

Sl. No. 531



**Government of Kerala**

***Evaluation Study on Soil  
Conservation in Kerala  
2003-04***

**Department of Economics & Statistics  
Thiruvananthapuram  
2005**



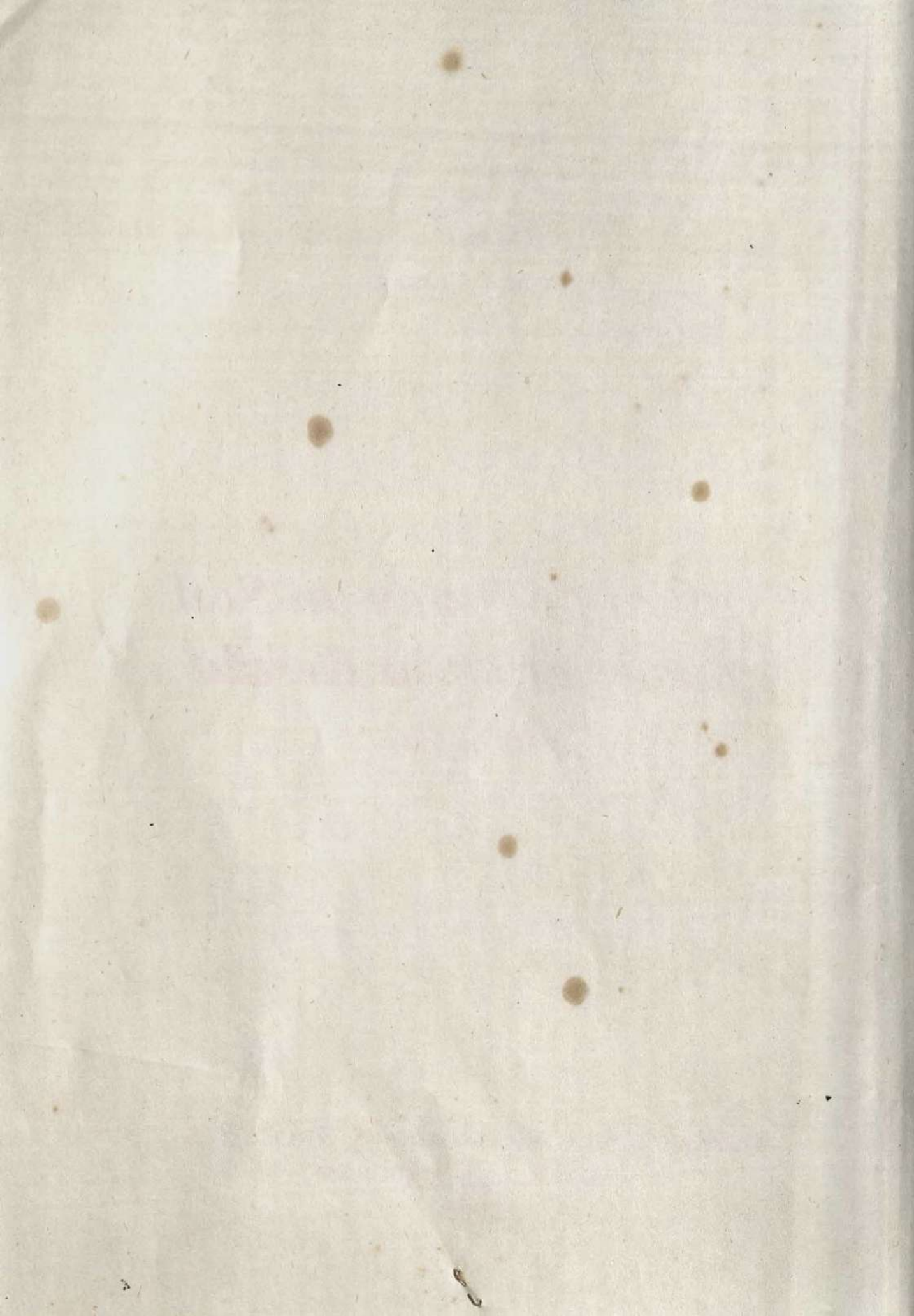


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## PREFACE

*One of the most valuable gifts of nature to mankind is soil. For the maintenance of soil, adequate protection and conservation are necessary. Due to the peculiarity of the rainfall and topography of the state, soil conservation assumes importance in our planning process. Heavy soil erosion results in the loss of fertility and moisture content of the earth's surface and diminishing rate of agricultural production. Hence Government is implementing various Soil Conservation measures through the Soil Conservation Department, local bodies etc. for maintaining the fertility and moisture content of the surface soil.*

*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. Eranakulam district has been exempted from the study due to the non- implementation of SC Schemes in the year under study (1998-99).*

*This report relates to the survey results of 51 schemes completed by the soil conservation Department and various agencies. The field survey was conducted during the agricultural year 2003-04. 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 use of 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. Narayanan, Additional Director. The services of the staff of Evaluation Division of the Directorate of Economics and Statistics and the co-operation extended by the Soil Conservation Department are acknowledged. The computer support extended by Sri. S. Saseendran, U.D. Typist is also acknowledged*

*Suggestions for improvement are solicited.*

**M.R.BALAKRISHNAN**  
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Thiruvananthapuram,  
12/09/05

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## Chapter – I

### 1.1 Introduction

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. In Kerala, Soil conservation programme was started towards the close of the First Five-Year Plan. Important measures adopted for conserving soil conservation are bunding, terracing grassing of waterways, water shed management etc.

The schemes for soil conservation have been winded to include protection of land against deterioration of quality and the adoption of a pattern of optimization of land use.

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

The main objectives of the evaluation study are:

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

In order to study the impact of various soil conservation programmes, 51 SC schemes, which were executed 5 years back have been selected from the schemes completed in the state representing all districts except Wayanad where the same is directly beings done by the Central Government This time Ernakulam District was also exempted from the study since no SC schemes were executed there during the periodic under study. The list of beneficiaries under each scheme is obtained from the Soil Conservation Department. The beneficiaries are being selected using stratified random sampling method on the basis of the area of the holding. The holdings are stratified into four strata namely:

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

## Selection of Beneficiaries

From among the schemes implemented by the Soil Conservation Department during the reference year five schemes are selected at random for detailed evaluation survey. A total number of 25 beneficiaries are selected from each scheme by simple random sampling covering all the above 4 stratum (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 other stratum. However, if the beneficiaries in a scheme are less than 25, all of them are selected. From of purpose of comparison, 5 plots are also selected from out side the scheme area, where the soil conservation works are not carried out under any scheme.

For the successful conduct of the survey, 13 trained investigators are posted in 13 districts (except Wayanad). Necessary training was also imparted to the investigators before the commencement of field work by the district level officers in charge of the scheme in the districts. After the completion of the fieldwork, scrutiny, tabulation, consolidation and analysis of data are done in the Head office.

