kasaragod	----	----	----	----	----	----	0.03	0.02	(--) 33.33	0.24	0.47	95.83
	Total	5.79	5.06	(--) 12.61	0.46	0.58	26.09	12.46	14.48	16.21	351.03	351.27	0.07

## Impact of Soil Conservation Treatment on the yield of crops

Details regarding yield and value of crops are also collected from the beneficiaries in the scheme area. District wise details are displayed in table 7.

An increasing trend has noted in the yield of the perennial crops during the period under report. The total production of perennial crops is increased to 60%. The value of rubber shows an increase of 79% over production before soil conservation programme. The lowest rate noted is in the case of pepper. In the case of rubber the percentage increase of area after implementation of soil conservation work is 10.46% where as the area under pepper has increased to 31.77% after the SCP.

While analysing the impact of soil conservation treatment on the yield of seasonal crops it is seen that even though area under paddy had decreased, production showed a nominal increase. It may be due to the implementation of SCP. In the case of ginger also the situation is same as paddy. Seasonal crops area showed an increase of 26.09 percent. But yield is on a declining trend. Plantain cultivation is seen improved. Both area and yield of it increased. Tapioca cultivation also attained favourable impact due to the implementation of soil conservation programmes. Details are appended.

**Table 7 – Crop wise yield and value of perennial crops in scheme area.**

District	Name of Crop	Unit	Before SC work		After SC work		
			Quantity	Value	Quantity	Value	Value at constant price
1	2	3	4	5	6	7	8
Thiruvananthapuram	Coconut	Nos.	29358	125065	38678	214276	164768
	Arecanut	Nos.	11500	9775	17070	7340	14510
	Cashew	Qtl.	0.19	475	0.62	1488	1550
	Pepper	Qtl.	2.18	26526	7.51	31757	91380
	Rubber	Qtl.	126.43	417384	183.85	957858	606705
	Others		----	12120	----	49350	38250
	Total		----	591345	----	1262069	917163
Kollam	Coconut	Nos.	25760	126997	29567	183907	145765
	Arecanut	Nos.	10050	6134	21320	7030	13650
	Cashew	Qtl.	3.63	12705	4.98	14355	17430
	Pepper	Qtl.	6.69	80454	11.98	53910	144071
	Rubber	Qtl.	171.75	558359	198.80	1069544	646299
	Others		----	84810	----	183207	170786
	Total		----	869759	----	1512862	1138001

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Pathanamthitta	Coconut	Nos.	25826	120607	40525	265840	189251
	Arecanut	Nos.	17088	11704	24723	8774	16933
	Cashew	Qtl.	0.53	1250	0.65	1227	1533
	Pepper	Qtl.	1.45	17877	1.83	8195	22562
	Rubber	Qtl.	631.55	2097378	663.70	3228901	2204148
	Others		-----	11172	-----	114820	110860
	Total		-----	2259988	-----	3627757	2545287
Alappuzha	Coconut	Nos.	46332	213591	58473	340897	269561
	Arecanut	Nos.	9267	5560	18198	5641	10918
	Cashew	Qtl.	3.60	7200	7.70	12320	15400
	Pepper	Qtl.	0.01	105	0.02	96	210
	Rubber	Qtl.	---	----	----	----	----
	Others		---	121720	---	189198	201760
	Total		----	348176	---	548152	497849
Kottayam	Coconut	Nos.	92950	440583	121570	797499	576242
	Arecanut	Nos.	2763	1768	3671	1505	2349
	Cashew	Qtl.	0.40	600	0.58	812	870
	Pepper	Qtl.	6.04	74493	6.41	29590	79056
	Rubber	Qtl.	92003	3036099	934.99	4394453	3085467
	Others		----	126980	----	132118	110363
	Total	Qtl.	----	3680523	----	5355977	3854347
Idukki	Coconut	Nos.	80150	387926	87625	614251	424105
	Arecanut	Nos.	202450	119445	259625	90869	153178
	Cashew	Qtl.	5.53	14378	11.64	32592	30264
	Pepper	Qtl.	122.68	556172	189.66	619556	859827
	Rubber	Qtl.	323.50	1015790	473.70	2353342	1487418
	Others		----	236371	----	183872	178632
	Total	Qtl.	-----	2330082	----	3894482	3133424
Ernakulam	Coconut	Nos.	1410	6599	2165	13318	10133
	Arecanut	Nos.	90	52	291	99	168
	Cashew	Qtl.	0.18	540	0.22	528	660
	Pepper	Qtl.	----	----	----	----	----
	Rubber	Qtl.	4.24	13992	4.58	22753	15114
	Others		---	----	----	----	----
	Total		----	21183	----	36698	26075
Thrissur	Coconut	Nos.	55012	243703	79596	409123	352610
	Arecanut	Nos.	19485	14419	30725	11983	22737
	Cashew	Qtl.	0.16	480	0.21	504	630
	Pepper	Qtl.	4.53	20385	5.94	15246	26730
	Rubber	Qtl.	0.09	288	0.10	530	320
	Others		----	4708	----	10860	7964
	Total			283983		448246	410991

