GOVERNMENT OF KERALA

Evaluation Study on Soil Conservation In Kerala 1991-92

Department of Economics & Statistics
Thiruvananthapuram
1996

Government of Kerala

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Preface

The geographical peculiarity of Kerala with its ghats section in the East sloping towards the west with its extensive sea coast and heavy monsoon causes tremendous erosion of its surface soil and fertility.This loss of fertility and moisture content of the earth surface resulting in diminishing rate of Agricultural production. Hence government is implementing various soil conservation measures through the Soil Conservation Department in order to maintain the fertility and moisture content of the surface soil. Every year crores of rupees have been spent in order to implement schemes like Contour Bunding, Strip Cropping, Cover cropping, Crop rotation etc.

Soil Conservation Schemes implemented in all the districts except Wayanad after 1985 have been considered as the frame for the Survey 91-92.Out of which 65 Schemes from different districts were selected for the purpose of this study. The report of the survey has been prepared by the Evaluation Division of this Directorate.In this context we also acknowledge our thanks to the staff of Soil Conservation department for their valuable suggestion and whole-hearted co-operation in the successful conduct of the Survey

Director

Thiruvananthapuram
15-02-1996

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Chapter I

I.1 Introduction

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

Soil is a thin film of earths crust,which is a natural medium for crop growth. A farmer considers soil as a habitat for plant growth which supplies nutrients and water. To him,soil is gift of God for productive agriculture For human existence soil should be productive and coservation programmes are indispesable

Soil Conservation means applying of all the necessary practices to maintain the capability of the land for which it is suited and to improve the productivity of agricultural land

Considering the importance of Soil Conservation it is aimed in our national policy on the first plan to optimise the use of land resources on a sustained basis in the interest of the present and future generation.The subsequent plans carried forward the same policy defines the context of the programme in greater detail and enhanced plan provisions.

The various measures under Soil Conservation programme envisaged in the plan include engineering measures , improvement of land use practices, 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 benifit of the programme particularly in relation to the cultivation of seasonal and perinnial crops.
(ii) To thow light on various aspects like cost benefit analysis, production potential etc.
(iii) To estimate the extent of additional area brought under cultivation concequent on the implementation of this programme.
(iv).To study the effects of the work carried out by the Soil Conservation department in this direction.

For this, 65 schemes were selected from the schemes completed after 1985 in this state representing all districts except Wayanad directly by the Central Govt.. The list of beneficieries under each scheme is obtained from the Soil Conservation department. The beneficeries 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 hectre -**Stratum - I** ,Holdings with 1 hectre to less than 3 hectres - **Stratum - II**

Holdings with 3 hectre to less than 5 hectres - **Stratum - III** , Holdings with 5 hectre and above - **Stratum - IV**

A total number of 25 beneficieries are selected from each scheme by simple random sampling covering all the above 4 stratum, atleast 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.

The districtwise selection details of beneficiary plots and control plots are given in the tables1&1(a).

Table 1 **Stratumwise distribution of Selected beneficiaries ,Number of beneficiaries**

Sl. No.	District	No of Schemes Selected	Stratum-I		Stratum-II		Stratum-III		Stratum-IV		Total	
			No.	Area (hect.)	No.	Area (hect)	No.	Area (hect.)	No.	Area (hect)	No.	Area (hect.)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	6	127	25.46	6	6.97	0	0.00	0	0.00	133	32.43
2	Kollam	5	92	13.48	19	10.91	2	4.00	0	0.00	113	28.39
3	Pathanamthitta	5	107	27.50	15	20.67	2	6.59	0	0.00	124	54.76
4	Alappuzha	4	77	17.06	0	0.00	0	0.00	0	0.00	77	17.06
5	Kottayam	5	58	10.34	6	8.29	0	0.00	0	0.00	64	18.63
6	Idukki	4	81	27.78	19	23.27	0	0.00	0	0.00	100	51.05
7	Ernakulam	5	87	4.87	19	17,36	13	18.62	3	8.66	122	49.51
8	Thrissur	6	98	15.08	11	18.54	3	11.34	1	5.58	113	50.54
9	Palakkad	6	69	11.56	3	3.96	1	1.17	0	0.00	73	16.69
10	Malappuram	6	83	17.48	15	22.89	6	19.60	7	79.22	111	139.19
11	Kozhikkode	4	82	16.68	1	1.21	0	0.00	0	0.00	83	17.89
12	Kannur	5	67	32.23	34	51.67	11	38.89	0	0.00	112	122.79
13	Kasargod	4	54	19.65	17	24.23	2	7.36	0	0.00	73	55.24
	Total	**65**	**1082**	**239.17**	**165**	**209.97**	**40**	**107.57**	**11**	**93.46**	**1298**	**650.17**

Table 1.a

Statement showing Stratumwise distribution of Selected beneficiaries ,Number of beneficiaries

Sl. No.	District	No of Schemes Selected	Stratum-I		Stratum-II		Stratum-III		Stratum-IV		Total	
			No.	Area (hect.)	No.	Area (hect)	No.	Area (hect.)	No.	Area (hect)	No.	Area (hect.)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	6	29	5.79	1	1.82	0	0	0	0	30	7.61
2	Kollam	5	25	3.38	0	0	0	0	0	0	25	3.38
3	Pathanamthitta	5	24	3.39	1	1.16	0	0	0	0	25	4.55
4	Alappuzha	4	19	8.43	1	1.23	0	0	0	0	20	9.66
5	Kottayam	5	25	7.87	0	0	0	0	0	0	25	7.87
6	Idukki	4	16	6.26	4	5.41	0	0	0	0	20	11.67
7	Ernakulam	5	23	2.67	2	2.1	0	0	0	0	25	4.77
8	Thrissur	6	27	3.9	3	3.78	0	0	0	0	30	7.68
9	Palakkad	6	28	2.7	0	0	2	6.68	0	0	30	9.38
10	Malappuram	6	27	6.81	3	5.94	0	0	0	0	30	12.75
11	Kozhikkode	4	20	3.69	0	0	0	0	0	0	20	3.69
12	Kannur	5	13	6.51	8	13.07	3	10.4	0	0	24	29.98
13	Kasargod	4	15	4.88	5	5.68	0	0	0	0	20	10.56
	Total	65	291	66.28	28	40.19	5	17.08	0	0	324	123.55

Thus from 65 schemes 1298 beneficiaries are selected. 83% of the beneficiaries are having holding less than 1 hectre and 1% beneficiaries are having holding more than 5 hectre and above. The distribution under the stratum II & III are 13% and 3 % respectively. Similarly 324 control plots are also selected for comparison. This distribution is 90%, 9% and 1% under stratum I, II and III respectively.

