



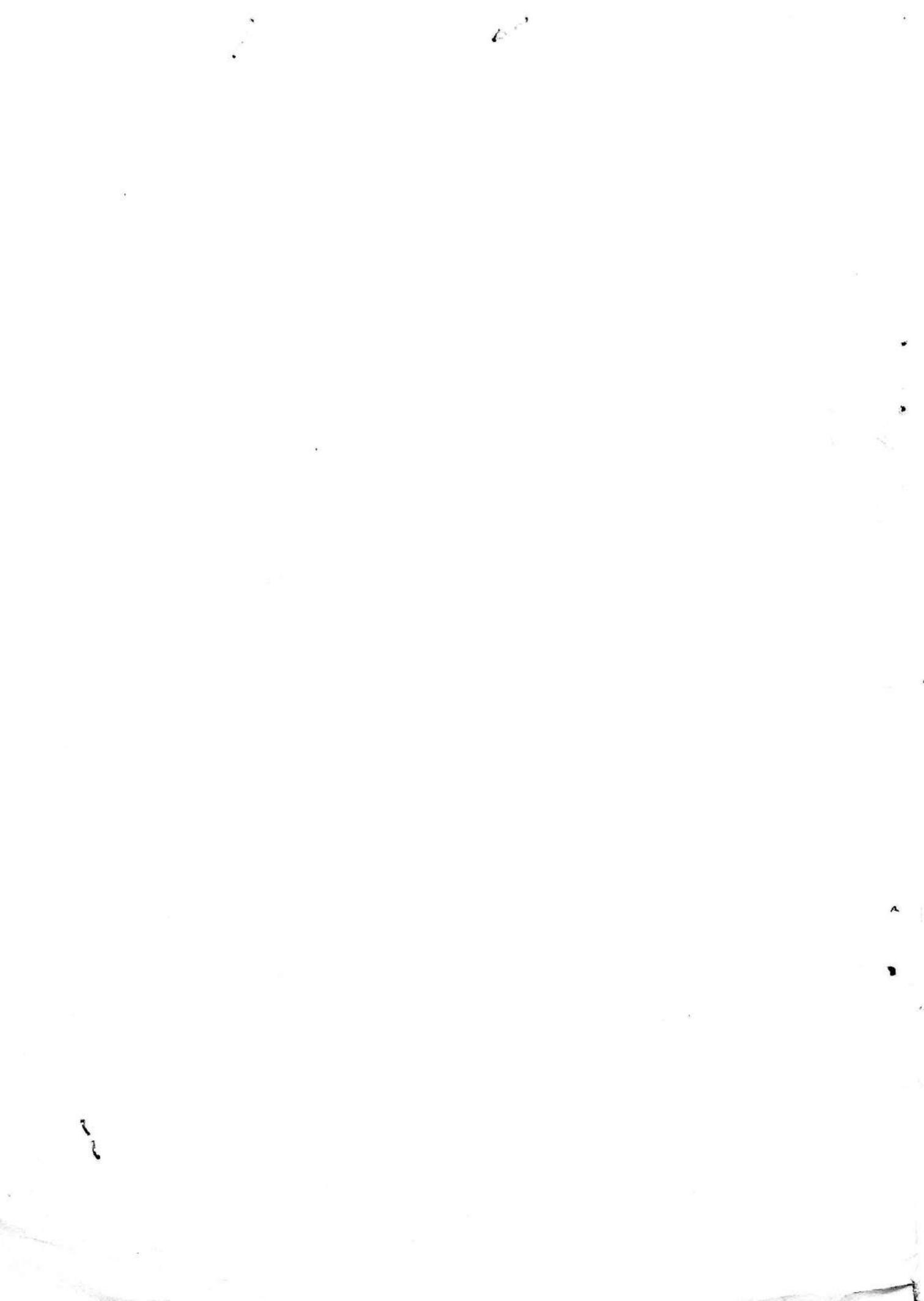
GOVERNMENT OF KERALA

EVALUATION STUDY ON SOIL CONSERVATION IN KERALA 2010-11



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Evaluation Study on Soil Conservation in Kerala
2010-11

DEPARTMENT OF ECONOMICS & STATISTICS
THIRUVANANTHAPURAM
2013

PREFACE

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

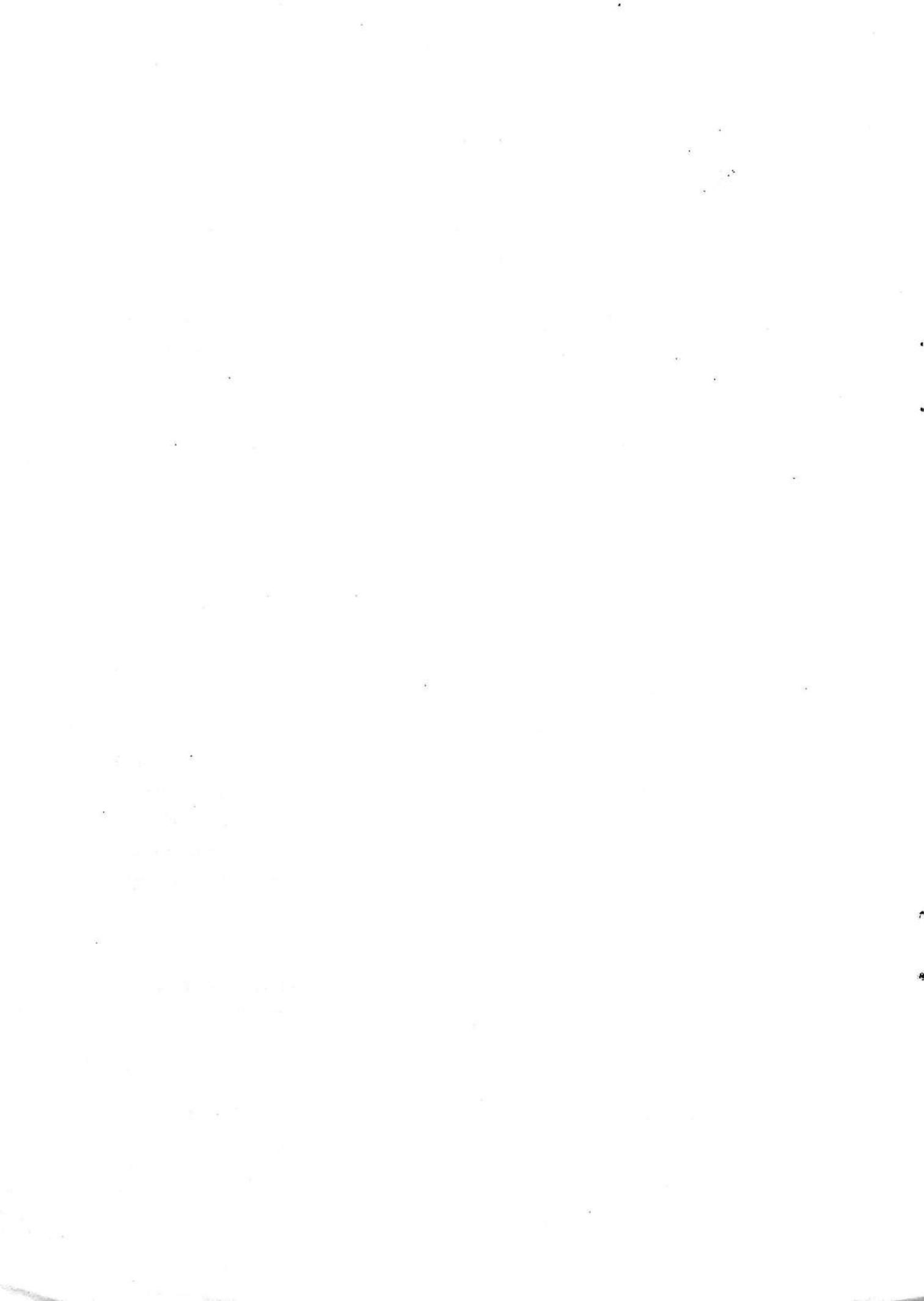
The Evaluation study of these schemes has been done by the Directorate of Economics and Statistics for all districts except Wayanad where the direct implementation and evaluation of the schemes are done by the Central Agency.

This report relates to the survey results of 52 schemes completed by the Soil Conservation Department and various agencies. The field survey was conducted during the agricultural year 2010-11. The schemes implemented and completed before five years are taken up for study so that full benefit of the scheme could be evaluated and assessed. This evaluation study results may be much of use to Administrators, Statisticians, Research Scholars and Agricultural Geologists and others interested in the subject.

The tabulation was done in the Evaluation Division of this Directorate. The Report of the survey has been prepared by Sri. Suresh Kumar N, Deputy Director , Sri. Gopa kumar R, Research Officer, Smt. Nazeema Begum.Z, Research Assistant , Smt. Minimole S, Statistical Assistant Gr I and Smt Gracy K K ,Statistical Assistant Gr I under the guidance of Smt. K. Sathiabhama, Additional Director. In this context I acknowledge my thanks to the staff of Soil Conservation Department and other local bodies for their valuable suggestion and whole hearted co-operation in the successful conduct of the survey.

