Government of Kerala

Evaluation Study on Soil Conservation 1995-96

Department of Economics & Statistics.
Thiruvananthapuram.
1998

Preface

Agricultural production is heavily dependent on the soil fertility level and fertility level in turn is determined by the manure and moisture content of the earth's surface. The unique geographical features of Kerala with ghats in the east slopping towards west and extending up to Arabian sea, contributes to soil erosion and loss of soil fertility. This in turn, leads to diminishing agricultural production year after year. Although the state is blessed with heavy monsoon, the advantage is neutralised by the gravity of the soil erosion. Taking full cognisance of the gravity of the situation, the Central & State governments have adopted various measures to prevent soil erosion in the State. The formation of the Soil Conservation Department was a direct consequence of the heightened awareness and the schemes implemented through their district level officers bear testimony to the commitments with which the government purses its goal. The Soil Conservation Department takes utmost care in fulfilling its target every year.

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

All schemes completed by Soil Conservation Department upto 1983-84 were listed for this survey, of which 57 schemes were selected for the detailed study. For comparison purpose of the 57 schemes control plots were also taken into consideration

This evaluation study can be an invaluable asset for Administrators, Statisticians, Research Scholars and Agricultural geologists.

In this context, I acknowledge my thanks to the staff of Evaluation Division of the Directorate for bringing out the report and to the staff of Soil Conservation Department, who have given whole hearted co-operation for the successful conduct of the survey.

Thiruvananthapuram
20..05..1998

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Chapter I

I.1 Introduction

Soils of Kerala are briefly described as (1) Soils of hills & uplands (2) Soils of central Sahyadri (3) Soils of Eastern parts of Malappuram and (4) Soils of South sahyadri.

Topography and climates are the chief factors, which influence soil formation. The texture of the surface layer of soils of Kerala covers a wide range from sandy to clayey. About 82 % of the area of Kerala has well drained and moderately well drained soil. About 35 % of the area of the state is dominated by soil with high AWC (Soil Available Water Capacity).

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. The measures adopted for conserving soil are bunding, gully plugging, terracing, grassing of waterways and spill ways.

The main objectives of the Soil Conservation Schemes 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.

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.*

57 schemes were selected for the study from the schemes already completed upto 1993-94 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 by 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

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 short fall is compensated from another stratum with the nearest area holding. If the beneficiaries in a scheme are less than 25, all of them are selected. For the purpose of comparison 5 control plots are also selected from the scheme area, where the Soil Conservation works are not carried out under any scheme. Agricultural year 1995-96 is the reference period of the survey.

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

Table 1

Statement showing Stratum wise distribution of Selected beneficiaries, Number of beneficiaries for the year 1993-94.

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	4	68	21.22	9	14.17	1	3.11			78	38.50
2	Kollam	3	58	13.11	3	5.01					61	18.12
3	Pathanamthitta	4	54	16.14	21	33.95	22	81.14	3	29.03	100	160.26
4	Alappuzha	3	39	17.13							39	17,13
5	Kottayam	5	42	13.69	8	11.10	2	8.74	3	15.40	55	48.93
6	Idukki	4	33	25.55	41	93.80	14	57.69	6	56.00	97	233.04
7	Ernakulam	4	48	8.27	13	26.85	6	21.85	1	7.80	68	64.77
8	Thrissur	5	64	16.13	34	70.11	16	57.87	11	225.69	125	369.80
9	Palakkad	7	53	13.55	13	26.25	6	23.14	4	27.07	76	90.01
10	Malappuram	6	77	27.42	4	6.90	2	8.04	2	15.97	85	58.33
11	Kozhikkode	4	95	18.81	2	2.21					97	21.02
12	Kannur	5	21	16.95	31	60.30	13	49.93	14	107.36	79	234.54
13	Kasargod	3	26	15.51	20	45.47	4	14.11	1	6.20	57	81.29
	Total	57	678	223.48	208	396.12	86	325.62	45	490.52	1017	1435.74

Table 1(a)

Statement showing Stratum wise distribution of Control Plots for the year 1993-94

(Area in Acres)

Sl. No.	District	No of Schemes Selected	Stratum-I		Stratum-II		Stratum-III		Stratum-IV		Total	
			No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	4	19	5.34	1	0.80					20	6.14
2.	Kollam	3	15	3.58							15	3.58
3	Pathanamthitta	4	17	6.01	3	3.80					20	9.81
4	Alappuzha	3	15	13.03							15	13.03
5	Kottayam	5	13	3.62	6	10.00	1	4.00	1	5.85	21	23.47
6	Idukki	4	8	5.75	9	14.70	3	13.00			20	33.45
7	Ernakulam	4	18	3.39	2	5.15					20	8.54
8	Thrissur	5	18	4.69	6	12.80			1	5.50	25	22.99
9	Palakkad	7	12	2.98	4	5.20	1	3.25	2	12.00	19	23.43
10	Malappuram	6	22	5.30	2	3.10	2	7.15	2	14.30	28	29.85
11	Kozhikkode	4	20	5.23							20	5.23
12	Kannur	5	3	2.45	10	19.35	2	8.50	3	23.25	18	53.55
13	Kasargod	3	3	1.20	7	10.40	5	17.50			15	29.10
	Total	**57**	**183**	**62.57**	**50**	**85.30**	**14**	**53.40**	**9**	**60.90**	**256**	**262.17**

Thus from 57 schemes 1017 beneficiaries are selected. About 67% of the beneficiaries are having holding of less than one acre and 4% of beneficiaries are having holdings of more than 5 acre. 256 control plots are also selected for comparison. Their distribution is 71 %, 20 %, 5 % and 4 % respectively under stratum I, II, III and IV.

Following 4 types of schedules are used for collecting the details from beneficiary plots and control plots.