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Palakkad	Coconut	Nos.	95477	404822	114492	598793	485446
	Arecanut	Nos.	141425	70713	185586	59388	92794
	Cashew	Qtl.	27.96	75492	49.84	109648	134568
	Pepper	Qtl.	6.72	81088	10.07	45483	121511
	Rubber	Qtl.	158.67	460143	217.25	1068001	630025
	Others	Qtl.		66960		138336	129690
	Total				1159218		2019649
Malappuram	Coconut	Nos.	404600	1715504	545950	2544127	2314828
	Arecanut	Nos.	12372	6928	15941	4208	8927
	Cashew	Qtl.	25.16	57868	31.70	69740	72910
	Pepper	Qtl.	12.95	155400	16.94	76795	203280
	Rubber	Qtl.	----	---	---	---	---
	Others	Qtl.		3864		8592	8234
	Total				1939564		2703462
Kozhikode	Coconut	Nos.	55998	246951	75254	434216	331870
	Arecanut	Nos.	108180	67072	182560	47466	113188
	Cashew	Qtl.	2.06	4614	2.76	6017	6182
	Pepper	Qtl.	6.55	79910	7.01	31216	85522
	Rubber	Qtl.	2.94	9114	4.43	22061	13733
	Others	Qtl.		116196		241500	222180
	Total				523857		782476
Kannur	Coconut	Nos.	70126	283309	89981	479599	363523
	Arecanut	Nos.	221094	148133	265956	90425	178191
	Cashew	Qtl.	6.36	14628	11.62	24402	26726
	Pepper	Qtl.	27.55	332437	29.11	131965	351261
	Rubber	Qtl.	208.30	645730	279.20	1399630	865520
	Others	Qtl.		4312		8880	8140
	Total				1428549		2134901

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Kasaragod	Coconut	Nos.	100963	454334	127075	701454	571838
	Arecanut	Nos.	164152	134605	315884	126354	259026
	Cashew	Qtl.	3.35	8710	7.57	17335	19682
	Pepper	Qtl.	5.01	61122	6.39	28550	77958
	Rubber	Qtl.	451.50	1408680	545.04	2779704	1700525
	Others	Qtl.		2484		4626	4248
	Total			2069935		3658023	2633277
STATE	Coconut	Nos.	1083962	4769991	1410951	7597300	6199940
	Arecanut	Nos.	919916	596608	1341550	461991	886569
	Cashew	Qtl.	79.11	198940	130.09	290968	328405
	Pepper	Qtl.	202.36	1485969	292.87	1072359	2063368
	Rubber	Qtl.	2999.05	9662957	3505.64	17296777	11255274
	Others			791697		1265359	1191107
	Total			17506162		27984754	21924663

Table - 8 - Crop wise yield and value of seasonal crops in scheme area.

District	Name of Crop	Unit	Before SC work		After SC work		Value at constant price
			Quantity	Value	Quantity	Value	
1	2	3	4	5	6	7	8
	Paddy	Qtl	-	-	-	-	-
Thiruvananthapuram	Tapioca	Qtl	33.01	12115	51.87	21215	19037
	Banana	Qtl	-	-	-	-	-
	other plantain	Qtl	26.05	15604	37.38	22876	22391
	Ginger	Qtl	0.14	1036	0.40	2120	2960
	Others	Qtl	-	3780		10505	10880
	<b>Total</b>	<b>Qtl</b>	-	<b>32535</b>		<b>56716</b>	<b>55268</b>
Kollam	Paddy	Qtl	-	-	-	-	-
	Tapioca	Qtl	157.48	46614	208.82	69831	61811
	Banana	Qtl	1.22	531	1.72	1956	749
	other plantain	Qtl	6.05	3633	11.59	7534	6960
	Ginger	Qtl	2.00	14088	5.50	17170	17610
	Others	Qtl	-	22456		25894	25346
	<b>Total</b>	<b>Qtl</b>	-	<b>87322</b>		<b>122385</b>	<b>112476</b>

Table - 8 Contd..