To collect the details from beneficiaries 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

Selection of beneficiaries

For the proper conduct of the survey, 13 trained investigators are posted in the respective districts. Necessary training was also imparted to the investigators before the commencement of the field work. The field work was done under the supervision of the officers in the districts concerned. After the completion of the field work, the scrutiny, tabulation, consolidation and analysis of data are done in the head office.

The agriculture year 1991-92 was the reference period of the survey. This report is based on the sample survey conducted for the same period.

I.3. Problems of Soil Erosion

Soil erosion means the disappearance of the top soil by the action of wind and water. It has been estimated that 1/5th of the area in the hilly regions and the whole waste lands is in the advanced state of erosion. By erosion the upper fertile layer of land is washed away and land become unfit for cultivation. To avoid this, various Soil Conservation schemes have been planned and implemented in the state.

The factors which influence the extent of erosion are climate, topography, physical and chemical characteristics of soil and vegetation. The degree of erosion is in tune with the hardness of the controlling factors.

Responsibility for prevention of erosion

Conservation of soil requires the adaptation 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 Govt. 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 to the problem of such far reaching importance that its control cannot be left exclusively to the farmers who are interested in quick returns for 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 in the matter of soil conservation is no less importance than that of individual farmers. But without the close co-operation of the farmers no Govt. action in this regard would be 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 manure 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. These are designed to reduce the flow of surface water, impound water for a longer time and allow surplus run of to flow. The various mechanical practices are contour bunding, 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 hectares. Of which forests, uncultivable waste and land put on non agricultural uses occupies 13,50,750 hectares. The area sown is 21,33,698 hectares and the remaining area is occupied by current fallow, follow other than cuttent 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

Soil, the primary ingradiant of land was till recently taken for granted in India. It was not recognised for long, that soil was an asset and that its depletion through natural agencies was accelerated by the indifference and ignorance of the farmers.

The extend of the havoc may be endued from an estimate that 2 % of the valuable surface soil is lost every year through erosion. Knowledgeable farmers have adopted several measures to fight soil erosion but there have been 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 under taken in the Kerala State except in Wayanad district.

Chapter-II

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

65 schemes are selected for the evaluation study of soil conservation programme in the state for the agricultural year 1991-92.The table2 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 (hex)	Cost (Rs)	No.of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1.	Thiruvananthapuram	32.43	229126	194	133
2.	Kollam	28.39	233071	113	113
3.	Pathanamthitta	54.76	27250	125	124
4.	Alappuzha	17.06	70000	77	77
5.	Kottayam	18.63	81427	64	64
6.	Idukki	51.05	416231	249	100
7.	Ernakulam	49.51	220346	509	122
8.	Thrissur	50.54	349099	113	113
9.	Palakkad	16.69	129491	73	73
10.	Malappuram	139.19	232660	111	111
11.	Kozhikkode	17.89	72638	111	83
12.	Kannur	122.79	537602	112	112
13.	Kasargod	51.24	262426	73	73
	Total	**650.17**	**2861367**	**1924**	**1298**

It may be noted from the table2 that 1298 beneficiaries were selected from the 1924 beneficiaries (67% of the total beneficiaries).They occupies 650.17 Hectares of land.The cost incurred for the 65 scheme is Rs.28,61,367.

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

Table 3

Land use Particulars of Beneficiary Plots

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	28.07	87	28.02	87	0.64	2	0.64	2	2.85	9	2.92	9	0.87	2	0.85	2	32.43	100	32.43	100
2	Kollam	26.77	94	27.19	96	0.59	2	0.16	0	1.03	4	1.04	4	0.00	0	0.00	0	28.39	100	28.39	100
3	Pathanamthitta	48.10	88	50.19	92	0.30	1	0.88	2	1.45	2	1.60	2	4.91	9	2.09	4	54.76	100	54.76	100
4	Alappuzha	16.56	97	16.56	97	0.01	0	0.01	0	0.49	3	0.49	3	0.00	0	0.00	0	17.06	100	17.06	100
5	Kottayam	12.30	66	12.92	69	0.26	1	0.09	0	0.38	2	0.38	2	5.69	31	5.24	29	18.63	100	18.63	100
6	Idukki	48.21	94	48.03	94	1.55	3	1.32	3	0.32	1	0.56	1	0.97	2	1.14	2	51.05	100	51.05	100
7	Ernakulam	36.80	74	41.46	84	4.55	9	3.87	8	1.53	3	1.09	2	6.63	14	3.09	6	49.51	100	49.51	100
8	Thrissur	27.44	54	43.47	86	0.50	1	0.10	0	1.14	2	1.35	3	21.46	43	5.62	11	50.54	100	50.54	100
9	Palakkad	12.73	76	12.73	76	1.30	8	1.30	8	1.35	8	1.39	8	1.31	8	1.27	8	16.69	100	16.69	100
10	Malappuram	50.99	37	78.35	56	8.96	6	52.68	38	1.77	1	1.98	1	77.47	56	6.18	5	139.19	100	139.19	100
11	Kozhikkode	8.74	49	10.21	57	1.49	8	1.89	11	1.16	7	1.22	7	6.50	36	4.57	25	17.89	100	17.89	100
12	Kannur	114.90	94	115.53	94	2.62	2	0.80	1	3.29	3	4.47	3	1.98	1	1.99	2	122.79	100	122.79	100
13	Kasargod	47.53	93	47.53	93	1.53	3	1.53	3	1.32	3	1.32	3	0.86	1	0.86	1	51.24	100	51.24	100
	Total	**479.14**	**74**	**532.19**	**82**	**24.30**	**4**	**65.27**	**10**	**18.08**	**3**	**19.81**	**3**	**128.65**	**19**	**32.90**	**5**	**650.17**	**100**	**650.17**	**100**

The above table gives us certain positive trends while comparing with the area before and after the Soil Conservation programme. Area under cultivation before Soil Conservation measures has increased from 479.14 hex. to 532.19 hex. after the programme. An addition area of 53.05 hex. of land has brought under cultivation which was not cultivated earlier. Hence it can be stated that 11% 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 74% to 82% by decreasing the area of not cultivated from 19% to 5% to the total area of the scheme.