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

I.3. Problems of Soil Erosion

Soil is the natural medium for crop growth and for human existence. Soil should be productive and conservation programmes are indispensable. Due to erosion topsoil may sometimes be disappeared which results in deterioration in the fertility of land. To avoid this, various Soil Conservation schemes have been implemented in the state. Climate, topography, physical and chemical characteristics of soil etc. are the main factors, which influence the extent of erosion.

Responsibility for prevention of erosion

Responsibility for prevention of erosion lies in the individual farmer and in general with the Government to protect the land under cultivation. Soil erosion has been recognised as the problem of such far reaching importance that its control can not be left exclusively to the farmers who are interested in quick returns from their investments. 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.

I.4. Methods of Soil Conservation Programme

Soil Conservation practices are mainly grouped into two categories viz. Agronomic and Mechanical. The agronomic practices are 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 bunding, contour cultivation, terracing, bench terracing etc.

Extent of problem in the state

The total geographical area of the state excluding Wayanad district is 36,72,937 hectares, of which forests, uncultivable land and land put to non-agricultural uses occupies 13,54,033 hectares. The area sown is 21,21,683 hectares 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 bunding 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 1995-96. The table 2 gives the district wise details regarding area, cost , 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	38.50	190425	78	78
2	Kollam	18.12	60626	61	61
3	Pathanamthitta	160.26	278953	159	100
4	Alappuzha	17.13	17978	39	39
5	Kottayam	48.93	104771	55	55
6	Idukki	233.04	276510	97	97
7	Ernakulam	64.77	418944	399	68
8	Thrissur	369.80	183897	125	125
9	Palakkad	90.01	245989	76	76
10	Malappuram	58.33	115056	85	85
11	Kozhikkode	21.02	120548	229	97
12	Kannur	234.54	440602	176	79
13	Kasargod	81.29	227183	108	57
Total		1435.74	2681482	1687	1017

It is revealed from table 2 that 1017 beneficiaries were selected out of total 1687 beneficiaries (60% of the total beneficiaries) and they possess 1435.74 acres of land. The cost incurred for the 57 schemes is Rs.26,81,482/-

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)

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
TVM	30.27	78.62	32.32	83.95	0.50	1.30	0.29	0.75	3.41	8.86	3.52	9.14	4.82	12.52	2.66	6.91	38.50	100	38.50	100
KLM	15.16	83.66	16.07	88.69					1.31	7.23	1.33	7.34	1.65	9.11	0.72	3.97	18.12	100	18.12	100
PTA	151.81	94.73	155.81	97.22					4.40	2.75	4.40	2.75	4.05	2.53	0.05	0.03	160.26	100	160.26	100
ALP	16.01	93.46	16.08	93.87	0.16	0.93			0.73	4.26	0.73	4.26	0.39	2.28	0.32	1.87	17.13	100	17.13	100
KTM	41.30	84.41	44.00	89.92					1.61	3.29	1.61	3.29	6.02	12.30	3.32	6.79	48.93	100	48.93	100
IDK	217.23	93.22	217.23	93.22	0.70	0.30	0.70	0.30	13.06	5.60	13.06	5.60	2.75	1.18	2.75	1.18	233.04	100	233.04	100
EKM	58.41	90.18	62.57	96.60	1.25	1.93	2.20	3.40	1.48	2.29	1.57	2.42	4.88	7.53	0.63	0.97	64.77	100	64.77	100
TCR	359.60	97.24	362.34	97.98	0.10	0.03	0.10	0.03	7.27	1.97	7.46	2.02	2.93	0.79			369.80	100	369.80	100
PGT	79.70	88.55	83.90	93.21					3.28	3.64	3.28	3.64	7.03	7.81	2.83	3.14	90.01	100	90.01	100
MLP	46.13	79.08	47.81	81.96	5.28	9.05	3.77	6.46	3.55	6.09	3.55	6.09	8.65	14.83	6.97	11.95	58.33	100	58.33	100
KZD	14.66	69.74	15.90	75.64					2.17	10.32	2.33	11.08	4.19	19.93	2.79	13.27	21.02	100	21.02	100
KNR	210.98	89.95	217.08	92.56	2.70	1.15	3.00	1.28	6.14	2.62	7.06	3.01	17.42	7.43	10.40	4.43	234.54	100	234.54	100
KSD	74.71	91.91	74.81	92.03	1.10	1.35	1.00	1.23	4.73	5.82	4.81	5.92	1.85	2.28	1.67	2.05	81.29	100	81.29	100
Total	1315.97	91.66	1345.92	93.74	11.79	0.82	11.06	0.77	53.14	3.70	54.71	3.81	66.63	4.64	35.11	2.45	1435.74	100	1435.74	100

It is revealed from table 3 that as a result of Soil Conservation works, an area of 30 acres of land more could be brought under cultivation. In other words the percentage increase in the cultivated area due to the implementation of Soil Conservation measures comes to 2.28.

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	5.25	85			0.59	10	0.30		6.14	100
2	Kollam	3.11	87			0.47	13			3.58	100
3	Pathanamthitta	9.37	96			0.44	4			9.81	100
4	Alappuzha	12.60	97			0.33	2	0.10	1	13.03	100
5	Kottayam	17.57	75	0.20	1	0.58	2	5.32	22	23.47	100
6	Idukki	28.70	86			2.20	7	2.55	7	33.45	100
7	Ernakulam	7.96	93			0.26	3	0.32	4	8.54	100
8	Thrissur	21.85	93	0.40	2	1.14	5			22.99	100
9	Palakkad	21.29	91			1.34	6	0.80	3	23.43	100
10	Malappuram	23.54	73	2.31	7	1.50	5	4.81	15	29.85	100
11	Kozhikkode	3.97	76			0.46	9	0.80	15	5.23	100
12	Kannur	50.63	84	7.00	12	1.37	2	1.55	2	53.55	100
13	Kasargod	27.05	92	0.25	1	0.94	3	1.11	4	29.10	100
	Total	**232.89**	**86**	**10.16**	**4**	**11.62**	**4**	**17.66**	**6**	**262.17**	**100**

From the above table, it is seen that 86 % of the area of the control plots were cultivated whereas the area not cultivated is about 6 %. Here the land cultivated is more or less the same as that of the beneficiaries plots when compared to the total area.

