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GOVERNMENT OF KERALA

EVALUATION STUDY ON SOIL CONSERVATION 1992-93

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DEPARTMENT OF ECONOMICS & STATISTICS
THIRUVANANTHAPURAM
1998

Government of Kerala

Evaluation Study on Soil Conservation 1992-93

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Preface

The Diminishing rate of Agricultural production is due to the loss of fertility and moisture content of the surface soil of the earth. The special feature of the State with ghats sections in the East,sloping towards west, up to the Arabian sea coast and heavy monsoon result tremendous surface soil erosion and loss of fertility. Experiencing the grave situation, Central and State Governments have taken many measures to preserve and improve the soil conditions for agricultural production. For the purpose, the Soil Conservation Department is entrusted to implement various schemes like Contour Bundling, Strip Cropping, Cover Cropping, Crop rotation etc.

The Evaluation Study of these implemented schemes has been done by the staff of Evaluation Division of Directorate of Economics & Statistics Department for all districts except in Wayanad, where direct implementation and evaluation was done by the Central agency.

Soil Conservation Schemes implemented in all the districts except Wayanad have been considered as the frame for the survey '92-93 of which 57 schemes from different districts were selected at random for this evaluation study. This report is useful for administrators, Statisticians and Research scholars of the State.

In this context we also acknowledge our thanks to the staff of Soil Conservation Department for their whole hearted co-operation in the successful conduct of the survey.

Director
U.Thomas Sleeba

Thiruvananthapuram
04..04..1997

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Chapter I

I.1 Introduction

Soil Conservation 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 Kerala, Soil Conservation programme was started towards the close of First Five Year Plan. The measures adopted for conserving soil are bundling, gully plugging, terracing, grassing of waterways and spill ways.

The schemes for Soil Conservation have been widened to include protection of land against deterioration and the adoption of a pattern of optimisation of land use. The objectives of the study include

1. Rebuilding the lost fertility of land due to soil erosion
2. Conservation of moisture in Grid region
3. Proper and effective water management
4. Promoting surface and subsoil drainage in badly drained areas and
5. Other management practices to optimise the benefits from investment on land.

The various measures under Soil Conservation Programme envisaged in the Plan include engineering measures, improvement of land use practice, afforestation and preservation of forest and adoption measures to ensure that each type of land is used according to capacity.

I.2 Objectives and methodology of the survey.

The main objectives of the evaluation study are :-

i. *To asses 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 cultivation consequent on the implementation of the programme.*
iv. *To study the effects of the work carried out by the Soil Conservation department in this direction.*

For this, 57 schemes were selected from the schemes completed after 1986-87 in this state representing all districts 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 according to 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

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, this short fall is compensated from another stratum with the nearest area holding. However, if the beneficiaries in a scheme are less than 25, all of them are selected. For the purpose of comparison 5 control plots are also selected from the scheme area, where the Soil Conservation works are not carried out under any scheme

For the successful conduct of the survey, 13 trained investigators are posted in 13 districts (all districts except Wayanad). Necessary training was also imparted to the investigators before the commencement of field work under the supervision of the district officers concerned After the completion of field work, scrutiny, tabulation, consolidation and analysis of data are done in the Head Office. Agriculture year 1992-93 is the reference period of the survey The report is based on the survey conducted for the same period

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

Table I

Statement showing Stratum wise distribution of Selected beneficiaries, Number of beneficiaries for the year 1992-93.

Sl. No.	District	No of Schemes Selected	Stratum-I		Stratum-II		Stratum-III		Stratum-IV		Total	
			No	Area (Acre.)	No.	Area (Acre.)	No	Area (Acre.)	No	Area (Acre.)	No	Area (Acre.)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	3	28	17.13	4	11.95	2	9.00	2	16.05	36	54.13
2	Kollam	4	96	30.40	3	9.04					99	39.44
3	Pathanamthitta	5	76	23.92	29	43.37	6	23.79	4	23.29	115	114.37
4	Alappuzha	4	67	17.44							67	17.44
5	Kottayam	5	28	8.12	7	14.29	1	3.00	1	5.50	37	30.91
6	Idukki	4	29	22.50	41	86.40	16	58.72	1	6.92	87	174.54
7	Ernakulam	4	69	34.50	13	45.97	1	9.70			83	90.17
8	Thrissur	5	76	19.91	29	49.09	5	19.24	4	23.84	114	112.08
9	Palakkad	7	84	13.36	21	35.13	6	18.70	4	46.52	115	113.71
10	Malappuram	6	94	36.44	10	31.22	1	8.00			105	75.66
11	Kozhikkode	4	74	18.8	12	15.83			1	5.50	87	40.13
12	Kannur	5	61	76.30	39	153.64	8	75.46	1	15.78	109	321.18
13	Kasargod	1	22	10.81	2	2.48					24	13.29
	Total	57	804	329.63	210	498.41	46	225.61	18	143.40	1078	1197.05

Table 1(a)

Statement showing Stratum wise distribution of Control Plots

Sl. No.	District	No of Schemes Selected	Stratum-I		Stratum-II		Stratum-III		Stratum-IV		Total	
			No	Area (Acre.)	No.	Area (Acre.)	No.	Area (Acre.)	No.	Area (Acre.)	No.	Area (Acre.)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	3	10	4.63			1	5.00			11	9.63
2	Kollam	4	20	6.67							20	6.67
3	Pathanamthitta	5	21	6.77	4	5.31					25	12.08
4	Alappuzha	4			20	106.23					20	106.23
5	Kottayam	5	14	3.57	4	7.65	6	21.00			24	32.22
6	Idukki	4	3	1.25	12	20.29	5	17.00			20	38.54
7	Ernakulam	4	17	4.81	3	4.75					20	9.56
8	Thrissur	5	18	4.48	3	5.29	2	6.45	2	14.00	25	30.22
9	Palakkad	7	26	5.22	1	1.53					27	6.75
10	Malappuram	6	26	15.74	3	9.80	1	3.75			30	29.29
11	Kozhikkode	4	20	5.57							20	5.57
12	Kannur	5	15	21.65	6	23.25	1	9.50			22	54.40
13	Kasargod	1	1	0.40	2	3.65	1	3.65	1	5.50	5	13.20
	Total	**57**	**191**	**80.76**	**58**	**187.75**	**17**	**66.35**	**3**	**19.50**	**269**	**354.36**

Thus from 57 schemes 1078 beneficiaries are selected. 74.58% of the beneficiaries are having holding less than one acre, 1.67% of beneficiaries are having holdings more than 5 acre. 269 control plots are also selected for comparison. Their distribution is 71.00%, 21.56%, 6.32% and 1.12% 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.