On examining the district wise data a remarkable increase is noted in the area additionally brought under cultivation in Trissur (32%), Malappuram (19%), Ernakulam (10%) and Kozhikkode (8%).districts..

In most of the schemes most of the schemes maintenance works were carried out annually. The cost incurred for this during the years 1988 to 1992 were Rs.30381, 35781, 57740, 22141 and 3150 respectively.

Table 3.a

Land Use Particulars (Control Plots)

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	6.83	90	0.08	1	0.66	9	0.04	0	7.61	100
2	Kollam	3.10	92	0.01	0	0.27	8	0.00	0	3.38	100
3	Pathanamthitta	4.19	92	0.03	1	0.23	5	0.10	2	4.55	100
4	Alappuzha	8.31	86	0.27	3	1.06	11	0.02	0	9.66	100
5	Kottayam	6.62	84	0.00	0	0.59	8	0.66	8	7.87	100
6	Idukki	11.48	98	0.00	0	0.08	1	0.11	1	11.67	100
7	Ernakulam	3.31	69	0.61	13	0.49	10	0.36	8	4.77	100
8	Thrissur	6.91	90	0.04	1	0.65	8	0.08	1	7.68	100
9	Palakkad	8.60	92	0.01	0	0.38	4	0.39	4	9.38	100
10	Malappuram	8.11	64	1.21	9	0.48	4	2.95	23	12.75	100
11	Kozhikkode	2.39	65	0.44	12	0.34	9	0.52	14	3.69	100
12	Kannur	26.50	88	1.02	3	0.46	2	2.00	7	29.98	100
13	Kasargod	8.98	82	0.28	3	0.15	1	1.44	14	10.56	100
	Total	105.04	85	4.00	3	5.84	5	8.67	7	123.55	100

Table 3(a) shows the land used at the control plots. Here also the land used in more or less same as in the area of beneficiaries plots before Soil Conservation programme. Hence it is suited for a comparison with the beneficiaries plots.

The Crop Pattern

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

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	20.31	72	15.70	56	7.76	28	12.32	44	28.07	100	28.02	100
2	Kollam	15.66	59	15.92	59	11.11	41	11.27	41	26.77	100	27.19	100
3	Pathanamthitta	38.92	81	42.08	84	9.18	19	8.11	16	48.10	100	50.19	100
4	Alappuzha	14.48	87	14.98	90	2.08	13	1.58	10	16.56	100	16.56	100
5	Kottayam	7.10	58	10.29	80	5.2	42	2.63	20	12.30	100	12.92	100
6	Idukki	38.25	79	43.77	91	9.96	21	4.26	9	48.21	100	48.03	100
7	Ernakulam	36.20	98	40.35	97	0.6	2	1.11	3	36.80	100	41.46	100
8	Thrissur	10.11	37	33.66	77	17.33	63	9.81	23	27.44	100	43.47	100
9	Palakkad	9.39	74	10.89	86	3.34	26	1.84	14	12.73	100	12.73	100
10	Malappuram	43.31	85	70.93	91	7.68	15	7.42	9	50.99	100	78.35	100
11	Kozhikkode	7.69	88	9.53	93	1.05	12	0.68	7	8.74	100	10.21	100
12	Kannur	98.78	86	96.12	83	16.12	14	19.41	17	114.90	100	115.53	100
13	Kasargod	44.47	94	44.55	94	3.06	6	2.98	6	47.53	100	47.53	100
	Total	**384.67**	**80**	**448.77**	**84**	**94.47**	**20**	**83.42**	**16**	**479.14**	**100**	**532.19**	**100**

The above table displays 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 384.67 hectares. to 448.77 hectares. 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, Kottayam, Idukky, Trissur and Palakkad shows high degree of change in the cropping pattern.

The study reveals that 17% of area is increased under perennial crops even though there are changes in the area among the crops.

Table 5

Area under Selected Perennial Crops

Sl No	Dist-rict	Coconut			Arecanut			Cashew			Pepper			Rubber			Others			Total		
		Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.	Tvm	7.92	8.02	1	0.10	0.12	20	0.71	0.65	-8	0.15	0.05	-67	11.43	6.86	-40	0.00	0.00	0	20.31	15.70	-22
2.	Klm	8.19	8.45	3	0.06	0.06	0	1.08	1.13	5	0.98	1.01	3	4.73	4.61	-2	0.63	0.66	5	15.66	15.92	2
3.	Pta	12.03	10.27	-14	0.67	0.39	-41	1.86	1.48	-20	4.01	4.23	5	16.33	22.39	37	4.02	3.32	-17	38.92	42.08	8
4.	Alp	9.84	10.03	2	0.19	0.06	-68	1.79	1.23	-31	0.01	0.03	200	1.42	3.00	111	1.23	0.63	-49	14.48	14.98	3
5.	Ktm	2.01	1.73	-14	0.02	0.02	0	0.01	0.02	100	0.92	0.65	-29	4.10	7.65	87	0.04	0.22	450	7.10	10.29	45
6.	Idk	4.11	4.67	14	2.46	3.76	53	2.00	2.09	5	26.50	30.97	17	2.27	1.20	-47	0.91	1.08	19	38.25	43.77	14
7.	Ekm	6.26	7.20	15	0.08	0.12	50	0.19	0.23	21	0.72	0.95	32	27.37	30.79	13	1.58	1.06	-33	36.20	40.35	11
8.	Tsr	4.11	11.22	173	0.42	0.33	21	1.65	1.22	-26	1.14	1.07	-6	0.40	16.61	40	2.39	3.21	34	10.11	33.66	233
9.	Pkd	2.70	2.88	7	0.07	0.07	0	0.14	0.10	-28	0.42	0.48	14	4.18	5.80	40	1.88	1.56	-17	9.39	10.89	16
10.	Mlp	16.29	24.19	49	0.42	0.83	98	3.18	4.46	40	5.89	6.51	11	14.50	32.34	123	3.02	2.60	-14	43.31	70.93	64
11.	Kkd	2.64	5.43	106	0.38	0.02	-94	2.55	2.84	11	1.54	0.27	-82	0.04	0.05	25	0.54	0.92	70	7.69	9.53	24
12.	Knr	21.88	28.48	30	11.50	14.01	22	11.03	14.21	29	46.09	15.82	-66	8.08	23.36	189	0.20	0.24	20	98.78	96.12	-2
13.	Ksd	16.46	16.03	-2	2.64	1.56	-41	6.05	5.81	-4	6.11	6.16	1	12.05	14.43	20	1.16	0.56	-52	44.47	44.55	0
	Total	114.44	138.6	21	19.01	21.35	12	32.24	35.47	10	94.7	68.20	-28	106.9	169.04	58	17.6	16.10	-8	384.67	448.76	17