Consequent on the introduction of 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	20.18	60.71	39.70	72.70	13.06	39.29	14.91	27.30	33.24	100	54.61	100
2	Kollam	12.10	67.67	13.20	62.80	5.78	32.33	7.82	37.20	17.88	100	21.02	100
3	Pathanamthitta	147.93	90.40	151.91	90.29	15.71	9.60	16.34	9.71	163.64	100	168.25	100
4	Alappuzha	6.13	37.22	7.59	39.43	10.34	62.78	11.66	60.57	16.47	100	19.25	100
5	Kottayam	38.64	78.47	47.86	87.19	10.60	21.53	7.03	12.81	49.24	100	54.89	100
6	Idukki	248.61	82.10	225.76	79.79	54.19	17.90	57.20	20.21	302.80	100	282.96	100
7	Ernakulam	39.02	67.77	57.84	89.01	18.56	32.23	7.14	10.99	57.58	100	64.98	100
8	Thrissur	98.19	26.47	187.18	40.11	272.81	73.53	279.52	59.89	371.00	100	466.70	100
9	Palakkad	59.89	73.41	66.14	75.76	21.69	26.59	21.16	24.24	81.58	100	87.30	100
10	Malappuram	46.69	80.42	55.29	78.54	11.37	19.58	15.11	21.46	58.06	100	70.40	100
11	Kozhikkode	15.78	98.32	19.14	97.40	0.27	1.68	0.51	2.60	16.05	100	19.65	100
12	Kannur	188.00	75.00	193.18	89.81	62.68	25.00	21.92	10.19	250.68	100	215.10	100
13	Kasargod	77.56	79.78	83.61	83.72	19.66	20.22	16.26	16.28	97.22	100	99.87	100
	Total	998.72	65.90	1148.40	70.67	516.72	34.10	476.58	29.33	1515.44	100	1624.98	100

Table 5 - Area under Selected Perennial Crops (Contd....)

District	Rubber			Others			Total		
	Before SC Work	After SC Work	% increase	Before SC Work	After SC Work	% increase	Before SC Work	After SC Work	% increase
1	14	15	16	17	18	19	20	21	22
Tvm	1.33	8.62	548.12	3.19	9.18	187.77	20.18	39.70	96.73
Klm	2.82	2.90	2.84	0.59	0.82	38.98	12.10	13.20	9.09
Pta	119.49	126.42	5.80	1.71	1.71	0.00	147.93	151.91	2.69
Alp		1.16		0.22	0.50		6.13	7.59	23.82
Ktm	26.57	35.46	33.46	3.13	3.35	7.03	38.64	47.86	23.86
Idk	33.30	37.60	12.91	99.94	47.00	-52.97	248.61	225.76	-9.19
Ekm	36.88	52.18	41.49	0.19	0.28	47.37	39.02	57.84	48.23
Tsr	15.22	65.71	381.73	22.50	13.66	-39.29	98.19	187.18	90.63
Pkd	33.50	37.22	11.10	4.04	8.17	102.23	59.89	66.14	10.44
Mlp	0.50	0.50	0.00	9.04	11.61	28.43	46.69	55.29	18.42
Wkd	0.02	0.02	0.00	3.23	3.65	13.00	15.78	19.14	21.29
Knr	43.70	69.12	58.26				188.00	193.18	2.76
Ksd	33.00	37.60	13.94	8.18	12.00	46.70	77.56	83.61	7.80
Total	346.33	474.55	37.02	155.96	111.93	-28.23	998.72	1148.40	14.99

The above table reveals that after the introduction of Soil Conservation programme rubber has occupied the largest area under perennial crops, the percentage of increase is 37 %. Coconut comes next with an increase of 35%. Arecanut and Cashew shown an increase of 26% and 43% respectively while Pepper shows a decrease of 23%.

The above table reveals 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 has increased from 1.33 acres to 8.62 acres and also in Trissur district, land under cultivation of Rubber has increased from 15.22 acres to 65.71 acres due to Soil Conservation Programme.

It is revealed from table 4 that after the Soil Conservation programme, area under perennial crops has increased remarkably. It has increased by 149.68 acres (ie, increase from 998.72 acres to 1148.40 acres) in the scheme area after the implementation of the programme. From this table it can be concluded 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.

The study reveals that 15 % of area is increased under perennial crops even though there are differences in the change of area among the crops.