1	2	3	4	5	6	7	8
Pathanamthitta	Paddy	Qtl	192.32	110777	129.22	87870	74431
	Tapioca	Qtl	198.72	64981	512.02	202248	167430
	Banana	Qtl	0.40	192	0.84	778	403
	other Plantain	Qtl	3.40	2040	4.93	3057	2958
	Ginger	Qtl	0.24	1440	2.00	12200	12000
	Others	Qtl		432		1974	1692
	<b>Total</b>	<b>Qtl</b>		<b>179862</b>		<b>308127</b>	<b>258914</b>
Alappuzha	Paddy	Qtl	1351.20	810720	1730.04	1249089	1038024
	Tapioca	Qtl	16.00	15680	28.00	33600	27440
	Banana	Qtl	----	---	---	---	---
	other Plantain	Qtl	---	---	---	---	---
	Ginger	Qtl	---	---	---	---	---
	Others	Qtl	--	---	---	---	---
	<b>Total</b>	<b>Qtl</b>		<b>826400</b>		<b>1282689</b>	<b>1065464</b>
Kottayam	Paddy	Qtl					
	Tapioca	Qtl	127.62	42242	134.80	54055	44620
	Banana	Qtl	--	----	---	---	---
	Other Plantain	Qtl	25.97	15582	47.95	29250	28770
	Ginger	Qtl	---	---	---	---	---
	Others	Qtl	----	96	----	60	65
	<b>Total</b>	<b>Qtl</b>		<b>57920</b>		<b>83365</b>	<b>73455</b>
Idukki	Paddy	Qtl	2.30	1566	3.40	2625	2315
	Tapioca	Qtl	426.15	132106	593.25	221875	183907
	Banana	Qtl	2.24	1994	16.96	19165	15097
	Other Plantain		113.44	66930	190.16	115997	112195
	Ginger	Qtl	9.30	57660	9.90	47520	61380
	Others	Qtl	----	3415	----	9872	10176
	<b>Total</b>	<b>Qtl</b>		<b>263671</b>		<b>417054</b>	<b>385070</b>
Ernakulam	Paddy	Qtl	1737.23	1033652	1864.40	1258470	1109318
	Plantain	Qtl	----	----	1.06	689	508
	<b>Total</b>			<b>1033652</b>		<b>1259159</b>	<b>1109826</b>

Table - 8 Contd..

1	2	3	4	5	6	7	8
Thrissur	Plantain	Qtl	0.88	537	1.75	1102	1068
	Tapioca	Qtl	---	---	---	---	--
	Banana	Qtl	---	---	---	---	---
	Other Plantain	Qtl	---	---	---	---	---
	Ginger	Qtl	---	---	---	---	---
	Others	Qtl	---	---	---	---	---
	Total	Qtl		537		1102	1068
Palakkad	Paddy	Qtl	60.50	38357	67.00	50451	42478
	Tapioca	Qtl	29.60	8022	32.70	11412	8862
	Banana	Qtl	3.42	2155	4.40	4660	2773
	Other Plantain	Qtl	16.50	9900	27.72	17464	16632
	Ginger	Qtl	1.74	13920	4.00	24000	32000
	Others	Qtl		90144		106628	92787
	Total	Qtl		162498		214615	195532
Malappuram	Paddy	Qtl	---	---	---	---	---
	Tapioca	Qtl	4.00	1056	5.50	1953	1452
	Banana	Qtl	---	---	---	---	---
	Other Plantain	Qtl	0.36	220	1.18	743	721
	Ginger	Qtl	--	---	---	---	---
	Others	Qtl	---	154	---	90	69
	Total	Qtl		1430		2786	2242
Kozhikode	Paddy	Qtl					
	Tapioca	Qtl	10.66	3966	27.87	11817	10369
	Banana	Qtl	2.88	2016	3.04	3435	2128
	Other Plantain	Qtl	4.55	2730	5.60	3450	3360
	Ginger	Qtl	0.02	140	0.62	3596	4340
	Others	Qtl	---	531	---	546	386
	Total	Qtl	---	9383		22811	20587



Table - 8 Contd.