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 58 %. The coconut comes next with an increase of 21%. Arecanut and Cashew shown an increase of 12% and 10% respectively while Pepper shows a decrease of 28%.

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 Trissur district there was only 0.40 hect. of land under Rubber which rise to 16.41 hectares. after the Soil Conservation programme.

Table 6

Area under Selected Seasonal Crops

Sl No	Dist-rict	Paddy			Tapioca			Plantain			Ginger			Others			Total		
		Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease	Before S.C Work	After S.C Work	% incr-ease
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Tvm	0.00	0.00	0	7.06	11.22	59	0.70	1.10	57	0.00	0.00	0	0.00	0.00	0	7.76	12.32	59
2	Klm	0.02	0.02	0	6.61	6.01	-9	1.98	2.09	6	0.25	0.83	232	2.25	2.32	3	11.11	11.27	1
3	Pta	0.10	0.11	10	4.08	2.69	-34	1.16	1.15	-1	1.25	0.51	-59	2.59	3.65	41	9.18	8.11	-11
4	Alp	0.00	0.00	0	0.00	0.00	0	2.07	1.58	-24	0.00	0.00	0	0.00	0.00	0	2.07	1.58	-23
5	Ktm	0.00	0.00	0	4.28	1.06	-75	0.51	0.16	-69	0.04	0.04	0	0.37	1.37	270	5.20	2.63	-49
6	Idk	0.23	0.20	-15	4.82	1.25	-74	2.96	2.28	-23	0.23	0.31	35	1.72	0.22	-87	9.96	4.26	-57
7	Ekm	0.00	0.00	0	0.20	0.24	20	0.19	0.55	189	0.01	0.19	1800	0.20	0.13	-35	0.60	1.11	85
8	Tsr	0.00	0.00	0	7.18	3.74	-48	0.29	5.70	1866	0.04	0.06	50	9.82	0.31	-96	17.33	9.81	-43
9	Pkd	0.00	0.00	0	2.84	1.02	64	0.17	0.28	65	0.02	0.07	250	0.31	0.47	52	3.34	1.84	-45
10	Mlp	0.04	0.50	1150	5.57	3.76	-32	0.67	0.97	45	0.00	0.14	0	1.40	2.05	46	7.68	7.42	-3
11	Kkd	0.00	0.00	0	0.06	0.26	333	0.08	0.28	250	0.00	0.03	0	0.90	0.11	-87	1.04	0.68	-34
12	Knr	0.62	0.50	-19	14.92	17.62	18	0.22	0.43	95	0.10	0.05	-50	0.26	0.81	212	16.12	19.41	20
13	Ksd	0.00	0.00	0	1.70	1.50	-12	0.89	1.12	26	0.00	0.00	0	0.47	0.36	-23	3.06	2.98	-2
	Total	1.01	1.33	32	59.26	50.37	-15	11.89	17.69	49	1.94	2.23	15	20.35	11.80	-42	94.45	83.42	-12

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 12% over the area under Seasonal crops before Soil Conservation programme. Even though the area under plantain, Ginger and Paddy shows an increase of 49%, 32% and 15% respectively. Area under Tapioca and other Seasonal Crop recorded a decrease of 15% and 42 % respectively.

The analysis also reveals that the area under cultivation of Ginger and Plantain has increased about 18 times over the area under that crops before Soil Conservation programme in Ernakulam and Trissur 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 displayed in table.7

Table 7- Crop wise yield and Value of Perennial Crops in the Scheme Area

District	Name of Crop	Unit	Before S.C work.		After S.C work			% inc/ dec
			Qty	Value	Qty	Value	Value at con.price	
1	2	3	4	5	6	7	8	9
TVM	Coconut	Nos	33655	44761	47815	171178	63594	42
	Arecanut	Qtl	0.34	170	0.49	539	245	44
	Cashew	Qtl	11.82	11997	13.1	28034	13296	11
	Pepper	Qtl	0.67	2617	0.7	2017	2734	4
	Rubber	Qtl	35.42	52020	52.4	104460	76958	48
				111565		306228	156827	41
KLM	Coconut	Nos	30435	46566	42335	162566	64773	39
	Arecanut	Qtl	0.63	250	1.36	1436	539	116
	Cashew	Qtl	4.98	5468	10.33	22106	11342	107
	Pepper	Qtl	2.96	11861	7.92	23475	31735	168
	Rubber	Qtl	21.95	32267	57.5	114713	84525	162
	Others	Qtl	28.97	1009	59.65	3121	2263	106
				97511		327417	195177	100
PTA	Coconut	Nos	70490	98686	53492	210224	74889	-24
	Arecanut	Qtl	13.41	4425	10.05	10944	3317	-25
	Cashew	Qtl	28.47	28897	39.87	85322	40468	40
	Pepper	Qtl	36.08	145474	38.91	114512	156885	8
	Rubber	Qtl	128.2	188454	297.53	593572	437369	132
	Others	Qtl	242	92843	735	172348	281982	204
				558779		1186922	994910	78