The district wise selection details of beneficiaries plots and control plots are given in the table I and I(a)

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

(Area in Acres)

Sl. No.	Districts	No. of schemes selected	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	3	84	45.78	41	49.55	-	-	-	-	125	95.33
2	Kollam	4	106	40.30	18	24.37	1	3.35	-	-	125	68.02
3	Pathanamthitta	10	109	26.59	16	22.71	-	-	-	-	125	49.30
4	Alappuzha	8	70	11.70	20	28.89	1	3.30	-	-	91	43.89
5	Kottayam	1	32	20.46	31	64.40	45	175.05	17	164.94	125	424.85
6	Idukki	3	28	14.24	67	111.94	15	56.59	15	116.00	125	298.77
7	Eranakulam*	-	-	-	-	-	-	-	-	-	-	-
8	Thrissur	4	81	24.98	43	62.17	1	3.43	-	-	125	90.58
9	Palakkad	6	118	19.45	7	10.32	-	-	-	-	125	29.77
10	Malappuram	1	38	18.83	33	54.02	27	100.83	27	216.69	125	390.37
11	Kozhikode	7	103	29.28	21	38.57	1	3.25	-	-	125	71.10
12	Kannur	2	42	20.48	80	127.07	1	3.78	2	16	125	167.33
13	Kasaragod	2	50	22.69	50	86.22	-	-	-	-	100	108.91
<b>Total</b>		<b>51</b>	<b>861</b>	<b>294.78</b>	<b>427</b>	<b>680.23</b>	<b>92</b>	<b>349.58</b>	<b>61</b>	<b>513.63</b>	<b>1441</b>	<b>1838.22</b>

\*Eranakulam district was not taken up for study as no SC schemes have extended there in the year under study.



Table I (a) Statement showing stratum wise distribution of selected control plots

(Area in acres)

Sl. No.	Districts	No. of control plots selected	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	3	18	7.49	6	8.10	-	-	1	5.50	25	21.09
2	Kollam	4	20	7.95	5	6.08	-	-	-	-	25	14.03
3	Pathanamthitta	10	47	15.24	3	3.30	-	-	-	-	50	18.54
4	Alappuzha	8	41	6.82	4	8.21	-	-	-	-	45	15.03
5	Kottayam	1	1	0.51	2	3.99	1	3.98	1	5.89	5	14.37
6	Idukki	3	5	2.95	16	28.50	3	10.50	1	6.00	25	47.95
7	Eranakulam			-	-	-	-	-	-	-	-	-
8	Thrissur	4	18	4.08	2	4.50	-	-	-	-	20	8.58
9	Palakkad	6	24	2.11	1	1.60	-	-	-	-	25	3.71
10	Malappuram	1	8	3.86	7	9.88	5	15.75	5	28.26	25	57.75
11	Kozhikode	8	23	8.90	2	2.72	-	-	-	-	25	11.62
12	Kannur	2	4	2.21	16	22.56	4	14.50	1	6.00	25	45.27
13	Kasaragod	2	13	3.10	6	10.63	1	5.00	-	-	20	18.73
Total		52	222	65.22	70	110.07	14	49.73	9	51.65	315	276.67

During 2003-04 from 51 scheme 1441 beneficiaries were selected. 60% of the beneficiaries were having holding less than one acre, 30 % of beneficiaries had holdings more than one acre. 52 number of control plots were also selected for comparison. Their distribution is 70%, 22%, 5% and 3% under stratum I, II, III and IV respectively

To collect the details from beneficiary plots and control plots, 4 types of schedules have been used. They are: -

- |              |  |
|--------------|--|
| 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

In Kerala about 10 lakh hectares of land is under the threat of severe soil erosion. Top soil which is the most vital part of the soil, may sometimes disappear due to erosion, It results in the deterioration of the fertility of the land. To avoid this, various soil conservation measures are being taken up to implementation in the State.

The factors which influence the extent of erosion are climate, topography, physical and chemical characteristics of soil and vegetation

#### Responsibility for prevention of erosion

Conservation of soil requires the adoption of sound land use principles and cultural practices by the farming community as a whole. Thus the responsibility lies in the individual farmer and in general with the Government to protect the land under cultivation. The evils of erosion, even though serious, are not recognised properly. The benefits of anti erosion works reach only gradually to the farmers

Soil conservation measures assume so much importance that its control cannot be left exclusively to the farmers who are interested in guide returns from their investment. Lack of technical know-how and finance also stand in the way of the individual action in this respect. Hence responsibility of the state Government in the matter of soil conservation is more important than that of individual farmers. In the decentralised planning process local self governments, demarcate considerable amount for implementing soil conservation scheme. This is a clear indication of the increasing importance being assigned to the soil conservation programmes.

This study is confined to the soil conservation measures undertaken in all the districts of the state except in Wayanad district.(Eranakulam district also for the year under study.)

## Chapter - II

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

During the agricultural year 2003-04 for the evaluation study of soil conservation programme in the state 51 schemes were selected. The table 2 gives the district wise details regarding area, cost, the total no. of beneficiaries and no. of selected beneficiaries.

It is revealed from table 2 that 1441 beneficiaries were selected out of a total of 3030 beneficiaries and they occupy 1838.22 acres of land. The cost incurred for the 51 schemes is Rs 17389724/-

**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	95.33	2681686	125	125
2	Kollam	68.02	501743	220	125
3	Pathanamthitta	49.30	1004186	125	125
4	Alappuzha	43.89	1396993	94	91
5	Kottayam	424.85	1340941	252	125
6	Idukki	298.77	2199445	492	125
7	Eranakulam	-	-	-	-
8	Thrissur	90.58	1776157	243	125
9	Palakkad	29.77	766067	197	125
10	Malappuram	390.37	3057768	377	125
11	Kozhikode	71.10	734565	142	125
12	Kannur	167.33	873967	364	125
13	Kasargod	108.91	1056206	397	100
	Total	1838.22	17389724	3030	1441

#### Land Use particulars of Beneficiary plots

The following table shows the land use particulars of beneficiary plots. It reveals positive trends while comparing with the area before and after the soil conservation programme. An additional area of 21.29 acres of land has been brought under cultivation, which was not cultivated earlier. Hence it can be stated that 1.21% of area over the acre cultivated before soil conservation programme is due to the implementation of soil conservation measures. In other words area under cultivation has increased from 90% to 91% by decreasing the area of not cultivated from 5.68% to 4.47% to the total area of the scheme.

Table - 3 Land use particulars of Beneficiary plots

Sl. No	Districts	Area cultivated						Current fallow					
		Before		After		Before		After		Before		After	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10				
1	Thiruvananthapuram	86.72	90.97	87.59	91.88	25.93	27.20	19.16	20.10				
2	Kollam	58.16	85.50	58.20	85.56	1.75	2.57	2.05	3.01				
3	Pathanamthitta	30.77	62.4	32.87	66.67	16.62	33.71	4.60	9.33				
4	Alappuzha	39.30	89.54	39.48	89.95	-	-	-	-				
5	Kottayam	397.36	93.53	397.44	93.55	19.67	4.63	19.62	4.62				
6	Idukki	280.48	93.88	288.16	96.45	38.98	13.05	20.32	6.8				
7	Ernakulam	-	-	-	-	-	-	-	-				
8	Thrissur	85.82	94.74	85.85	94.78	-	-	-	-				
9	Palakkad	24.37	81.86	24.39	81.93	0.13	0.44	0.35	1.18				
10	Malappuram	342.59	87.76	344.65	88.30	43.33	11.10	38.37	9.83				
11	Kozhikode	63.32	89.06	63.34	89.08	-	-	-	-				
12	Kannur	149.90	89.58	154.70	92.45	0.45	.27	2.62	1.57				
13	Kasaragod	95.47	87.66	98.88	90.79	19.52	17.92	6.78	6.23				
	<b>Total</b>	<b>1654.26</b>	<b>89.99</b>	<b>1675.55</b>	<b>91.15</b>	<b>166.38</b>	<b>9.05</b>	<b>113.87</b>	<b>6.19</b>				

Table - 3 Contd..