1	2	3	4	5	6	7	8
Kannur	Paddy	Qtl					
	Tapioca	Qtl	363.00	130317	265.11	124071	95174
	Banana	Qtl	10.24	7168	12.31	13541	8617
	Other Plantain	Qtl	20.25	12798	12.24	7834	7736
	Ginger	Qtl	11.10	84360	17.85	94605	135660
	Others	Qtl		35547		55350	48010
	Total	Qtl		270190		295401	295197
Kasaragod	Paddy	Qtl	--	--	--	--	---
	Tapioca	Qtl	12.00	4164	25.48	10472	8842
	Banana	Qtl	--	---	---	----	---
	Other Plantain	Qtl	2.40	1488	7.42	4675	4600
	Ginger	Qtl	--	---	--	--	--
	Others	Qtl		273		190	166
	Total	Qtl		5925		15337	13608
STATE	Paddy	Qtl	3343.55	1995072	3794.06	2648505	2266566
	Tapioca	Qtl	1362.24	451511	1857.42	728949	601504
	Banana	Qtl	46.37	29338	39.27	43535	29767
	Other Plantain	Qtl	209.88	131560	377.58	248271	235339
	Ginger	Qtl	24.54	172644	37.27	201211	265950
	Others	Qtl		156828	---	211109	189577
	Total	Qtl		2936953		4081580	3588703

## 2.2 Cost Benefit Analysis of Soil Conservation Programme

Degradation of land due to soil erosion leads to distraction of agricultural land. Over a period, the entire fertility soil is lost and the land becomes barren and unproductive. In sloppy regions, soil erosion deplete the fertility of the soil and production and degradation of the area under agriculture is to be assessed in terms of production and protective benefits accrued from these areas. These benefits are to be further compared with the investments to arrive at benefit cost ratio, which gives an indication of the viability of the programme implemented.

Productive benefits are the direct returns from the programmes implemented. In regular agricultural land, increase in the yield provide the productive benefits. In addition, production from degraded land which are cultivated after the soil conservation measures are also to be taken into consideration.

Protective benefits are the intangible benefits derived from the soil conservation programme implementation though indirect in nature, are more stable and provide base for the continued prosperity in the area. In the case of agricultural land, protective benefits are assessed in terms of this increased values because of the prevention of further soil erosion and its increased productive potentialities. The increase in the land values are to be assessed.

In the light of the present study, an attempt is made for the cost benefit analysis with the collected data.

The productive benefits obtained from the cultivation of land with various perennial crops and seasonal crops can be assessed from the table given below.

**Table 9**  
**Quantity and Value of Selected perennial and seasonal crops for the years 2003-2004**

	Name of Crops	Units	Before SC Work		After SC Work		Value at constant Price
			Quantity	Values (Rs)	Quantity	Value (Rs)	
A. Perennial Crops	Coconut	Nos	1083962	4769991	1410951	7597300	6199940
	Arecanut	"	919916	596608	1341550	461991	886569
	Cashew	Qtl	79.11	198940	130.09	290968	328405
	Peppr	"	202.36	1485969	292.87	1072359	2063368
	Rubber	"	2999.05	9662957	3505.64	17296777	11255274
	Others	"		791697		1265359	1191107
	Total A			17506162		27984754	21924663
B. Seasonal Crops	Paddy	Qtl	3343.55	1995072	3794.06	2648505	2266566
	Tapioca	"	1362.24	445583	1857.42	728949	601504
	Benana	"	46.37	29638	39.27	43535	29767
	Other plantain	"	209.88	131560	377.58	248271	235339
	Ginger	"	24.54	172644	37.27	201211	265950
	Others	"		156828		211109	189577
	Total B			2931325		4081580	3588703
	All Crops (A+B)			20437487		32066334	25513366

From this study, it can be seen that the total gross area cropped before the implementation of soil conservation programme comes to 1574.40 acres and after soil conservation programme assessed as 1725.29 acres. The value of crops after soil conservation programme has calculated with the price prevailed before the soil conservation programme so as to eliminate price changes due to inflation and other factors such as demand and supply, etc. which may affect price. It is estimated as Rs.20437487 which prevailed before soil conservation programme and value at constant price as Rs.25513366/-. Thus the annual additional benefits due to the implementation of soil conservation programme is worked out as Rs.5075879/- This shows that 28% of the cost of soil conservation programme (including maintenance) has benefited in the year under study itself.