I.3. Problems of Soil Erosion

Top soil, which is the most vital part of the soil may sometimes be disappeared due to erosion, it results in deterioration in the fertility of land. To avoid this, various Soil Conservation schemes have been implemented 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. Further, the benefits of anti-erosion works could be reaped only gradually.

Soil erosion has been recognised as the problem of such far reaching importance that its control cannot be left exclusively to the farmers who are interested in quick 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 not less important than that of individual farmers. But without the close co-operation of the farmers no Government action in this regard would be a success.

The problem of soil conservation is of particular importance in Kerala where an explosive increase in population has significantly reduced the per capita availability of cultivable land. People have tried to exploit the land without treating it with adequate manures and fertilisers. This is because of wrong cropping pattern which also leads to impoverishment of the soil.

I.4. Methods of Soil Conservation Programme

All measures of Soil Conservation basically aim at reducing top soil as well as water losses and improving productivity. Mainly the Soil Conservation practices are grouped into two categories viz. agronomic and mechanical. The agronomic practices such as crop rotation, cover cropping, strip cropping etc. to protect the fertility of the soil and the mechanical practices includes various engineering aspects that supplement the effect of agronomic measures. The various mechanical practices are contour bundling, contour cultivation, terracing, beach terracing etc.

Extent of problem in the state

The total geographical area of the state excluding Wayanad district is 36,72,937 hectores, of which forests, uncultivable land and land put on non agricultural uses occupies 13,52,209 hectores. The area sown is 21,33,698 hectores and the remaining area is occupied by current fallow, fallow other than current fallow, cultivable waste etc. In the total geographical area 43% is high land. The mid land and low land occupies 46% and 11% respectively.

Soil Conservation programmes

It is estimated that 2 % of the valuable surface soil is lost every year through erosion. Knowledgeable farmers have adopted several measures to fight against soil erosion but there have been mostly empirical steps like bundling taken in a half hazard and customary manner.

Adoption of such measures is necessary to ensure that the different types of land are used according to capability.

This study is confined to the Soil Conservation measures undertaken in the Kerala State except in Wayanad district.

Chapter II

2.1 Impact of soil conservation programme on land use and crop pattern

57 schemes were selected for the evaluation study of soil conservation programme in the state for the agricultural year 1992-93. The table 2 gives the district wise details regarding area,cost , the total no of beneficiaries and no. of selected beneficiaries.

Table 2

District wise details of area , cost and number of beneficiaries

Sl No	District	Area (Acre)	Cost (Rs)	No.of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1	Thiruvananthapuram	54.13	85503	36	36
2	Kollam	39.44	513711	207	99
3	Pathanamthitta	114.37	249191	129	115
4	Alappuzha	17.44	327283	92	67
5	Kottayam	30.91	133742	37	37
6	Idukki	174.54	367753	124	87
7	Ernakulam	90.17	158119	152	83
8	Thrissur	112.08	170858	186	114
9	Palakkad	113.71	219246	211	115
10	Malappuram	75.66	156731	208	105
11	Kozhikkode	40.13	96786	87	87
12	Kannur	321.18	566879	171	109
13	Kasargod	13.29	37352	24	24
	Total	**1197.05**	**3083154**	**1664**	**1078**

It is revealed from table 2 that 1078 beneficiaries were selected out of total 1664 beneficiaries (65% of the total beneficiaries) and they occupy 1197 acres of land. The cost incurred for the 57 schemes is Rs.30,83,154/-.

Tables 3 and 3(a) given below show the land use particulars of beneficiary plots and control plots respectively.

Table 3

Land use Particulars of Beneficiary Plots

(Area in Acres)

Sl No	Districts	Area Cultivated				Current Fallow				Other Use				Area not Cultivated				Total			
		Before		After		Before		After		Before		After		Before		After		Before		After	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
1	Thiruvananthapuram	52.74	97	52.99	97	12.30	23	4.34	8	1.16	2	1.41	3	0.23	1	0.23		54.13	100	54.13	100
2	Kollam	37.12	94	37.12	94					1.91	5	1.91	5	0.41	1	0.41	1	39.44	100	39.44	100
3	Pathanamthitta	103.42	91	106.40	93					4.84	4	6.61	6	6.11	5	1.36	1	114.37	100	114.37	100
4	Alappuzha	15.94	91	15.94	91					1.09	6	1.09	6	0.41	3	0.41	3	17.44	100	17.44	100
5	Kottayam	28.29	91	28.29	91					1.74	6	1.74	6	0.88	3	0.88	3	30.91	100	30.91	100
6	Idukki	64.22	37	77.16	45	1.82	1	4.82	3	2.54	1	2.60	1	107.78	62	94.78	54	174.54	100	174.54	100
7	Ernakulam	68.08	75	83.58	93					1.58	2	1.58	2	20.51	23	5.01	5	90.17	100	90.17	100
8	Thrissur	105.35	94	105.35	94	0.15	0	0.15		6.46	6	6.46	6	0.27		0.27		112.08	100	112.08	100
9	Palakkad	101.59	90	101.59	90	0.50	0	0.50		4.97	4	4.97	4	7.15	6	7.15	6	113.71	100	113.71	100
10	Malappuram	43.43	57	64.97	86	5.49	7	3.36	4	4.27	6	4.71	6	27.96	37	5.98	8	75.66	100	75.66	100
11	Kozhikkode	19.86	50	20.06	50					2.06	5	2.06	5	18.21	45	18.01	45	40.13	100	40.13	100
12	Kannur	311.85	97	311.83	97	30.37	9	15.16	5	3.66	1	3.74	1	5.67	2	5.61	2	321.18	100	321.18	100
13	Kasargod	12.66	95	12.66	95	0	0	0		0.38	3	0.38	3	0.25	2	0.25	2	13.29	100	13.29	100
	Total	**964.55**	**81**	**1017.44**	**85**	**50.63**	**4**	**29.32**	**2**	**36.66**	**3**	**39.26**	**3**	**195.84**	**16**	**140.35**	**12**	**1197.05**	**100**	**1197.05**	**100**

The above table shows a positive trends while comparing with the area before and after the Soil Conservation programme. An addition of area 52.89 acres. of land has brought under cultivation which was not cultivated earlier. Hence it can be stated that 5.48% of area over the area cultivated before Soil Conservation Programme in due to the implementation of Soil Conservation measures. In other words area under cultivation has increased from 81% to 85% by decreasing the area of not cultivated from 16% to 12% to the total area of the scheme.