Table 7 continued

District	Name of Crop	Unit	Before S.C work.		After S.C work			% inc/ dec
			Qty	Value	Qty	Value	Value at con.price	
1	2	3	4	5	6	7	8	9
ALP	Coconut	Nos	45533	70121	49239	197941	75828	8
	Arecanut	Qtl	5.37	1343	7	6930	2541	30
	Cashew	Qtl	8.42	8664	9.81	20993	10094	17
	Others	Qtl	3.86	1418	2.53	1232	929	-34
				81546		227096	89392	10
KTM	Coconut	Nos	7820	11574	8210	33825	12151	5
	Arecanut	Qtl	0.1	33	0.14	129	46	40
	Cashew	Qtl	0	0	0.09	193	94	0
	Pepper	Qtl	4.8	19296	3.5	10203	14070	-27
	Rubber	Qtl	86.55	127279	124.2	247779	182574	44
	Others	Qtl	11.09	2310	12.64	3000	2633	14
				160442		295129	211568	32
IDK	Coconut	Nos	1365	2184	11353	49158	18165	732
	Arecanut	Qtl	23.5	6980	5833	51972	17324	148
	Cashew	Qtl	1.35	1355	2.78	5949	2791	106
	Pepper	Qtl	29.44	118054	109.13	319860	437611	271
	Rubber	Qtl	0	0	6.72	13406	9878	0
	Others	Qtl	1.74	1522	2.8	5785	2449	61
				130095		446130	488218	275

Table 7 continued

District	Name of Crop	Unit	Before S.C work.		After S.C work			% inc/ dec
			Qty	Value	Qty	Value	Value at con.price	
1	2	3	4	5	6	7	8	9
EKM	Coconut	Nos	29118	46880	45843	200792	73807	57
	Arecanut	Qtl	1.13	485	2.16	2210	927	91
	Cashew	Qtl	1.56	1646	1.57	3360	1656	0.6
	Pepper	Qtl	3.33	13380	1.22	3621	4902	-63
	Rubber	Qtl	142	208740	148.5	296258	218295	5
	Others	Qtl	4.31	4650	15.6	10360	16831	262
				275781		516601	316418	15
TCR	Coconut	Nos	12335	19983	53626	203779	86874	325
	Arecanut	Qtl	3.7	1954	3.51	4402	1853	-5
	Cashew	Qtl	21.63	25675	9.85	21079	11692	-54
	Pepper	Qtl	3.43	13576	4.43	13400	17534	29
	Rubber	Qtl	0	0	87	173565	127890	0
	Others	Qtl	11.69	4364	18.72	24804	6988	60
				65552		441029	252831	286
PKD	Coconut	Nos	4904	7160	9957	35845	14537	103
	Arecanut	Qtl	0	0	1.66	1643	603	0
	Cashew	Qtl	0.22	244	0.4	856	444	82
	Pepper	Qtl	0.19	750	0.56	1665	2209	195
	Rubber	Qtl	4.5	6615	31.25	62344	45938	594
	Others	Qtl	3.6	872	4.32	3550	1046	20
				15641		105903	64777	314
MLP	Coconut	Nos	41505	58937	252406	921282	358417	508
	Arecanut	Qtl	4	1452	13.79	15472	5006	245
	Cashew	Qtl	21.32	23942	25.36	54270	28479	9
	Pepper	Qtl	43.61	174789	40.87	121016	163807	-6
	Rubber	Qtl	13.6	19992	230.4	459648	338688	1594
	Others	Qtl	48.53	4930	67.4	8835	6847	-39
				284042		1580523	901244	217

Table 7 continued

District	Name of Crop	Unit	Before S.C work.		After S.C work			% inc/ dec
			Qty	Value	Qty	Value	Value at con.price	
1	2	3	4	5	6	7	8	9
KKD	Coconut	Nos	9090	11726	25360	95100	32714	179
	Arecanut	Qtl	2.45	647	5.23	4660	1381	113
	Cashew	Qtl	18.04	20457	38.03	81384	43126	111
	Pepper	Qtl	13.85	56259	20.07	60090	82337	45
	Rubber	Qtl	0	0	0	0	0	0
	Others	Qtl	56.3	2280	28.82	8880	1167	-49
				91369		250114	160725	76
KNR	Coconut	Nos	56130	72969	147060	585299	191178	162
	Arecanut	Qtl	166.95	44075	191.78	164547	50630	15
	Cashew	Qtl	70.95	58818	135.66	290312	112462	91
	Pepper	Qtl	147.92	593751	75.91	224162	304703	-49
	Rubber	Qtl	3	4410	78.62	156847	115571	2521
	Others	Qtl	0	0	2	600	564	0
				774023		1421767	775108	0.14
KSD	Coconut	Nos	41529	53988	42446	173180	55180	2
	Arecanut	Qtl	10.03	3641	14.23	17844	5165	42
	Cashew	Qtl	63.77	52865	81.12	173597	67248	27
	Pepper	Qtl	9.91	39779	16.29	34860	65388	64
	Rubber	Qtl	36.2	53214	51.17	102084	75220	41
	Others	Qtl	0	0	0.6	300	169	0
				203487		501865	268270	32
Total	**Coconut**	**Nos**	**383909**	**545535**	**741327**	**3040169**	**1122107**	**106**
	Arecanut	**Qtl**	**231.61**	**65455**	**309.73**	**282728**	**89577**	**37**
	Cashew	**Qtl**	**252.53**	**240028**	**367.97**	**787455**	**343192**	**43**
	Pepper	**Qtl**	**296.19**	**1189586**	**319.51**	**928881**	**1283915**	**8**
	Rubber	**Qtl**	**471.42**	**692941**	**1165.29**	**2324676**	**1712906**	**147**
	Others	**Qtl**	**412.09**	**116288**	**950.08**	**242815**	**323868**	**108**
Grand Total				**2849833**		**7606724**	**4875565**	**71**

An increasing trend has noted in the yield of the perennial crops during the period under report.The total production of perennial crops is increased to 71%.The yield of rubber shows the highest increase of 147% over production of B.S.C.P.The lowest rate is of 8% noted in the case of pepper.

