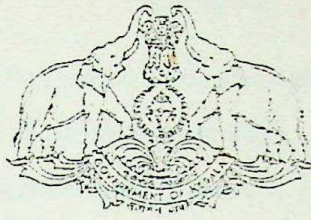


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Government of Kerala

*Evaluation Study on Soil
Conservation in Kerala
2001-02*

DEPARTMENT OF ECONOMICS & STATISTICS
THIRUVANANTHAPURAM
2004

PREFACE

Soil and water conservation activities in the State received much attention in the State as part of local plans during the Ninth Five Year Plan. An evaluation study on these schemes can be very helpful for policy decision making units.

The Evaluation study of schemes implemented by Soil Conservation Department has been done by the Directorate of Economics and Statistics for all districts except Wayanad where the direct implementation and evaluation is done by the Central Agency.

This report relates to the survey results of the 60 schemes already completed by the Soil Conservation Department. The field survey was conducted during the agricultural year 2001-02. The schemes completed by the Soil Conservation Department before five years are taken up for study so that the full benefit of the scheme could be evaluated and assessed. It is an invaluable asset for Administrators, Statisticians, Research Scholars and Agricultural Geologists.

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 Shri. P. Kochunarayana Pillai, Joint Director. Service of Sri.S.Saseendran, U.D. Typist for his computer support is also acknowledged.

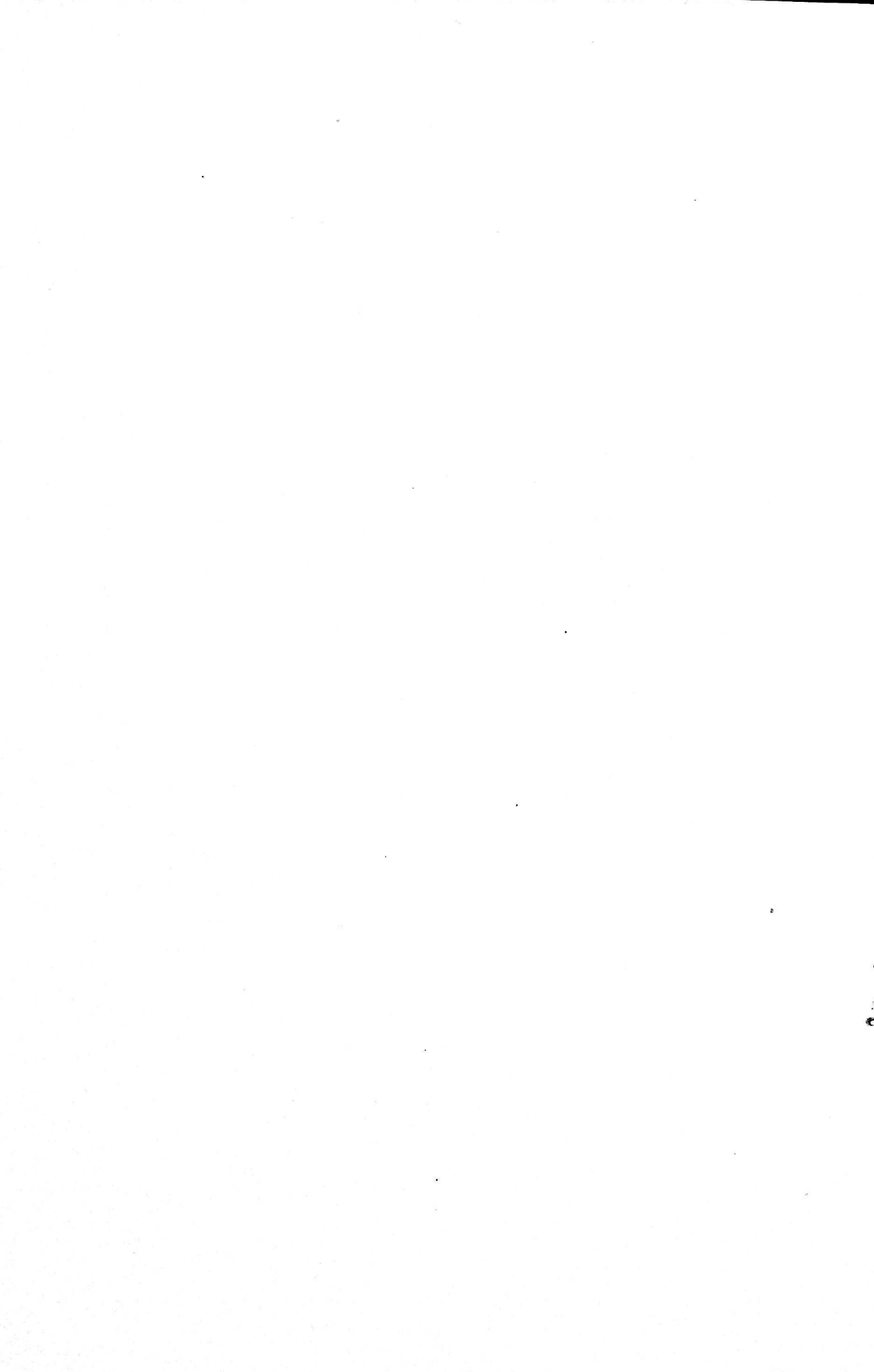
In this context, I acknowledge my thanks to the staff of Soil Conservation Department who have given whole-hearted co-operation for the successful conduct of the survey. Suggestions for improvement are solicited.

M.R.BALAKRISHNAN
DIRECTOR



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Chapter – I

1.1 Introduction

The geographical peculiarity of Kerala and heavy monsoon causes erosion of earth's surface soil and fertility. This loss of fertility and moisture content of the earth surface resulting in diminishing rate of agricultural production. Hence Government is implementing various soil conservation measures through Soil Conservation Department in order to maintain the fertility and moisture contents of the surface soil. An evaluation study on these schemes can be very helpful for policy decision-making units

1.2 Objectives and Methodology of the Survey:-

The main objectives of the evaluation study are:-

- (i) To assess the benefit of the programme particularly in relation to the cultivation of seasonal and perennial crops.
- (ii) To throw light on various aspects like cost benefit analysis, production potential etc.
- (iii) To estimate the extent of additional area brought under cultivations consequent on the implementation of this programme.
- (iv) To study the effects of the work carried out by the soil conservation department in this direction.

60 schemes were selected during 2001-2002 from the schemes, which are completed by the Soil Conservation Department during 1996-97 for the purpose. 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 into four strata viz.

Holding with less than 1 acre	Stratum I
Holding with 1 acre to less than 3 acres	Stratum II
Holdings with 3 acres to 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 strata 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 this shortfall is compensated from another stratum. If the total 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 central plots are given in the table I and I (a).