Table 3(a)

Land Use Particulars (Control Plots)

(Area in Acres.)

Sl No	Districts	Area Cultivated		Current Fallow		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	8.97	93	0.98	10	0.66	7			9.63	100
2	Kollam	6.28	94			0.39	6			6.67	100
3	Pathanamthitta	10.35	86			0.47	4	1.26	10	12.08	100
4	Alappuzha	101.30	95			3.08	3	1.85	2	106.23	100
5	Kottayam	27.80	86	2.90	9	0.87	3	3.55	11	32.22	100
6	Idukki	29.24	76			0.65	2	8.65	22	38.54	100
7	Ernakulam	8.91	93			0.26	3	0.39	4	9.56	100
8	Thrissur	28.38	94			1.84	6			30.22	100
9	Palakkad	6.12	91	0.08	1	0.34	5	0.29	4	6.75	100
10	Malappuram	20.10	69	2.94	10	0.94	3	8.25	28	29.29	100
11	Kozhikkode	2.78	50			0.36	6	2.43	44	5.57	100
12	Kannur	53.30	98	4.30	8	0.29	1	0.81	1	54.40	100
13	Kasargod	9.90	75			0.21	2	3.09	23	13.20	100
	Total	**313.43**	**88**	**11.20**	**3**	**10.36**	**3**	**30.57**	**9**	**354.36**	**100**

Here 88 % of the area of the control plots were cultivated whereas the area not cultivated is about 9 %. Here the land cultivated is more or less the same as that of the beneficiaries plots.

Consequent on the introduction on the Soil Conservation programme there are certain significant changes in the cropping pattern. This phenomenon shows an increasing trend towards the cultivation of perennial crops.

Table 4

Crop Pattern (Area wise)

(Area in Acres.)

Sl. No	Districts	Perennial Crops				Seasonal Crops				Total			
		Before S.C Work	%	After S.C Work	%	Before S.C Work	%	After S.C Work	%	Before S.C Work	%	After S.C Work	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Thiruvananthapuram	11.91	22.58	43.30	82.49	40.83	77.42	9.19	17.51	52.74	100	52.49	100
2	Koilam	25.71	69.26	26.41	71.15	11.41	30.74	10.71	28.85	37.12	100	37.12	100
3	Pathanamthitta	91.81	88.77	100.64	94.59	11.61	11.23	5.76	5.41	103.42	100	106.40	100
4	Alappuzha	15.68	98.37	15.84	99.37	0.26	1.63	0.10	0.63	15.94	100	15.94	100
5	Kottayam	25.26	89.29	28.25	99.86	3.03	10.71	0.04	0.14	28.29	100	28.29	100
6	Idukki	57.85	90.08	67.52	87.51	6.37	9.92	9.64	12.49	64.22	100	77.16	100
7	Ernakulam	42.69	62.71	79.26	94.83	25.39	37.29	4.32	5.17	68.08	100	83.58	100
8	Thrissur	104.07	98.79	105.14	99.80	1.28	1.21	0.21	0.20	105.35	100	105.35	100
9	Palakkad	91.54	90.11	99.94	98.38	10.05	9.89	1.65	1.62	101.59	100	101.59	100
10	Malappuram	38.48	88.60	63.41	97.60	4.95	11.40	1.56	2.40	43.43	100	64.97	100
11	Kozhikkode	19.86	100.00	19.99	99.65			0.07	0.35	19.86	100	20.06	100
12	Kannur	282.78	90.68	296.10	94.96	29.07	9.32	15.73	5.04	311.85	100	311.83	100
13	Kasargod	12.66	100.00	12.66	100.00					12.66	100	12.66	100
	Total	**820.30**	**85.04**	**958.46**	**94.20**	**144.25**	**14.96**	**58.98**	**5.80**	**964.55**	**100**	**1017.44**	**100**

From the above table it is revealed that the area under perennial crops has increased after the Soil Conservation programme by decreasing the area under seasonal crops. The area under perennial crops has increased from 820.30 acres. to 958.46 acres. in the scheme area after the implementation of the programme. From this table we can arrive at the conclusion that the farmers have accrued a tendency to cultivate perennial crops in sloppy regions where the Soil Conservation measures are carried out. The cultivation of seasonal crops in such regions is likely to induce soil erosion. More over farmers are reluctant to cultivate seasonal crops due to the recurring expenditure, non-availability of labours in time and the risk they have to bear behind it.

In the district wise figures, Thiruvananthapuram, Kottayam, Ernakulam and Palakkad show high degree of change in the cropping pattern.

The study reveals that 9.16% of area is increased under perennial crops even though there are changes in the area among the crops.

The following table shows that after the introduction of Soil Conservation programme rubber has occupied the largest area under perennial crops, the percentage of increase is 51 %. The coconut comes next with an increase of 17%. Arecanut and Cashew shown an increase of 12% and 11% respectively while Pepper shows a decrease of 51%.

On going through the district wise data, it is noted that the cropping area under different crops are interchanged according to the suitability of land. It is particularly notable that, in Thiruvananthapuram district, land under cultivation of rubber increased from 7.90 acres to 35 acres due to Soil Conservation Programme. Similarly in Pathanamthitta district, there was an increase from 22.92 acres to 68.22 acres of land under rubber.