If we analyse the production details in district level few crops have displayed a decreasing trend . This is because of the decrease in area under that particular crop.For example,if we take the case of Pathanamthitta district the production of Coconut and Arecanut has decreased to 24% and 25% over the production of B.S.C.P.This is due to decrease in area after S.C.P in that particular crops and the same is used for rubber cultivation.Such situations are also noted in other districts. The analysis of district wise data reveals that the production has increased with the range of 0.14% at Kannur to 314% at Palakkad

Table 8- Crop wise yield and Value of Perennial Crops in the Scheme Area

District	Name of		Before S.C work.		After S.C work			%
	Crop	Unit	Qty	Value	Qty	Value	Value at con.price	incr-ease
1	2	3	4	5	6	7	8	9
TVM	Tapioca	Qtl	983.30	81614	1342.00	210694	111386	36
	Plantain	Qtl	110.90	25129	186.50	46758	42259	68
				106743		257452	153645	45
KLM	Tapioca	Qtl	178.35	14446	264.00	36432	21384	48
	Plantain	Qtl	57.86	16901	79.09	27050	23344	38
	Paddy	Qtl	0.15	36	0.20	75	47	31
	Ginger	Qtl	3.33	2511	5.13	11702	3868	54
				33894		75259	48643	44
PTA	Tapioca	Qtl	715.05	59349	515.65	85598	42799	-28
	Plantain	Qtl	41.13	11403	39.03	22465	10821	-5
	Ginger	Qtl	26.20	26672	22.03	47849	22427	-16
	Paddy	Qtl	3.00	717	0.00	0	0	0
	Others	Qtl	253.27	69789	313.02	107458	86253	24
				167930		263370	162300	-3

Table-8 Continued

District	Name of		Before S.C work.		After S.C work			%
	Crop	Unit	Qty	Value	Qty	Value	Value at con.price	incr-ease
1	2	3	4	5	6	7	8	9
ALP	Plantain	Qtl	23.40	11172	25.40	12758	12127	9
			0.00	11172		12758	12127	9
KTM	Tapioca	Qtl	183.30	17780	81.50	7906	7906	-56
	Plantain	Qtl	40.40	11716	11.72	6739	3399	-71
	Ginger	Qtl	2.00	2018	2.00	4344	2018	0
	Others	Qtl	4.05	910	4.80	1590	1079	19
				32424		20579	14402	-56
IDK	Tapioca	Qtl	216.65	18632	184.90	28290	15901	-15
	Plantain	Qtl	212.60	50154	382.95	183123	78546	57
	Ginger	Qtl	12.70	12776	45.79	96708	46065	261
	Paddy	Qtl	2.50	593	1.00	389	237	-60
	Others	Qtl	1.50	2700	3.80	6130	6840	153
				84855		314640	147589	74

Table-8 Continued.

District	Name of Crop	Unit	Before S.C work.		After S.C work			%
			Qty	Value	Qty	Value	Value at con.price	incr-ease
1	2	3	4	5	6	7	8	9
EKM	Tapioca	Qtl	3.00	264	4.50	689	396	50
	Plantain	Qtl	8.98	2604	23.92	13634	6936	166
				2868		14323	7332	156
TCR	Tapioca	Qtl	57.20	4976	62.75	36081	5459	10
	Plantain	Qtl	16.80	4536	57.69	32883	15576	243
	Ginger	Qtl	1.50	1212	2.00	4320	1616	33
	Others	Qtl	0.80	195	1.02	478	249	28
				10919		73762	22900	110
PKD	Tapioca	Qtl	18.42	1197	28.63	3607	1861	55
	Plantain	Qtl	5.20	1404	13.09	7461	3534	152
	Ginger	Qtl	0.02	22	0.37	800	402	1727
	Others	Qtl	3.82	1146	12.73	5349	3819	233
				3769		17217	9616	155
MLP	Tapioca	Qtl	25.76	2344	12.06	1712	1097	-53
	Plantain	Qtl	4.04	1091	29.36	16735	4860	345
	Paddy	Qtl	22.00	5104	18.00	6462	4176	-18
	Ginger	Qtl	0.00	0	0.60	1352	552	0
	Others	Qtl	1.00	200	13.27	5308	2654	1227
				8739		31569	13339	53

Table-8 Continued

District	Name of Crop	Unit	Before S.C work.		After S.C work			%
			Qty	Value	Qty	Value	Value at con.price	incr-ease
1	2	3	4	5	6	7	8	9
KKD	Tapioca	Qtl	0.00	0	23.00	3956	2461	0
	Plantain	Qtl	1.90	513	4.99	2844	1347	163
	Ginger	Qtl	0.00	0	0.40	901	368	0
	Others	Qtl	1.72	473	6.45	2580	1774	275
				986		10281	5950	503
KNR	Tapioca	Qtl	422.50	35068	543.00	102627	45069	29
	Plantain	Qtl	6.25	1688	19.50	11115	5265	212
	Ginger	Qtl	0.00	0	1.55	3240	1496	0
	Paddy	Qtl	1.50	354	14.00	7980	3304	833
				37110		124962	55134	49
KSD	Tapioca	Qtl	12.25	1274	22.25	4383	2314	82
	Plantain	Qtl	22.45	6061	43.26	24658	11680	92
				7335		29041	13994	90
Total	**Tapioca**	Qtl	**2815.78**	**236944**	**3084.24**	**521975**	**258033**	**10**
	Plantain	Qtl	**551.91**	**144372**	**866.50**	**408223**	**219694**	**52**
	Ginger	Qtl	**45.75**	**45211**	**79.87**	**171216**	**78812**	**74**
	Paddy	Qtl	**29.15**	**6804**	**33.20**	**14906**	**7764**	**14**
	Others	Qtl	**266.16**	**75413**	**355.09**	**128893**	**102668**	**36**
				508744		**1245213**	**666971**	**31**

The production particulars of seasonal crops are given in Table (8). It shows that production increased to 31% over the B.S.C.P. On cropwise examination, Ginger and Plantain shows an increase of 74% and 52 % respectively. It is particular to note that even after 12% decrease in area under seasonal crops the production has increased to 32%. Such a strange situation is due to change in productivity of soil through the S.C.P.