*Thiruvananthapuram,
30-05-2013*

V RAMACHANDRAN
DIRECTOR



CONTENTS

Chapter – I		Pages
1.1	Introduction	1
1.2	Objectives and Methodology	1
1.3	Problems of Soil Erosion	4
1.4	Methods of Soil Conservation Programmes	5
1.5	Land Use Pattern of the State	5
Chapter – II		
2.1	Impact of Soil Conservation Programmes on Land use and crop pattern	6
2.2	Cost Benefit Analysis of the Soil Conservation Programmes	31
Chapter – III		
3.1	General Observations	36
3.2	Occupational Profile	39
3.3	Summary of Findings	40



Chapter – I

1.1 Introduction

Land is one of the basic resources of a nation. Productive land is the source of human sustenance and security. The future of the country and its teeming millions depend to a large extent, the conservation of its fertile soil through the proper land use and scientific agricultural practices.

Soil conservation means applying of all necessary practices to maintain the capability of land for which it is suited and to improve the productivity of agricultural land. Considering the importance of soil conservation our plan provisions enhanced for optimizing the use of land resources. An evaluation study in this front can be helpful for developing much more suitable conservation measures for the State

1.2 Objectives and Methodology of the Survey:-

The main objectives of the evaluation study are:

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

For this schemes were selected which were executed five years before ie during 2005-06 in the State by the Soil Conservation Department and other local bodies. The study covered all the districts of the State except Wayanad where the same is directly done by the Central Government. The list of beneficiaries under each scheme is obtained from the Soil Conservation Department and other local bodies. The beneficiaries are selected by stratified random sampling method on the basis of the area of the holding. The holdings are stratified in to four viz.

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

Selection of Beneficiaries

Selection of beneficiaries is done by the District Level Officers from the list of beneficiaries collected from Soil Conservation Department and from other local bodies. A total number of 25 beneficiaries are selected from each scheme by simple random sampling covering all the above 4 stratum 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 the shortfall is compensated from another stratum with the nearest area of the 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. The district wise selection details of beneficiary plots and control plots are given in the table 1 & 1 (a).

Table – 1

Statement showing stratum wise distribution of selected beneficiaries

Sl. No	Districts	No. of schemes selected	(Area in Acres)									
			Stratum – I		Stratum – II		Stratum – III		Stratum – IV		Total	
			No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	5	116	23.03	9	13.21	0	0	0	0	125	36.24
2	Kollam	5	125	24.06	0	0	0	0	0	0	125	24.06
3	Pathanam-thitta	9	125	45.73	0	0	0	0	0	0	125	45.73
4	Alappuzha	6	125	8.45	0	0	0	0	0	0	125	8.45
5	Kottayam	5	38	23.80	42	80.62	26	93.61	19	117.22	125	315.25
6	Idukki	5	83	32.41	38	53.78	3	11.00	1	5.00	125	102.19
7	Thrissur	2	75	27.97	43	66.28	6	22.97	1	5.62	125	122.84
8	Palakkad	5	46	21.70	54	89.24	15	56.46	10	76.12	125	243.52
9	Malappuram	2	34	17.79	67	119.84	18	68.14	6	35.93	125	241.70
10	Kozhikode	5	94	37.10	27	42.15	2	7.00	2	10.01	125	96.26
11	Kannur	2	56	29.19	68	105.54	1	3.00	0	0	125	137.73
12	Kasaragod	1	2	0.54	0	0	0	0	0	0	2	0.54
Total		52	919	291.77	348	570.66	71	262.18	39	249.9	1377	1374.51

Table I (a)
Statement showing stratum wise distribution of selected Control Plots

Sl. No	Districts	No. of schemes selected	(Area in acres)									
			Stratum - I		Stratum - II		Stratum - III		Stratum - IV		Total	
			No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre	No.	Area in acre
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	5	25	4.63	0	0	0	0	0	0	25	4.63
2	Kollam	5	25	3.68	0	0	0	0	0	0	25	3.68
3	Pathanam-thitta	9	24	10.61	1	1.50	0	0	0	0	25	12.11
4	Alappuzha	6	24	1.87	0	0	0	0	1	5.00	25	6.87
5	Kottayam	5	10	6.21	10	20.42	5	19.71	0	0	25	46.34
6	Idukki	5	12	4.32	13	16.45	0	0	0	0	25	20.77
7	Thrissur	2	8	1.69	2	2.50	0	0	0	0	10	4.19
8	Palakkad	5	9	3.08	13	22.52	3	12.75	0	0	25	38.35
9	Malappuram	2	8	3.50	13	24.79	3	9.50	1	5.00	25	42.79
10	Kozhikode	5	11	4.47	10	20.72	4	14.74	0	0	25	39.93
11	Kannur	2	18	9.15	7	8.15	0	0	0	0	25	17.3
12	Kasaragod											0
Total		51	174	53.21	69	117.05	15	56.7	2	10	260	236.96

The total number of beneficiaries comes to 1377. About 66.74% of the beneficiaries are having holding less than one acre, 25.27% are having holdings one acre or more but less than 3 acres, 5.16% are having holding 3 acre or more but less than 5 acres and only 2.83% of the beneficiaries are having holdings of more than 5 acres. In order to compare the benefits of the implementation of Soil Conservation Programmes, control plots were also selected. Its distribution is 66.92%, 26.54%, 5.77% and 0.77% respectively under stratum I, II, III and IV.

Following schedules were 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

1.3 Problems of Soil Erosion

Soil erosion means the disappearance of the topsoil by the action of wind and water. Ultimately soil erosion leads the desertification of land. Degradation of natural resources has led to many indirect damages, such as increasing extent of wasteland, soil erosion, land sliding, etc. all these cumulatively or independently has affected agricultural or independently has affected agricultural productivity. Unlike other parts of the country, Kerala has some unique land form related aspects such as over 90% of the geographical area is either in midland or high land category. The average rate of soil erosion in the country, to the tune of 16.3 t/ha/yr – has been alarming and has to be checked. In hilly areas, the rate is much higher, i.e. about 30 to 50 t/ha/yr/, considering that about 5 to 10 cm of the top soil (ranging from 0.3 to 1.0 m depth) is being lost every year due to lead management practices. It has been estimated 9-5 lakh hectares of cultivated land in the State is having soil erosion problems.

Responsibility for prevention of erosion

Land which is one of the precious gift of the nature embodies soil, water and associated flora and fauna involving the total ecosystem. The topography of the land plays the most important role in soil erosion. Kerala is a narrow strip of land (width varies from 15 to 120 Km) situated on the Western Slopes of the Western Ghats (the Sahyadri). The very steep slopes facilitate quick run off of the rainfall resulting in low time of concentration poor ground water recharge. This high velocity of the surface flow causes soil displacement and movement. The surface soil gets washed away along with the running water. The major portion of the state is laterite and as such are more prone are erosion. The different forms of

soil erosion causes huge damage to Kerala's economy every year. Many people die every year due to land slides.

1.4 Methods of Soil Conservation Programme

Soil Conservation practices are mainly grouped into two categories viz. Agronomical and Engineering measures. Agronomic measures are comparatively low costly such as contour ploughing / optimal fertilizing organic farming, etc. Engineering measures include contour bunding, land leveling, construction of check dams and water harvesting structure, etc. At present various watershed programmes are being implemented in the state for effective preservation and management of the natural resources.

1.5 Land Use Particulars of the State

There has been a significant change in the land use of the state over the years. On many occasions the change is adversely affecting the environment by way of intensified soil erosion, water logging, conversion of paddy lands, etc. are some of the examples. Cultivation of very steep lands without adopting scientific conservation practices lead to heavy soil erosion. Use of chemicals on a large scale for agricultural productions leave dangerous quantities of the residues in the soil and the water sources.

Chapter - II

2.1 Impact of Soil Conservation Programme on Land use and Crop Pattern

Before 1994-95, soil conservation programme was executed by Department of Agriculture/Soil and Water conservation, etc. There was increased employment to rural people due to soil and water conservation works and this improved income of people and reduced migration of labour from these places to outside. Soil and water conservation structures in arable and non arable lands reduced soil erosion, soil loss, run-off water, etc. and increased rainwater infiltration, ground water table, surface storage, cropping intensity, productivity of crops, etc. As long as works were carried out based on funding by Government and subsidies provided for supporting income generating enterprises, there was positive impact.

After 1994-95, there was a proposal from the Government that people should contribute 5-10% or more towards soil and water conservation works. Farmers contributed in some of the watersheds based on the direct benefits derived from such activities;

Soil can be well maintained through bunding (mechanical and mechanical-cum-vegetative barriers), deep ploughing, leveling, smoothening, etc. Bunding was accepted by farmers to strengthen existing bunds without any obstruction in their plot. Moisture conservation on measures increased yield magically.