Table - I 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	Thuvananthapuram	5	51	8.72	3	6.00	2	8.25	2	10.00	58	32.97
2	Kollam	5	92	28.25	15	22.35	1	3.80	-	-	108	54.40
3	Padanamthitta	5	63	13.82	1	1.49	-	-	-	-	64	15.31
4	Alappuzha	5	91	4.54	-	-	-	-	-	-	91	4.54
5	Kottayam	5	31	14.61	60	91.30	15	50.79	6	37.42	112	194.12
6	Idukki	3	17	9.03	33	52.33	11	42.24	14	76.13	75	179.73
7	Travancokulam	4	93	10.91	-	-	-	-	-	-	93	10.91
8	Thiruvur	3	70	6.86	-	-	-	-	-	-	70	6.86
9	Palakkad	5	113	19.79	4	5.58	-	-	-	-	117	25.37
10	Malappuram	5	77	9.01	-	-	-	-	-	-	77	9.01
11	Kozhikode	8	73	8.59	8	9.48	2	6.32	1	6.20	81	30.59
12	Kannur	5	18	11.02	7	9.92	1	4.48	-	-	26	25.42
13	Kasaragod	2	40	6.70	6	6.88	-	-	-	-	46	13.58
	Total	60	829	151.85	137	205.33	32	115.88	23	129.75	1021	602.81

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

(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	5	19	3.33	5	7.40	-	-	1	5.00	25	15.73
2	Kollam	5	20	5.92	5	5.92	-	-	-	-	25	11.84
3	Pathanamthitta	5	24	4.21	1	-	-	-	-	-	25	4.21
4	Alappuzha	5	25	3.41	-	-	-	-	-	-	25	3.41
5	Kottayam	5	13	5.84	9	14.84	2	6.37	1	5.00	25	32.05
6	Idukki	3	4	1.55	7	12.45	4	12.65	-	-	15	26.65
7	Eranakulam	4	20	3.21	-	-	-	-	-	-	20	3.21
8	Thrissur	3	15	1.16	-	-	-	-	-	-	15	1.16
9	Palakkad	5	20	2.52	2	2.41	-	-	-	-	22	4.93
10	Malappuram	5	25	2.04	-	-	-	-	-	-	25	2.04
11	Kozhikode	8	18	2.43	5	6.12	-	-	-	-	23	8.55
12	Kannur	5	10	2.13	3	3.52	-	-	-	-	13	5.65
13	Kasaragod	2	8	1.78	2	2.11	-	-	-	-	10	3.89
	Total	60	221	39.53	39	54.77	6	19.02	2	10.00	268	123.32

From the 60 selected schemes 1021 beneficiaries are selected. 81% of the beneficiaries are having holding less than 1 acre and 2% beneficiaries are having holding more than 5 acre and above. The distribution under stratum II and III are 13% and 4% respectively. Similarly control plots are also selected for comparison. This distribution is 82%, 15%, 2% and 1% under Stratum I, II, III, and IV respectively.

To collect the details from beneficiary plots and control plots, 4 types of schedules are 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 |

Chapter - II

2.1 Impact of Soil Conservation Programme on Land use and cropping pattern

Impact of various soil conservation schemes on land use and cropping pattern of the State varied on different soil tracts. Evaluation of the results of these programmes are very useful for the success of the decision process.

During the year under review 60 schemes were selected for evaluation study of soil conservation programme in the State. For detailed study 1021 beneficiaries were selected out of total 1306 beneficiaries (78% of the total beneficiaries) and they occupy 602.81 acres of land. The cost incurred for 60 schemes is Rs.48,16,570/-. Details are given below:

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	32.97	697744	58	58
2	Kollam	54.40	255078	199	108
3	Pathanamthitta	15.31	171626	64	64
4	Alappuzha	4.54	865500	105	91
5	Kottayam	194.12	559063	137	112
6	Idukki	179.73	582096	193	75
7	Eranakulam	10.91	174506	120	93
8	Thrissur	6.86	124514	70	70
9	Palakkad	25.37	149099	117	117
10	Malappuram	9.01	367454	77	77
11	Kozhikode	30.59	416450	84	84
12	Kannur	25.42	340212	26	26
13	Kasargod	13.58	113218	46	46
	Total	602.81	4816570	1306	1021

Land Use

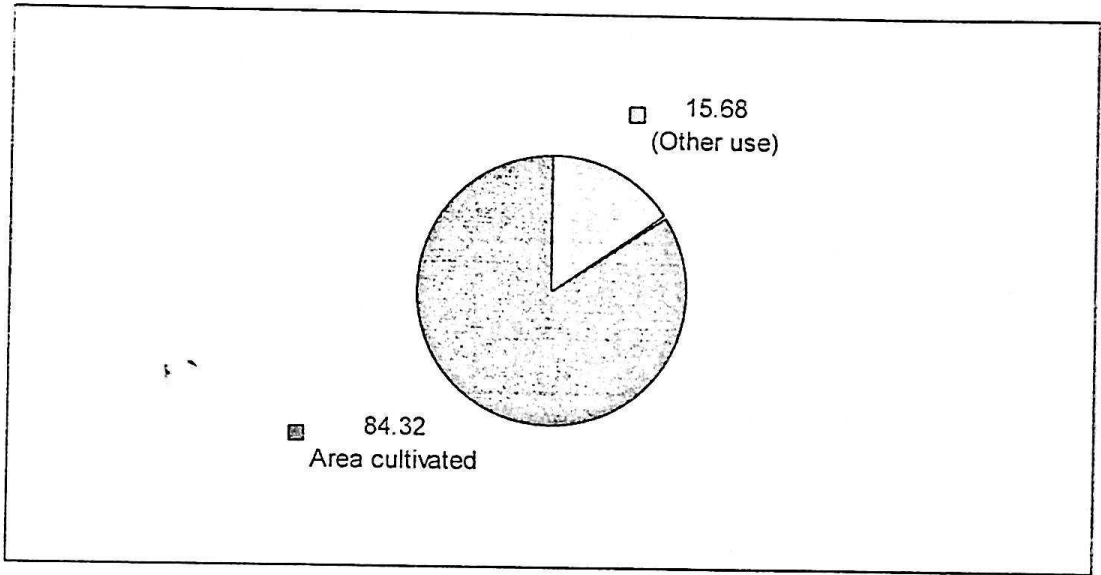
District wise details of land use particulars of beneficiary plots and control plots are given in table No.3 and 3(a) separately. An abstract is depicted in figure 1 and figure 2 respectively.

Area cultivated before the implementation of the : 508.31 acres
scheme

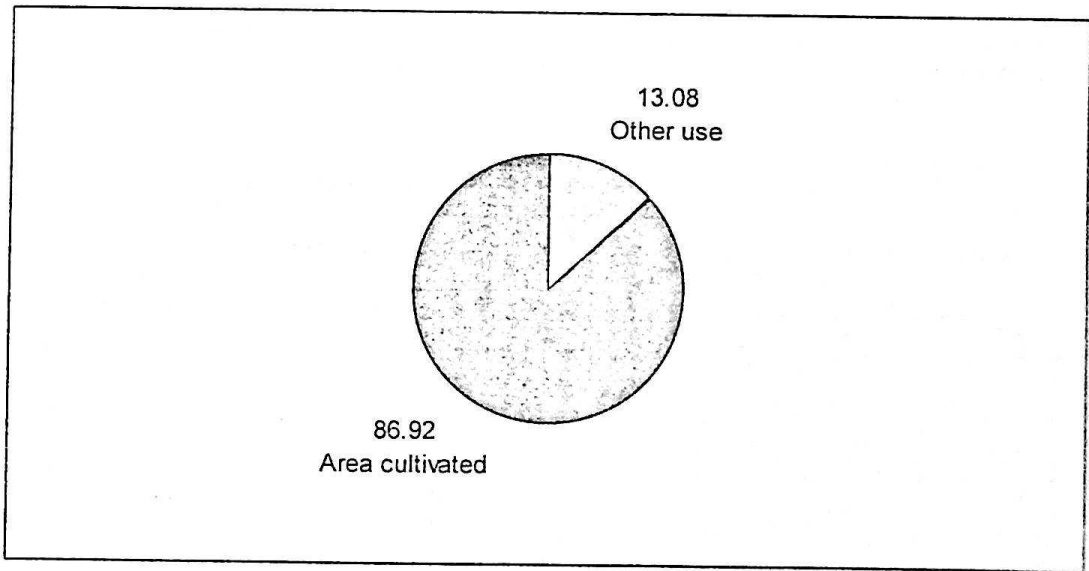
Area cultivated after the implementation of the scheme : 523.97 acres