Table 5

Area under Selected Perennial Crops

Districts	Coconut			Arecanut			Cashew			Pepper		
	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	3	4	5	6	7	8	9	10	11	12	13
Tvm	13.10	17.62	34.50	0.25	0.50	100.00	1.15	1.42	23.48	1.16	2.36	103.45
Klm	6.12	6.38	4.25	0.25	0.38	52.00	0.57	0.77	35.09	1.75	1.95	11.43
Pta	19.93	16.95	-14.95	0.22	0.22	0.00	0.38	0.38	0.00	6.20	6.23	0.48
Alp	5.59	5.21	-6.80	0.01	0.01	0.00	0.30	0.70	133.33	0.01	0.01	0.00
Ktm	5.15	5.92	14.95	0.14	0.22	57.14	0.07	0.07	0.00	3.58	2.84	-20.67
Idk	33.33	44.74	34.23	7.44	9.57	28.63	4.00	4.39	9.75	70.60	82.46	16.30
Ekm	1.71	3.57	108.77	0.03	0.33	1000.00	0.10	0.16	60.00	0.11	1.32	1100.00
Tsr	23.09	34.45	49.20	21.15	22.90	8.27	3.33	27.09	713.51	12.90	23.37	81.16
Pkd	8.84	15.31	73.19	0.94	2.18	131.91	1.57	2.05	30.57	11.00	1.21	-89.00
Mlp	24.33	27.22	11.88	1.86	2.19	17.74	7.55	9.36	23.97	3.41	4.41	29.33
Kkd	10.32	13.03	26.26	0.57	0.36	-36.84	0.92	0.98	6.52	0.72	1.10	52.78
Knr	41.50	66.70	60.72	16.54	22.26	34.58	15.70	21.62	37.51	70.56	13.44	-80.95
Ksd	14.01	22.30	59.17	0.08	1.20	1400.00	17.95	7.38	-50.89	4.34	3.13	-27.88
Total	207.02	279.40	34.96	49.48	62.32	25.95	53.59	76.37	42.51	186.34	143.83	-22.81

Table 6

Area under Selected Seasonal Crops

(Area in Acres.)

District	Paddy			Tapioca			Plantain			Ginger			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	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	12	13	14	15	16	17	18	19
Tvm	0.25	0.30	20.00	10.40	8.44	-18.85	1.80	4.55	152.78		0.02		0.61	1.60	162.30	13.06	14.91	14.17
Klm				4.13	4.75	15.01	1.20	1.78	48.33	0.38	0.40	5.26	0.07	0.89	171.43	5.78	7.82	35.29
Pta				10.24	10.28	0.39	0.81	1.00	23.46	2.68	2.93	9.33	1.98	2.13	7.58	15.71	16.34	4.01
Alp	9.39	10.31	9.80	0.13	0.31	138.46	0.46	0.78	69.57	0.04	0.16	300.00	0.32	0.10	-68.75	10.34	11.66	12.77
Ktm				9.72	6.67	-31.38	0.55	0.30	-45.45		0.03		0.33	0.03	-90.91	10.60	7.03	-33.68
Idk	11.40	5.80	-49.12	29.62	34.52	16.54	4.16	5.09	22.36	8.16	9.89	21.20	0.85	1.90	123.53	54.19	57.20	5.55
Ekm	3.75	3.08	-17.87	12.02	1.08	-91.01	0.26	0.41	57.69		0.01		2.53	2.56	1.19	18.56	7.14	-61.53
Tsr	12.25		-100.00	253.62	263.06	3.72	1.38	4.13	199.28	1.90	6.05	218.42	3.66	6.28	71.58	272.81	279.52	2.46
Pkd		2.70		11.56	7.43	-35.73	1.83	2.79	52.46	2.83	1.30	-54.06	5.47	6.94	26.87	21.69	21.16	-2.44
Mlp				4.64	5.70	22.84	1.16	2.11	81.90	0.67	0.70	4.48	4.90	6.60	34.69	11.37	15.11	32.89
Kkd		0.02			0.06		0.26	0.36	38.46				0.01	0.07	600.00	0.27	0.51	88.89
Knr	2.75	0.50	-81.82	47.45	12.22	-74.25	5.38	3.43	-36.25	1.40	0.12	-91.43	5.70	5.65	-0.88	62.68	21.92	-65.03
Ksd	3.05	2.20	-27.87	16.22	13.31	-17.94	0.29	0.55	89.66				0.10	0.20	100.00	19.66	16.26	-17.29
Total	42.84	24.91	-41.85	409.75	367.83	-10.23	19.54	27.28	39.61	18.06	21.61	19.66	26.53	34.95	31.74	516.72	476.58	-7.77

On analysing the cropping pattern, it is observed that the area under perennial crops has recorded an increasing trend after Soil Conservation Programme, but a similar trend is not seen observed in the case of Seasonal Crops. The decrease is calculated as 8 % over the area under Seasonal crops before Soil-Conservation programme. Area under paddy and tapioca recorded a decrease of 42 % and 10 % 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	36200	84335	41500	111375	96682	15
	Arecanut	Nos	9250	1660	18660	6897	3349	102
	Cashew	Qtl	2.75	3106	8.50	17125	9600	209
	Pepper	Qtl	1.45	5608	6.10	23952	23592	321
	Rubber	Qtl	4.08	7312	35.00	71350	62728	758
	Others			9330		22810		
	Total			111351		253509		
KLM	Coconut	Nos	6826	18312	9978	31743	26756	46
	Arecanut	Nos	10850	1463	23600	2350	3182	117
	Cashew	Qtl	1.05	1232	2.30	5618	2699	119
	Pepper	Qtl	2.37	9238	6.64	29963	25882	180
	Rubber	Qtl	4.90	8780	10.35	24581	18482	111
	Others			392		699		
	Total			39417		94954		
PTA	Coconut	Nos	19610	74881	21780	84425	83167	11
	Arecanut	Nos	28472	3228	32872	11242	3727	15
	Cashew	Qtl	6.95	7630	7.70	16016	8453	11
	Pepper	Qtl	48.68	77415	55.71	88299	88595	14
	Rubber	Qtl	819.00	2574660	903.25	3383805	2839514	10
	Others			2395		2760		
	Total			2740209		3586547		
ALP	Coconut	Nos	10419	28358	9711	31557	26431	-7
	Arecanut	Nos	400	25	800	58	50	100
	Cashew	Qtl	0.14	2000	0.23	3500	3286	64
	Pepper	Qtl	0.07	300	0.17	835	729	143
	Rubber	Qtl			3.57	8478		
	Others			1200		3175		
	Total			31883		47603		