Several benefits flow from the soil conservation programme implementation. Three of them, which derive special attention, are taken up for consideration.

They are:

- (i) Extension of area under cultivation
- (ii) Increase in productivity
- (iii) Diversification of cropping pattern

### **(i) Extension of area under cultivation**

The study revealed that 36.30 acre of land has been additionally brought under cultivation by cultivating areas which were not cultivated before soil conservation programme. This benefit is achieved only due to the implementation of soil conservation programme.

### **(ii) Increase in Productivity**

Productivity also increased due to the implementation of soil conservation programme. The productivity of almost all the crops showed slight improvement after the implementation of soil conservation programme.

### **(iii) Diversification of cropping pattern**

Soil Conservation Programmes increase the soil capacity and which facilitates the cultivation of more remunerative crops. This advantage can be reaped in full, only if the conservation programmes are followed properly, i.e. the dissemination of new techniques of production, adequate provision of inputs and service which will promote the land to improve production.

In the scheme area, cultivation of perennial crops have shown encouraging performance. The increase in area of perennial crops is higher over the area under same before soil conservation programme. Growing of perennial crops will accelerate conservation of soil more affectively.

## **Income and Expenditure**

The particulars relating to income and expenditure of b beneficiary holdings and control plots are given below:

**Table 10 - Total Income, expenditure and Net Income of Scheme area (Rs)**

Sl No	Name of District	Income (Rs)		Expenditure (Rs)		Net Income (Rs)	
		Before SC work	After SC work	Before SC work	After SC work	Before SC work	After SC work
1	2	3	4	5	6	7	
1	Thiruvananthapuram	623880	1318785	313465	544640	310415	774145
2	Kollam	957081	1635247	533128	952114	423953	683133
3	Pathanamthitta	2439850	3935884	669301	1698757	1770549	2237127
4	Alappuzha	1174576	1830841	515748	644402	658828	1186439
5	Kottayam	3738443	5439342	783902	1718800	2954541	3720542
6	Idukki	2593753	4311536	1118766	1958413	1474987	2353123
7	Eraakulam	1054835	1295857	698985	698570	355850	597587
8	Thrissur	284520	449348	135600	188590	148920	260758
9	Palakkad	1321716	2234264	736317	1508334	585399	725930
10	Malappuram	1940994	2706248	694380	1011467	1246614	1694781
11	Kozhikode	533240	805320	108235	178474	425005	626846
12	Kannur	1698739	2430302	434690	575659	1264049	1854643
13	Kasaragod	2075860	3673360	852870	1109811	1222990	2563549
<b>State</b>		<b>20437487</b>	<b>32066334</b>	<b>7795387</b>	<b>12787731</b>	<b>12842100</b>	<b>19278603</b>

**Table 10 (a) - Income, Expenditure and Net Income of Control Plots (Rs)**

Sl No	Name of District	Income	Expenditure	Net Income
1	2	3	4	5
1	Thiruvananthapuram	175905	125800	50105
2	Kollam	285050	202350	82700
3	Pathanamthitta	377411	216900	160511
4	Alappuzha	254461	160402	94059
5	Kottayam	1289451	447045	842406
6	Idukki	273413	135500	137913
7	Eraakulam	91217	58870	32347
8	Thrissur	26604	12600	14004
9	Palakkad	209089	114658	94431
10	Malappuram	276418	144300	132118
11	Kozhikode	147901	84615	63286
12	Kannur	469144	119300	349844
13	Kasaragod	657842	203150	454692
<b>State</b>		<b>4533906</b>	<b>2025490</b>	<b>2508416</b>

**Table 11 – Income per Acre before and after soil conservation programme**

(Income in Rs)

Sl No	Name of District	Before SC work			After SC work		
		Area in acre	Net Income (Rs)	Net Income per acre (Rs)	Area in acre	Net Income (Rs)	Net Income per acre (Rs)
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	34.36	310415	9034	40.15	774145	19281
2	Kollam	57.17	423953	7416	57.89	683133	11801
3	Pathanamthitta	83.41	1770549	21227	84.99	2237127	26322
4	Alappuzha	74.20	658828	8879	74.31	1186439	15966
5	Kottayam	137.46	2954541	21494	138.30	3720542	26902
6	Idukki	224.75	1474987	6563	256.79	2353123	9164
7	Eraakulam	66.41	355850	5358	66.85	597587	8939
8	Thrissur	23.97	148920	6213	24.12	260758	10811
9	Palakkad	127.90	585399	4577	128.53	725930	5648
10	Malappuram	149.80	1246614	8322	155.88	1694781	10872
11	Kozhikode	40.96	425005	10376	41.20	626846	15215
12	Kannur	70.39	1264049	17958	71.81	1854643	25827
13	Kasaragod	155.18	1222990	7881	161.36	2563549	15887
<b>State</b>		<b>1245.96</b>	<b>12842100</b>	<b>10307</b>	<b>1302.18</b>	<b>19278603</b>	<b>14805</b>