Land brought more under cultivation : 15.66 acres

Fig. 1 Beneficiary plots : Area cultivated (Before)



Area cultivated (After)

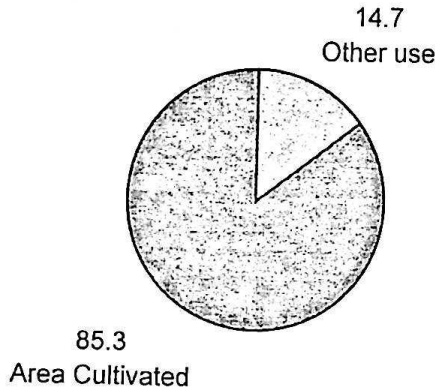


Control Plots

Control plots are selected for comparing the benefits derived through the implementation of soil conservation measures.

The percentage share of the cultivated area of the control plots are 85.30% and not cultivated area belongs to 8.08% whereas the respective share of the beneficiary plots comes to 86.92% and 6.11% respectively.

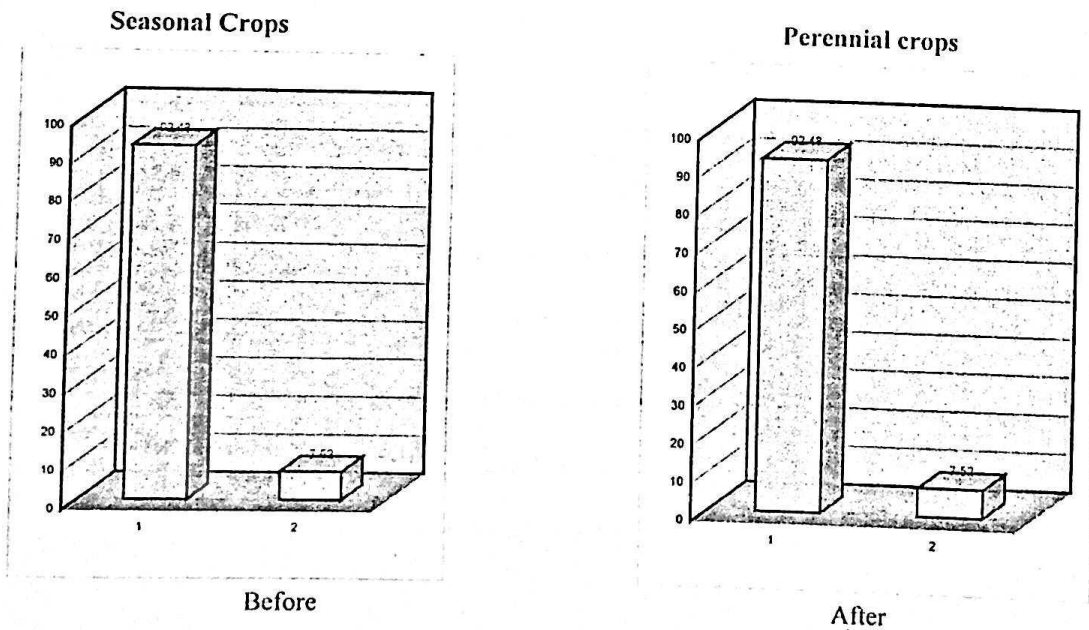
Fig. 2 Control Plots
Area cultivated



The Crop Pattern

Consequent on the introduction on the soil conservation programme there are certain significant changes occurred in the cropping pattern. This phenomenon shows an increasing trend towards the cultivation of perennial crops. District wise details are given in table No.4. The trend of cropping pattern in the beneficiary plots are illustrated in Fig.3

Fig.3 Crop pattern – Perennial crops, Seasonal crops



Area under crops

Area under perennial crops in the scheme area before the implementation of the soil conservation programme was 470.09 acres whereas after the programme it increased to 486.86 acres. It showed an increase of 4% in the cultivated area of perennial crops. District wise details of area under the crops are given in table No.5 and 6. Area under seasonal crops has not showed this tendency.

Table 2(a) - Area under crops

Sl. No.	Crops	Area (in acres)	
		Before	After
1	2	3	4
	A. Perennial Crops		
1	Coconut	84.09	96.22
2	Arecanut	7.12	10.68
3	Cashew	8.14	8.86
4	Pepper	40.63	43.99
5	Rubber	264.05	280.51
6	Others	66.06	46.60
	Total A	470.09	486.86
	B. Seasonal Crops		
1	Paddy	1.58	1.58
2	Tapioca	20.51	20.56
3	Plantain	6.04	9.03
4	Ginger	0.63	0.91
5	Others	9.36	5.03
	Total B	38.22	37.11
	Grand Total A+B	508.31	523.97

Table - 3 Land use particulars of Beneficiary plots

Sl. No	District	Area cultivated						Current follow					
		Before			After			Before			After		
		Area	%		Area	%		Area	%		Area	%	
1	2	3	4	5	6	7	8	9	10				
1	Thiruvananthapuram	30.52	91.05	29.72	90.14	1.20	3.64	-	-	-	-	-	-
2	Kollam	45.77	84.14	46.52	85.51	-	-	-	-	-	-	-	-
3	Pathanamthitta	12.41	81.06	12.28	80.20	0.84	5.49	1.09	7.12	-	-	-	-
4	Alappuzha	2.20	48.46	2.02	44.49	-	-	-	-	-	-	-	-
5	Kottayam	163.47	84.21	166.86	85.95	2.16	1.11	0.76	0.39	-	-	-	-
6	Idukki	160.71	89.42	165.17	91.89	3.65	2.03	2.34	1.30	-	-	-	-
7	Eranakulam	8.04	73.69	8.52	78.09	0.57	5.22	0.49	4.49	-	-	-	-
8	Thrissur	4.62	67.35	4.74	69.09	-	-	-	-	-	-	-	-
9	Palakkad	19.18	75.60	19.65	77.45	-	-	-	-	-	-	-	-
10	Malappuram	6.10	67.70	6.17	68.47	0.74	8.21	0.04	0.44	-	-	-	-
11	Kozhikode	24.79	81.04	27.13	88.68	0.55	1.79	0.53	1.73	-	-	-	-
12	Kannur	19.86	78.13	22.28	87.64	0.64	2.51	0.63	2.48	-	-	-	-
13	Kasaragod	11.14	82.03	12.91	95.06	0.66	4.86	0.63	4.64	-	-	-	-
	Total	508.31	84.32	523.97	86.92	11.01	1.82	6.51	1.08				

Table - 3 Contd..