Farmers in different parts reported that the fact that the sustainability of agriculture is only possible by soil and water conservation measures. They also reported that soil erosion can be minimized and irrigation potentials can be improved through soil and water conservation measures. In addition, vegetation covering the soil is a must for minimizing soil loss even further.

Land Use particulars of Beneficiary plots

Table Nos. 3 and 3(a) reveals the land use particulars of beneficiary plots and control plots respectively. It gives us certain positive trends while comparing with the area before and after soil conservation programme. Area increased from 1254.64 acres to 1271.99 acre after the implementation of soil conservation programme. An additional area of 17.35 acre of

land has brought under cultivation which was not cultivated earlier. Hence it can be stated that 1.38% of area over the area cultivated before soil conservation programme is due to the implementation of soil conservation measures. In other words area under cultivation has increased from 91.28% to 92.54% by decreasing the current fallow.

On examining the district wise data a marginal increase is noted in the area additionally brought under cultivation in Palakkad, Pathanathitta, Trissur, Kozhikkode, Malappuram, Thiruvananthapuram, Idukki, Alappuzha.

In control plots also the land use is more or less same as in the area of beneficiary plots, before soil conservation programme. Hence it is suited for a comparison with the beneficiary plots.

In Ernakulam district the list of schemes was not available for the survey.

Table - 2

District wise details of area, cost and number of beneficiaries

Sl No.	District	Area of beneficiaries selected (Acres)	Cost (Rs.)	Number of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1	Thiruvananthapuram				
2	Kollam	36.24	1136974	203	125
3	Pathanamthitta	24.06	1236146	125	125
4	Alappuzha	45.73	2366846	125	125
5	Kottayam	8.45	3091913	125	125
6	Idukki	315.25	2476320	125	125
7	Thrissur	102.19	11635701	142	125
8	Palakkad	122.84	200800	125	125
9	Malappuram	243.52	1398244	143	125
10	Kozhikkode	241.70	148000	125	125
11	Kannur	96.26	325000	125	125
12	Kasaragod	137.73	8732231	125	125
	Total	1374.51	32763750	1490	1377

Table - 3 Land use particulars of Beneficiary Plots

SI. No	Districts	Area cultivated						(Area in Acres)		
		Before SC Work		After SC Work		%	Before SC Work		Current fallow	
		Area	%	Area	%		Area	%	Area	%
1	2	3	4	5	6	7	8			
1	Thiruvananthapuram	31.37	86.56	32.15	88.71	1.12	3.09	0.3		0.83
2	Kollam	19.23	79.93	19.23	79.93	0.17	0.71	0.17		0.71
3	Pathanamthitta	28.69	62.74	30.76	67.26	5.04	11.02	3.61		7.89
4	Alappuzha	5.34	63.20	5.55	65.68	0.39	4.62	0.20		2.37
5	Kottayam	306.42	97.20	306.42	97.20	0	0.00	0		0.00
6	Idukki	99.84	97.70	100.17	98.02	0.45	0.44	0.12		0.12
7	Thrissur	114.05	92.84	115.95	94.39	1.90	1.55	0		0.00
8	Palakkad	217.37	89.26	227.13	93.27	7.09	2.91	0.22		0.09
9	Malappuram	209.42	86.64	210.47	87.08	7.92	3.28	6.87		2.84
10	Kozhikode	87.57	90.97	88.82	92.27	3.45	3.58	1.15		2.93
11	Kannur	134.8	97.87	134.8	97.87	0	0.00	0		0.00
12	Kasaragod	0.54	100.00	0.54	100.00	0	0.00	0		0.00
	Total	1254.64	91.28	1271.99	92.54	27.53	2.00	12.64		0.92

Table - 3 Contd..

Sl. No	Districts	Other use						Area not cultivated						Total	
		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work		Area	%
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%		
1	2	11	12	13	14	15	16	17	18	19	20	21	22		
1	Thiruvananthapuram	3.64	10.04	3.68	10.15	0.11	0.30	0.11	0.30	36.24	100	36.24	100		
2	Kollam	3.78	15.71	3.80	15.79	0.88	3.66	0.86	3.57	24.06	100	24.06	100		
3	Pathanamthitta	10.27	22.46	10.05	21.98	1.73	3.78	1.31	2.86	45.73	100	45.73	100		
4	Alappuzha	2.70	31.95	2.70	31.95	0.02	0.24	0	0.00	8.45	100	8.45	100		
5	Kottayam	8.14	2.58	8.14	2.58	0.69	0.22	0.69	0.22	315.25	100	315.25	100		
6	Idukki	1.90	1.86	1.90	1.86	0	0.00	0	0.00	102.19	100	102.19	100		
7	Thrissur	6.39	5.20	6.39	5.20	0.50	0.41	0.50	0.41	122.84	100	122.84	100		
8	Palakkad	7.85	3.22	5.66	2.32	11.21	4.60	10.51	4.32	243.52	100	243.52	100		
9	Malappuram	5.97	2.47	5.97	2.47	18.39	7.61	18.39	7.61	241.70	100	241.70	100		
10	Kozhikkode	3.20	3.32	4.23	4.39	2.04	2.12	2.06	2.14	96.26	100	96.26	100		
11	Kannur	2.84	2.06	2.84	2.06	0.09	0.07	0.09	0.07	137.73	100	137.73	100		
12	Kasaragod	0	0.00	0	0.00	0	0.00	0	0.00	0.54	100	0.54	100		
	Total	56.68	4.12	55.36	4.03	35.66	2.59	34.52	2.51	1374.51	100	1374.51	100		

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

Sl. No	Districts	Area cultivated		Current follow		Other use		Area not cultivated		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	4.06	87.69	0.00	0.00	0.57	12.31	0.00	0.00	4.63	100
2	Kollam	3.00	81.52	0.01	0.27	0.63	17.12	0.04	1.09	3.68	100
3	Pathanamthitta	10.13	83.65	0.40	3.30	1.58	13.05	0.00	0.00	12.11	100
4	Alappuzha	5.09	74.09	1.32	19.21	0.45	6.55	0.01	0.15	6.87	100
5	Kottayam	44.02	94.99	0.00	0.00	2.32	5.01	0.00	0.00	46.34	100
6	Idukki	18.79	90.47	0.00	0.00	1.38	6.64	0.60	2.89	20.77	100
7	Thrissur	3.67	87.59	0.00	0.00	0.52	12.41	0.00	0.00	4.19	100
8	Palakkad	32.90	85.79	1.60	4.17	2.27	5.92	1.58	4.12	38.35	100
9	Malappuram	39.60	92.54	1.00	2.34	1.19	2.78	1.00	2.34	42.79	100
10	Kozhikkode	34.32	85.95	1.00	2.50	4.07	10.19	0.54	1.35	39.93	100
11	Kannur	16.49	95.32	0.00	0.00	0.81	4.68	0.00	0.00	17.30	100
12	Kasaragod										
	Total	212.07	89.50	5.33	2.25	15.79	6.66	3.77	1.59	236.96	100

Crop Pattern

In order to reduce the soil loss an appropriate cropping pattern is essential. The selection of suitable vegetation that form good canopy can reduce erosion since soil loss is governed by the extent of exposed land surface. The binding force of the roots also offers good resistance to erosion. Grass roots have excellent soil binding property. Legumes are also good soil binders. The grasses, legumes and tree crops are classified as erosion preventing or soil conserving crops while cereals, tapioca, ginger, etc. are erosion permitting/erosion favouring crops.

Depending upon the capability class to which a land belongs and the socio-economic needs of the people, the appropriate crops can be selected to achieve maximum conservation of soil and water.

Contour Farming

Contour farming refers to village practices of applying all treatments along contour; i.e. across the direction of the slope. The crops are cultivated along contour ridges and furrows. In regions of low rainfall contour farming helps in the conservation of rainwater and in human areas it reduces soil loss and increases recharge of aquifers. This practice can minimize the effects of flash floods and droughts.

Mixed farming, intercropping, mixed cropping; multistoried cropping, etc. are also beneficial in controlling soil erosion.

The growing of perennial horticultural crops, including plantation crops will give a permanent protective cover for the soil. In high rainfall areas of the humid tropics this higher level tree cover for the soil helps in reducing the erosive action of highly intensive rainfall.

Consequent in the introduction of the soil conservation programmes significant changes in the cropping pattern occurred which favours perennial crops. The area under perennial crops has increased from 1004.99 acre to 1073.1 acre. It showed an increase of

6.78%. At the same time the percentage change occurred in the cultivation of seasonal crops recorded as -23.62 %. From this we can arrive at the conclusion that the farmers have shown 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 increase soil erosion. In seasonal crops the cultivation of Tapioca, Banana, Plantain Paddy are exhibited increases. The respective percentage changes are recorded as 66.75 % and 54.55 %. The plantain, cultivation percentage increase recorded as 20.99 % At the same time in paddy cultivation percentage variation is 3.78%.