Sl. No	Districts	Other use			Area not cultivated			Total					
		Before Area	%	After Area	Before Area	%	After Area	Before Area	%	After Area			
1	2	11	12	13	14	15	16	17	18	19	20	21	22
1	Thiruvananthapuram	5.41	5.67	5.42	5.69	3.20	3.36	2.32	2.43	95.33	100	95.33	
2	Kollam	9.18	13.50	9.22	13.56	0.68	1.00	0.60	.88	68.02	100	68.02	
3	Pathanamthitta	4.83	9.80	4.83	9.8	13.70	27.80	11.60	23.53	49.30	100	49.30	100
4	Alappuzha	2.24	5.1	2.26	5.15	2.35	5.36	2.15	4.90	43.89	100	43.89	100
5	Kottayam	10.77	2.53	10.85	2.55	16.72	3.94	16.56	3.9	424.85	100	424.85	100
6	Idukki	3.53	1.18	3.82	1.28	14.76	4.94	6.79	2.27	298.77	100	298.77	100
7	Eranakulam	-	-	-	-	-	-	-	-	-	-	-	-
8	Thrissur	4.01	4.43	4.06	4.48	0.75	.83	0.67	.74	90.58	100	90.58	100
9	Palakkad	4.37	14.68	4.38	14.71	1.03	3.46	1.00	3.36	29.77	100	29.77	100
10	Malappuram	19.47	4.99	19.51	4.99	28.31	7.25	26.21	6.71	390.37	100	390.37	100
11	Kozhikode	5.35	7.52	5.38	7.57	2.43	3.42	2.38	3.35	71.10	100	71.10	100
12	Kannur	3.88	2.33	4.16	2.49	13.55	8.09	8.47	5.06	167.33	100	167.33	100
13	Kasaragod	6.57	6.03	6.68	6.13	6.87	6.31	3.35	3.08	108.91	100	108.91	100
	<b>Total</b>	<b>79.61</b>	<b>4.33</b>	<b>80.57</b>	<b>4.38</b>	<b>104.35</b>	<b>5.68</b>	<b>82.10</b>	<b>4.47</b>	<b>1838.22</b>	<b>100</b>	<b>1838.22</b>	<b>100</b>

### Land use particulars of Control plot

Land use particulars of control plots reveals that 87% of the area were cultivated whereas the area not cultivated is 7%. Here the land cultivated is more or less the same as that of the beneficiary plots. Details are as follows:

**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	19.18	90.94	3.69	17.50	1.64	7.78	0.27	1.28	21.09	100
2	Kollam	5.86	41.77	4.27	30.44	6.13	43.69	2.04	14.54	14.03	100
3	Pathanamthitta	12.68	68.39	3.24	17.48	3.66	19.74	2.20	11.87	18.54	100
4	Alappuzha	12.03	80.04	0.38	2.53	2.57	17.1	0.43	2.86	15.03	100
5	Kottayam	8.04	55.95	0.18	1.25	3.00	20.88	3.33	23.17	14.37	100
6	Idukki	43.72	91.18	7.18	14.97	0.96	2.00	3.27	6.82	47.95	100
7	Ernakulam	-	-	-	-	-	-	-	-	-	100
8	Thrissur	7.57	88.23	-	-	1.01	11.77	-	-	8.58	100
9	Palakkad	2.98	80.32	0.19	5.12	0.56	15.10	0.17	4.58	3.71	100
10	Malappuram	48.87	84.62	5.70	9.87	4.72	8.17	4.16	7.21	57.75	100
11	Kozhikode	10.40	89.50	-	-	0.95	8.18	0.27	2.32	11.62	100
12	Kannur	40.86	90.26	-	-	1.18	2.61	3.23	7.13	45.27	100
13	Kasaragod	12.03	64.23	1.31	6.99	5.90	31.5	0.80	4.27	18.73	100
<b>Total</b>		<b>224.22</b>	<b>81.04</b>	<b>26.14</b>	<b>9.45</b>	<b>32.28</b>	<b>11.67</b>	<b>20.17</b>	<b>7.29</b>	<b>276.67</b>	<b>100</b>

## Crop Pattern

Consequent on the introduction of the soil conservation programme, significant changes in the cropping pattern have been occurring the agricultural field. This phenomenon shows same trend towards the cultivation of perennial and seasonal crops. Crop pattern details are presented in Table No. 4. It is revealed that the area under perennial crops accounts to 92% whereas seasonal crops shares to 8% to the total gross cropped area. Cultivation of perennial crops is likely to reduce soil erosion.

In the district wise figures aimed at by tabulating the data received, it is seen that Kollam, Alappuzha and Palakkad show change in the cropping pattern in favour of perennial crops. Thiruvananthapuram, Pathanamthitta, Idukki, Kozhikode, Kannur and Kasaragod districts show slight change in favour of seasonal crops Kottayam, Thrissur and Malappuram districts keep more or less the same trend of cropping pattern.

The study revealed that after the introduction of soil conservation programmes, cashew occupied the largest area under perennial crops, the increase is 28%. Pepper comes next with an increase of 16%. Coconut, Arecanut and Rubber show an increase of 14%, 9% and 8% respectively. (See table No. 5)

The trend in the cropping pattern of seasonal crop was also analysed. Among seasonal crops a positive trend is noticed in favour of paddy cultivation. Paddy area before soil conservation work was 37.40 acres. It increased to 43.38 acres after the implementation of Soil Conservation work. The percentage increase noticed is 16%. It is a good symptom as far as paddy cultivation is concerned. This may be due to the implementation of soil conservation works. While analysing the district wise data, it is seen that Pathanamthitta and Idukki recorded highest percentage increase in favour of paddy cultivation. Alappuzha and Malappuram districts remained with the same area under paddy as in previous years. Among other seasonal crops, ginger occupied the largest percentage increase (68%). Banana ranks next (38%) followed by Plantain (23%). The percentage increase under tapioca recorded as 11%. Details are presented in table No.6