Sl. No.	District	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	2.95	8.95	1.73	5.25	-	-	1.52	4.61	32.97	100	32.97	100
2	Kollam	3.20	5.88	3.20	5.88	5.43	9.98	4.68	8.60	54.40	100	54.40	100
3	Pathanamthitta	2.24	14.63	2.25	14.70	0.66	4.31	0.78	5.09	15.31	100	15.31	100
4	Alappuzha	1.13	24.89	1.12	24.67	1.21	26.65	1.40	30.84	4.54	100	4.54	100
5	Kottayam	4.45	2.29	7.82	4.02	26.20	13.50	19.44	10.01	194.12	100	194.12	100
6	Idukki	8.00	4.45	8.47	4.71	11.02	6.13	6.09	0.03	179.73	100	179.73	100
7	Ernakulam	2.23	20.44	2.23	20.44	0.64	5.87	0.16	0.01	10.91	100	10.91	100
8	Thrissur	2.09	30.47	2.09	30.47	0.15	2.19	0.03	0.44	6.86	100	6.86	100
9	Palakkad	4.47	17.62	5.47	21.56	1.72	6.78	0.25	0.99	25.37	100	25.37	100
10	Malappuram	2.02	22.42	2.10	23.31	0.89	9.88	0.74	8.21	9.01	100	9.01	100
11	Kozhikode	2.67	8.73	2.52	8.24	3.13	10.23	0.94	3.07	30.59	100	30.59	100
12	Kannur	2.41	9.48	2.40	9.44	3.15	12.39	0.74	2.91	25.42	100	25.42	100
13	Kasaragod	0.59	4.34	0.61	4.49	1.85	13.62	0.06	0.44	13.58	100	13.58	100
	Total	38.45	6.38	42.01	6.97	56.05	9.30	36.83	6.11	602.81	100	602.81	100

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

(Area in Acres)

Sl. No	District	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	14.72	93.58	-	-	0.74	4.70	0.27	1.72	15.73	100
2	Kollam	10.88	91.89	-	-	0.74	6.25	0.22	1.86	11.84	100
3	Pathanamthitta	3.39	80.52	0.13	3.15	0.82	19.48	-	-	4.21	100
4	Alappuzha	1.35	39.59	-	-	0.51	14.96	1.55	45.45	3.41	100
5	Kottayam	28.18	87.93	0.16	0.50	1.19	3.71	2.68	8.36	32.05	100
6	Idukki	25.79	97.14	0.10	0.38	0.59	2.22	0.17	0.64	26.55	100
7	Ernakulam	2.55	79.44	-	-	0.51	15.89	0.15	4.67	3.21	100
8	Thrissur	0.63	54.31	-	-	0.53	45.69	-	-	1.16	100
9	Palakkad	2.64	53.55	-	-	0.52	10.55	1.77	35.90	4.93	100
10	Malappuram	1.44	70.59	-	-	0.60	29.41	-	-	2.04	100
11	Kozhikode	6.22	72.75	0.25	2.92	0.68	7.95	1.65	19.30	8.55	100
12	Kannur	4.09	72.39	0.07	1.24	0.45	7.96	1.11	19.65	5.65	100
13	Kasaragod	3.23	83.03	0.10	2.57	0.28	7.20	0.38	9.77	3.89	100
	Total	105.11	85.30	0.81	0.66	8.16	6.62	9.95	8.08	123.22	100

Table - 4 Crop Pattern

Sl. No	Districts	Before SC work	%	After SC work	%	Before SC work	%	%
1	2	3	4	5	6	7	8	
1	Thiruvananthapuram	22.34	74.42	22.55	75.87	7.68	25.58	
2	Kollam	35.96	78.57	40.30	86.63	9.81	21.43	
3	Pathanamthitta	8.14	65.59	8.13	66.21	4.27	34.41	
4	Alappuzha	1.40	63.64	1.65	81.68	0.80	36.36	
5	Kottayam	156.49	95.73	160.38	96.12	6.98	4.27	
6	Idukki	158.64	98.71	162.72	98.52	2.07	1.29	
7	Franakulam	7.51	93.41	7.92	92.96	0.53	6.59	
8	Thirissur	4.42	95.67	4.48	94.51	0.20	4.33	
9	Palakkad	16.18	84.36	17.91	91.15	3.00	15.64	
10	Malappuram	5.44	89.18	5.70	92.38	0.66	10.82	
11	Kozhikode	23.54	94.96	24.30	89.57	1.25	5.01	
12	Kannur	19.11	96.22	19.63	88.11	0.75	3.78	
13	Kasaragod	10.92	98.03	11.19	86.68	0.22	1.97	
	Total	470.09	92.48	486.86	92.92	38.22	7.52	

Table - 4 Contd..

Sl. No	Districts	After SC work	%	Before SC work	%	After SC work	%
1	2	9	10	11	12	13	14
1	Thiruvananthapuram	7.17	24.13	30.02	100	29.72	100
2	Kollam	6.22	13.37	45.77	100	46.52	100
3	Pathanamthitta	4.15	33.79	12.41	100	12.28	100
4	Alappuzha	0.37	18.32	2.20	100	2.02	100
5	Kottayam	6.48	3.88	163.47	100	166.86	100
6	Idukki	2.45	1.48	160.71	100	165.17	100
7	Ernakulam	0.60	7.04	8.04	100	8.52	100
8	Thrissur	0.26	5.49	4.62	100	4.74	100
9	Palakkad	1.74	8.85	19.18	100	19.65	100
10	Malappuram	0.47	7.62	6.10	100	6.17	100
11	Kozhikode	2.83	10.43	24.79	100	27.13	100
12	Kannur	2.65	11.89	19.86	100	22.28	100
13	Kasaragod	1.72	13.32	11.14	100	12.91	100
	Total	37.11	7.08	508.31	100	523.97	100

Table 5 - Area under selected perennial crops

Sl. No	Districts	Coconut		Arecanut		Cashew		Pepper	
		Before SC work	After SC work	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	8	9	10
1	Thiruvananthapuram	6.00	6.91	0.01	0.19	0.73	0.65	1.80	2.80
2	Kollam	5.71	5.77	0.18	0.37	1.56	1.56	0.49	0.43
3	Pathanamthitta	2.88	3.77	0.16	0.22	0.44	0.58	0.28	0.37
4	Alappuzha	1.15	1.37	0.01	0.06	0.02	0.02	-	-
5	Kottayam	13.98	17.34	1.70	2.80	2.58	3.30	5.28	6.29
6	Idukki	20.21	21.24	2.63	3.91	1.16	0.88	26.20	28.68
7	Ernakulam	3.25	3.38	0.08	0.38	0.03	0.25	0.13	0.21
8	Idiissur	3.41	3.54	0.12	0.35	0.10	0.08	0.02	0.03
9	Palakkad	7.33	9.13	0.03	0.10	0.32	0.42	0.26	0.22
10	Malappuram	3.22	3.77	0.20	0.30	0.40	0.51	0.13	0.14
11	Kozhikode	10.79	9.20	0.72	0.72	0.28	0.18	1.92	1.58
12	Kannur	4.76	7.28	0.68	0.68	0.31	0.25	2.13	1.75
13	Kasaragod	1.40	3.52	0.60	0.60	0.21	0.18	1.99	1.49
	Total	84.09	96.22	7.12	10.68	8.14	8.86	-40.63	-43.99

Table - 5 Contd..