Table No. 5 reveals that after the introduction of soil conservation programmes, Rubber has occupied the largest area under perennial crops; the percentage increase is 11.28 %. Coconut comes next with an increase of 3.79%. The area under Arecanut has decreased to 24.5 % after the Soil Conservation Programme.

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.

Table - 4
Crop Pattern (Area wise)

Sl. No.	Districts	Perennial crops			Seasonal Crops				
		Before SC work	%	After SC work	Before SC work	%	After SC work		
1	2	3	4	5	6	7	8	9	10
1	Thiruvananthapuram	28.37	86.86	33.54	82.17	4.29	13.14	7.28	17.83
2	Kollam	13.11	84.04	23.90	91.15	2.49	15.96	2.32	8.85
3	Pathanamthitta	21.51	94.05	22.00	87.86	1.36	5.95	3.04	12.14
4	Alappuzha	5.85	92.86	7.85	90.02	0.45	7.14	0.87	9.98
5	Kottayam	290.22	99.26	291.37	99.04	2.17	0.74	2.83	0.96
6	Idukki	61.06	74.72	72.61	77.93	20.66	25.28	20.56	22.07
7	Thrissur	87.93	79.22	88.17	77.46	23.06	20.78	25.66	22.54
8	Palakkad	164.47	76.22	187.83	85.57	51.32	23.78	31.68	14.43
9	Malappuram	149.37	86.21	150.58	97.39	23.89	13.79	4.03	2.61
10	Kozhikkode	73.04	89.48	83.66	92.12	8.59	10.52	7.16	7.88
11	Kannur	109.83	99.26	111.06	99.27	0.82	0.74	0.82	0.73
12	Kasaragod	0.23	100	0.53	100	0.00	0	0.00	0
	Total	1004.99	87.84	1073.1	90.99	139.10	12.16	106.25	9.01

Table - 4 Contd..

Sl No	Districts	Total Gross area cropped			
		Before SC work	%	After SC work	%
1	2		12	13	14
1	Thiruvananthapuram	32.66	100	40.82	100
2	Kollam	15.60	100	26.22	100
3	Pathanamthitta	22.87	100	25.04	100
4	Alappuzha	6.30	100	8.72	100
5	Kottayam	292.39	100	294.20	100
6	Idukki	81.72	100	93.17	100
7	Thrissur	110.99	100	113.83	100
8	Palakkad	215.79	100	219.51	100
9	Malappuram	173.26	100	154.61	100
10	Kozhikode	81.63	100	90.82	100
11	Kannur	110.65	100	111.88	100
12	Kasaragod	0.23	100	0.53	100
	Total	1144.09	100	1179.35	100

Table 5 – Area under selected perennial crops

Sl. No	Districts	Coconut			Arecanut			Cashew		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	15.04	15.96	6.12	0.07	0.09	28.57	0	0.08	0
2	Kollam	5.73	6.95	21.29	0.22	0.37	68.18	0.61	0.78	27.87
3	Pathanamthitta	5.89	6.09	3.4	0.17	0.17	0	0.33	0.33	0
4	Alappuzha	4.38	5.39	23.06	0.14	0.35	150	0.12	0.15	25
5	Kottayam	13.07	13.52	3.44	0.28	0.28	0	0.49	0.49	0
6	Idukki	5.66	7.27	28.45	0	0	0	0	0	0
7	Thrissur	40.72	40.24	-1.18	2.28	2.28	0	1.85	1.72	-7.03
8	Palakkad	61.23	71.11	16.14	0.57	0.61	7.02	3.64	10.02	175.27
9	Malappuram	111.27	111.08	-0.17	3.68	2.83	-23.1	2.57	1.66	-35.41
10	Kozhikode	45.22	43.79	-3.16	6.8	3.62	-46.76	0.91	1.48	62.64
11	Kannur	9.52	8.38	-11.97	2.16	1.76	-18.52	65.52	49.53	-24.4
12	Kasaragod	0.11	0.11	0	0	0	0	0	0	0
	Total	317.84	329.89	3.79	16.37	12.36	-24.5	76.04	66.24	-12.89

Table - 5 Contd..

Sl. No	Districts	Rubber			Pepper			Jack			Mango		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17	16	17	18	19	20	21
1	Thiruvananthapuram	11.11	14.98	34.83	0.01	0.32	3100	1.88	1.82	-3.19	0.26	0.29	11.54
2	Kollam	2.42	9.88	308.26	0.79	1.14	44.3	2.32	3.02	30.17	0.5	1.09	118
3	Pathanamthitta	14.73	15	1.83	0.28	0.29	3.57	0	0	0	0.01	0.01	0
4	Alappuzha	0.01	0.01	0	0.1	0.16	60	0.51	0.69	35.29	0.45	0.83	84.44
5	Kottayam	266	266.3	0.11	8.15	8.58	5.28	1.15	1.12	-2.61	0	0	0
6	Idukki	17.92	25.45	42.02	14.25	14.65	2.81	0	0	0	0	0	0
7	Thrissur	38.47	39.32	2.21	0	0	0	0.02	0.02	0	0.07	0.07	0
8	Palakkad	87.23	89.73	2.87	8.27	8.37	1.21	2.53	2.86	13.04	1	5.13	413
9	Malappuram	27.23	30.39	11.6	0.8	0.8	0	2.07	2.07	0	0.38	0.38	0
10	Kozhikkode	10.17	22.59	122.12	2.66	2.12	-20.3	3.5	4.35	24.29	0.98	0.92	-6.12
11	Kannur	29.06	47.35	62.94	2.84	2.73	-3.87	0.5	0.5	0	0.08	0.08	0
12	Kasaragod	0.12	0.37	208.33	0	0.05	0	0	0	0	0	0	0
	Total	504.47	561.37	11.28	38.15	39.21	2.78	14.48	16.45	13.6	3.73	8.8	135.92

Table -- 5 Contd..

Sl No	Districts	Coco			Coffee			Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17			20	21	22	23
1	Thiruvananthapuram	0	0	0	0	0	0	0	0	0	28.37	33.54	18.22
2	Kollam	0	0	0	.52	.67	0	0.52	0.67	28.85	13.11	23.9	82.3
3	Pathanamthitta	0	0	0	0.10	0.11	10.00	0.00	0.00	0	21.51	22	2.28
4	Alappuzha	0	0	0	0	0	0	0.14	0.27	92.86	5.85	7.85	34.19
5	Kottayam	1.08	1.08	0	0	0	0	0	0	0	290.22	291.37	0.4
6	Idukki	19.95	21.51	7.82	2.74	2.71	-1.09	0.54	1.02	88.89	61.06	72.61	18.92
7	Thrissur	0	0	0	0	0	0	4.52	4.52	0	87.93	88.17	0.27
8	Palakkad	0	0	0	0	0	0	0.00	0.00	0	164.47	187.83	14.2
9	Malappuram	0	0	0	0.10	0.10	0	1.27	1.27	0	149.37	150.58	149.37
10	Kozhikkode	2.2	4.05	84.09	0.1	0.13	30.00	0.50	0.61	22.00	73.04	83.66	73.04
11	Kannur	0.15	0.69	360	0	0.04	0	0.00	0.00	0	109.83	111.06	109.83
12	Kasaragod	0	0	0	0	0	0	0.00	0.00	0	0.23	0.53	0.23
	Total	23.38	27.33	16.89	3.04	3.09	1.64	7.49	8.36	11.62	1004.99	1073.10	6.78

Table 6 – Area under selected seasonal crops

(Area in Acres)

SI No	Districts	Paddy			Tapioca			Plantain		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	0	0	0	1.31	2.98	127.48	1.48	2.48	67.57
2	Kollam	0	0	0	0.28	0.24	14.29	1.25	1.39	11.20
3	Pathanamthitta	0	0	0	0.9	1.76	95.56	0.15	0.59	293.33
4	Alappuzha	0	0	0	0.04	0.14	250.00	0.01	0.03	200.00
5	Kottayam	0	0	0	0.82	1.02	24.39	0.87	1.17	34.48
6	Idukki	15.65	15.3	-2.24	2.89	2.85	-1.38	0.71	1.2	69.01
7	Thrissur	15.68	17.58	12.12	0.2	0.65	225.00	6.58	6.83	3.80
8	Palakkad	0.35	0	-100.00	0	3	0	0	0	46.39
9	Malappuram	0	0	0	0.15	0.65	0	0	0	8.28
10	Kozhikkode	0.05	0.05	0.00	1.59	0.35	77.99	2.01	2.25	11.94
11	Kannur	0	0	0	0	0	0	0.81	0.81	0.00
12	Kasaragod	0	0	0	0	0	0	0	0	0
	Total	31.73	32.93	3.78	8.18	13.64	66.75	16.53	20.00	20.99