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	12975	35305	15155	54621	41237	17
	Arecanut	Nos	5800	1100	7200	3225	1366	24
	Cashew	Qtl	0.33	450	0.41	975	559	24
	Pepper	Qtl	4.07	16255	3.23	12524	12900	-21
	Rubber	Qtl	104.95	188070	151.90	360800	272282	45
	Others			19990		40580		
	Total			261170		472725		
IDK	Coconut	Nos	52053	175628	61948	209155	209014	19
	Arecanut	Nos	549857	102284	657471	131019	122302	20
	Cashew	Qtl	21.60	26308	24.58	52355	29938	14
	Pepper	Qtl	132.31	448213	163.44	665682	553669	24
	Rubber	Qtl	141.71	253944	161.22	455922	288906	14
	Others			199249		206738	-	
	Total			1205626		1720871		
EKM	Coconut	Nos	4483	10740	9360	32853	22424	109
	Arecanut	Nos	1730	225	9412	3200	1224	444
	Cashew	Qtl			0.22	450		
	Pepper	Qtl	0.38	1365	2.21	8490	7939	482
	Rubber	Qtl	146.78	350415	207.67	637845	495781	41
	Others			16350		31200		
	Total			379095		714038		
TSR	Coconut	Nos	29070	78535	66745	212536	180317	130
	Arecanut	Nos	928506	92980	1232612	187904	123433	33
	Cashew	Qtl	12.10	11326	80.64	178940	95475	566
	Pepper	Qtl	6.98	26657	14.02	54005	53543	101
	Rubber	Qtl	63.47	113738	274.01	650774	491025	332
	Others			560		879		
	Total			326796		1285038		
PKD	Coconut	Nos	30005	81245	55720	162869	150874	86
	Arecanut	Nos	5255	629	6020	799	721	15
	Cashew	Qtl	48.00	57432	63.00	131733	75380	31
	Pepper	Qtl	6.88	27685	0.66	2802	2656	-90
	Rubber	Qtl	145.00	259840	174.00	444375	311808	20
	Others			101234		194001		
	Total			528065		936579		

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	59853	147771	77248	213711	190717	29
	Arecanut	Nos	98560	10476	111220	11258	11822	13
	Cashew	Qtl	23.76	28346	28.82	63807	34387	21
	Pepper	Qtl	103.85	261641	181.95	407820	458407	75
	Rubber	Qtl	0.40	717	0.60	1425	1076	50
	Others			114221		29693		
	Total			563172		727714		
KOZ	Coconut	Nos	20530	49275	34790	102291	83501	69
	Arecanut	Nos	40200	4412	54800	28025	6014	36
	Cashew	Qtl	1.02	1244	1.50	3346	1829	47
	Pepper	Qtl	0.65	2565	0.88	4348	3473	35
	Rubber	Qtl						
	Others			1925		3997		
	Total			59421		142007		
KAN	Coconut	Nos	100181	265480	150585	444226	399051	50
	Arecanut	Nos	772010	70638	1076800	462404	147935	109
	Cashew	Qtl	58.04	76339	73.55	170735	96739	27
	Pepper	Qtl	93.95	371384	16.93	66604	66924	-82
	Rubber	Qtl	67.00	120064	369.05	887720	661338	451
	Others			2090		7690		
	Total			905995		2039379		
KSD	Coconut	Nos	22005	56113	44145	134956	112570	101
	Arecanut	Nos			2000	700		
	Cashew	Qtl	34.20	48220	31.40	71600	44272	-8
	Pepper	Qtl	32.84	116800	30.52	144028	108549	-7
	Rubber	Qtl			153.50	364562		
	Others			7000		8200		
	Total			228133		724046		
STATE	Coconut	Nos	404210	1105978	598665	1826318	1638035	48
	Arecanut	Nos	2450890	289120	3773467	849081	445138	54
	Cashew	Qtl	209.94	266633	322.85	716200	410014	54
	Pepper	Qtl	434.48	1365126	482.46	1509352	1515878	11
	Rubber	Qtl	1497.29	3877540	2504.12	7291637	6484933	67
	Others			475936		552422		
	Total			7380333		12745010		

There is an increasing trend with respect to the yield of perennial crops during the period under report. The yield of rubber shows the highest increase of 67 % over production before Soil Conservation Programme. The lowest rate of 11 % is noted in the case of pepper during the period under report.

If we analyse the production details at district level, few crops have displayed decreasing trend . This is because of the decrease in area under that particular crop. The decrease in pepper production in Palakkad, Kannur and

Kottayam districts are noted as 90 %, 82 % and 21 % respectively over the production before Soil Conservation Programme. This is due to decrease in crop area after S.C.P for that particular crop. In the case of Coconut production in Alappuzha district, a decrease of 7 % is also noted after SCP. The productivity of the crops increased by an average rate of 46.8 %.