Sl. No	Districts	Rubber		Others		Total	
		Before SC work	After SC work	Before SC work	After SC work	Before SC work	After SC work
1	1	11	12	13	14	15	16
1	Thiruvananthapuram	5.81	9.00	7.99	3.00	22.34	22.55
2	Kollam	19.45	28.23	8.57	3.94	35.96	40.30
3	Pathanamthitta	0.61	2.27	3.77	0.92	8.14	8.13
4	Allappuzha	-	-	0.22	0.20	1.40	1.65
5	Kottayam	113.90	112.47	19.05	18.18	156.49	160.38
6	Idukki	95.16	96.41	13.28	11.60	158.64	162.72
7	Eranakulam	3.01	3.13	1.01	0.57	7.51	7.92
8	Thrissur	0.02	0.02	0.75	0.46	4.42	4.48
9	Palakkad	2.85	2.85	5.39	5.19	16.18	17.91
10	Malappuram	0.63	0.11	1.36	0.87	5.44	5.70
11	Kozhikode	8.04	12.23	1.79	0.39	23.54	24.30
12	Kannur	9.11	9.00	2.12	0.67	19.11	19.63
13	Kasaragod	5.96	4.79	0.76	0.61	10.92	11.19
	Total	264.05	280.51	66.06	46.60	470.09	486.86

Table 6 – Area under selected seasonal crops

Sl. No	Districts	Paddy		Tapioca		Plantain	
		Before SC work	After SC work	Before SC work	After SC work	Before SC work	After SC work
1	2	3	4	5	6 ⁰⁰	7	8
1	Thiruvananthapuram	-	-	1.17	2.07	3.00	3.75
2	Kollam	1.58	1.58	4.77	3.14	1.37	0.90
3	Palanananthitta	-	-	2.58	2.65	0.27	0.28
4	Alappuzha	-	-	-	0.01	0.68	0.27
5	Kottayam	-	-	5.87	5.54	0.40	0.40
6	Idukki	-	-	1.75	2.00	0.32	0.45
7	Franakulam	-	-	0.18	0.11	0.13	0.38
8	Thrissur	-	-	-	-	0.20	0.26
9	Palakkad	-	-	0.47	0.19	1.28	0.48
10	Malappuram	-	-	0.08	0.07	0.20	0.21
11	Kozhikode	-	-	0.53	1.94	0.47	0.65
12	Kannur	-	-	0.45	1.68	0.25	0.57
13	Kasaragod	-	-	0.00	1.16	0.01	0.13
	Total	1.58	1.58	20.61	20.56	6.04	9.03

Table--6 Contd..

Sl. No	Districts	Ginger		Others		Total	
		Before SC work	After SC work	Before SC work	After SC work	Before SC work	After SC work
1	2	9	10	11	12	13	14
1	Thiruvananthapuram	0.26	-	3.25	1.35	7.68	7.17
2	Kollam	0.07	0.10	2.02	0.50	9.81	6.22
3	Pathanamthitta	0.40	0.40	1.02	0.82	4.27	4.15
4	Alappuzha	-	-	0.12	0.09	0.80	0.37
5	Kottayam	-	-	0.71	0.54	6.98	6.48
6	Idukki	-	-	-	-	2.07	2.45
7	Ernakulam	-	-	0.22	0.11	0.53	0.60
8	Thrissur	-	-	-	-	0.20	0.26
9	Palakkad	0.05	0.08	1.20	0.99	3.00	1.74
10	Malappuram	-	0.01	0.38	0.18	0.66	0.47
11	Kozhikode	0.04	0.13	0.21	0.11	1.25	2.83
12	Kannur	0.05	0.15	0.00	0.25	0.75	2.65
13	Kasaragod	0.02	0.04	0.16	0.09	0.22	1.72
	Total	0.63	0.91	9.36	5.03	38.22	37.11

Impact of Soil Conservation measures on the yield of crops

Details of value and quantity of various crops received from the scheme area are detailed in the following table. District wise details are presented in table No. 8 and 9

Table – 7: Quantity and Value of selected perennial and seasonal crops

Name of Crop	Unit	Before SC Work		After SC work		Value at constant price (96.97)	
		Quantity	Value	Quantity	Value		
A. Perennial crops	Coconut	Nos.	175837	935453	358859	1309855	1909130
	Arecanut	"	417338	171108	1032701	331483	413080
	Cashew	Qtl	8.2	23641	24.01	68525	69221
	Pepper	"	134.19	1280344	266.09	1655495	2538765
	Rubber	"	863.02	3167283	937.01	2554289	3438827
	Others	"	-	222800	-	256210	
	Total A	"		5800629		6175837	
B. Seasonal crops	Tapioca	Qtl	928.04	289548	1380.38	465188	430679
	Plantain	"	197.91	116569	524.43	291059	308889
	Paddy	"	27.00	16524	40	23160	24480
	Ginger	"	3.99	12660	10.40	27061	32999
	Others	"	-	16530		23420	-
	Total B			451831		829888	
Grand Total A + B				6252460		7005725	

Table - 8 - 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
1	2	3	4	5	6	7
Thiruvananthapuram	Coconut	Nos.	15003	79816	54880	200312
	Arecanut	Nos.	170	70	24575	7864
	Cashew	Qtl.	0.69	1989	3.09	8819
	Pepper	Qtl.	1.61	15359	5.83	36274
	Rubber	Qtl.	1.22	4477	2.64	7197
	Others			18640		21440
	Total				120351	
Kollam	Coconut	Nos.	5783	30766	17760	64824
	Arecanut	Nos.	3374	1383	17700	5664
	Cashew	Qtl.	0.37	1067	2.67	7677
	Pepper	Qtl.	2.25	21565	8.02	49930
	Rubber	Qtl.	11.59	42535	16.96	46233
	Others			15310		17600
	Total				112626	
Pathanamthitta	Coconut	Nos.	5380	28622	11555	42176
	Arecanut	Nos.	101	41	455	146
	Cashew	Qtl.	0.46	1326	1.23	3510
	Pepper	Qtl.	2.27	21699	6.23	38763
	Rubber	Qtl.	1.38	5065	1.66	4525
	Others		-	8600	-	9890
	Total			-	65353	-
Allappuzha	Coconut	Nos.	2625	13965	16835	61446
	Arecanut	Nos.	250	103	3010	963
	Cashew	Qtl.	-	-	0.36	1027
	Pepper	Qtl.	-	-	-	--
	Rubber	Qtl.	-	-	-	-
	Others		-	4805	-	5520
	Total			-	18873	-

Table - 8 Contd.

Kottayam	Coconut	Nos.	31573	167968	38200	139430
	Arecanut	Nos.	56086	22995	136342	42059
	Cashew	Qtl.	1.12	3209	4.48	12786
	Pepper	Qtl.	74.39	710701	99.96	621991
	Rubber	Qtl.	466.20	1710954	502.17	1368915
	Others			26140		30060
	Total	Qtl.		2641967		2215241
Idukki	Coconut	Nos.	67321	358148	123171	449574
	Arecanut	Nos.	180506	74007	511021	163927
	Cashew	Qtl.	0.67	1902	2.04	5822
	Pepper	Qtl.	45.74	437397	137.18	853584
	Rubber	Qtl.	205.59	754515	221.50	603809
	Others			25805		29680
	Total	Qtl.		1651774		2106396
Ernakulam	Coconut	Nos.	4473	23796	9348	34120
	Arecanut	Nos.	10095	4139	8384	2683
	Cashew	Qtl.	0.15	432	0.75	2141
	Pepper	Qtl.	0.04	381	0.30	1866
	Rubber	Qtl.	80.23	294446	86.84	236726
	Others	Qtl.		18305		21050
	Total	Qtl.		341499		298586
Thrissur	Coconut	Nos.	4941	26286	7552	27565
	Arecanut	Nos.	608	249	9556	3058
	Cashew	Qtl.	0.07	202	0.12	342
	Pepper	Qtl.	0.39	3721	0.67	4168
	Rubber	Qtl.	1.22	4477	4.19	11422
	Others			17400		29010
	Total			52335		66565
Palakkad	Coconut	Nos.	12085	64292	30090	109829
	Arecanut	Nos.	2510	1029	40998	13119
	Cashew	Qtl.	0.25	721	1.23	3510
	Pepper	Qtl.	0.21	2003	0.35	2177
	Rubber	Qtl.	11.16	40957	1127	36722
	Others	Qtl.		19800		22770
	Total			128802		182127

Table - 8 Contd.