Here also, few crops in district level showed a decrease in production. This is happened due to the decrease in the area under that crop. In most of the districts, the total production has increased except in Kottayam and Pathanamthitta. The highest increase is persued in the Kozhikode district of 503% over the Pathanamthitta B.S.C.P. It is followed by Ernakulam with 156% and Palakkad with 155% increase in the production of seasonal crops.

The higher rate of production is proved beyond any doubt that the productivity of soil increased in Perennial as well as Seasonal crops due to the implementation Soil Conservation measures.

2.2 Cost Benefit Analysis of Soil Conservation Programme.

Degradation of land due to soil erosion leads to distruction of agricultural land Over a period, the entire soil is lost and the land become barren and unproductive. In the case of sloppy region, rushing water makes deeper in roads creating gutters. Thus soil erosion deplete the fertility of the soil and production 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 consideration.

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.

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

The cost incurred for the Soil Conservation works are collected from the 1298 beneficiaries in the 65 schemes. Including the maintenance works, it comes to Rs.2861367/- . 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 Hect	Qty	Value	Area Hect	Qty	Value	
	1	2	3	4	5	6	7	8	9
A.Perennial Crops	Coconut	Nos	114.44	383909	545535	138.60	741327	3040169	1122107
	Arecanut	Qtl	19.01	231.61	65455	21.35	309.73	282728	89577
	Cashew	Qtl	32.24	252.53	240028	35.47	367.97	787455	343192
	Pepper	Qtl	94.47	296.19	1189586	68.20	319.51	928881	1283915
	Rubber	Qtl	106.91	471.42	692941	169.04	1165.29	2324676	1712906
	Others	Qtl	17.60	412.09	116288	16.10	950.08	242815	323868
	Total A		384.67		2849833	448.76		7606724	4875565
B.Seasonal Crops	Tapioca	Qtl	59.26	2815.78	236944	50.37	3084.24	521975	258033
	Plantain	Qtl	11.89	551.91	144372	17.69	866.50	408223	219694
	Paddy	Qtl	1.94	45.75	45211	2.23	79.87	171216	78812
	Ginger	Qtl	1.01	29.15	6804	1.33	33.20	14906	7764
	Others	Qtl	20.35	266.16	75413	11.80	355.09	128893	102668
	Total B		94.45		508744	83.42		1245213	666971
	Grand Total A+B		479.12		3358577	532.18		8851937	5542536

@Base year price of 1985 has been used

The total area under cultivation have been calculated to 532.18 hectares. The value of crops before the S.C.P comes to Rs.3358577/-. 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.55,42,532/-. Thus the annual additional benefits due to the implementation of S.C.P is worked out as Rs.21,83,959/-. This shows that 76% 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). Diversification of cropping pattern (iii) Increase in productivity.

(i). Extension of area under cultivation

On examining the table 9 it is observed that 53.05 hectares. 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) Diversification of Cropping Pattern

Soil Conservation programme increases the soil capability 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 discrimination of new techniques of production, adequate provision of inputs and service which will promote the land to improve production.

In the scheme area cultivation of perennial crops have shown an encouraging performance. The increase in area of perennial crops is 17% higher over the area under the same before S.C.P Growing of perennial crops will accelerate conservation of soil more effectively.

(iii)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 & 10a.

Table 10 - Income,Expenditure and net Income of Beneficiary Holdings

Sl No	District	Income		Expenditure		Net Income	
		Bef.S.C work	Aft S.C Work	Bef.S.C work	Aft S.C Work	Bef.S.C work	Aft S.C Work
1	Thiruvananthapuram	249466	598712	69361	195315	180105	403397
2	Kollam	155116	463077	20188	162076	134928	301001
3	Pathanamthitta	766709	1522806	229706	692262	537003	830544
4	Alappuzha	101989	263839	15886	90064	86103	173775
5	Kottayam	212152	347278	24665	107231	187487	240047
6	Idukki	249186	765782	40309	156873	208877	608909
7	Eranakulam	350623	546851	65247	134175	285376	412676
8	Trissur	80294	566275	12421	133851	67873	432424
9	Palakkad	21351	137894	2378	36320	18973	101574
10	Malappuram	302059	1267205	60514	182317	241545	1084888
11	Kozhikkode	96972	273414	10932	72910	86040	200504
12	Kannur	892246	1639532	223061	394415	669185	1245117
13	Kasargod	231904	557451	47976	138652	183928	418799
	State Total	3710067	8950116	822644	2496461	2887423	6453655

Table 10a-Income, Expenditure and net Income of Control Plots

Sl No	District	Income	Expen-diture	Net Income
1	Thiruvananthapuram	101353	45531	55822
2	Kollam	44011	14640	29371
3	Pathanamthitta	88238	37891	50347
4	Alappuzha	75630	18042	57588
5	Kottayam	142585	37030	105555
6	Idukki	65851	8705	57146
7	Eranakulam	37040	7955	29085
8	Thrissur	81136	39925	41211
9	Palakkad	74791	25565	49226
10	Malappuram	87901	35300	52601
11	Kozhikkode	39025	14410	24615
12	Kannur	345212	154200	191012
13	Kasargod	46711	5520	41191
14	State Total	1229484	444714	784770

The net income received from the beneficiary plot is Rs.64,53,655/- and from the control plot is Rs.7,84,770/-. The district wise net income per hect. is given in table 11 & 11 (a).