**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	65.81	92.00	88.14	90.96	5.55	8.00	8.76	9.04
2	Kollam	44.78	71.12	58.51	82.33	18.18	28.88	12.56	17.67
3	Pathanamthitta	16.09	84.02	24.52	59.37	3.06	15.98	16.78	40.63
4	Alappuzha	16.57	34.88	19.42	38.32	30.94	65.12	31.26	61.68
5	Kottayam	418.89	89.24	425.62	89.29	50.50	10.76	51.07	10.71
6	Idukki	310.34	99.26	388.49	98.65	2.32	0.74	5.30	1.35
7	Thrissur	98.84	98.87	99.75	98.82	1.13	1.13	1.19	1.18
8	Palakkad	22.44	75.84	26.00	78.50	7.15	24.16	7.12	21.50
9	Malappuram	328.49	97.21	369.34	97.10	9.42	2.79	11.03	2.90
10	Kozhikode	75.75	97.54	79.13	95.34	1.91	2.46	3.87	4.66
11	Kannur	158.44	89.33	170.62	88.83	18.93	10.67	21.45	11.17
12	Kasaragod	81.50	98.26	110.23	94.70	1.44	1.74	6.17	5.30
	<b>Total</b>	<b>1637.94</b>	<b>91.58</b>	<b>1859.77</b>	<b>91.33</b>	<b>150.53</b>	<b>8.42</b>	<b>176.56</b>	<b>8.67</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	71.36	100	96.90	100
2	Kollam	62.96	100	71.07	100
3	Pathanamthitta	19.15	100	41.30	100
4	Alappuzha	47.51	100	50.68	100
5	Kottayam	469.39	100	476.69	100
6	Idukki	312.66	100	393.79	100
7	Ernakulam				
8	Thrissur	99.97	100	100.94	100
9	Palakkad	29.59	100	33.12	100
10	Malappuram	337.91	100	380.37	100
11	Kozhikode	77.66	100	83.00	100
12	Kannur	177.37	100	192.07	100
13	Kasaragod	82.94	100	116.40	100
	<b>Total</b>	<b>1788.47</b>	<b>100.00</b>	<b>2036.33</b>	<b>100</b>



Table 5 - Area under selected perennial crops

Sl. No	Districts	Coconut			Arecanut			Cashew		
		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	23.87	28.89	21.03	1.16	1.37	18.10	1.93	2.78	44.04
2	Kollam	24.17	27.36	13.20	0.11	0.40	263.64	1.00	2.05	105
3	Pathanamthitta	4.63	8.92	92.66	0.20	0.89	345	1.39	2.25	19.05
4	Alappuzha	15.47	18.06	16.74	0.06	0.21	350	0.59	1.02	14.61
5	Kottayam	65.75	72.03	9.55	6.41	6.39	-0.31	1.01	1.02	0.99
6	Idukki	20.89	29.68	42.08	18.33	20.68	12.82	17.36	24.18	39.29
7	Ernakulam									
8	Thrissur	1.83	19.87	0.20	0.39	0.52	33.33	0.77	0.77	0
9	Palakkad	10.34	10.83	4.74	0.12	0.24	100	0.72	0.96	33.33
10	Malappuram	142.77	173.03	21.20	115.19	117.21	1.75	11.21	11.58	3.30
11	Kozhikkode	58.30	58.58	0.48	2.89	4.00	38.41	1.51	2.11	39.74
12	Kannur	75.86	72.06	-5.01	10.70	13.36	24.86	21.09	29.60	40.35
13	Kasaragod	39.10	53.88	37.80	5.69	9.68	70.12	13.56	15.34	13.13
	<b>Total</b>	<b>500.98</b>	<b>573.19</b>	<b>14.41</b>	<b>161.25</b>	<b>174.95</b>	<b>8.50</b>	<b>72.94</b>	<b>93.66</b>	<b>28.41</b>

Table 5 - Area under selected perennial crops

Sl. No	Districts	Coconut			Arecanut			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	23.87	28.89	21.03	1.16	1.37	18.10	1.93	2.78	44.04	
2	Kollam	24.17	27.36	13.20	0.11	0.40	263.64	1.00	2.05	105	
3	Pathanamthitta	4.63	8.92	92.66	0.20	0.89	345	1.89	2.25	19.05	
4	Alappuzha	15.47	18.06	16.74	0.06	0.21	350	0.89	1.02	14.61	
5	Kottayam	65.75	72.03	9.55	6.41	6.39	-0.31	1.01	1.02	0.99	
6	Idukki	20.89	29.68	42.08	18.33	20.68	12.82	17.36	24.18	39.29	
7	Ernakulam	..									
8	Thrissur	19.83	19.87	0.20	0.39	0.52	33.33	0.77	0.77	0	
9	Palakkad	10.34	10.83	4.74	0.12	0.24	100	0.72	0.96	33.33	
10	Malappuram	142.77	173.03	21.20	115.19	117.21	1.75	11.21	11.58	3.30	
11	Kozhikode	58.30	58.58	0.48	2.89	4.00	38.41	1.51	2.11	39.74	
12	Kannur	75.86	72.06	-5.01	10.70	13.36	24.86	21.09	29.60	40.35	
13	Kasaragod	39.10	53.88	37.80	5.69	9.68	70.12	13.56	15.34	13.13	
	<b>Total</b>	<b>500.98</b>	<b>573.19</b>	<b>14.41</b>	<b>161.25</b>	<b>174.95</b>	<b>8.50</b>	<b>72.94</b>	<b>93.66</b>	<b>28.41</b>	