Table 5

Area under Selected Perennial Crops

(Area in Acres)

District	Coconut			Arecanut			Cashew			Pepper			Rubber			Others			Total		
	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Tvm	3.80	7.50	97		0.10	100	0.01	0.48	47	0.20	0.22	10	7.90	35.00	343				11.91	43.30	264
Klm	9.16	9.33	2	1.68	1.24	-26	1.44	1.74	21	1.97	2.13	8	10.12	10.39	3	1.34	1.58	18	25.71	26.41	3
Pta	27.29	16.89	-38	2.63	1.06	-60	2.58	1.00	-61	12.47	9.85	-21	22.92	68.22	198	23.92	3.62	-85	91.81	100.64	10
Alp	12.13	11.40	-6	1.07	1.05	-2	1.76	0.69	-61				0.72	2.70	275				15.68	15.84	1
Ktm	3.14	2.34	-25	0.10	0.10		0.06	0.06		0.45	0.17	-62	19.66	25.03	27	1.85	0.55	-70	25.26	28.25	12
Idk	5.20	4.54	-13	1.17	0.94	-20	1.07	1.07		18.52	9.87	-47	9.64	9.87	2	22.25	41.23	85	57.85	67.52	17
Ekm	10.72	13.37	25		1.31	100		1.04	100	1.61	6.27	289	30.22	56.59	87	0.14	0.68	386	42.69	79.26	86
Tsr	19.83	22.33	13	1.52	1.75	15	6.28	6.09	-3	1.79	2.60	45	71.44	71.61	0.2	3.21	0.76	-76	104.07	105.14	1
Pkd	8.82	10.32	17	0.95	1.06	12	1.07	1.11	4	2.30	3.65	59	72.80	82.73	14	5.60	1.07	-81	91.54	99.94	9
Mlp	21.62	38.81	79	0.46	0.53	15	4.48	3.38	-25	7.01	7.80	11	0.50	8.35	1570	4.41	4.54	3	38.48	63.41	65
Kkd	16.77	17.50	4	0.30	0.40	33	0.06	0.07	17	1.24	0.49	-60				1.49	1.53		19.86	19.99	0.6
Knr	76.55	99.58	30	28.53	33.40	17	39.51	48.14	22	73.36	15.96	-78	64.51	98.01	52	0.32	1.01	216	282.78	296.10	5
Ksd	12.66	12.66																	12.66	12.66	
Total	**227.69**	**266.57**	**17**	**38.41**	**42.94**	**12**	**58.32**	**64.87**	**11**	**120.92**	**59.01**	**-51**	**310.43**	**468.50**	**51**	**64.53**	**56.57**	**12**	**820.30**	**958.46**	**17**

Table 6

Area under Selected Seasonal Crops

(Area in Acres.)

District	Paddy			Tapioca			Plantain			Ginger			Others			Total		
	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase	Before S.C Work	After S.C Work	% increase
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Tvm	4.00	3.50	-13	16.50	8.37	-49	2.50	0.56	78	4.01	3.70	8	13.82	2.55	-82	40.83	18.68	-54
Klm				6.46	7.50	16	0.69	0.70	2	1.77	1.94	10	2.49	1.79	-28	11.41	11.93	5
Pta				8.68	4.25	-77	1.14	0.86	25	4.03	3.92	-3	5.69	4.30	-24	19.54	13.33	-32
Alp				0.06	0.10	67				0.20	0.10	-50				0.26	0.20	-23
Ktm				2.15	0.13	-94	0.18	0.20	11	0.17	0.21	24	0.68	0.04	-94	3.18	0.58	-82
Idk				5.73	5.38	-6		0.40	40	1.76	1.92	9		3.20	320	7.49	10.90	46
Ekm				25.23	3.74	-85		0.02	2	0.26	0.74	185	0.02	0.22	1000	25.51	4.72	-81
Tsr				0.05	0.03	-40	0.02	0.06	200	0.61	0.15	-75	0.60	0.28	-53	1.28	0.52	-59
Pkd				6.79	0.51	-92	0.08	0.05	-38	2.13	1.27	-40	2.11	0.13	-94	11.11	1.96	-83
Mlp	0.60	0.28	-53	3.45	0.52	-85	0.04	0.03	25	0.25	0.55	120	1.40	0.18	-87	5.74	1.56	-73
Kkd					0.01	1				0.03	0.09	200		0.06	6	0.03	0.16	433
Knr				14.00	8.45	-40	2.60	1.65	-37	4.52	4.60	2	8.30	3.28	60	29.42	17.98	-39
Ksd																		
Total	**4.60**	**3.78**	**-18**	**89.10**	**38.99**	**-56**	**7.25**	**4.53**	**-38**	**19.74**	**19.19**	**-3**	**35.11**	**16.03**	**-54**	**155.80**	**82.52**	**-47**

The trend in the cropping pattern of seasonal crop is also analysed. The area under perennial crops has recorded an increasing trend after Soil Conservation Programme, but a similar trend is not observed in the case of Seasonal Crops. The decrease is calculated as 47% over the area under Seasonal crops before Soil Conservation programme. Area under tapioca, Ginger and other seasonal crops recorded a decrease of 56 %, 38 % and 54 % respectively.

Impact of Soil Conservation treatment on the yield of crops.

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

Table 7

Cropwise yield and value of Perennial Crops in scheme area

District	Name of Crop	Unit	Before S.C work.		After S.C work		Value at constant price	% incre/ decre
			Qty	Value	Qty	Value		
1	2	3	4	5	6	7	8	9
TVM	Coconut	Nos	7450	19728	13335	47798	35312	79
	Arecanut	Nos			10920	3575	1412	100
	Cashew	Qtl			1.00	2075	956	100
	Pepper	Qtl			1.27	3659	5800	100
	Rubber	Qtl	31.00	53134	90.22	221039	154637	191
	Others				25.00	10000	10000	100
	Total			72862		288146	208117	186
KLM	Coconut	Nos	3970	11057	8460	32518	23563	113
	Arecanut	Nos	132000	15550	500000	161950	58900	279
	Cashew	Qtl	1.05	1075	6.34	13120	6490	505
	Pepper	Qtl	2.33	9182	7.80	23125	30737	235
	Rubber	Qtl	25.80	44215	42.80	104860	73349	66
	Others	Qtl	1.82	556	3.76	1782	1149	107
	Total			81635		337355	194188	138
PTA	Coconut	Nos	50214	142146	31980	125803	90529	-36
	Arecanut	Nos	11200	1387	15200	4976	1882	36
	Cashew	Qtl	9.24	10401	2.16	4520	2431	-77
	Pepper	Qtl	31.00	139908	12.00	35316	54158	-61
	Rubber	Qtl	158.00	270812	379.00	928550	649606	140
	Others	Qtl	4.28	4261	3.17	4645	3156	-26
	Total			568915		1103810	801762	41
ALP	Coconut	Nos	21496	63620	26265	105478	77734	22
	Arecanut	Nos	2360	317	3400	1005	457	44
	Cashew	Qtl	4.19	3781	5.51	10885	4973	32
	Total			67718		117368	83164	23

Table 7 Contd...