**Table 11 (a) - Income per acre in the Control Plots**

Sl No	Name of District	Area in acre	Net Income (Rs)	Net Income per acre
1	2	3	4	5
1	Thiruvananthapuram	9.51	50105	5269
2	Kollam	10.30	82700	8029
3	Pathanamthitta	8.55	160511	18773
4	Alappuzha	7.96	94059	11816
5	Kottayam	37.31	842406	22579
6	Idukki	30.40	137913	4537
7	Eraakulam	7.19	32347	4499
8	Thrissur	1.80	14004	7780
9	Palakkad	21.54	94431	4384
10	Malappuram	21.14	132118	6250
11	Kozhikode	8.26	63286	7662
12	Kannur	14.99	349844	23338
13	Kasaragod	59.47	454692	11520
<b>State</b>		<b>218.42</b>	<b>2508416</b>	<b>11484</b>

Analysis of the data collected reveals that the net income per acre received from the beneficiary plot is Rs.14805/- and from the control plot is Rs.11484/-. This district wise net income per acre is given in Table No. 11 and 11(a). The higher rate of net income from the scheme area is due to the positive impact of soil conservation programme.

## Chapter III

### 3.1 General Observations

During the survey period the staff of this department have visited all the beneficiary plots.

The distribution of holding of the selected beneficiaries of the soil conservation reveals that 69% of the beneficiary holding less than one acre, 25% have holding area between one acre to 3 acre. It is noted that the beneficiaries processing over 3 acre to 5 acre and above 5 acre were 3% each.

The opinion of 1590 selected beneficiaries are collected. Out of that 20% of the beneficiaries reported that contour bunds effectively control soil erosion while about 79 percent opinioned that it moderately controls erosion of the soil. The rest 1% are of opinion that it has no effect.

About the fertility of the soil 21% are of the view that the conservation measures have improved that the fertility remarkably. While 77% reported that the fertility of the soil has improved moderately and 2% opinioned that it has no effect on the fertility of the soil.

Similarly regarding the moisture retention 14% reported that the scheme has substantially increased moisture retention while 86% reported that the scheme has caused moisture retention moderately only. Details are presented in table No. 12

**Table 12 - Opinion of cultivators about of effectiveness of bunds, Fertility of the soil and moisture retention of scheme area**

Sl No	Name of District	Effectiveness of contour bunds			Fertility of soil			Moisture retention			Total
		Effectively controlled	Moderately controlled	No effect	Remarkably controlled	Moderately controlled	No effect	Substantially controlled	Moderately controlled	No effect	
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	58	67	--	49	76	--	42	83	--	125
2	Kollam	34	92	--	93	33	--	16	110	--	126
3	Pathanamthitta	1	124	--	1	124	--	--	125	---	125
4	Alappuzha	13	117	1	11	114	6	19	110	2	131
5	Kottayam	14	107	4	4	121	--	---	125	--	125
6	Idukki	53	72	--	54	68	3	34	90	1	125
7	Ernakulam	16	107	2	1	121	3	3	122	--	125
8	Thrissur	54	71	--	53	72	--	52	73	--	125
9	Palakkad	--	125	--	1	124	--	--	125	--	125
10	Malappuram	1	123	1	3	121	1	4	120	1	125
11	Kozhikode	22	94	9	9	104	12	12	110	3	125
12	Kannur	11	72	--	19	64	--	9	72	2	83
13	Kasaragod	46	78	1	41	83	1	25	99	1	125
<b>State</b>		<b>323</b>	<b>1249</b>	<b>18</b>	<b>339</b>	<b>1225</b>	<b>26</b>	<b>216</b>	<b>1364</b>	<b>10</b>	<b>1590</b>

**Table 13 - Conditions of Bund**

(Scheme Area)