1	2	3	4	5	6	7
Malappuram	Coconut	Nos.	5491	29212	12119	44234
	Arecanut	Nos.	238	98	838	268
	Cashew	Qtl.	0.72	2053	1.50	4281
	Pepper	Qtl.	0.14	1336	0.14	608
	Rubber	Qtl.	0.49	1798	0.51	1390
	Others	Qtl.		15155		17430
	Total			49652		68211
Kozhikode	Coconut	Nos.	2422	12885	3225	11771
	Arecanut	Nos.	58264	23888	76282	24410
	Cashew	Qtl.	0.39	1124	0.52	1484
	Pepper	Qtl.	2.21	21183	2.43	15149
	Rubber	Qtl.	31.14	114284	34.37	93693
	Others	Qtl.		25855		29730
	Total			199219		176237
Kannur	Coconut	Nos.	12284	65351	22610	82527
	Arecanut	Nos.	55416	22721	85795	27454
	Cashew	Qtl.	0.49	1413	0.73	2083
	Pepper	Qtl.	2.45	23152	2.69	16737
	Rubber	Qtl.	30.68	112596	30.94	84342
	Others	Qtl.		20315		23360
	Total			245548		236503
Kasaragod	Coconut	Nos.	6456	34346	11514	42025
	Arecanut	Nos.	47720	20384	123745	39831
	Cashew	Qtl.	2.88	8203	5.29	15080
	Pepper	Qtl.	2.29	21847	2.29	14248
	Rubber	Qtl.	22.12	81180	23.96	65315
	Others	Qtl.		6670		7670
	Total			172630		184169
STATE	Coconut	Nos.	175837	935453	358859	1309835
	Arecanut	Nos.	417338	171108	1032701	331483
	Cashew	Qtl.	8.2	23641	24.01	68525
	Pepper	Qtl.	134.19	1280344	266.09	1655495
	Rubber	Qtl.	863.02	3167283	937.01	2554289
	Others		-	222800	-	256210
	Total		-	5800629	-	6175837

Table - 9 - Crop wise yield and value of seasonal crops in scheme area.

District	Name of Crop	Unit	Before SC work		After SC work	
			Quantity	Value	Quantity	Value
1	2	3	4	5	6	7
Thiruvananthapuram	Tapioca	Qtl	2015	6286	9515	32066
	Plantain	Qtl	581	3420	3881	21540
	Paddy	Qtl				
	Ginger	Qtl			.05	130
	Others	Qtl				
	Total	Qtl		9706		53736
Kollam	Tapioca	Qtl	24.40	7613	76.10	25646
	Plantain	Qtl	42.35	24944	98.04	54412
	Paddy	Qtl	27.00	16524	40.00	23160
	Ginger	Qtl	0.80	2507	1.60	4163
	Others	Qtl		1350	2.00	2011
	Total	Qtl		52938		109392
Pathanamthitta	Tapioca	Qtl	12885	40201	7890	26589
	Plantain	Qtl	1508	8882	1885	10462
	Paddy	Qtl				
	Ginger	Qtl	200	6346	575	14961
	Others	Qtl	781	8205	726	8288
	Total	Qtl		63634		60300
Alappuzha	Tapioca	Qtl	-		0.35	118
	Plantain	Qtl	0.52	306	4.63	2570
	Paddy	Qtl				
	Ginger	Qtl				
	Others	Qtl			0.05	67
	Total	Qtl		306		2755
Kottayam	Tapioca	Qtl	297.99	92973	289.53	97572
	Plantain	Qtl	51.33	30233	71.77	39832
	Paddy	Qtl				
	Ginger	Qtl				
	Others	Qtl				
	Total	Qtl	123206			137404

Table – 9 Contd.

1	2	3	4	5	6	7
Idukki	Tapioca	Qtl	252.05	78640	441.35	148735
	Plantain	Qtl	52.73	31058	100.42	55733
	Paddy	Qtl				
	Ginger	Qtl				
	Others	Qtl				
	Total	Qtl		109698		204468
Eranakulam	Tapioca	Qtl	4.60	1435	1.00	337
	Plantain	Qtl	5.22	3075	25.11	13936
	Paddy	Qtl				
	Ginger	Qtl				
	Others	Qtl	1.36	1600	1.37	1890
	Total	Qtl		6110		16163
Thrissur	Tapioca	Qtl				
	Plantain	Qtl	6.60	3887	16.50	9324
	Paddy	Qtl				
	Ginger	Qtl				
	Others	Qtl	0.50	855	0.60	92
	Total	Qtl		4742		9416
Palakkad	Tapioca	Qtl	2.10	655	5.75	1938
	Plantain	Qtl	10.05	5920	35.01	19431
	Paddy	Qtl				
	Ginger	Qtl	1.20	3807	1.80	4684
	Others	Qtl	4.92	2460	11.23	5615
	Total	Qtl	0.38	12842	-	31668
Malappuram	Tapioca	Qtl	0.38	119	0.50	169
	Plantain	Qtl	1.06	624	3.70	2053
	Paddy	Qtl	-			
	Ginger	Qtl	-		0.01	26
	Others	Qtl				
	Total	Qtl		743		2248

Table - 9 Contd.

1	2	3	4	5	6	7
Kozhikode	Tapioca	Qtl	7115	22199	18825	63448
	Plantain	Qtl	282	1661	4814	26718
	Paddy	Qtl				
	Ginger	Qtl			48	1249
	Others	Qtl	25	382	218	2245
	Total	Qtl		24242		93660
Kannur	Tapioca	Qtl	8342	26027	12875	43389
	Plantain	Qtl	248	1461	3928	21800
	Paddy	Qtl				
	Ginger	Qtl			41	1067
	Others	Qtl	111	890	149	1719
	Total	Qtl		28378		67975
Kasaragod	Tapioca	Qtl	4295	13400	7475	25181
	Plantain	Qtl	186	1096	2387	13248
	Paddy	Qtl				
	Ginger	Qtl			30	781
	Others	Qtl	98	790	152	1493
	Total	Qtl		15286		40703
STATE	Tapioca	Qtl	928.04	289548	1380.38	465188
	Plantain	Qtl	197.91	116569	524.43	291059
	Paddy	Qtl	27.00	16524	40.00	23160
	Ginger	Qtl	3.99	12660	10.40	27061
	Others	Qtl		16530		23420
	Total	Qtl		451831		829888

2.2 Cost Benefit Analysis of Soil Conservation Programme

Soil erosion leads to degradation of land and there by distruction of agricultural land. If the process is continuing the entire soil is lost and the land become barren and un productive. In the case of sloppy region, rushing water makes deeper in roads creating gutters. Thus soil erosion deplete the fertility of the soil and production. This 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 productive benefits. In addition, production from degraded land which are cultivated after the soil conservation measures are also to be taken in to consideration

An important objective of a project evaluation is to estimate the various impacts of its operation such as production, yield, regional development etc

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

The cost incurred for the soil conservation work, including maintenance work collected from the beneficiaries is Rs. 48,16,570 . The value of crops before the soil conservation Programme comes to Rs. 4,51,831 . The value of crops after the soil conservation programme has also been calculated as Rs. 8,29,888. Thus the additional benefits due to the implementation of soil conservation programme is worked out to be Rs. 3,78,057 . Implementation of soil conservation programme could be the main reason for the increase with production of crops

Implementation of soil conservation Programme is beneficial to the people in different ways.