District	Name of Crop	Unit	Before S.C work.		After S.C work		Value at constant price	% incre/ decre
			Qty	Value	Qty	Value		
1	2	3	4	5	6	7	8	9
KTM	Coconut	Nos	3835	11446	7965	32839	23773	108
	Arecanut	Nos	320	35	600	172	65	86
	Cashew	Qtl	0.11	119	0.07	145	75	-36
	Pepper	Qtl	0.78	3433	0.94	2741	4137	21
	Rubber	Qtl	14.25	24425	82.05	203473	142348	483
	Others	Qtl	1.85	3540	2.55	4950	4879	38
	Total			42998		244320	175277	308
IDK	Coconut	Nos	8118	25229	7959	34497	24735	-2
	Arecanut	Nos	9920	1034	8440	2314	879	-15
	Cashew	Qtl	7.72	8138	9.28	17390	9783	20
	Pepper	Qtl	58.66	263912	37.44	109748	168443	-36
	Rubber	Qtl	24.45	41907	27.83	68184	47701	14
	Others	Qtl	24.75	285100	94.10	1922550	1083956	280
	Total			625320		2424683	1335497	114
EKM	Coconut	Nos	6889	21080	11327	49654	34659	64
	Arecanut	Nos			1000	309	108	100
	Pepper	Qtl	1.28	5752	2.88	8580	12942	125
	Rubber	Qtl	77.34	132561	102.61	251395	175874	33
	Others	Qtl	6.00	1800	13.00	4680	3900	117
	Total			161193		314588	227483	41
TSR	Coconut	Nos	34890	98505	67293	255882	189988	93
	Arecanut	Nos	3240	397	7440	2839	911	129
	Cashew	Qtl	3.44	4168	7.47	15762	9051	117
	Pepper	Qtl	0.81	3463	3.94	11653	16844	386
	Rubber	Qtl	65.82	112815	166.82	408709	285929	153
	Others	Qtl	82.80	17160	45.30	13590	9388	-45
	Total			236508		708435	512111	117
PKD	Coconut	Nos	21787	60522	39483	142466	109680	81
	Arecanut	Nos	4160	426	11880	3594	1218	186
	Cashew	Qtl	0.43	485	1.63	3519	1839	179
	Pepper	Qtl	1.04	4732	10.05	29897	45732	866
	Rubber	Qtl	385.84	661330	654.39	1603256	1121624	70
	Others	Qtl	19.85	5265	38.35	9648	10172	93
	Total			732760		1792380	1290265	76

Table 7 Contd...

District	Name of Crop	Unit	Before S.C work.		After S.C work		Value at constant price	% incre/ decre
			Qty	Value	Qty	Value		
1	2	3	4	5	6	7	8	9
MAL	Coconut	Nos	30810	75951	79533	290049	196065	158
	Arecanut	Nos	1760	162	6280	2177	579	257
	Cashew	Qtl	11.31	10782	8.87	19465	8456	-22
	Pepper	Qtl	3.88	17116	11.45	33913	50511	195
	Rubber	Qtl						
	Others	Qtl	2.70	775	3.80	1350	1091	41
	Total			104786		346954	256702	144
KOZ	Coconut	Nos	17340	41713	35008	131315	84215	102
	Arecanut	Nos	360	23	2560	725	163	607
	Cashew	Qtl	0.04	49	0.06	132	74	51
	Pepper	Qtl	1.02	4556	1.60	4792	7147	57
	Others	Qtl	11.85	1207	26.99	3123	2749	128
	Total			47548		140087	94348	98
KAN	Coconut	Nos	26475	72383	211105	840325	577161	697
	Arecanut	Nos	1301040	98098	2103920	541339	158636	62
	Cashew	Qtl	73.05	98542	92.95	215334	125386	27
	Pepper	Qtl	149.50	681615	15.35	45340	69985	-90
	Rubber	Qtl	147.50	252815	228.45	559703	391563	55
	Others	Qtl	0.25	375	1.20	3400	1800	380
	Total			1203828		2205441	1324531	10
KSD	Coconut	Nos	5927	16373	25523	104299	70442	330
	Total			16373	25523	104299	70442	330
STATE	Coconut	Nos	239201	659753	565236	2192923	1537856	136
	Arecanut	Nos	1466360	117429	2671640	724975	225210	92
	Cashew	Qtl	110.58	137540	135.34	302347	169514	23
	Pepper	Qtl	250.30	1133669	104.72	308734	466436	-59
	Rubber	Qtl	930.00	1594014	1775.20	4349169	3042631	91
	Others	Qtl	156.15	320039	257.22	2249718	1132240	254
	Total			3962444		10127866	6573887	66

In the case of perennial crops, an increasing trend is noted during the period under report. The total production of perennial crops is increased to 66%.The yield of coconut shows the highest increase of 136% on production. The above increase in production is mainly due to the increase of crop area. The productivity has also been increased remarkably.

On analysing the district level production details, it is understood that few crops have displayed a decreasing trend . This is because of the decrease in area under that particular crop. In Pathanamthitta district the production of Coconut, Cashew and pepper have decreased to 36%, 77 % and 61% respectively over the

production before Soil Conservation Programme. This is due to decrease in area after S.C.P in that particular crops. Similar cases are also noted in some other districts also. The analysis of district wise data reveals that the production has increased with in the range of 10% at Kannur to 330% at Kasaragod. The productivity in almost all the crops is seen increased to about 40 % in the case of perennial crops.