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	18.76	26.34	40.41	13.21	18.50	40.05	6.88	10.26	49.13	65.81	88.14	33.93
2	Kollam	8.65	8.67	0.23	2.95	6.07	105.76	7.90	13.96	76.71	44.78	58.51	30.66
3	Pathanamthitta	6.71	7.90	17.74	2.40	2.78	15.83	0.26	1.78	584.62	16.09	24.52	52.39
4	Alappuzha							0.15	0.13	-13.33	16.57	19.42	17.20
5	Kottayam	206.44	206.64	0.097	81.05	81.20	0.19	58.23	58.34	0.19	418.89	425.62	1.61
6	Idukki	95.74	112.78	17.80	72.33	90.48	25.09	85.69	110.69	29.18	310.34	388.49	25.18
7	Eranakulam												
8	Thrissur	74.90	75.60	0.94	2.00	2.01	0.5	0.95	0.98	3.16	98.84	99.75	0.92
9	Palakkad	40.07	4.11	0.98	1.31	1.96	49.62	5.88	7.90	34.35	22.44	26.00	15.87
10	Malappuram	32.20	38.33	19.04	10.52	12.19	15.88	16.60	17.00	2.41	328.49	369.34	12.44
11	Kozhikode	9.61	9.88	2.81	1.63	2.24	37.42	1.81	2.32	28.18	75.75	79.13	4.46
12	Kannur	16.17	19.02	17.63	32.24	34.14	5.89	2.38	2.44	2.52	158.44	170.62	7.69
13	Kasaragod	12.21	15.58	27.60	10.94	15.75	43.97				81.50	110.23	35.25
	<b>Total</b>	<b>485.46</b>	<b>524.85</b>	<b>8.11</b>	<b>230.58</b>	<b>267.32</b>	<b>15.93</b>	<b>186.73</b>	<b>223.84</b>	<b>19.87</b>	<b>1637.94</b>	<b>1859.77</b>	<b>13.54</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	-	-		3.90	5.06	29.74	1.03	1.60	55.34
2	Kollam	-	-		7.12	6.39	-10.25	1.06	1.38	30.19
3	Pathanamthitta	0.50	3.45	590.00	0.94	4.92	423.40	0.36	0.71	97.22
4	Alappuzha	30.73	30.73	0	-	0.12	100.00	0.15	0.26	73.33
5	Kottayam				22.19	22.24	0.23	9.88	10.14	2.63
6	Idukki	0.17	3.70	2076.47	0.95	0.35	-63.16	0.84	1.14	35.71
8	Thrissur				0.90	0.75	-16.67	0.23	0.44	91.30
9	Palakkad				0.34	0.21	-38.24	0.43	0.66	53.49
10	Malappuram	5.50	5.50	0	3.35	3.34	-0.30	0.49	1.28	161.23
11	Kozhikode				0.23	0.49	113.04	1.21	2.19	80.99
12	Kannur	0.50	-	-100.00	4.17	2.95	-29.26	7.19	7.23	0.56
13	Kasaragod				0.40	2.30	475.00	0.44	1.57	256.82
	<b>Total</b>	<b>37.40</b>	<b>43.38</b>	<b>15.99</b>	<b>44.49</b>	<b>49.22</b>	<b>10.63</b>	<b>23.31</b>	<b>28.60</b>	<b>22.69</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	0.10	0.11	10	0.08	0.68	750.00	0.44	1.31	197.73	5.55	8.76	57.84
2	Kollam	0.15	0.25	66.67	-	-	-	9.85	4.54	-53.91	18.18	12.56	-30.91
3	Pathanamthitta	-	0.01	-	0.50	2.85	470.00	0.76	4.84	536.84	3.06	16.78	448.37
4	Alappuzha	-	-	-	-	-	-	0.06	0.15	150.00	30.94	31.26	1.03
5	Kottayam	0.09	0.09	0	14.14	14.27	0.92	4.20	4.33	3.10	50.50	51.07	1.13
6	Idukki	-	-	-	0.06	-	-100.00	0.30	0.11	-63.33	2.32	5.30	128.45
7	Eranakulam	-	-	-	-	-	-	-	-	-	-	-	-
8	Thrissur	-	-	-	-	-	-	-	-	-	1.13	1.19	5.31
9	Palakkad	0.01	0.03	200	-	0.13	100.00	6.37	6.09	-4.40	7.15	7.12	-0.42
10	Malappuram	-	-	-	-	0.50	100.00	0.08	0.31	287.5	9.42	11.03	17.09
11	Kozhikode	0.02	0.02	0	-	-	-	0.45	1.17	160.00	1.91	3.87	102.62
12	Kannur	2.53	3.77	49.01	1.64	3.78	130.49	2.90	3.72	28.28	18.93	2.45	-87.06
13	Kasaragod	-	0.60	-	0.50	1.19	138.00	0.10	0.51	410.00	1.44	6.17	328.47
	<b>Total</b>	<b>2.90</b>	<b>4.88</b>	<b>68.28</b>	<b>16.92</b>	<b>23.40</b>	<b>38.30</b>	<b>25.51</b>	<b>27.08</b>	<b>6.15</b>	<b>150.53</b>	<b>176.56</b>	<b>17.29</b>

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

An analysis of the impact of soil conservation treatment on the yield of crops enables to assess the cost benefit of the projects. Details regarding yield and value of crops are also collected from the beneficiaries of the scheme area. It is furnished in table No 7.

In the case of perennial crops as well as seasonal crops, an increasing trend is noted during the period under report. The total production of perennial crops is increased to 33 %. The yield of pepper shows the highest increase of 41% on production. The crop area of pepper also increased to 16%. The production of coconut and Arecanut has increased to 33% each. The respective crop area increase was 14% and 8%. The production increase of cashew shares to 24% where as the area increase was 28%.

Area effect of seasonal crops exhibits an increase of 17% after the implementation of soil conservation programme. Where as the production increase recorded as 27%. Crop wise analysis shows that even though the area of paddy increased to 16% the value increase was on a negative trend (-44%). The production particulars of seasonal crops are given in Table 8.

**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.	47014	187421	60647	335742	241769
	Arecanut	Nos.	15965	7938	27148	11663	13498
	Cashew	Qtl.	3.29	8466	3.73	9957	9598
	Pepper	Qtl.	8.86	141834	9.24	58613	147917
	Rubber	Qtl.	155.18	371656	192.28	1032748	460510
	Others				25718		44414
	Total			743033		1409523	912723
Kollam	Coconut	Nos.	84680	395523	79637	495406	371968
	Arecanut	Nos.	8730	4388	9070	3380	4559
	Cashew	Qtl.	5.19	13757	5.29	14833	14022
	Pepper	Qtl.	2.85	46653	4.80	32400	78574
	Rubber	Qtl.	266.50	631072	281.80	1382229	667302
	Others				126202		49083
	Total			1217595		1977331	1320708

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Pathanamthitta	Coconut	Nos.	12005	51102	17695	116014	75323
	Arecanut	Nos.	4136	1843	8276	2937	3688
	Cashew	Qtl.	70.90	198900	96.13	276903	269679
	Pepper	Qtl.	2.45	44820	10.49	70463	191902
	Rubber	Qtl.	27.00	131907	90.88	454220	443989
	Others			29594		32471	55070
	Total				458166		953008
Alappuzha	Coconut	Nos.	13917	61957	18363	107099	81750
	Arecanut	Nos.	3240	1317	2630	814	1069
	Cashew	Qtl.					
	Pepper	Qtl.					
	Rubber	Qtl.					
	Others			121			
	Total				63395		107913
Kottayam	Coconut	Nos.	51306	234104	59848	392405	273080
	Arecanut	Nos.	99836	50457	98999	40213	50034
	Cashew	Qtl.	2.11	6106	2.11	6033	6106
	Pepper	Qtl.	94.47	1713371	95.62	649359	1734228
	Rubber	Qtl.	1886.20	9975244	1927.05	11240483	10191281
	Others			60928		60578	46071
	Total	Qtl.			12040210		12389071
Idukki	Coconut	Nos.	22949	112498	39322	275560	192760
	Arecanut	Nos.	644270	291403	1253934	442263	567154
	Cashew	Qtl.	7.93	18649	2.60	7345	6114
	Pepper	Qtl.	331.39	5952248	551.93	3735446	9913468
	Rubber	Qtl.	302.23	1578523	783.82	3824258	4093829
	Others			476115		1406467	1371699
	Total	Qtl.			8429436		9691339
Thrissur	Coconut	Nos.	29018	125709	30914	158963	133923
	Arecanut	Nos.	42150	25193	57100	22046	34129
	Cashew	Qtl.	6.42	19799	8.40	23494	25905
	Pepper	Qtl.	1.07	18956	1.67	11271	29586
	Rubber	Qtl.	630.90	2634008	633.04	3081639	2642943
	Others			81441		87594	87714
	Total				2905106		3385007

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Palakkad	Coconut	Nos.	7462	30336	9707	50756	39463
	Arecanut	Nos.	5897	1973	20845	6679	6974
	Cashew	Qtl.	2.10	6552	2.76	8330	8611
	Pepper	Qtl.	0.96	16889	1.79	12128	31491
	Rubber	Qtl.	82.55	414058	102.36	510981	513434
	Others	Qtl.		9590		11564	10822
	Total				479408		600438
Malappuram	Coconut	Nos.	546165	2075209	754760	3519295	2867787
	Arecanut	Nos.	33871	11127	43989	11613	14451
	Cashew	Qtl.	66.51	187669	113.01	335414	318877
	Pepper	Qtl.	30.42	52889	41.93	285109	72901
	Rubber	Qtl.	1.15	5699	65.78	321598	325983
	Others	Qtl.		37051		47165	42054
	Total				2845653		4520194
Kozhikode	Coconut	Nos.	102615	439110	134015	773106	573477
	Arecanut	Nos.	231250	69907	339300	86691	102571
	Cashew	Qtl.	2.85	8734	4.09	11173	12534
	Pepper	Qtl.	4.46	79299	4.36	29118	77521
	Rubber	Qtl.			10.00	47110	5000
	Others	Qtl.		24763		39374	38113
	Total				621813		986572
Kannur	Coconut	Nos.	137505	573506	175335	934991	731287
	Arecanut	Nos.	1756700	875364	1890650	646413	942111
	Cashew	Qtl.	69.97	230719	70.70	215282	233126
	Pepper	Qtl.	34.52	601679	31.34	212742	546252
	Rubber	Qtl.	90.60	474518	127.25	638413	666473
	Others	Qtl.	2.22	3645	2.76	4747	4532
	Total				2759431		2652588



(Table 7 Contd..)