The main benefits are:

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

(i) Extension of area under cultivation

The study result shows that 15.66 acres of land has been additionally brought under cultivation by cultivating land which could not be cultivated before soil conservation programme. In other words implementation of soil conservation Programme has brought more land suitable for cultivation

(ii) Increase in Productivity

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

Table 10 - . Expenditure and Net Income of Beneficiary Holdings (Rs)

Sl No	Name of District	Income		Expenditure		Net Income	
		Before SC work	After SC work	Before SC work	After SC work	Before SC work	After SC work
1	Thiruvananthapuram	130057	335692	27315	88345	102742	247297
2	Kollam	165564	301320	48565	99313	116999	22007
3	Pathanamthitta	128987	159310	62115	70426	66872	88884
4	Alappuzha	19179	71713	5561	40079	13618	31634
5	Kottayam	2751665	2352645	467783	399949	2283882	1952696
6	Idukki	1774980	2310864	532210	739215	1242770	1571649
7	Eranakulam	347609	314749	255616	216655	91993	98094
8	Thrissur	57077	75981	27960	34950	27117	41031
9	Palakkad	141644	213795	40950	66276	100694	147519
10	Malappuram	50395	70459	12395	27099	38000	43360
11	Kozhikode	223461	269897	109495	124140	113966	145757
12	Kannur	273926	304478	46550	60900	227376	243578
13	Kasaragod	187916	224872	33825	40465	154091	184407
	State	6252460	7005725	1670340	2007812	4582120	4997913

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

Sl No	Name of District	Income	Expenditure	Net Income
1	Thiruvananthapuram	80350	26650	53700
2	Kollam	38000	11250	26750
3	Pathanamthitta	28915	8315	20600
4	Alappuzha	17150	4445	12705
5	Kottayam	135140	19100	176040
6	Idukki	129250	16750	112500
7	Eranakulam	29110	4250	24860
8	Thrissur	3500	825	2675
9	Palakkad	18600	4850	13750
10	Malappuram	12940	3815	9125
11	Kozhikode	35935	8375	27560
12	Kannur	44890	6680	38210
13	Kasaragod	28980	5430	23550
	State	602760	120735	482025

(iii) Diversification of cropping pattern

Soil conservation programme maintain the fertility and moisture content of the surface soil and facilitate the cultivation of more remunerative crops. This advantage can be utilized in full, only if the conservation programmes are followed properly i.e. the dissemination of new techniques of production, adequate provision of inputs and services which will promote productivity

In the scheme area, cultivation of perennial crops has shown an encouraging performance. The area of perennial crops is increased when compared to the area under the same before soil conservation programme. This is because growing the perennial crops accelerates conservation of soil more effectively.

(iv) Net Income Analysis

The net income receivable from the beneficiary plot is Rs. 9,540 and from the central plots is Rs. 4,586. The district wise net income per acre is given in table 11 and 11(a)

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	
		Net Income	Net Income per acre	Net Income	Net Income per acre
1	Thiruvananthapuram	102742	3422	247297	7947
2	Kollam	116999	2556	202007	4116
3	Pathanamthitta	66872	5389	38884	7168
4	Alappuzha	13618	9201	31634	15660
5	Kottayam	2283882	13971	1952696	11672
6	Idukki	1242770	7733	1571649	9493
7	Eranakulam	91993	11442	98094	11664
8	Thrissur	29117	6302	41031	8656
9	Palakkad	100694	5072	147519	7144
10	Malappuram	38000	6230	43360	7028
11	Kozhikode	113966	4597	145757	5817
12	Kannur	227376	11449	243578	12161
13	Kasaragod	154091	13832	184407	16262
	State	4582120	9014	4997913	9540

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	Thiruvananthapuram	14.72	53700	3648
2	Kollam	10.88	26750	2459
3	Pathanamthitta	3.39	20600	6077
4	Alappuzha	1.35	12705	9411
5	Kottayam	28.18	116040	4118
6	Idukki	25.79	112500	4362
7	Eranakulam	2.55	24860	9749
8	Thrissur	0.63	2675	4246
9	Palakkad	2.64	13750	5083
10	Malappuram	1.44	9125	6337
11	Kozhikode	6.22	27560	4431
12	Kannur	4.09	38210	9342
13	Kasaragod	3.23	23550	7291
	State	105.11	482025	4586

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 selected beneficiaries were collected. Out of this 13% were if the opinion that construction of contour bund effectively controlled the soil erosion, 84% remarked that it is moderately helpful for soil erosion only 3% 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. According to 10% of the beneficiaries, soil conservation measures have improved the fertility of the soil remarkably. While 89% reported that it is moderately improved the soil fertility and the remaining 1% 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 32% of the selected beneficiaries it is seen that the scheme have substantially increased moisture retention while about 67% reported that it moderately increased and the remaining 1% felt that the programme had no effect on the moisture retention

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

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

Sl No	Name of District	Effectiveness of contour bunds			Fertility of soil			Moisture retention		
		Effectively controlled	Moderately controlled	No effect	Remarkably controlled	Moderately controlled	No effect	Substantially controlled	Moderately controlled	No effect
1	Thiruvananthapuram	1	57	-	2	56	-	-	58	-
2	Kollam	-	108	-	4	104	-	-	100	8
3	Pathanamthitta	-	64	-	-	64	-	-	64	-
4	Alappuzha	3	74	14	-	91	-	-	91	-
5	Kottayam	4	105	3	1	110	1	107	5	-
6	Idukki	72	3	-	74	1	-	72	3	-
7	Eranakulam	1	90	2	2	91	-	-	93	-
8	Thrissur	1	69	-	-	70	-	-	70	-
9	Palakkad	-	117	-	12	105	-	62	55	-
10	Malappuram	35	39	3	7	67	3	-	77	-
11	Kozhikode	15	69	-	6	78	-	84	-	-
12	Kannur	-	26	-	-	26	-	-	26	-
13	Kasaragod	4	40	2	-	46	-	2	44	-
	State	136	861	24	108	909	4	327	686	8

The benefit of the construction on 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 deserved that about 35% of the bunds are in good condition 64% is partially damaged and 1% are seriously damaged. In general the work is satisfactory. District wise statement of the condition of the bunds id furnished in table 13

Table 13 - Conditions of Bund

SI No	Name of District	Good	Partially damaged	Seriously damaged
1	Thiruvananthapuram	55	3	-
2	Kollam	6	102	-
3	Pathanamthitta	41	23	-
4	Alappuzha	-	91	-
5	Kottayam	1	111	-
6	Idukki	43	32	-
7	Eranakulam	19	74	-
8	Thrissur	6	63	1
9	Palakkad	100	17	-
10	Malappuram	52	16	9
11	Kozhikode	35	49	-
12	Kannur	-	26	-
13	Kasaragod	2	44	-
State		360	651	10

According to the size class distribution of the beneficiaries of the scheme area reveals that 81% are having holding size class less than 1 acre. Area between 1 acre and 3 acres comes to 13%. Holding with 3 acres to less than 5-acre group firms to 4% and the remaining 2% have a large area of more than 5 acres