Table 8

Cropwise yield and value of seasonal crops in the scheme area

District	Name of Crop	Unit	Before S.C work.		After S.C work		Value at constant price	% increase
			Qty	Value	Qty	Value		
1	2	3	4	5	6	7	8	9
TVM	Tapioca	Qtl	990.00	75161	555.00	87268	42136	-44
	Plantain	Qtl	176.00	45056	160.00	100800	40960	-9
	Paddy	Qtl	208.00	60384	215.00	83119	62417	3
	Ginger	Qtl	150.00	281250	56.00	121500	105000	-63
	Others	Qtl	553.00	124425	122.00	33366	27450	-78
	Total			586276		426053	277963	-53
KLM	Tapioca	Qtl	380.00	32980	460.00	63889	39923	21
	Plantain	Qtl	78.00	24336	95.00	50504	29640	22
	Ginger	Qtl	65.00	121875	95.00	206116	178125	46
	Others	Qtl	100.00	27500	76.00	30314	20900	-24
	Total			206691		350823	268588	30
PTA	Tapioca	Qtl	520.00	51392	258.00	30038	25498	-50
	Plantain	Qtl	178.00	53222	180.00	93661	53820	1
	Ginger	Qtl	110.00	176458	90.00	205313	144375	-18
	Others	Qtl	223.00	79388	181.00	90905	64436	-19
	Total			360460		419917	288129	-20
ALP	Tapioca	Qtl	4.00	463	6.00	823	695	50
	Plantain	Qtl	9.00	3276	5.00	2625	1820	-44
	Total			3739		3448	2515	-33
KTM	Tapioca	Qtl	129.00	12900	8.00	1365	800	-94
	Plantain	Qtl	7.00	2289	10.00	5150	3270	43
	Ginger	Qtl	15.00	24365	21.00	45614	34111	40
	Others	Qtl	28.00	11816	2.00	1212	844	-93
	Total			51370		53341	39025	-24
IDK	Tapioca	Qtl	343.00	39606	328.00	52678	37874	-4
	Plantain	Qtl	78.00	28314	93.00	42780	33759	19
	Others	Qtl			128.00	61250	61250	100
	Total			67920		156708	132883	96

Table 8 Contd....

District	Name of Crop	Unit	Before S.C work.		After S.C work		Value at constant price	% increase
			Qty	Value	Qty	Value		
1	2	3	4	5	6	7	8	9
EKM	Tapioca	Qtl	1514.00	145798	225.00	34555	21668	-85
	Plantain	Qtl	12.00	3768	35.00	15750	10990	192
	Others	Qtl	1.00	362	10.00	4750	3620	900
	Total			149928		55055	36278	-76
TSR	Tapioca	Qtl	3.00	303	2.00	323	202	-33
	Plantain	Qtl	27.00	8019	7.00	3648	2079	-74
	Ginger	Qtl	2.00	3831	6.00	13253	11494	200
	Others	Qtl	24.00	9912	12.00	6260	4956	-50
	Total			22065		23484	18731	-15
PKD	Tapioca	Qtl	407.00	34522	35.00	4405	2969	-91
	Plantain	Qtl	93.00	27063	59.00	27730	17169	-37
	Ginger	Qtl	8.00	12930	8.00	17292	12930	0
	Others	Qtl	84.00	35028	6.00	3160	2502	-93
	Total			109543		52587	35570	-68
MLP	Tapioca	Qtl	207.00	20953	35.00	4954	3543	-83
	Plantain	Qtl	11.00	3322	25.00	11250	7550	127
	Paddy	Qtl	31.00	7934	16.00	5867	4095	-48
	Ginger	Qtl	4.00	4400	3.00	6484	3300	-25
	Others	Qtl	56.00	23296	9.00	4590	3744	-84
	Total			59905		33145	22232	-63
KZD	Tapioca	Qtl			1.00	172	131	100
	Plantain	Qtl	2.00	584	5.00	2250	1460	148
	Others	Qtl			2.00	1000	1000	100
	Total			584		3422	2591	344
KNR	Tapioca	Qtl	840.00	103950	547.00	103670	67491	-35
	Plantain	Qtl	200.00	59400	212.00	95612	62964	6
	Ginger	Qtl	260.00	425900	185.00	386768	303044	-29
	Others	Qtl	332.00	105576	136.00	64600	43248	-59
	Total			694826		650650	476747	-31
KSD	Nil							
STATE	**Tapioca**	**Qtl**	**5337**	**518028**	**2460**	**384140**	**242930**	**-53**
	Plantain	**Qtl**	**871**	**258649**	**886**	**451760**	**265481**	**3**
	Paddy	**Qtl**	**239**	**68318**	**231**	**88986**	**66512**	**-3**
	Ginger	**Qtl**	**614**	**1051009**	**464**	**1002340**	**792379**	**-25**
	Others	**Qtl**	**1401**	**417303**	**684**	**301407**	**233950**	**-40**
	Total			**2313307**		**2228633**	**1601252**	**-30**

The production particulars of seasonal crops are given in Table 8. It may be noted that even after 47% decrease in area under seasonal crops, the production has decreased by 30% only, showing that SCP has helped to increase the quality of the soil. The productivity of seasonal crops has increased by 30 %.

Here seasonal crops in district level showed a decrease in production except in Kollam, Iduki and Kozhikode districts. The highest increase of 344% is seen in Kozhikode district. It is followed by Idukki with 96 % and Kollam with 30% increase in the production of seasonal crops. It is seen that the productivity of soil has also increased. Among other factors, implementation of SCP has contributed much in the increase in productivity.

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 soil is 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. 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 lands, 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 in to account.

Protective benefits are the intangible benefits derived from the S.C.P implementation though indirect in nature, are more stable and provide base for the continued prosperity in the area. In the case of agricultural land protective benefits are assessed in terms of this increased values because of the prevention of further soil erosion and its increased productive potentialities. The increase in the land values are to be assessed 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 the 1078 beneficiaries in the 57 schemes. It comes to Rs.3083154/- including the maintenance work.