Sl No	Name of District	Good	Partially damaged	Seriously damaged	Total
1	2	3	4	5	6
1	Thiruvananthapuram	115	9	1	125
2	Kollam	93	33	---	126
3	Pathanamthitta	120	5	---	125
4	Alappuzha	107	24	---	131
5	Kottayam	124	1	---	125
6	Idukki	84	39	2	125
7	Eraakulam	125	---	---	125
8	Thrissur	118	7	---	125
9	Palakkad	97	27	1	125
10	Malappuram	123	1	1	125
11	Kozhikode	62	52	11	125
12	Kannur	73	10	---	83
13	Kasaragod	73	52	---	125
	<b>State</b>	<b>1314</b>	<b>260</b>	<b>16</b>	<b>1590</b>

While examining the condition of bund the study revealed that 83% are in good condition 16% are partially damaged and 1% is seriously damaged, District wise statement is given in Table No. 13.

**Table 14 - Occupational profile**

(Scheme Area)

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agricultural Labours	Non-agriculture labours	
1	2	3	4	5	6	7
1	Thiruvananthapuram	6	31	12	76	125
2	Kollam	10	46	14	56	126
3	Pathanamthitta	12	32	57	24	125
4	Alappuzha	15	16	26	74	131
5	Kottayam	56	18	21	30	125
6	Idukki	71	15	26	13	125
7	Eraakulam	5	41	17	62	125
8	Thrissur	21	24	23	57	125
9	Palakkad	19	25	67	14	125
10	Malappuram	26	83	4	12	125
11	Kozhikode	9	28	60	28	125
12	Kannur	23	1	34	25	83
13	Kasaragod	46	15	36	28	125
	<b>State</b>	<b>319</b>	<b>375</b>	<b>397</b>	<b>499</b>	<b>1590</b>

The occupational profile of the selected beneficiaries reveals that 20% included agriculture job, 24% are accounted as non-agriculture, 25% agricultural labourers and 31% are categorized as non-agricultural labourers. Details are presented in Table No. 14.

**Table 14 (a)**

**Occupational profile (Control Plots)**

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agriculture labours	Non-agriculture labours	
1	2	3	4	5	6	7
1	Thiruvananthapuram	1	5	4	15	25
2	Kollam	1	10	6	8	25
3	Pathanamthitta	3	4	19	14	40
4	Alappuzha	2	7	19	11	39
5	Kottayam	5	3	5	12	25
6	Idukki	11	2	4	8	25
7	Eraakulam	1	2	3	9	15
8	Thrissur	1	1	3	5	10
9	Palakkad	2	8	10	5	25
10	Malappuram	6	3	2	14	25
11	Kozhikode	3	4	7	11	25
12	Kannur	3	--	6	8	17
13	Kasaragod	4	2	13	6	25
<b>Total</b>		<b>43</b>	<b>51</b>	<b>101</b>	<b>126</b>	<b>321</b>

Details regarding the occupational profile of the control plots shows that major portion of the beneficiaries coming under the category of Non-Agricultural labourers.

### 3.3 Summary of findings

The data furnished in this report are collected through the Evaluation study on soil conservation conducted during 2004-2005. All the district except Wayanad were covered in this study. 59 Schemes implemented by Soil Conservation Department 5 years prior to 2004-05 have been selected for the evaluation study. The summary of findings are discussed below:

#### Benefit of the Programme

There is an increasing awareness of the importance of the soil conservation programme among the people in the scheme area. Most of the watershed programmes are on watershed basis. AGrama Panchayats, Block Panchayats and District Panchayats are also engaged in these programmes. A large number of Harijan Colonies are benefited through the programmes. Tribal colonies also enjoyed benefits.



Productivity of the land to a certain extent influenced the cropping pattern of a locality. Through this study it is seen that the cropping intensity of the scheme area increased from 126.36% to 132.49%. Details are presented in Table No. 15.