Table - 6 Contd.,

Sl. No	Districts	Ginger			Banana			Vegetables			Pineapple		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17	18	19	20	21	22	23
1	Thiruvananthapuram	0	0.34	0	0	0	0	0.13	0.56	330.77	0.01	0.18	1700.00
2	Kollam	0.02	0.03	50.00	0.35	0.39	11.43	0.02	0	-100.00	0.14	0.12	14.29
3	Pathanamthitta	0.01	0.05	400.00	0.03	0.18	500.00	0.07	0.11	57.14	0	0	0
4	Alappuzha	0	0	0	0.37	0.51	37.84	0	0.1	0	0	0	0
5	Kottayam	0	0	0	0.48	0.64	33.33	0	0	0	0	0	0
6	Idukki	1.35	0.77	-42.96	0.06	0.09	0	0	0	0	0	0	0
7	Thrissur	0.3	0.3	0	0	0	0	0	0	0	0	0	0
8	Palakkad	0	0	0	0.49	0.51	0	7.25	9.25	27.59	0	0	0
9	Malappuram	0	0	0	0	0	0	0	0	0	0	0	0
10	Kozhikode	0.97	0.51	-47.42	0.41	1.07	160.98	0.09	0.17	88.89	0.42	0.47	11.90
11	Kannur	0	0	0	0.01	0.01	0.00	0	0	0	0	0	0
12	Kasaragod	0	0	0	0	0	0	0	0	0	0	0	0
	Total	2.65	2.00	-24.53	2.20	3.40	54.55	7.56	10.19	34.79	0.57	0.77	35.09

Table - 6 Contd..

Sl. No	Districts	Chennai			Kollacasia			Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17	18	19	20	21	22	23
1	Thiruvananthapuram	0	0	0	0	0	0	1.36	0.74	-45.59	4.29	7.28	69.7
2	Kollam	0.02	0.03	50	0.32	0.1	-68.75	0.09	0.02	-77.78	2.49	2.32	-6.83
3	Pathanamthitta	0.13	0.2	53.85	0.07	0.12	71.43	0	0.03	0	1.36	3.04	123.53
4	Alappuzha	0.01	0.03	200	0.02	0.05	150	0	0.01	0	0.45	0.87	93.33
5	Kottayam	0	0	0	0	0	0	0	0	0	2.17	2.83	30.41
6	Idukki	0	0.35	0	0	0	0	0	0	0	20.66	20.56	-0.48
7	Thrissur	0	0	0	0	0	0	0.3	0.3	0	23.06	25.66	11.27
8	Palakkad	0	0	0	0	0	0	42.26	17.5	-58.59	51.32	31.68	-38.27
9	Malappuram	0	0	0	0	0	0	22.05	1.55	-92.97	23.89	4.03	-83.19
10	Kozhikode	1.07	0.58	-45.79	1.33	1.29	-3.01	0.65	0.42	-35.38	8.59	7.16	-16.65
11	Kannur	0	0	0	0	0	0	0	0	0	0.82	0.82	0
12	Kasaragod	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1.23	1.19	-3.25	1.74	1.56	-10.34	66.71	20.57	-69.17	139.10	106.25	-23.67

Impact of Soil Conservation Treatment on the Yield of Crops

For studying the impact of soil conservation treatment on the yield of crops a detailed survey was conducted following the "Before" and "After" method. Details regarding the yield and value of crops are collected from the beneficiaries in the scheme area. District wise details are presented in table No. 7 and 8 Survey results reveals that in most cases, the crop yields after the implementation of the programme were higher than that of before. Therefore the total output from crops represented a big increase. As much as major portion of this output came from perennial crops indicating improved stability in output. Almost all perennial crops have also shown a marked improvement.

For example in Idukki district total cropped area before soil conservation works was 81.72 acres. It increases to 93.17 acres after the implementation of soil conservation measures. The increase in area is accounted as 11.45 acres. The percentage increase recorded as 14.01 %. When we analyse the yield of perennial crops in this district it can be seen that production of Coconut, Pepper, Rubber, Coffee, Cocco, Cardamom ,etc. increased. .

In Kollam, Kozhikkode, Thiruvananthapuram and Palakkad districts before soil conservation work the area were 15.60 acres, 81.63 acres, 32.66 acres and 215.79 acres respectively. It increased to 26.22, 90.82, 40.82 and 219.51 acres after the implementation of soil conservation work. Increase in area accounted as 10.62 in Kollam., In Kozhikkode it increases 9.19 acres, in Thiruvananthapuram it increases 8.16 acres, in Palakkad it increases 3.72 acres.

Production impact is also commendable. Output of all perennial crops increased after soil conservation works.

The production details of seasonal crops of these districts shows that paddy area and production increased and in the case of banana, other plantain and tapioca also the area and production increased.

Table 7
Crop wise yield and value of perennial crops in scheme area.

District	Name of Crop	Unit	Before SC work		After SC work		
			Quantity	Value	Quantity	Value	Value at constant price
1	2	3	4	5	6	7	8
Thiruvananthapuram	Coconut	Nos	15455.00	95204.00	27245.00	120966.00	68619.00
	Arecanut	Nos.	1200.00	564.00	2900.00	1508.00	624.00
	Pepper	Qtl.	0.08	432.00	0.83	10794.00	1040.00
	Rubber	Qtl.	0.00	0.00	181.85	2714113.00	0.00
	Jack	Qtl	43.20	38880.00	105.00	31500.00	12960.00
	Total				135080		2878881
Kollam	Coconut	Nos	3090.60	22127.00	4541.95	25800.00	17556.00
	Arecanut	Nos.	1932.00	871.00	3144.00	1506.00	925.00
	Cashew	Qtl.	1.44	5339.00	2.32	9872.00	6127.00
	Pepper	Qtl.	0.42	2573.00	0.86	11069.00	5406.00
	Rubber	Qtl.	21.41	111010.00	30.49	370363.00	260068.00
	Pappaya	Qtl	3.61	1083.00	4.99	1996.00	1444.00
	Jack	Qtl	29.10	13095.00	44.79	17916.00	11640.00
	Mango	Qtl	2.59	1211.00	5.11	6981.00	3538.00
	Drumstic	Qtl	0.66	1320	0.94	2350	1650
	Tamarind	Qtl	0.41	1107.00	0.90	3330.00	1517.00
Total				159736		451183	309871
Pathanamthitta	Coconut	Nos	2478.00	17973.00	3453.00	20518.00	14724.00
	Arecanut	Nos.	4030.00	1897.00	5365.00	2683.00	2015.00
	Cashew	Qtl.	1.20	3608.00	1.40	5685.00	4873.00
	Pepper	Qtl.	2.10	12690.00	2.80	38041.00	28531.00
	Rubber	Qtl.	100.65	526505.00	121.50	1591288.00	1318215.00
	Mango	Qtl	0.00	0.00	0.20	263.00	0.00
	Coffee	Qtl	1.15	3347.00	1.98	7920.00	4600.00
	Total				566020		1666398

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Alappuzha	Coconut	Nos	15048.00	94658.00	20425.00	108466.00	79912.00
	Arecanut	Nos.	4865.00	1752.00	6410.00	2694.00	2045.00
	Cashew	Qtl.	1.55	4478.00	2.01	8241.00	6355.00
	Pepper	Qtl.	0.17	1059.00	0.12	1320.00	1870.00
	Jack	Qtl	17.05	11935.00	22.97	4594.00	3410.00
	Mango	Qtl	8.70	5411.00	10.65	12523.00	10230.00
	Tamarind	Qtl	0.32	599.00	0.42	756.00	576.00
	Total			119892		138594	104398
Kottayam	Coconut	Nos	26195.00	193582.00	28667.00	155943.00	142496.00
	Pepper	Qtl.	7.79	47289.00	9.11	125073.00	106950.00
	Rubber	Qtl.	1979.60	10416653.00	2393.70	31142037.00	25754596.00
	Jack	Qtl	0.00	0.00	2.00	412.00	0.00
	Coco	Qtl	8.02	16626.00	10.83	32805.00	24293.00
	Total			10674150		31456270	26028335
Idukki	Coconut	Nos	6125.00	47474.00	10085.00	59504.00	36139.00
	Pepper	Qtl.	25.80	159324.00	36.80	504450.00	353663.00
	Rubber	Qtl.	31.15	160674.00	39.77	520591.00	407755.00
	Coffee	Qtl	16.15	56154.00	23.30	90174.00	62503.00
	Coco	Qtl	80.25	165800.00	127.30	480174.00	302702.00
	Cardamum	Qtl	0.55	15785	2.40	195120	44715
	Total			605211		1850013	1207477