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

Table 9

Area, Quantity and Value of Selected Perennial Crops and Seasonal Crops

	Name of the Crop	Unit	Before S.C work.			After S.C work.			Value at constant price *
			Area Acre	Qty	Value	Area Acre	Qty	Value	
	1	2	3	4	5	6	7	8	9
A.Perennial Crops	Coconut	Nos	227.69	239201	659753	266.57	565236	2192923	1537856
	Arecanut	Nos	38.41	1466360	117429	42.94	2671640	724975	225210
	Cashew	Qtl	58.32	110.58	137540	64.87	135.34	302347	169514
	Pepper	Qtl	120.92	250.30	1133669	59.01	104.72	308734	466436
	Rubber	Qtl	310.43	930.00	1594014	468.50	1775.20	4349169	3042631
	Others	Qtl	64.53	156.15	320039	56.57	257.22	2249718	1132240
	Total A		820.30		3962444	958.46		10127866	6573887
B.Seasonal Crops	Tapioca	Qtl	89.10	5337.00	518028	38.99	2460.00	384140	242930
	Plantain	Qtl	19.74	871.00	258649	19.19	886.00	451760	265481
	Paddy	Qtl	7.25	239.00	68318	4.53	231.00	88986	66512
	Ginger	Qtl	4.60	614.00	1051009	3.78	464.00	1002340	792379
	Others	Qtl	35.11	1401.00	417303	16.03	684	301407	233950
	Total B		155.80		2313307	82.52		2228633	1601282
	Grand Total A+B		976.10		6275751	1040.98		12356499	8175169

*: Constant Price - Price before S.C work has been used.

The total area under cultivation have been calculated to 1040.98 acres. The value of crops before the S.C.P comes to Rs.6275751/-. The value of crops after the S.C.P has also calculated with the price prevailed before the S.C.P 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.8175169/-. Thus the annual additional benefits due to the implementation of S.C.P is worked out as Rs.1899418/-. This shows that 62% of the cost of S.C.P (including maintenance) has benefited in the year under survey itself.

Several benefits flow from the S.C.P 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

On examining the table 9 it is observed that 64.88 acres. of land has been additionally brought under cultivation by cultivating area which were not cultivated before S.C.P. This benefit is achieved only due to the implementation of Soil Conservation measures.

ii. Increase in Productivity.

A comparison of income expenditure and net income from the holding in the scheme area and control area will clearly indicate the benefits acquired due to the implementation of conservation programme. The above particulars are given in table 10 & 10(a).

Table 10

Income,Expenditure and Net Income of Beneficiary Holdings

(in Rupees)

Sl No	District	Income		Expenditure		Net Income	
		Before S.C work	After S.C work	Before S.C work	After S.C work	Before S.C work	After S.C work
1	Thiruvananthapuram	659138	714199	141290	175100	517848	539099
2	Kollam	288326	688178	38634	95262	249692	592916
3	Pathanamthitta	929375	1523727	211789	589589	717586	934138
4	Alappuzha	71457	120816	24925	29840	46532	90976
5	Kottayam	94368	297661	22916	74883	71452	222778
6	Idukki	693240	2581391	169612	188251	523628	2393140
7	Eranakulam	311121	369643	126675	87010	184446	282633
8	Trissur	258573	731919	77265	201770	181308	530149
9	Palakkad	842303	1844967	317026	196960	525277	1648007
10	Malappuram	164691	380099	44686	146343	120005	233756
11	Kozhikkode	48132	143509	4480	11490	43652	132019
12	Kannur	1898654	2856051	335598	526970	1563056	2329121
13	Kasargod	16373	104299	2142	29407	14231	74892
	State Total	6275751	12356499	1517038	2352875	4758713	10003624

Table 10(a)

Income, Expenditure and Net Income of Control Plots

(in Rupees)

Sl No	District	Income	Expen-diture	Net Income
1	Thiruvananthapuram	101540	24330	77210
2	Kollam	87343	10606	76737
3	Pathanamthitta	88057	35713	52344
4	Alappuzha	197188	72133	125055
5	Kottayam	211113	74693	136420
6	Idukki	120263	50679	69584
7	Eranakulam	67770	17700	500700
8	Thrissur	128475	45250	83225
9	Palakkad	34451	17871	16580
10	Malappuram	60510	26040	34470
11	Kozhikkode	17212	2350	14862
12	Kannur	347880	78600	269280
13	Kasargod	32280	10400	21880
	State Total	1494082	466365	1027717

iii. Diversification of Cropping Pattern

Soil Conservation programmes increase the soil capacity of which facilitate the cultivation of more remunerative crops. This advantage can be reaped in full, only if the conservation programmes are followed properly - ie; 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 an encouraging performance. The area of perennial crops is increased by 17% compared to the area under the same before S.C.P. Growing of perennial crops will accelerate conservation of soil more effectively.

Net Income Analysis

The net income received from the beneficiary plot is Rs.10003624/- and from the control plot is Rs.1027717/-. The district wise net income per acre is given in table 11 & 11 (a).

Table 11

Net Income per Acre Before and After Soil Conservation Programme

(Income in rupees)

Sl No	District	Before S.C Work			After S.C Work		
		Area	Income	Income/Acre	Area	Income	Income/Acre
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	52.74	517848	9819	52.49	511099	9737
2	Kollam	37.12	206848	5572	37.12	592916	15973
3	Pathanamthitta	103.42	837926	8102	106.40	934138	8779
4	Alappuzha	15.94	46532	2919	15.94	90976	5707
5	Kottayam	28.29	71452	2526	28.29	222778	7875
6	Idukki	64.22	523628	8154	77.16	2393140	31015
7	Eranakulam	68.08	184446	2709	83.58	282633	3382
8	Thrissur	105.35	181308	1721	105.35	530149	5032
9	Palakkad	101.59	200200	1971	101.59	1648007	16222
10	Malappuram	43.43	52401	1207	64.97	233756	3598
11	Kozhikkode	19.86	43652	2198	20.06	27317	1362
12	Kannur	311.85	1563056	5012	311.83	2329121	7469
13	Kasargod	12.66	29407	2323	12.66	127555	10075
	Total	**964.55**	**4443528**	**4607**	**1017.44**	**9923585**	**9753**

Table 11 (a)

Net Income per acre in the Control Plots

Sl No	District	Area in Acre	Net Income	Net Income per Acre.
1	2	3	4	5
1.	Thiruvananthapuram	8.97	77210	8608
2.	Kollam	6.28	76737	12219
3.	Pathanamthitta	10.35	52344	5057
4.	Alappuzha	101.30	125055	1235
5.	Kottayam	27.80	136420	4907
6.	Idukki	29.24	69584	2380
7.	Eranakulam	8.91	50070	5620
8.	Thrissur	28.38	83225	3131
9.	Palakkad	6.12	16580	2709
10.	Malappuram	20.10	34470	1715
11.	Kozhikkode	2.78	14862	5346
12.	Kannur	53.30	269280	5052
13.	Kasargod	9.90	21880	2210
	State	313.43	1027717	3279

The higher rate of net income from the scheme areas is due to the positive impact of S.C.P. The net income per acre before and after S.C.P and in Control Plots are Rs.4607/-, Rs.9753/- and Rs.3279/- respectively.