**Table 15**  
**Cropping Intensity in Scheme area**

Sl.No	District	Net area cultivated		Total Gross Area Cropped		Intensity of Cropping (%)	
		Before SC Work	After SC work	Before SC work	After SC work	Before SC work	After work
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	34.36	40.15	43.57	57.41	126.80	142.99
2	Kollam	57.17	57.89	61.28	71.20	107.19	122.99
3	Pathanamthitta	83.41	84.99	118.12	120.50	141.61	141.78
4	Alappuzha	74.20	74.31	147.46	147.88	198.73	199.00
5	Kottayam	137.46	138.30	162.65	170.88	118.33	123.56
6	Idukki	224.75	256.79	251.90	308.15	112.08	120.00
7	Eranakulam	66.41	66.85	126.84	129.68	191.00	193.99
8	Thrissur	23.97	24.12	27.79	28.95	115.94	120.02
9	Palakkad	127.90	128.53	137.99	143.42	107.89	111.58
10	Malappuram	149.80	155.88	165.99	186.64	110.81	119.73
11	Kozhikode	40.96	41.20	48.27	53.47	117.85	129.78
12	Kannur	70.39	71.81	81.34	87.33	115.56	121.61
13	Kasaragod	155.18	161.36	201.20	219.78	129.66	137.05
<b>State</b>		<b>1245.96</b>	<b>1302.18</b>	<b>1574.40</b>	<b>1725.29</b>	<b>126.36</b>	<b>132.49</b>

## Evaluation Survey on Soil Conservation 2004-05

### Name of Schemes covered in the study (District wise)

<b>1)</b>	<b>Thiruvananthapuram</b>	
	Vettinad watershed under RIDF III	- 115
	Vettinad Watershed under RIDFIII	- 10
		<u>125</u>
<b>2)</b>	<b>Kollam</b>	
	Palickal Soil and water conservation scheme	- 31
	Elavaramkuzhy IHDP conservation scheme	- 26
	Mankunnu IHDP Colony Soil and water conservation scheme	- 21
	Ayiravally IHDP Colony Soil and water conservation scheme	- 16
	Manalipacha water shed soil and water conservation scheme	- 31
		<u>125</u>
<b>3)</b>	<b>Pathananhitta</b>	
	Paramala Colony	- 4
	Anjilimottil	- 9
	Pooehakkulam	- 36
	Oorampara	- 7
	Nagavara	- 25
	Kokkathodu	- 25
	Ennakkattupadi	- 15
		<u>128</u>
<b>4)</b>	<b>Alappuzha</b>	
	Kuzhikkala Harijan colony	- 9
	Mavelikkolam SC Colony	- 10
	Erupathi Parambu	- 14
	Kazhuvidamola	- 19
	Illichira Ambedkar colony	- 25
	Kothakulangara Tribal colony	- 16
	Pariyathu scheme	- 8
	Ramarajapuram Kayal puncha sekharan	- 25
	Kariyil	- 2
		<u>128</u>
<b>5)</b>	<b>Kottayam</b>	
	Kannamkulam-Nadukkepady S.C.Scheme	- 24
	Kadukkachira S.C. Scheme	- 33
	Mothirathani S.C Scheme	- 25
	Chiramangalam S.C. Scheme	- 14
	S.C.P. Anakkally Thoppu	- 29
		<u>125</u>
<b>6)</b>	<b>Trissur</b>	
	MALA RIDF	- 60
	Parakulamricladoor water shed RIDF	- 65
		<u>125</u>

<b>7) Idukki</b>	
Manjappara S.C.P	- 28
Mariyapuram TSP	- 9
Chokormudi RIDF	- 28
Parayamala S.C.P	- 35
Contour bund, Agroforestry	- 25
	<u>125</u>
<b>8) Palakkad</b>	
Mosheny kottopuran IHDP Colony	- 11
Chembra water shed	- 25
Munidankavu watershed	- 39
Kappur water shed	- 25
Mezhukumpara water shed	- 25
	<u>125</u>
<b>9 Malappuram</b>	
WGDP	- 38
District Panchayat	- 25
NWDPR	- 28
RVDF	- 34
	<u>125</u>
<b>10 Kozhikode</b>	
Payona Michabhumi	- 14
Pookoth Watershed	- 5
Kanniparambu Harijan Colony	- 10
Adappor Thodu Watershed	- 7
Chemnil, meethal Harijan Colony	- 9
MittathPlavu Water shed	- 8
Villiapally	- 23
Koduvally	- 49
	<u>125</u>
<b>11 Kannur</b>	
Thirumani Neermari	- 34
MannorKochi Neermari	- 13
Padappangad Neermari	- 27
Madhyavelloormar Neermari	- 9
	<u>83</u>
<b>12 Kasargod</b>	
Nallampuzha water shed	- 53
Cherukayam water shed	- 72
	<u>125</u>
<b>13 Ernakulam</b>	
Kavungampadam	- 100
Kakkol	- 25
	<u>125</u>

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