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	Paddy	Qtl	2.72	890	2.80	925	916	3
	Tapioca	Qtl	185.16	24674	190.20	42975	25346	3
	Ginger	Qtl			1.25	700		
	Plantain	Qtl	111.25	20225	237.20	60800	43122	113
	Others			840		950		
	Total			46629		106350	69384	49
KLM	Paddy	Qtl						
	Tapioca	Qtl	107.75	9868	143.00	24350	13096	33
	Ginger	Qtl	37.78	56515	45.64	76260	68273	21
	Plantain	Qtl	62.95	6295	103.00	24053	10300	64
	Others			2858		3103		
	Total			75536		127766	91669	21
PTA	Paddy	Qtl						
	Tapioca	Qtl	312.81	50633	346.63	93810	56107	11
	Ginger	Qtl	36.92	50230	51.55	95216	70134	40
	Plantain	Qtl	49.32	4737	65.33	8679	6274	32
	Others			7890		10570		
	Total			113490		208275	132515	17
ALP	Paddy	Qtl	226.38	57460	238.77	86895	60605	5
	Tapioca	Qtl	10.25	2835	24.65	7730	6818	140
	Ginger	Qtl	4.03	5224	18.77	27535	24331	366
	Plantain	Qtl	25.00	6810	42.95	12660	11700	72
	Others			1220		3175		
	Total			73549		137995	103454	41
KTM	Paddy	Qtl						
	Tapioca	Qtl	95.00	10760	50.60	10414	5731	-47
	Ginger	Qtl			0.32	935		
	Plantain	Qtl	14.84	2640	8.09	4490	1439	-45
	Others			19990		40580		
	Total			33390		56419	7170	-79

Table 8 Contd....

District	Name of Crop	Unit	Before S.C work. Qty	Before S.C work. Value	After S.C work Qty	After S.C work Value	Value at constant price	% increase
1	2	3	4	5	6	7	8	9
IDK	Paddy	Qtl	93.84	37221	47.10	23359	18682	-50
	Tapioca	Qtl	1293.87	165571	1856.30	281893	237543	43
	Ginger	Qtl	87.24	117742	108.95	294680	147043	25
	Plantain	Qtl	184.45	41549	247.18	59818	55679	34
	Others			199249		206738		
	Total			561332		866488	458947	-18
EKM	Paddy	Qtl	88.18	26687	91.36	45314	27649	4
	Tapioca	Qtl	721.20	61165	64.80	7880	5496	-91
	Ginger	Qtl			0.08	50		
	Plantain	Qtl	12.65	2555	23.70	5680	4787	87
	Others			16350		31200		
	Total			106757		90124	37932	-64
TCR	Paddy	Qtl	19.20	5282				
	Tapioca	Qtl	9581.38	855045	11647.32	1130059	1039410	22
	Ginger	Qtl	130.00	177006	404.30	556260	550489	211
	Plantain	Qtl	25.50	4180	87.05	34565	14269	241
	Others			2500		3140		
	Total			1044013		1724024	1604168	54
PKD	Paddy	Qtl			37.72	15475		
	Tapioca	Qtl	671.85	56882	464.85	40920	39356	-31
	Ginger	Qtl	115.05	122213	68.30	88560	72552	-41
	Plantain	Qtl	57.46	9825	129.80	29240	22194	126
	Others			28437		174071		
	Total			217357		348266	134102	-38
MLPM	Paddy	Qtl						
	Tapioca	Qtl	311.46	38640	463.58	155878	57512	49
	Ginger	Qtl	31.05	43310	45.34	93410	63242	46
	Plantain	Qtl	69.96	9695	121.40	83115	16824	74
	Others							
	Total			91645		332403	137578	50
KKD	Paddy	Qtl			0.15	67		
	Tapioca	Qtl			3.60	675		
	Ginger	Qtl						
	Plantain	Qtl	4.24	576	8.51	1371	1156	101
	Others			100		500		
	Total			676		2613	1156	71

Table 8 Contd....

District	Name of Crop	Unit	Before S.C work.		After S.C work		Value at constant price	% incr-case
			Qty	Value	Qty	Value		
1	2	3	4	5	6	7	8	9
CNR	Paddy	Qtl	43.80	13765	8.60	4200	2703	-80
	Tapioca	Qtl	1324.40	164163	770.30	99093	95481	-42
	Ginger	Qtl	72.50	99680	8.60	35007	11824	-88
	Plantain	Qtl	133.70	28860	65.70	29648	14182	-51
	Others			9480		16548		
	Total			315948		184496	124190	-61
KSD	Paddy	Qtl	28.20	7100	21.50	7200	5413	-24
	Tapioca	Qtl	923.80	135850	776.70	122210	114218	-16
	Ginger	Qtl						
	Plantain	Qtl	21.45	2562	49.41	14352	5902	130
	Others			500		800		
	Total			146012		144562	125533	-14
STATE	Paddy	Qtl	502.32	148405	448.00	183435	132357	-11
	Tapioca	Qtl	15538.93	1576086	16802.53	2017887	1704251	-8
	Ginger	Qtl	514.57	671920	753.10	1268613	983390	46
	Plantain	Qtl	772.77	140509	1189.32	368471	216248	54
	Others			289414		491375		
	Total			2826334		4329781	3027798	7

The production particulars of seasonal crops are given in Table 8. It may be noted that even though there is decrease in area and production of seasonal crops by 8 %, the productivity has increased at an average rate of 24.25 %, which is due to the implementation of Soil Conservation measures.

Here seasonal crops at State level showed an increased in production of 7 %. While comparing the district level production in tapioca, five districts viz. Kottayam, Ernakulam, Palakkad, Kannur and Kasaragod showed a negative trend. In the case of production of paddy also, there is a decrease of 11 % at State level. It is seen that productivity has increased considerably in the case of Ginger and Plantain. Among other factors, implementation of SCP has contributed much in the increase in productivity of Soil during the year.

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 protection 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 provides the productive benefits. In addition, production from degraded land, which are cultivated after the Soil Conservation measures are also taken in to consideration.

Protective benefits are the intangible benefits derived from the S.C.P implementation though indirect in nature. These benefits 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 these increased values because of the prevention of further soil erosion and its increased productive potentialities. The increase in the land value are to be assessed from the data collected.