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Thrissur	Coconut	Nos	162952.00	888098.0 0	210600.00	855035.00	661584.00
	Arecanut	Nos.	135425.00	63651.00	184247.00	103179.00	75838.00
	Cashew	Qtl.	15.70	57071.00	12.20	42689.00	54936.00
	Rubber	Qtl.	479.30	2526871.00	561.80	7325872.00	6250072.00
	Jack	Qtl	0.50	300.00	2.20	691.00	157.00
	Mango	Qtl	5.60	3976.00	7.05	15588.00	12382.00
	Total			3539967		8343054	7054969
Palakkad	Coconut	Nos	300367.00	1676050.00	386834.00	1574415.00	1222494.00
	Arecanut	Nos.	13470.00	4984.00	70233.00	28093.00	5388.00
	Cashew	Qtl.	156.20	570287.00	202.97	806401.00	620584.00
	Pepper	Qtl.	13.16	78199.00	22.03	295820.00	176713.00
	Rubber	Qtl.	1318.48	6833688.00	1581.46	20649126.00	17215396.00
	Jack	Qtl	1.40	700.00	2.30	831.00	506.00
	Mango	Qtl	7.00	3479.00	99.50	123380.00	8680.00
	Total			9167387		23478066	19249761
Malappuram	Coconut	Nos	206530.00	1065694.00	276980.00	994360.00	741444.00
	Arecanut	Nos.	305150.00	91545.00	383950.00	126704.00	100700.00
	Cashew	Qtl.	43.40	168479.00	45.45	177301.00	169304.00
	Pepper	Qtl.	6.25	37357.00	10.10	135451.00	83819.00
	Rubber	Qtl.	400.32	2094073.00	466.67	5995309.00	5142911.00
	Total			3457148		7429125	6238178
Kozhikode	Coconut	Nos	175165.00	987932.00	178124.00	626862.00	616449.00
	Arecanut	Nos.	510500.30	296091.00	268230.38	85833.00	163359.00
	Cashew	Qtl.	5.15	18077.00	3.85	16154.00	21609.00
	Pepper	Qtl.	2.57	15218.00	1.67	22211.00	34181.00
	Rubber	Qtl.	70.05	362651.00	37.82	490565.00	908622.00
	Coffee	Qtl	1.43	4760.00	2.93	10051.00	4905.00
	Coco	Qtl	1.20	2349.00	19.67	64341.00	3925.00
	Total			1687078		1316017	1753050

(Table 7 Contd..)

1	2	3	4	5	6	7	8
Kannur	Coconut	Nos	41375.00	222598.00	44850.00	139035.00	128263.00
	Arecanut	Nos.	103600.00	38332.00	130000.00	49400.00	39368.00
	Cashew	Qtl.	520.15	1952126.00	352.75	1403240.00	2069157.00
	Pepper	Qtl.	2.71	16048.00	2.77	37305.00	36497.00
	Rubber	Qtl.	268.50	1416606.00	301.80	3898652.00	3468483.00
	Total			3645710		5527632	5741768
Kasargod	Coconut	Nos	235.00	1483.00	280.00	1006.00	844.00
	Pepper	Qtl.	0.00	0.00	0.25	3342.00	0.00
	Rubber	Qtl.	0.00	0.00	0.90	12348.00	0.00
	Total			1483		16696	844
STATE	Coconut	Nos	955015.60	5312873	1192084.95	4681910	3730524
	Arecanut	Nos.	1080172.30	499687	1054479.38	401600	390262
	Cashew	Qtl.	744.79	2779465	622.95	2469583	2952945
	Pepper	Qtl.	61.05	370189	87.34	1184876	828670
	Rubber	Qtl.	4669.46	24448731	5717.76	74710264	60726118
	Pappaya	Qtl	3.61	1083	4.99	1996	1444
	Jack	Qtl	91.25	64910	179.26	55944	28673
	Mango	Qtl	23.89	14077	122.51	158735	34830
	Coffee	Qtl	18.73	64261	28.21	108145	72008
	Coco	Qtl	89.47	184775	157.80	577320	330920
	Tamarind	Qtl	0.73	1706	1.32	4086	2093
	Drumstic	Qtl	0.66	1320	0.94	2350	1650
	Cardamum	Qtl	0.55	15785	2.40	195120	44715
	Total			33758862		84551929	69144852

Table – 8 – Crop wise yield and value of seasonal crops in scheme area.

District	Name of Crop	Unit	Before SC work		After SC work		
			Quantity	Value	Quantity	Value	Value at constant price
1	2	3	4	5	6	7	8
Thiruvananthapuram	Tapioca	Qtl	14.40	5732	43.90	22653	7431
	Ginger	Qtl	0.00	0	0.10	350	0
	Plantain	Qtl	102.20	74097	246.67	264189	109458
	Vegitables	Qtl	0.10	60	1.30	1560	120
	Pineapple	Qtl	0.00	0	0.10	120	0
	Total			79889		288872	117009
Kollam	Tapioca	Qtl	5.33	1963	7.21	3850	2846
	Ginger	Qtl	0.22	1294	0.31	1183	840
	Plantain	Qtl	7.35	4948	10.71	10728	7362
	Banana	Qtl	3.55	4041	4.80	10220	7559
	Vegitables	Qtl	0.01	4	0.02	24	12
	Pineapple	Qtl	0.66	284	1.06	1343	836
	Chenai	Qtl	0.82	555	1.16	1407	995
	Kolacasia	Qtl	2.51	4148	3.70	8395	5695
	Turmeric	Qtl	0.66	3045	0.89	1157	858
	Total			20282		38307	27003

Table – 8 Contd.

1	2	3	4	5	6	7	8
Pathanamthitta	Tapioca	Qtl	42.40	17300	75.35	48378	27223
	Ginger	Qtl	0.20	1080	1.90	7283	767
	Plantain	Qtl	8.99	6544	17.09	17877	9404
	Banana	Qtl	2.37	2868	13.40	28476	5036
	Chenai	Qtl	2.85	2038	3.70	4722	3637
	Total				29830		106736
Alappuzha	Tapioca	Qtl	1.90	790	11.90	7344	1173
	Plantain	Qtl	0.30	184	0.47	474	303
	Banana	Qtl	15.00	16936	26.93	59873	33349
	Chenai	Qtl	0.08	74	1.45	2065	114
	Total				17984		69756
Kottayam	Tapioca	Qtl	53.00	23797	89.00	58384	34768
	Ginger	Qtl	1.50	8025	3.80	14140	5582
	Plantain	Qtl	32.70	21974	52.00	49297	31000
	Banana	Qtl	48.00	60336	30.00	63990	102384
	Total				114132		185811
Idukki	Paddy	Qtl	176.80	122699	248.50	269129	191477
	Tapioca	Qtl	69.50	30374	78.75	52845	46638
	Ginger	Qtl	5.35	28623	5.60	16150	15429
	Plantain	Qtl	58.00	32364	110.30	98502	51796
	Banana	Qtl	1.00	1078	3.00	5337	1779
	Total				215138		441963
Thrissur	Paddy	Qtl	343.30	221085	423.55	427363	346391
	Tapioca	Qtl	62.50	26000	78.16	46271	37000
	Ginger	Qtl	2.75	13200	3.50	12446	9779
	Plantain	Qtl	429.55	228096	462.60	336312	312285
	Banana	Qtl	15.40	18326	28.95	53702	28567
	Total				506707		876094

Table – 8 Contd..

1	2	3	4	5	6	7	8
Palakkad	Paddy	Qtl	5.00	3155	0.00	0	5355
	Tapioca	Qtl	0.00	0	280.00	145320	0
	Plantain	Qtl	85.30	47598	132.00	114311	73869
	Banana	Qtl	32.00	31680	33.25	59717	57472
	Groundnut	Qtl	240.50	226311	88.30	162561	442762
	Turmeric	Qtl	0.00	0	0.64	504	0
	Total			308744		482413	579458
Malappuram	Plantain	Qtl	0.50	345	0.50	496	496
	Total			345		496	496
Kozhikode	Paddy	Qtl	1.00	747	1.00	918	918
	Tapioca	Qtl	58.40	24294	10.50	7583	42176
	Ginger	Qtl	3.11	15399	1.75	4628	8225
	Plantain	Qtl	74.34	55467	103.56	111430	79989
	Banana	Qtl	18.95	20428	27.10	54175	37883
	Pineapple	Qtl	2.34	1102	2.59	4087	3693
	Chenai	Qtl	21.45	17743	16.85	23528	29951
	Turmeric	Qtl	11.72	47594	7.46	51689	81206
	Total			182774		258038	284041
Kannur	Plantain	Qtl	50.90	34157	53.90	63387	59859
	Banana	Qtl	0.80	844	0.80	1572	1572
	Total			35001		64959	61431
STATE	Paddy	Qtl	526.10	347686	673.05	697410	544141
	Tapioca	Qtl	307.43	130250	674.77	392628	199255
	Ginger	Qtl	13.13	67621	16.96	56180	40622
	Plantain	Qtl	850.13	505774	1189.80	1067003	735821
	Banana	Qtl	137.07	156537	168.23	337062	275601
	Vegitables	Qtl	0.11	64	1.32	1584	132
	Pineapple	Qtl	3.00	1386	3.75	5550	4529
	Chenai	Qtl	25.20	20410	23.16	31722	34697
	Kolacasia	Qtl	2.51	4148	3.70	8395	5695
	Groundnut	Qtl	240.50	226311	88.30	162561	442762
	Turmeric	Qtl	12.38	50639	8.99	53350	82064
	Total			1510826		2813445	2365319