1	2	3	4	5	6	7	8
Kasaragod	Coconut	Nos.	109325	497319	168660	930615	767234
	Areca nut	Nos.	48180	28426	127342	51191	75131
	Cashew	Qtl.	24.66	79991	19.13	57330	62053
	Pepper	Qtl.	7.19	125720	12.76	85519	223114
	Rubber	Qtl.	79.28	408292	138.19	691088	711679
	Others	Qtl.					
	Total			1139748		1815743	1839211
STATE	Coconut	Nos.	1163961	4783794	1548908	8089952	6349821
	Areca nut	Nos.	2894225	1369336	3879283	1325903	1815369
	Cashew	Qtl.	198.12	779342	327.95	966094	966625
	Pepper	Qtl.	518.64	9270367	765.93	5182168	13046954
	Rubber	Qtl.	3521.59	16624987	4352.45	23141153	20722423
	Others			875168		1783457	1879789
	Total			33702994		40488727	44780981

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	75.18	22790	76.01	31057	23042
	Banana	Qtl	14.52	14662	15.23	60218	15379
	other plantain	Qtl	1.03	556	1.60	6365	864
	Ginger	Qtl	0.77	4062	0.92	3678	4853
	Others	Qtl		3142		2686	2588
	<b>Total</b>	<b>Qtl</b>		<b>45212</b>		<b>60218</b>	<b>46726</b>
Kollam	Paddy	Qtl	-	-	-	-	-
	Tapioca	Qtl	111.4-5	3114.8	111.75	37370	3123
	Banana	Qtl					
	other plantain	Qtl	213.80	84339	124.42	70174	49081
	Ginger	Qtl	1.95	10286	3.43	18436	18093
	Others	Qtl		25478		31026	29937
	<b>Total</b>	<b>Qtl</b>		<b>151251</b>		<b>157006</b>	<b>100234</b>

Table - 8 Contd..

1	2	3	4	5	6	7	8
Pathanamthitta	Paddy	Qtl	3.88	2113	34.04	23424	18538
	Tapioca	Qtl	104.80	35518	384.20	151694	130210
	Banana	Qtl					
	other Plantain	Qtl	15.33	8608	40.69	26571	22848
	Ginger	Qtl			2.03	15741	9807
	Others	Qtl		33680		44685	42304
	<b>Total</b>	<b>Qtl</b>			<b>79919</b>		<b>262115</b>
Alappuzha	Paddy	Qtl	250.75	13665.1	308.95	223139	16837
	Tapioca	Qtl			9.37	3776	2645
	Banana	Qtl					
	other Plantain	Qtl	1.00	458	11.55	938	5290
	Ginger	Qtl					
	Others	Qtl					
<b>Total</b>	<b>Qtl</b>			<b>137109</b>		<b>227853</b>	<b>24772</b>
Kottayam	Paddy	Qtl					
	Tapioca	Qtl	2475.90	780428	2492.70	1000595	785724
	Banana	Qtl	157.07	107120	160.31	215349	109330
	Other Plantain	Qtl	413.38	219918	427.92	297404	227653
	Ginger	Qtl	2.55	12079	2.55	20254	12079
	Others	Qtl		43584		59212	45252
	<b>Total</b>	<b>Qtl</b>			<b>1163129</b>		<b>1592814</b>
Idukki	Paddy	Qtl	1.61	1033	35.08	27070	22508
	Tapioca	Qtl	66.10	18751	213.69	24701	60619
	Banana	Qtl	-	-	-	-	-
	Other Plantain	Qtl	20.91	11119	27.06	15178	11389
	Ginger	Qtl					
	Others	Qtl		8240		194558	190038
	<b>Total</b>	<b>Qtl</b>			<b>39143</b>		<b>261807</b>

Table - 8 Contd..

1	2	3	4	5	6	7	8
Thrissur	Paddy	Qtl	-	-	-	-	-
	Tapioca	Qtl	9.62	3733	90.33	36042	35052
	Banana	Qtl					
	Other Plantain	Qtl	13.55	6205	37.75	20121	17287
	Ginger	Qtl	-	-	-	-	-
	Others	Qtl	-	-	-	-	-
	Total	Qtl		9938		56163	52339
Palakkad	Paddy	Qtl	-	-	-	-	-
	Tapioca	Qtl	10.68	2717	11.01	3845	2801
	Banana	Qtl	-	-	5.24	6278	653
	Other Plantain	Qtl	3.69	1714	7.12	3895	3307
	Ginger	Qtl	0.03	139	1.05	12297	4865
	Others	Qtl		30336		56874	53762
	Total	Qtl		34906		83189	65388
Malappuram	Paddy	Qtl	81.00	46781	86.00	56004	49669
	Tapioca	Qtl	54.00	12921	75.00	26606	17946
	Banana	Qtl	-	-	30.00	39200	3917
	Other Plantain	Qtl	9.14	3728	12.00	8124	4895
	Ginger	Qtl	-	-	-	-	-
	Others	Qtl		58988		62667	60481
	Total	Qtl		122418		192601	136908
Kozhikode	Paddy	Qtl	-	-	-	-	-
	Tapioca	Qtl	1.89	542	3.03	1285	869
	Banana	Qtl	-	-	-	-	-
	Other Plantain	Qtl	6.49	3975	6.18	4388	3785
	Ginger	Qtl	0.05	251	0.45	3170	2259
	Others	Qtl		5331		10658	10112
	Total	Qtl		10099		19501	17025

Table - 8 Contd.

1	2	3	4	5	6	7	8
Kannur	Paddy	Qtl	8.00	4635	-	-	-
	Tapioca	Qtl	106.58	37702	105.61	49402	37359
	Banana	Qtl	30.09	4522	122.59	140902	18423
	Other Plantain	Qtl	85.81	52430	105.84	74723	64668
	Ginger	Qtl	53.94	244153	76.21	540853	344956
	Others	Qtl		28991		40753	38582
	Total	Qtl		372433		846633	503988
Kasaragod	Paddy	Qtl	-	-	-	-	-
	Tapioca	Qtl	4.00	1500	10.79	4440	4046
	Banana	Qtl	4.00	3600	54.45	64596	49005
	Other Plantain	Qtl	16.40	10316	55.40	36232	34848
	Ginger	Qtl	-	-	12.00	98775	49200
	Others	Qtl		1106		3559	3239
	Total	Qtl		16522		207602	140338
STATE	Paddy	Qtl	265.05	191213	464.07	329637	107552
	Tapioca	Qtl	3020.20	947750	3583.49	1370813	1103436
	Banana	Qtl	205.68	129904	387.82	482757	196707
	Other Plantain	Qtl	800.53	403366	847.53	564413	448915
	Ginger	Qtl	59.29	270970	98.64	713204	446112
	Others	Qtl		238876		506678	476295
	Total	Qtl		2182079		3967502	2779017

## 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 if may be lost and the land becomes barren and unproductive. In the case of 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 before and after implementation of soil conservation programme. 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 account.