3.2 Occupational profile

The occupational profile of the selected beneficiaries reveals that about 14% are engaged in agriculture and 10% in non-agriculture activities. Agricultural labourers and non-agricultural labourers constitutes to 76%. Details are given below

Table 14 - Occupational profile

SI No	Name of District	Occupation				
		Agriculture	Non-agriculture	Agriculture	Non-agriculture labourers	Total
1	Thiruvananthapuram	-	2	49	7	58
2	Kollam	1	58	6	43	108
3	Pathanamthitta	1	1	57	5	64
4	Alappuzha	2	8	81	-	91
5	Kottayam	66	10	30	6	112
6	Idukki	56	6	10	3	75
7	Eranakulam	-	-	93	-	93
8	Thrissur	4	1	65	-	70
9	Palakkad	-	-	117	-	117
10	Malappuram	4	3	69	1	77
11	Kozhikode	6	5	62	11	84
12	Kannur	-	2	24	-	26
13	Kasaragod	2	5	37	2	46
State		142	101	700	78	1021

Table 14 (a)
Occupational profile (Control Plots)

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agriculture labourers	Non-agriculture labourers	
1	Thiruvananthapuram	-	2	21	2	25
2	Kollam	-	8	17	-	25
3	Pathanamthitta	2	7	15	1	25
4	Alappuzha	1	5	12	7	25
5	Kottayam	-	7	18	-	25
6	Idukki	5	-	10	-	15
7	Eranakulam	2	2	15	1	20
8	Thrissur	-	-	15	-	15
9	Palakkad	-	5	17	-	22
10	Malappuram	5	17		3	25
11	Kozhikode	1	2	20	-	23
12	Kannur	-	-	12	1	13
13	Kasaragod	-	-	10	-	10
Total		16	55	182	15	268

3.3 Summary of findings

The data furnished in this report are collected through the Evaluation study on soil conservation 2001-2002. The districts covered in this study are all the districts of the state except Wayanad. Schemes implemented by soil conservation department five years prior to 2001-02 have been selected for the Evaluation study. The summary of finding are given below

Benefit of the Programme

Soil conservation generally means applying of all necessary practices to maintain the capability of the 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 survey results reveals that 1021 beneficiaries are selected out of total 1306 beneficiaries (78% of the total beneficiaries) and they possess 602.81 areas of land. The cost incurred for 60 Schemes is Rs. 4816570. The study results shows that the following benefits are derived from the implementations of the soil conservation measures in the state

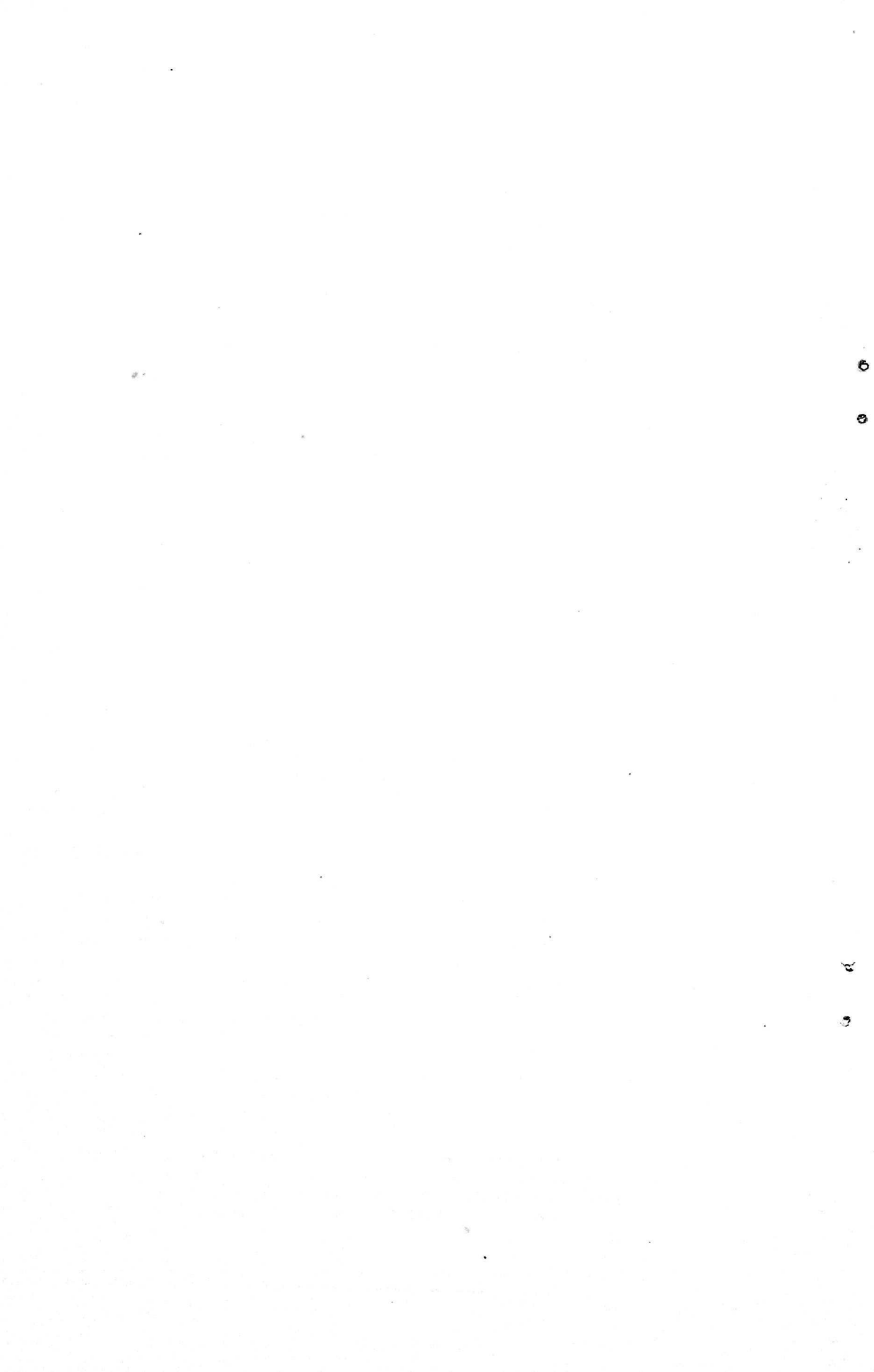
- (i) An area of 15.66 acres of land more could be brought under cultivation in the scheme area. In other words the percentage increase in the cultivated area due to the implementation of soil conservation measures comes to only 3.08%
- (ii) Significant changes occurred in the cropping pattern increasing trend in the cultivation of perennial crops is noticed. The area of perennial crops increased from 470.09 acres to 486.86 acres. Rubber occupied largest area. The area under rubber has increased from 264.05 acres to 280.51 acres after the implementation of soil conservation work.

- (iii) Above trend is not seen in the case of seasonal crops.
- (iv) There is an increasing trend with respect to the yield of perennial crops due to the implementation of soil conservation work

Cost Benefit Analysis

The cost incurred for the soil conservation works including the maintenance work, collected from the 1021 beneficiaries is Rs. 4816570/-

The total area under cultivation after soil conservation work was 523.97 acres . The values of crops before in soil conservation programmes comes to Rs. 451831/-. The value of crops after soil conservation programme is calculated as Rs. 829888. Thus the additional benefits due to the implementation of soil conservation programme is worked out to be Rs. 378057/-. This shows that 7.85% of the cost of the soil conservation programme has been benefited in the year itself.



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