Table 11

Net Income per Hectare Before and After Soil Conservation Programme

Sl No	District	Before S.C Work			After S.C Work		
		Area	Income	Income/Hect.	Area	Income	Income/Hect.
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	28.07	180105	6416	28.02	403397	14397
2	Kollam	26.77	134928	5040	27.19	301001	11070
3	Pathanamthitta	48.10	537003	11164	50.19	830544	16548
4	Alappuzha	16.56	86103	5199	16.56	173775	10494
5	Kottayam	12.30	187487	15243	12.92	240047	18579
6	Idukki	48.21	208877	4333	48.03	608909	12678
7	Eranakulam	36.80	285376	7755	41.46	412676	9954
8	Thrissur	27.44	67873	2474	43.47	432424	9948
9	Palakkad	12.73	18973	1490	12.73	101574	7979
10	Malappuram	50.99	241545	4737	78.35	1084888	13847
11	Kozhikkode	8.74	86040	9844	10.21	200504	19638
12	Kannur	114.90	669185	5824	115.53	1245117	10778
13	Kasargod	47.53	183928	3870	47.53	418799	8111
	Total	479.14	2887423	6026	532.19	6453655	12127

Table 11 a

Net Income per Hectare in the Control Plot

Sl No	District	Area	Net Income	Net Income per hec.
1	2	3	4	5
1.	Thiruvananthapuram	6.83	55822	8173
2.	Kollam	3.1	29371	9475
3.	Pathanamthitta	4.19	50347	12016
4.	Alappuzha	8.31	57588	6930
5.	Kottayam	6.62	105555	15945
6.	Idukki	11.48	57146	4978
7.	Eranakulam	3.31	29085	8787
8.	Thrissur	6.91	41211	5964
9.	Palakkad	8.6	49226	5724
10.	Malappuram	8.11	52601	6486
11.	Kozhikkode	2.39	24615	10299
12.	Kannur	26.5	191012	7208
13.	Kasargod	8.69	41191	4740
14.	State	105.04	784770	7471

The higher rate of net income from the scheme areas is due to the positive impact of S.C.P. The net income per hectare B.S.C.P, A.S.C.P and in Control Plot are Rs.6026/-, Rs.12127/- and Rs.7471/- respectively.

CHAPTER - III

3.1 General Observation

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

The distribution of holding of the selected beneficiaries of the Soil Conservation reveals that 83% of the beneficiaries holding less than one hect. and 13% have holding area between one hect. to 3 hect. It is noted that only 3 % of beneficiaries were possessing over 3 hect. to 5 hect. and the rest 1% have more than one hect.

The practice of providing 25 % subsidiary to the loan schemes persuaded. The practice may be replaced by supplying improved seeds, manure etc. to cultivators to optimise the production. The market for this products should also be found out.

The opinion of 1298 selected beneficiaries are collected. Out of that 35% of the beneficiaries reported that contour bunds effectively controlled soil erosion while about 56% opinioned that it moderately controls erosion of the soil. The rest 9% area of the opinion that contour bunds has no effect.

About the fertility of the soil 29% are of the view that the conservation measures have improved the fertility remarkably. While 66% reported that the fertility of the soil has improved moderately and 5 % opinioned that it has no effect on the fertility of the soil.

Similarly regarding the moisture retention 34% reported that the scheme has substantially increased moisture retention while 62% reported that the scheme has caused moisture retention moderately only. About 4 % reported that it has not effected any change in moisture condition.

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 Bund , 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	85	47	1	66	66	1	67	65	1
2	Kollam	1	112	0	0	113	0	0	113	0
3	Pathanamthitta	6	115	3	1	120	3	1	120	3
4	Alappuzha	6	46	25	8	44	25	6	46	25
5	Kottayam	0	64	0	0	64	0	0	64	0
6	Idukki	32	66	2	49	49	2	23	75	2
7	Eranakulam	62	60	0	40	68	14	80	34	8
8	Thrissur	1	112	0	0	113	0	0	113	0
9	Palakkad	41	31	1	2	54	17	61	12	0
10	Malappuram	35	70	6	18	84	9	20	84	7
11	Kozhikkode	6	1	76	3	80	0	4	79	0
12	Kannur	112	0	0	112	0	0	112	0	0
13	Kasargod	73	0	0	73	0	0	73	0	0
14	**Total**	**460**	**724**	**114**	**372**	**855**	**71**	**447**	**805**	**46**

About 58 % of the bunds are in good condition, 41% are partially damaged and 1 % is seriously damaged.

District wise statement is given in table 13.

The occupational profile of the beneficiaries are pictured in table 14.

Table 13

Condition of Bund

Sl No	District	Good	Partially Damaged	Seriously Damaged
1	2	3	4	5
1	Thiruvananthapuram	87	44	2
2	Kollam	81	32	0
3	Pathanamthitta	71	51	2
4	Alappuzha	27	50	0
5	Kottayam	46	18	0
6	Idukki	80	19	1
7	Eranakulam	97	25	0
8	Thrissur	72	39	2
9	Palakkad	9	62	2
10	Malappuram	70	40	1
11	Kozhikkode	32	51	0
12	Kannur	53	59	0
13	Kasargod	29	44	0
14	Total	754	534	10

Table 14

Occupational Profile

Sl No	District	Occupation		
		Agriculture	Non Agriculture	Agri/NonAgri Labourers
1	2	3	4	5
1	Thiruvananthapuram	20	18	95
2	Kollam	35	37	41
3	Pathanamthitta	30	43	51
4	Alappuzha	21	28	28
5	Kottayam	12	26	26
6	Idukki	14	9	77
7	Eranakulam	37	26	59
8	Thrissur	9	31	73
9	Palakkad	3	12	58
10	Malappuram	36	13	62
11	Kozhikkode	2	1	80
12	Kannur	32	14	66
13	Kasargod	22	1	50
14	Total	273	259	766

Summary and Conclusion

There is an increasing awareness of the importance of the Soil Conservation programme among the people in the scheme area.

Soil Conservation measures like contour bunding will become fully effective and promote maximum soil fertility only if they are supported by suitable farming practices such as crop rotation, contour bunding, Strip cropping, cover cropping, agronomic and agrostologic practices involving the use of reduced seed rate and adequate mannuring.

Among effective conservative programmes requires the adoption of sound land use and cultural practices by the target farming community.

It is learned from the study that there is a clear need to strengthen the Soil Conservation machinery at district level in such a manner that trained persons with proper orientation will find enough time to keep themselves in touch with concerned beneficiaries .