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 works, including the maintenance work, collected from the 1017 beneficiaries is Rs.26,81,482/-

The 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

Type	Name of 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	10
A.Perennial Crops	Coconut	Nos	207.02	404210	1105978	279.40	598665	1826318	1638035
	Arecanut	Nos	49.48	2450890	289120	62.32	3773467	849081	445138
	Cashew	Qtl	53.59	209.94	266633	76.37	322.85	716200	410034
	Pepper	Qtl	186.34	434.48	1365126	143.83	482.46	2805552	1515878
	Rubber	Qtl	346.33	1497.29	3877540	474.55	2504.12	7291637	6484933
	Others	Qtl	155.96		475936	111.93		552422	
	Total A		998.72		7380333	1148.40		12745010	10494018
B.Seasonal Crops	Paddy	Qtl	42.84	502.32	148405	24.91	448.00	183435	132357
	Tapioca	Qtl	409.75	15538.93	1576086	367.83	16802.53	2017887	1704251
	Ginger	Qtl	18.06	514.57	671920	21.61	753.10	1268613	983390
	Plantain	Qtl	19.54	772.77	140509	27.28	1189.32	368471	216248
	Others	Qtl	26.53		289414	34.95		491375	
	Total B		516.72		2826334	476.58		4329781	3036246
Grand Total A+B			1515.44		10206667	1624.98		17074791	13530264

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

The total area under cultivation after S.C work was 1624.98 acres. The value of crops before the S.C.P comes to Rs. 1,02,06,667/-. The value of crops after the S.C.P has also been calculated as Rs.1,35,30,264/- at the rate

prevailed before the S.C.P so as to eliminate price changes due to inflation and other factors such as demand and supply, which may affect the price level. Thus the annual additional benefits due to the implementation of S.C.P is worked out to be Rs.33,23,597/-. This shows that 124% of the cost of S.C.P (including maintenance) has been benefited in the year itself.

Several other benefits flow from the S.C.P implementation. Out of them following, three desire special attention.

i. Extension of area under cultivation.
ii. Increase in productivity.
iii. Diversification of cropping pattern

i. Extension of area under cultivation

It is revealed from table 9 that 109.54 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 furnished 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	2	3	4	5	6	7	8
1	Thiruvananthapuram	157980	359859	82375	165150	75605	194709
2	Kollam	114953	222720	56765	139660	58188	83060
3	Pathanamthitta	2853699	3794822	1424280	1774780	1429419	2020042
4	Alappuzha	105432	185598	52135	87904	53297	97694
5	Kottayam	294560	529144	137190	228878	157370	300266
6	Idukki	1766958	2587359	838164	1305651	928794	1281708
7	Eranakulam	485852	804162	225490	394060	260362	410102
8	Trissur	1370809	3009062	641357	1348140	729452	1660922
9	Palakkad	745422	1284845	388905	586007	356517	698838
10	Malappuram	654817	1060117	340720	531730	314097	528387
11	Kozhikkode	60097	144620	25645	70595	34452	74025
12	Kannur	1221943	2223875	642170	1064651	579773	1159224
13	Kasargod	374145	861608	181785	429299	192360	439309
	State Total	10206667	17074791	5036981	8126505	5169686	8948286

Table 10(a)

Income, Expenditure and Net Income of Control Plots

(in Rupees)

Sl No	District	Income	Expen-diture	Net Income
1	Thiruvananthapuram	52735	28250	24485
2	Kollam	18241	3765	14476
3	Pathanamthitta	108476	49530	58946
4	Alappuzha	32890	8475	24415
5	Kottayam	142686	38870	103816
6	Idukki	323634	194425	129209
7	Eranakulam	45260	19395	25865
8	Thrissur	164555	92450	72105
9	Palakkad	289931	184505	105426
10	Malappuram	111750	50670	61080
11	Kozhikkode	24604	12820	11784
12	Kannur	257250	112650	144600
13	Kasargod	75221	11396	63825
	State Total	1647233	807201	840032

iii. Diversification of Cropping Pattern

Soil Conservation programmes increase the soil capacity 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 services 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 15% 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.89,48,286/- and from the control plot is Rs.8,40,032/-. The districtwise 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	30.27	75605	2498	32.32	194709	6024
2	Kollam	15.16	58188	3838	16.07	83060	5169
3	Pathanamthitta	151.81	1429419	9416	155.81	2020042	12965
4	Alappuzha	16.01	53297	3329	16.08	97694	6075
5	Kottayam	41.30	157370	3810	44.00	300266	6824
6	Idukki	217.23	928794	4276	217.23	1281708	5900
7	Eranakulam	58.41	260362	4457	62.57	410102	6554
8	Thrissur	359.60	729452	2029	362.34	1660922	4584
9	Palakkad	79.70	356517	4473	83.90	698838	8329
10	Malappuram	46.13	314097	6809	47.81	528387	11052
11	Kozhikkode	14.66	34452	2350	15.90	74025	4656
12	Kannur	210.98	579773	2748	217.08	1159224	5340
13	Kasargod	74.71	192360	2575	74.81	439309	5872
	Total	1315.97	5169686	3928	1345.92	8948286	6648

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	5.25	24485	4664
2.	Kollam	3.11	14476	4655
3.	Pathanamthitta	9.37	58946	6291
4.	Alappuzha	12.60	24415	1938
5.	Kottayam	17.57	103816	5909
6.	Idukki	28.70	129209	4502
7.	Eranakulam	7.96	25865	3249
8.	Thrissur	21.85	72105	3300
9.	Palakkad	21.29	105426	4952
10.	Malappuram	23.54	61080	2595
11.	Kozhikkode	3.97	11784	2968
12.	Kannur	50.63	144600	2856
13.	Kasargod	27.05	63825	2360
	State	232.89	840032	3607

High rate of net income from the scheme area is due to the positive impact of S.C.P. The net income per acre before and after S.C.P in scheme area and in Control Plots are Rs.3928/-, Rs.6648/- and Rs.3607/- respectively.