CHAPTER III

3.1 General Observation

The staff of the Soil Conservation department have visited the selected beneficiaries at the time of implementation of Soil Conservation Programme.

The distribution of holding of the selected beneficiaries of the Soil Conservation scheme reveals that 75% of the beneficiaries have holding size less than one acre and 19% have holding area between one acre to 3 acres. It is noted that only 4 % of beneficiaries were possessing area over 3 acres to 5 acres and the rest 2% have more than 5 acres.

The opinion of 1078 selected beneficiaries were collected. Out of that 40% of the beneficiaries reported that contour bunds effectively controlled soil erosion while about 56% opinionated that it moderately controls erosion of the soil. The rest are of the opinion that contour bunds has no effect.

Considering the fertility of the soil 29% of the beneficiaries are of opinion that Soil Conservation measures have improved the fertility remarkably while 63% reported that the fertility of the soil has improved moderately and 8 % opinionated that it has no effect on the fertility of the soil.

Regarding the moisture retention 24% of beneficiaries have reported that the schemes have substantially increased moisture retention while about 67% reported that it moderately increased and the rest felt that the scheme had no effect on the moisture retention.

The district wise opinion about the effectiveness of bunds, fertility of the soil & moisture retention is given in the table 12.

Table 12

Opinion of Cultivators About Effectiveness of Bound , Fertility of the Soil and Moisture Retention

Sl No	Districts	Effectiveness of Contour Bund			Fertility of Soil			Moisture Retention			
		Effectively Controlled	Moderately Controlled	No Effect	Remarkably Improved	Moderately Improved	No Effect	Substantialy Increased	Moderately Increased	No Change	Total
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	6	30		7	26	3	13	20	3	36
2	Kollam	1	81	17	2	80	17	2	80	17	99
3	Pathanamthitta		115			115			115		115
4	Alappuzha	10	56	1	8	58	1	9	57	1	67
5	Kottayam	3	33	1	3	33	1	3	33	1	37
6	Idukki	33	52	2	27	58	2	25	59	3	87
7	Eranakulam	31	52		22	60	1	23	60		83
8	Thrissur	111	3		105	8	1	41	72	1	114
9	Palakkad	90	21	4	9	64	42	3	55	57	115
10	Malappuram	17	77	11	9	82	14	8	81	16	105
11	Kozhikkode		87			87			87		87
12	Kannur	109			100	9		109			109
13	Kasargod	24			24			24			24
	Total	**435**	**607**	**36**	**316**	**680**	**82**	**260**	**719**	**99**	**1078**

About 54% of the bunds are in good condition, 42% are partially damaged and 4 % are seriously damaged. District wise statement is given below in table 13.

Table 13
Condition of Bund

Sl No	District	Good	Partially Damaged	Seriously Damaged
1	2	3	4	5
1	Thiruvananthapuram	8	25	3
2	Kollam	36	45	18
3	Pathanamthitta	57	51	7
4	Alappuzha		67	
5	Kottayam	26	10	1
6	Idukki	34	48	5
7	Eranakulam	53	29	1
8	Thrissur	109	5	
9	Palakkad	12	95	8
10	Malappuram	95	10	
11	Kozhikkode	79	8	
12	Kannur	71	38	
13	Kasargod		24	
	Total	**580**	**455**	**43**

The occupational profile of the beneficiaries and of control plots are pictured in table 14 and 14(a) respectively.

Table 14
Occupational Profile

Sl No	District	Occupation			
		Agriculture	Non Agriculture	Agri/NonAgri Labourers	Total
1	2	3	4	5	6
1	Thiruvananthapuram	10	13	13	36
2	Kollam	22	21	56	99
3	Pathanamthitta	25	36	54	115
4	Alappuzha	7	8	52	67
5	Kottayam	7	12	18	37
6	Idukki	28	2	57	87
7	Eranakulam	19	14	50	83
8	Thrissur	37		77	114
9	Palakkad	13	5	97	115
10	Malappuram	14	7	84	105
11	Kozhikkode		1	86	87
12	Kannur	31	1	77	109
13	Kasargod			24	24
	Total	**213**	**120**	**745**	**1078**

Table 14(a)

Occupational Profile (Control Plots)

Sl No	District	Occupation			
		Agriculture	Non Agriculture	Agri/NonAgri Labourers	Total
1	2	3	4	5	6
1	Thiruvananthapuram	2	2	7	11
2	Kollam	1	5	14	20
3	Pathanamthitta	7	14	4	25
4	Alappuzha	11	7	2	20
5	Kottayam	8	2	14	24
6	Idukki	9		11	20
7	Eranakulam	2	5	13	20
8	Thrissur	8		17	25
9	Palakkad		5	22	27
10	Malappuram	10	5	15	30
11	Kozhikkode			20	20
12	Kannur	6	3	13	22
13	Kasargod	3		2	5
	Total	67	48	154	269

Summary and Conclusion

There is significant increase in the cultivation of perennial crops in the scheme area, yielding more profits to the cultivators. There is also an increasing awareness of the importance of the Soil Conservation programme among the people in the scheme area.

Suitable farming practices such as crop rotation, contour cultivation, strip cropping etc. have to be made use of by the cultivators to improve the capacity of the soil. Soil Conservation measures will become fully effective and promote fertility of the soil only if they are supported by suitable farming practices

From the evaluation study of the schemes implemented by Soil Conservation Department, it is observed that the fertility is maintained by checking soil erotion of the surface soil and by providing proper irrigation facilities. Suitable systems of measuring, use of high yielding seeds, protection of natural resources etc. have to be made by proper planning. With the co-operation of the public, the Soil Conservation Department has to trace out and implement appropriate schemes for different regions of the state.

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