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 value because of the prevention of further soil erosion and its increased productive potentialities. The increase in the land values are to be assessed from the data collected.

An attempt is made in the light of the present study for the cost benefit analysis with the collected data. The cost incurred for the soil conservation works are collected from 1441 beneficiaries in the 51 schemes. It comes to Rs.1,73,89,724/-.

The productive benefits obtained from the cultivation of land with various perennial crops and seasonal crops can be assessed from the table No.9

The total area under cultivation have been calculated to 2036.33 acres. The value of crops before the soil conservation programme comes to Rs. 3,58,85,073/- The value of crops after the Soil Conservation Programme has also 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 the price. It is estimated as Rs. 4,75,59,998/- Thus the annual additional benefits due to the implementation of Soil Conservation Programme is worked out as Rs.11674925/-. The shows that 67% of the cost of soil conservation programme has benefited in the year under survey itself.

**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	1163961	4783794	1548908	8089952	6349821
	Arecanut	"	2894225	1369336	3879283	1325903	1815369
	Cashew	Qtl	198.12	779342	327.95	966094	966625
	Peppr	"	518.64	9270367	765.93	5182168	13046954
	Rubber	"	3521.59	16624987	4352.45	23141153	20722423
	Others	"		875168		1783457	1879789
	Total A			33702994		40488727	44780981
B. Seasonal Crops	Paddy	Qtl	265.05	191213	464.07	329637	107552
	Tapioca	"	3020.20	947750	3583.49	1370813	1103436
	Benana	"	205.68	129904	387.82	482757	196707
	Other plantain	"	800.53	403366	847.53	564413	448915
	Ginger	"	59.29	270970	98.64	713204	446112
	Others	"		238876		506678	476295
	Total B			2182079		3967502	2779017
	All Crops (A+B)			35885073		44456229	47559998

Various 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**

Due to the implementation of soil conservation programme it is observed that 21.29 acres of land has been additionally brought under cultivation. This benefit is achieved only due to the implementation of soil conservation programme.

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

A comparison of income, expenditure and net income from the holdings in the scheme area and control area will clearly indicates the benefits acquired due to the implementation of soil conservation programme. These particulars are given in table 10 and 10(a)

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

Soil Conservation Programmes increase the soil capacity and which facilitate 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 productivity.

In the scheme area cultivation of perennial crops have shown encouraging performance.

### **Net Income Analysis**

The net income analysis details of beneficiary plots and control plots are given in table 11 and 11 (a). It shows that net income per acre increased from Rs. 16765/- to Rs. 19867/- after the implementation of soil conservation programme. It is seen that the net income per acre received from control plots is Rs.7105/-

**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	Thiruvananthapuram	788245	1469741	331315	698460	456930	771281
2	Kollam	1368846	2134337	890545	1177335	478301	957002
3	Pathanamthitta	538085	1215123	191100	495814	346985	719309
4	Alappuzha	200504	335766	157030	197590	43474	138176
5	Kottayam	13203339	13981885	2527437	2787601	10675902	11194284
6	Idukki	8468579	9953146	1829077	2053573	6639502	7899573
7	Thrissur	2915044	3441170	848210	1319080	2066834	2122090
8	Palakkad	514314	683627	336163	364830	178151	318797
9	Malappuram	2968071	4712795	2058175	2404093	909896	2308702
10	Kozhikode	631912	1006073	163685	224391	468227	781682
11	Kannur	3131864	3499221	1274835	1116032	1857029	2383189
12	Kasaragod	1156270	2023345	333615	591840	822655	1431505
<b>State</b>		<b>35885073</b>	<b>44456229</b>	<b>10941187</b>	<b>13430639</b>	<b>24943886</b>	<b>31025590</b>

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

Sl No	Name of District	Income	Expenditure	Net Income
1	Thiruvananthapuram	196833	100175	96658
2	Kollam	40403	26937	13466
3	Pathanamthitta	196190	108105	88085
4	Alappuzha	117809	61700	56109
5	Kottayam	184066	110017	74049
6	Idukki	488296	220170	268126
7	Thrissur	149271	85350	63921
8	Palakkad	47557	28417	19140
9	Malappuram	653581	397238	256343
10	Kozhikode	161233	90710	70523
11	Kannur	695173	376290	318883
12	Kasaragod	17179	89645	82147
<b>State</b>		<b>3102204</b>	<b>1694754</b>	<b>1407450</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	Thiruvananthapuram	60.79	456930	7517	68.43	771281	11271
2	Kollam	56.41	478301	8479	56.15	957002	17044
3	Pathanamthitta	14.15	346985	24522	28.27	719309	25444
4	Alappuzha	39.30	43474	1106	39.48	138176	3500
5	Kottayam	377.69	10675902	28266	377.82	11194284	29629
6	Idukki	241.50	6639502	27493	267.84	7899573	29494
7	Thrissur	85.82	2066834	24083	85.85	2122090	24719
8	Palakkad	24.24	178151	7349	24.04	318797	13261
9	Malappuram	299.26	909896	3040	306.28	2308702	7538
10	Kozhikode	63.32	468227	7395	63.34	781682	12341
11	Kannur	149.45	1857029	12426	152.08	2383189	15671
12	Kasaragod	75.95	822655	10832	92.10	1431505	15543
	<b>State</b>	<b>1487.88</b>	<b>24943886</b>	<b>16765</b>	<b>1561.68</b>	<b>31025590</b>	<b>19867</b>



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

SI No	Name of District	Area in acre	Net Income (Rs)	Net Income per acre
1	Thiruvananthapuram	15.49	96658	6240
2	Kollam	1.59	13466	8469
3	Pathanamthitta	9.44	88085	9331
4	Alappuzha	11.65	56109	4816
5	Kottayam	7.86	74049	9421
6	Idukki	36.54	268126	7338
7	Thrissur	7.57	63921	8444
8	Palakkad	2.79	19140	6860
9	Malappuram	43.17	256343	5938
10	Kozhikode	10.40	70523	6781
11	Kannur	40.86	318883	7804
12	Kasaragod	10.72	82147	7663
	<b>State</b>	<b>198.08</b>	<b>1407450</b>	<b>7105</b>

## Chapter III

### 3.1 General Observations

At the time of plot visits, the following observations have been noticed

The success or failure of any programme mainly depends upon the opinion of the beneficiaries. For this study, opinion of 1441 selected beneficiaries were collected. Out of this 28% were of the opinion that construction of contour bund effectively control the soil erosion, 68% expressed that it is moderately helpful for soil erosion only 4% had different view. According to them it has no effect on the soil erosion.