Chapter III

3.1 General Observation

During the time of implementation of Soil Conservation Programme, the staff of the Soil Conservation department has visited all the beneficiary plots.

The distribution of holding of the selected beneficiaries of the Soil Conservation scheme reveals that 67% of the beneficiaries have holding size less than one acre and 20% have holding area between 1 acre and 3 acres. It is also found that only 9 % of beneficiaries were possessing area of 3 to 5 acres and the rest 4 % have more than 5 acres.

The opinions of 1017 selected beneficiaries were collected. Out of that 22% of the beneficiaries reported that contour bunds effectively controlled soil erosion while about 77 % were of the opinion that it moderately controls erosion of the soil. The rest 1 % were of the opinion that contour bunds has no effect.

Considering the fertility of the soil 13 % of the beneficiaries are of opinion that Soil Conservation measures have improved the fertility remarkably while 86 % reported that the fertility of the soil has improved moderately and 1% are of opinion that it has no effect on the fertility of the soil.

Regarding the moisture retention 10 % of beneficiaries have reported that the schemes have substantially increased moisture retention while about 88% reported that it moderately increased and the remaining 2 % felt that the scheme had no effect on the moisture retention.

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

The condition of the bunds has to be watched after construction. About 56.24 % of the bunds are in good condition. 43.46 % are partially damaged and 0.3 % are seriously damaged. In general, the work is satisfactory. The broken parts has to be maintained. Frequent supervision by the Soil Conservation Staff will be helpful in the maintenance of the bunds in good condition. District wise statement of the condition of the bunds is furnished in table 13.

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
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	29	49		5	72	1	4	73	1
2	Kollam	1	60			61			61	
3	Pathanamthitta		100			100			100	
4	Alappuzha		39			39			39	
5	Kottayam	7	48		3	52		3	52	
6	Idukki	1	96		1	96			97	
7	Eranakulam	18	50		23	45		21	44	3
8	Thrissur	33	91	1	36	88	1	25	99	1
9	Palakkad	53	23		6	70		6	70	
10	Malappuram	24	61		11	74		7	78	
11	Kozhikkode	7	90		2	95			97	
12	Kannur	47	21	11	41	28	10	31	28	20
13	Kasargod		57		1	56			57	
	Total	220	785	12	129	876	12	97	895	25

Table 13
Condition of Build

Sl No	District	Good	Partially Damaged	Seriously Damaged
1	2	3	4	5
1	Thiruvananthapuram	28	49	1
2	Kollam	9	51	1
3	Pathanamthitta	73	37	—
4	Alappuzha	6	32	1
5	Kottayam	37	18	
6	Idukki	67	30	
7	Eranakulam	47	21	
8	Thrissur	68	57	
9	Palakkad	51	25	
10	Malappuram	85		
11	Kozhikkode	93	4	
12	Kannur	8	71	
13	Kasargod		57	
	Total	572	442	3

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

Table 14
Occupational Profile

Sl No	District	Occupation				
		Agriculture	Non Agriculture	Agri Labourers	Non-Agri Labourers	Total
1	2	3	4	5	6	7
1	Thiruvananthapuram	27	7	27	17	78
2	Kollam	1	11	41	8	61
3	Pathanamthitta	48	3	27	22	100
4	Alappuzha	3	2	34		39
5	Kottayam	7	5	41	2	55
6	Idukki	97				97
7	Eranakulam	19	14	17	18	68
8	Thrissur	23	39	54	9	125
9	Palakkad	21		40	15	76
10	Malappuram	6	3	73	3	85
11	Kozhikkode	1	5		91	97
12	Kannur	57	1	17	4	79
13	Kasargod	5		51	1	57
	Total	315	90	422	190	1017

Table 14(a)

Occupational Profile (Control Plots)

Sl.No.	District	Occupation				
		Agriculture	Non Agriculture	Agri Labourers	Non-Agri Labours	Total
1	2	3	4	5	6	7
1	Thiruvananthapuram	9	2	1	8	20
2	Kollam	3	3		9	15
3	Pathanamthitta	9		4	7	20
4	Alappuzha	6		9		15
5	Kottayam	8		7	6	21
6	Idukki	20				20
7	Eranakulam	3	5	6	6	20
8	Thrissur	12	5	7	1	25
9	Palakkad	7		10	2	19
10	Malappuram	6	8	5	9	28
11	Kozhikkode				20	20
12	Kannur	11	1	5	1	18
13	Kasargod	3		7	5	15
	Total	97	24	61	74	256

3.2 Summary and Conclusion

On analysing the tables, it is revealed that the cropping area under different crops are interchanged according to the suitability of land and It is particularly notable that the cultivation of perennial crops in the scheme area has increased much yielding more profit to the cultivators.

The estimation of production of coconut for the year 1995-96 after SCP stood at 60 million nuts as against 40 million nuts before SCP and the percentage increase is nearly 50. Thrissur was the major coconut-producing district of the state after implementation of SCP and Alappuzha shows a negative trend of 7 %.

The area of rubber produced in the scheme area of the state during the year under report was estimated as 474.55 acres as against 346.33 acres before SCP. Though the production of rubber was increasing substantially over the recent years, the gap between demand and supply continued to persist. Due to the implementation of SCP, Thrissur district has gained much in the production of rubber also.

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

It is observed from this evaluation study that the fertility of the soil is maintained by checking soil erosion of the surface soil and by providing

proper irrigation facilities. Suitable systems of making use of high yielding variety seeds, protection of natural resources etc. have to be made by proper planning.

It is suggested that Soil Conservation Scheme may be implemented only after making proper pilot studies about the necessity and scope of this scheme on that particular area.

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