Table 9

Quantity and Value of Selected perennial and seasonal crops for the years 2010-11

1	Name of Crops	Units	Before SC Work		After SC Work		Value at constant Price
			Quantity	Values (Rs)	Quantity	Value (Rs)	
2	3	4	5	6	7	8	
A. Perennial Crops	Coconut	Nos	955015.60	5312873	1192084.95	4681910	3730524
	Arecanut	Nos.	1080172.30	499687	1054479.38	401600	390262
	Cashew	Qtl.	744.79	2779465	622.95	2469583	2952945
	Pepper	Qtl.	61.05	370189	87.34	1184876	828670
	Rubber	Qtl.	4669.46	24448731	5717.76	74710264	60726118
	Pappaya	Qtl	3.61	1083	4.99	1996	1444
	Jack	Qtl	91.25	64910	179.26	55944	28673
	Mango	Qtl	23.89	14077	122.51	158735	34830
	Coffee	Qtl	18.73	64261	28.21	108145	72008
	Coco	Qtl	89.47	184775	157.80	577320	330920
	Tamarind	Qtl	0.73	1706	1.32	4086	2093
	Drumstic	Qtl	0.66	1320	0.94	2350	1650
	Cardamum	Qtl	0.55	15785	2.40	195120	44715
	Total(A)			33758862		84551929	69144852
B. Seasonal Crops	Paddy	Qtl	526.10	347686	673.05	697410	544141
	Tapioca	Qtl	307.43	130250	674.77	392628	199255
	Ginger	Qtl	13.13	67621	16.96	56180	40622
	Plantain	Qtl	850.13	505774	1189.80	1067003	735821
	Banana	Qtl	137.07	156537	168.23	337062	275601
	Vegitables	Qtl	0.11	64	1.32	1584	132
	Pineapple	Qtl	3.00	1386	3.75	5550	4529
	Chenai	Qtl	25.20	20410	23.16	31722	34697
	Kolacasia	Qtl	2.51	4148	3.70	8395	5695
	Groundnut	Qtl	240.50	226311	88.30	162561	442762
	Tumeric	Qtl	12.38	50639	8.99	53350	82064
	Total			1510826		2813445	2365319
	All Crops (A+B)			35269688		87365374	71510171

2.2. Cost Benefit Analysis of the Soil Conservation Programmes

An important objective of a project evaluation is to estimate the various impacts of its operation such as income, employment, demographic change, regional development and so on. Hence an analysis to appraise the performance of operating investment projects is essential for improved planning process. Degradation of land due to soil erosion leads to destruction of agricultural land. If it continue over a period, the entire soil will be lost and the land will become 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 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 into consideration.

Protective benefits are the intangible benefits derived from implementation of soil conservation programme. 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 it's increased productive potentialities.

In the light of the present study an attempt is made for cost benefit analysis with the collected data. Total cost incurred for the soil conservation works, including maintenance work for the 52 schemes is Rs.3,27,63,750/-

The total area under cultivation after soil conservation work was 1271.99 acres. The value of crops before the soil conservation programme comes to Rs.3,52,69,688/- The value of crops after the implementation of soil conservation programme has also been calculated as Rs. 8,73,65,374/- Thus the additional benefits due to the implementation of soil conservation programme is worked out to be Rs.5,20,95,686/-. It is estimated that the value at constant price as Rs. 7,15,10,171/- .

Several benefits flow from the soil conservation programme implementation. Three of them, which derive special attention, are taken up for consideration.

They are:

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

(i) Extension of area under cultivation

The study revealed that 17.35 acre of land has been additionally brought under cultivation by cultivating areas which were not cultivated before soil conservation programme. This benefit is achieved only due to the implementation of soil conservation programme.

(ii) Increase in Productivity

Productivity also increased due to the implementation of soil conservation programme. In the case of coconut it is recorded as 24.82%, cardamom 336.36%, Rubber 22.45%, Banana 22.73%, Pepper 43.06% etc. As a seasonal crop productivity of tapioca increased to 119.49%.

(iii) Diversification of cropping pattern

Soil Conservation Programmes increase the soil capacity and which facilitates the cultivation of more remunerative crops. This advantage can be reaped in full, only if the conservation programmes are followed properly, i.e. the dissimulation 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 encouraging performance. The increase in area of perennial crops is higher over the area under same before soil conservation programme (6.78%). Growing of perennial crops will accelerate conservation of soil more affectively.

Occupational Profile

The occupational profile of the selected beneficiaries reveals that 40.38% included agriculture job, 27.89% are accounted as non-agriculture; 15.47% agricultural labourers and 16.26% are categorized as non-agricultural labourers. Details are presented in Table No. 14 and 14 (a)

Table 10 - Total Income, expenditure and Net Income of Scheme area (Rs)

Sl No	Name of District	Income (Rs)		Expenditure (Rs)		Net Income (Rs)	
		Before SC work	After SC work	Before SC work	After SC work	Before SC work	After SC work
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	214969	3167753	188945	1125940	26024	2041813
2	Kollam	180018	489490	79348	134943	100670	354547
3	Pathanamthitta	595850	1773134	190120	462070	405730	1311064
4	Alappuzha	137876	208350	57455	107675	80421	100675
5	Kottayam	10788282	31642081	2494710	8956225	8293572	22685856
6	Idukki	820349	2291976	584150	1239255	236199	1052721
7	Thrissur	4046674	9219148	2371345	3723753	1675329	5495395
8	Palakkad	9476131	23960479	3322046	6124013	6154085	17836466
9	Malappuram	3457493	7429621	1241300	2308700	2216193	5120921
10	Kozhikkode	1869852	1574055	793470	952183	1076382	621872
11	Kannur	3680711	5592591	803267	1855558	2877444	3737033
12	Kasaragod	1483	16696	0	11000	1483	5696
State		35269688	87365374	12126156	27001315	23143532	60364059

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

Sl No	Name of District	Income	Expenditure	Net Income
1	2	3	4	5
1	Thiruvananthapuram	91088	71000	20088
2	Kollam	23771	17009	6762
3	Pathanamthitta	333475	112690	220785
4	Alappuzha	65374	30650	34724
5	Kottayam	4157570	1278300	2879270
6	Idukki	384422	242400	142022
7	Thrissur	78823	52900	25923
8	Palakkad	2939408	1008287	1931121
9	Malappuram	817514	347550	469964
10	Kozhikkode	546072	357680	188392
11	Kannur	677269	213980	463289
State		10114786	3732446	6382340

Table 11 – Income per Acre before and after soil conservation programme

Sl No	Name of District	Before SC work			After SC work		
		Area in acre	Net Income (Rs)	Net Income per acre (Rs)	Area in acre	Net Income (Rs)	Net Income per acre (Rs)
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	31.37	26024	830	32.15	2041813	63509
2	Kollam	19.23	100670	5235	19.23	354547	18437
3	Pathanamthitta	28.69	405730	14142	30.76	1311064	42622
4	Alappuzha	5.34	80421	15060	5.55	100675	18140
5	Kottayam	306.42	8293572	27066	306.42	22685856	74035
6	Idukki	99.84	236199	2366	100.17	1052721	10509
7	Thrissur	114.05	1675329	14689	115.95	5495395	47395
8	Palakkad	217.37	6154085	28312	227.13	17836466	78530
9	Malappuram	209.42	2216193	10583	210.47	5120921	24331
10	Kozhikkode	87.57	1076382	12292	88.82	621872	7001
11	Kannur	134.80	2877444	21346	134.80	3737033	27723
12	Kasaragod	0.54	1483	2746	0.54	5696	10548
State		1254.64	23143532	18446	1271.99	60364059	47456

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

Sl No	Name of District	Area in acre	Net Income (Rs)	Net Income per acre
1	2	3	4	5
1	Thiruvananthapuram	4.06	20088	4948
2	Kollam	3.00	6762	2254
3	Pathanamthitta	10.13	220785	21795
4	Alappuzha	5.09	34724	6822
5	Kottayam	44.02	2879270	65408
6	Idukki	18.79	142022	7558
7	Thrissur	3.67	25923	7063
8	Palakkad	32.90	1931121	58697
9	Malappuram	39.60	469964	11868
10	Kozhikkode	34.32	188392	5489
11	Kannur	16.49	463289	28095
State		212.07	6382340	30095

Chapter III

3.1 General Observations

During the survey period the staff of this department have visited all the beneficiary plots.