Preservation of soil fertility is an important objective of the implementation of soil conservation programme. From the opinion of the 24% of the selected beneficiaries, it is seen that soil conservation measures have improved the fertility of the soil remarkably. While 74% reported that it has moderately improved the soil fertility and the remaining 2% considered that the scheme had no effect on the fertility of the soil

Moisture retention is yet another target of the implementation of the soil conservation programme. From the opinion of the 26 % of the selected beneficiaries, it is seen that the scheme have substantially increased moisture retention while about 65% reported that it moderately increased and the remaining 9% felt that the programme had no effect on the moisture retention

The district wise details of opinion of cultivators about the effectiveness of bunds, fertility of the soil and moisture retention are given in table 12

The benefit of the construction of bund actually derives to the cultivators when it is in a good condition. The condition of the bunds has to be watched after construction. It is observed that 72% of the bunds are in good condition 25% partially damaged and 3% seriously damaged. In general the soil conservation work is satisfactory. District wise statement of the condition of the bunds is furnished in table 13

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	Thiruvananthapuram	33	92	-	33	92	-	32	93	-	125
2	Kollam	124	-	1	124	-	1	63	20	42	125
3	Pathanamthitta	5	114	6	5	116	4	4	116	5	125
4	Alappuzha	32	57	2	21	60	10	22	65	4	91
5	Kottayam	26	60	39	6	119	-	22	46	57	125
6	Idukki	20	104	1	13	110	2	4	116	5	125
7	Thrissur	68	57	-	68	57	-	68	57	-	125
8	Palakkad	1	124	-	1	123	1	1	124	-	125
9	Malappuram	2	122	1	2	122	1	2	123	-	125
10	Kozhikode	18	105	2	15	109	1	37	88	-	125
11	Kannur	15	110	-	15	110		75	50	-	125
12	Kasaragod	55	40	5	51	43	6	50	44	6	100
State		399	985	57	345	1061	26	380	942	119	1441

Table 13 - Conditions of Bund

Sl No	Name of District	Good	Partially damaged	Seriously damaged	Total
1	Thiruvananthapuram	89	35	1	125
2	Kollam	50	70	5	125
3	Pathanamthitta	105	20	-	125
4	Alappuzha	69	19	3	91
5	Kottayam	70	53	2	125
6	Idukki	50	72	3	125
7	Thrissur	125	-	-	125
8	Palakkad	100	20	5	125
9	Malappuram	115	8	2	125
10	Kozhikode	92	25	8	125
11	Kannur	90	25	10	125
12	Kasaragod	86	14	-	100
State		1041	361	39	1441

### 3.2 Occupational profile

The occupational profile of the selected beneficiaries reveals that about 27% are engaged in agriculture and 25% in non-agriculture activities. Agricultural labourers and non-agricultural labourers come to 31% and 17% respectively. District wise details are presented in Table No. 14 and 14 (a)

**Table 14 - Occupational profile**

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agricultural Labours	Non-agriculture labours	
1	Thiruvananthapuram	21	85	15	4	125
2	Kollam	7	47	14	57	125
3	Pathanamthitta	9	23	82	11	125
4	Alappuzha	17	12	7	55	91
5	Kottayam	66	13	30	16	125
6	Idukki	76	19	29	1	125
7	Thrissur	51	23	20	31	125
8	Palakkad	8	23	87	7	125
9	Malappuram	27	85	6	7	125
10	Kozhikode	8	20	78	19	125
11	Kannur	54	1	55	15	125
12	Kasaragod	43	3	37	17	100
	<b>State</b>	<b>387</b>	<b>354</b>	<b>460</b>	<b>240</b>	<b>1441</b>

**Table 14 (a)**

#### Occupational profile (Control Plots)

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agriculture labours	Non-agriculture labours	
1	Thiruvananthapuram	3	13	6	3	25
2	Kollam	2	8	9	6	25
3	Pathanamthitta	1	7	27	15	50
4	Alappuzha	2	9	21	13	45
5	Kottayam	1	1	1	2	5
6	Idukki	15	5	2	3	25
7	Thrissur	2	5	5	8	20
8	Palakkad	1	11	13	-	25
9	Malappuram	6	7	1	11	25
10	Kozhikode	2	3	15	5	25
11	Kannur	10	-	8	7	25
12	Kasaragod	4	1	12	3	20
	<b>Total</b>	<b>49</b>	<b>70</b>	<b>120</b>	<b>76</b>	<b>315</b>

### 3.3 Summary of findings

The data furnished in this report are collected through the Evaluation study on soil conservation 2003-2004. The districts covered in this study are all the districts of the state except Ernakulam and Wayanad. 51 Schemes implemented by Soil Conservation Department 5 years prior to 2003-04 have been selected for the evaluation study. The summary of findings are discussed below:

#### Benefit of the Programme

Soil conservation generally 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 in the State. The cropping pattern of a locality is emerged on the basis of the productivity of the land to a certain extent. The cropping intensity of the scheme area reveals the benefit of the programme. The cropping intensity of the scheme area increased from 120.20% to 130.39% after the implementation of Soil Conservation Programme. 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	After	Before	After	Before	After
1	Thiruvananthapuram	60.79	68.43	71.36	96.90	117.39	141.60
2	Kollam	56.41	56.15	62.96	71.07	111.61	126.57
3	Pathanamthitta	14.15	28.27	19.15	41.30	135.34	146.09
4	Alappuzha	39.30	39.48	47.51	50.68	120.89	128.37
5	Kottayam	377.69	377.82	469.39	476.69	124.28	126.17
6	Idukki	241.50	267.84	312.66	393.79	129.47	147.02
7	Thrissur	85.82	85.85	99.97	100.94	116.49	117.58
8	Palakkad	24.24	24.04	29.59	33.12	122.07	137.77
9	Malappuram	299.26	306.28	337.91	380.37	112.92	124.19
10	Kozhikode	63.32	63.34	77.66	83.00	122.65	131.04
11	Kannur	149.45	152.08	177.37	192.07	118.68	126.30
12	Kasaragod	75.95	92.10	82.94	116.40	109.20	126.38
<b>State</b>		<b>1487.88</b>	<b>1561.68</b>	<b>1788.47</b>	<b>2036.33</b>	<b>120.20</b>	<b>130.39</b>

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Table 1

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Year	1950	1951	1952	1953	1954
Enrollment	10,000	10,500	11,000	11,500	12,000
Faculty	1,000	1,100	1,200	1,300	1,400
Expenditure	\$10,000,000	\$11,000,000	\$12,000,000	\$13,000,000	\$14,000,000
Income	\$8,000,000	\$8,500,000	\$9,000,000	\$9,500,000	\$10,000,000
Operating	\$7,000,000	\$7,500,000	\$8,000,000	\$8,500,000	\$9,000,000
Capital	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
Reserve	\$0	\$0	\$0	\$0	\$0
Surplus	\$0	\$0	\$0	\$0	\$0
Deficit	\$0	\$0	\$0	\$0	\$0
Net Change	\$0	\$0	\$0	\$0	\$0
Total	\$10,000,000	\$11,000,000	\$12,000,000	\$13,000,000	\$14,000,000

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