The distribution of holdings of the selected beneficiaries of the soil conservation programmes reveals that 66.74% of the beneficiary holding belongs to less than one acre, 25.27% have holding area between one acre to 3 acre. And above 3 acre were 5.16%, up to 5 acres were 2.83% respectively.

The opinion of selected beneficiaries are collected. Out of that 16.41% of the beneficiaries reported that contour bunds effectively control soil erosion while about 74.37 percent opinioned that it moderately controls soil erosion. The rest 9.22% are of opinion that it has no effect.

About the fertility of the soil 5.59% are of the view that the conservation measures have improved the fertility of the soil remarkably. While 94.05% reported that the fertility of the soil has improved moderately and 0.36% opinioned that it has no effect on the fertility of the soil.

Similarly regarding the moisture retention 4.72% reported that the scheme has substantially increased moisture retention while 94.55% reported that the scheme has caused moisture retention moderately only. 0.73% are of no effect. Details are presented in table No. 12

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

Sl No	Name of District	Effectiveness of contour bunds			Fertility of soil			Moisture retention			Total
		Effectively controlled	Moderately controlled	No effect	Remarkably controlled	Moderately controlled	No effect	Substantially controlled	Moderately controlled	No effect	
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	1	124	0	1	124	0	3	122	0	125
2	Kollam	0	2	123	2	122	1	1	123	1	125
3	Pathanamthitta	2	123	0	3	122	0	3	121	1	125
4	Alappuzha	0	123	2	0	124	1	0	124	1	125
5	Kottayam	67	58	0	42	83	0	42	83	0	125
6	Idukki	7	117	1	1	124	0	0	125	0	125
7	Thrissur	6	119	0	2	123	0	1	122	2	125
8	Palakkad	39	86	0	14	111	0	8	117	0	125
9	Malappuram	7	117	1	1	123	1	2	122	1	125
10	Kozhikkode	12	113	0	3	122	0	2	123	0	125
11	Kannur	83	42	0	8	115	2	3	118	4	125
12	Kasaragod	2	0	0	0	2	0	0	2	0	2
State		226	1024	127	77	1295	5	65	1302	10	1377

Table 13
Conditions of Bund
(Scheme Area)

Sl	Name of District	Good	Partially	Seriously	Total
1	2	3	4	5	6
1	Thiruvananthapuram	74	51	0	125
2	Kollam	97	26	2	125
3	Pathanamthitta	123	2	0	125
4	Alappuzha	124	1	0	125
5	Kottayam	125	0	0	125
6	Idukki	123	2	0	125
7	Thrissur	124	1	0	125
8	Palakkad	117	8	0	125
9	Malappuram	62	62	1	125
10	Kozhikkode	99	26	0	125
11	Kannur	111	14	0	125
12	Kasaragod	2	0	0	2
State		1181	193	3	1377

Table 14
Occupational profile

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agricultural Labours	Non-agriculture	
1	2	3	4	5	6	7
1	Thiruvananthapuram	7	115	3	0	125
2	Kollam	41	3	36	45	125
3	Pathanamthitta	69	26	30	0	125
4	Alappuzha	2	16	15	92	125
5	Kottayam	104	19	2	0	125
6	Idukki	53	39	33	0	125
7	Thrissur	65	34	13	13	125
8	Palakkad	87	26	8	4	125
9	Malappuram	13	61	50	1	125
10	Kozhikkode	54	44	21	6	125
11	Kannur	61	1	2	61	125
12	Kasaragod	0	0	0	2	2
State		556	384	213	224	1377

Table 14 (a)

Occupational profile (Control Plots)

Sl No	Name of District	Occupation				Total
		Agriculture	Non-agriculture	Agriculture labours	Non-agriculture labours	
1	2	3	4	5	6	7
1	Thiruvananthapuram	5	19	0	1	25
2	Kollam	10	0	5	10	25
3	Pathanamthitta	12	11	2	0	25
4	Alappuzha	1	3	1	20	25
5	Kottayam	17	7	1	0	25
6	Idukki	3	11	10	1	25
7	Thrissur	4	4	1	1	10
8	Palakkad	14	5	3	3	25
9	Malappuram	9	8	8	0	25
10	Kozhikkode	13	8	3	1	25
11	Kannur	11	3	0	11	25
Total		99	79	34	48	260

One important finding of this study is that the concept of watershed management has been well recognized in the scheme area. Watershed management implies the wise use of soil, water and bio-resources in a watershed to obtain optimum production with minimum disturbance to the environment. Through this water and soil can be conserved. Since both of them are interdependent. The overall objective of watershed programme include, recognition of watershed as a basic unit for judicious utilization and development of all lands. The land is to be treated according to the capability and requirement by adopting suitable methods that will control soil erosion, conserve water, improve farm income control flood and droughts, etc.

There are a number of direct and indirect outcome of the project that can be associated with the impact of watershed development project. These include raising rain fed agricultural productivity changes in land use pattern, etc.

Conditions of Bund

While examining the condition of bund the study revealed that 85.76% are in good condition 14.02% are partially damaged and 0.22% is seriously damaged. District wise statement is given in Table No. 13.

Summary of Findings

The data furnished in this report are collected through the Evaluation study on soil conservation programmes conducted during 2010-11. All the district except Wayanad were covered in this study. In Wayanad the study is directly done by the Central Government. The methodology of this study was stratified sampling method on the basis of the area of the holding. For the study purpose schemes implemented by the Soil Conservation Department and other Local \Self Government were included. For the purpose of comparison control plots are also selected from the scheme area where the soil conservation works are not carried out under any scheme. In the light of the present study an attempt is made for the cost benefit analysis with the collected data. Several benefits flow from the soil conservation programme implementation. Some of the findings of the study are given below:

For the study purpose 52 schemes were selected. The total number of beneficiaries comes to 1490. Out of this 1377 number of beneficiaries were selected for the detailed study. Land use particulars of beneficiary plots gives us certain positive trends while comparing with the area before and after the soil conservation programme. The study revealed that 17.35 acre of land has been additionally brought under cultivation by cultivating area which are under the fallow land.

There is an increasing awareness of the importance of the soil conservation programme especially watershed management programme among the people in the scheme area. Besides Soil Conservation Department, Local Self Government also activated various programmes in this directions. WGDP, RIDF, TSP programmes are included under study. Tribal colonies also enjoyed benefits.

Income and Expenditure

The particulars relating to income and expenditure of beneficiary plots reveals that after implementation of SC programme net income of the beneficiaries of the scheme area increased to 160.82%. It is estimated that the percentage increase of net income per acre in beneficiary plots of the scheme area as 157.27%

Analysis of data collected from the beneficiary and control plots reveals that the net income per acre, received from the beneficiary plot is Rs.47456/- and from the control plot is Rs30095/- The district wise details are presented in Table No. 11 and 11 (a). The higher rate of income from the scheme area is due to the positive impact of soil conservation programme.

While analysing the production details of various crops it is revealed that an increase 43% recorded in the case of pepper even though the area under pepper showed an increase of 2.78% . Production of coconut also increased 24.82%. Whereas the percentage increase of area was 3.79%. Likewise in rubber production the percentage increase is recorded as 22.45%. Whereas the area increase was 11.28%.

Cost benefit analysis of the collected data reveals that 159% of the cost of soil conservation programme has benefited in the year under study itself.

Table 15
Cropping Intensity in Scheme area

Sl.No	District	Net area cultivated		Total Gross Area Cropped		Intensity of Cropping (%)	
		Before SC Work	After SC work	Before SC work	After SC work	Before SC work	After work
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	31.37	32.15	32.66	40.82	104.11	126.97
2	Kollam	19.23	19.23	15.60	26.22	81.12	136.35
3	Pathanamthitta	28.69	30.76	22.87	25.04	79.71	81.40
4	Alappuzha	5.34	5.55	6.30	8.72	117.98	157.12
5	Kottayam	306.42	306.42	292.39	294.20	95.42	96.01
6	Idukki	99.84	100.17	81.72	93.17	81.85	93.01
7	Thrissur	114.05	115.95	110.99	113.83	97.32	98.17
8	Palakkad	217.37	227.13	215.79	219.51	99.27	96.65
9	Malappuram	209.42	210.47	173.26	154.61	82.73	73.46
10	Kozhikkode	87.57	88.82	81.63	90.82	93.22	102.25
11	Kannur	134.80	134.80	110.65	111.88	82.08	83.00
12	Kasaragod	0.54	0.54	0.23	0.53	42.59	98.15
State		1254.64	1271.99	1144.09	1179.35	91.19	92.72

Cropping Intensity

Productivity of the land to a certain extent influenced the cropping pattern of a locality. Through this study it is seen that the cropping intensity of the scheme are increased from 91.19% to 92.72%. Districtwise details are presented in Table No.15.

1208



